On Craft Production and the Settlement Pattern of the Jinsha Site Cluster on the Chengdu Plain

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ABSTRACT

Analysis of settlement pattern and production organization of the Jinsha settlement suggests that it was less strictly organized than the Sanxingdui settlement and that it was inhabited by heterogeneous social groups during the early Bronze Age. Measuring and evaluating the standardization of two types of pottery vessels (i.e., jars with small bases [*xiaopingdi guan* 小平底罐] and saucers with pointed bottoms [*jiandizhan* 尖底盞]) reveal that potters employed different patterns for products to be used in different contexts. Vessels are more standardized at loci close to the sacrificial zone (where ritual paraphernalia were buried), while vessels used as burial goods tend to be smaller. Pottery production was loosely organized, ranging between individual and nucleated workshops, and widely distributed across loci both near the sacrificial zone and on the periphery of Jinsha. The sacrificial zone at the center of the settlement apparently created needs that promoted production activities. The presentation of multiple types of production in the Jinsha core, together with religious activities and public buildings, suggests not only multiple *chaînes opératoires* for objects but also communal activities and entangled social relations. Such gatherings and driving forces enabled different social groups to redress social tensions while promoting consensus. Crafters might have cooperated when necessary, but they were otherwise organized in a flexible manner, maintaining at most a loose network of production. **KEYWORDS:** Jinsha, craft production, standardization, urbanization, community archaeology.

BACKGROUND

EVER SINCE SETTLEMENT PATTERNS BECAME A MAJOR TOPIC of New Archaeology in the 1960s, archaeologists working on related topics have examined physical aspects of settlements, including scale (in terms of population or area), spatial structures, subsistence economies, and natural environments ([Chang 1968](#); [Parsons 1972](#); [Trigger 1967](#); [Willey 1968](#)). In the following decades, scholars have also raised issues concerning social identity, relationships, political order, and organization. These abstract aspects of settlement patterns relate to the processes of materialization that give life and meaning to objects, including production activities such as the extraction of natural

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resources and their conversion into artificial products.¹ By bridging ecosystems and social conditions, such processes not only invite multiple interpretations of the resulting products, but also implicate a web of social relationships formed from the exchange of the products. Whether hierarchical or nonhierarchical, different social relationships overlay one another and constitute complex networks within a society. As a result, craft production reflects labor organization and social complexity, even when a one-to-one correspondence between types of craft production and types of social organization cannot be clearly defined.

The Chengdu Plain of the early Bronze Age witnessed a shift in settlement centers and changing settlement patterns as people utilized different environmental settings and resources in various ways. They may even have developed different ritual practices by using different paraphernalia. The Jinsha 金沙 site, identified as the largest known settlement of the Shi'erqiao 十二橋 period (ca. 1200–600 B.C.), best exemplifies changing settlement patterns between the late Neolithic and early Bronze Age in the Sichuan Basin of the Chengdu Plain (Fig. 1). Archaeologists have published on more than 20 site components or loci ranging in size from 0.1 to 2 ha within this site cluster, totaling roughly 500 ha (unpublished loci are also known). Besides the Shi'erqiao cultural layers, a few loci contain earlier remains from the third and fourth phases of the Baodun 寶墩 period (late Neolithic, ca. 2400–1700 B.C.), though none belong to the

Fig. 1. Map showing scope of the Chengdu Plain and location of major sites mentioned in text: (1) Sanxingdui and Qingguanshan; (2) Shuiguanyin; (3) Pixian Gucheng; (4) Shi'erqiao and Jinsha; (5) Baodun; (6) Ya'an (Shaxi); (7) Gaoxin West District; (8) Hanyuan. (Map produced using QGIS 3.6, Attribution-ShareAlike 3.0 Unported [CC BY-SA 3.0], ArcGIS base map from ESRI at: www.arcgis.com/home/index.html.)

Sanxingdui 三星堆 period (early Bronze Age ca. 1700–1150 B.C.) (Chengdu Shi 2004a, 2005b; Flad and Chen 2013:99; Jiang Z. 2010). However, the two archaeological cultures, Shi'erqiao and Sanxingdui, were so alike around 1200 B.C. that many scholars today believe that Jinsha succeeded Sanxingdui following the latter's decay as the region's political center.²

Sites with Sanxingdui Culture features are rarely found beyond the Tuo 沱 river drainage where the type site is located. Archaeological finds related to Sanxingdui Culture seem to be concentrated around the Sanxingdui type site, a walled, well-populated settlement that formed a nucleated center with some signs of urbanization (Flad 2018; Sun 2013). By contrast, sites with Baodun or Shi'erqiao cultural features are scattered throughout the Chengdu Plain, not just nucleated at their type sites.

Two sacrificial pits at Sanxingdui exhibit remarkable achievement in the production tradition (Sichuan 1999). Since many items found at Jinsha contain images or icons that can be traced back to Sanxingdui, Sanxingdui probably influenced the production of precious and everyday goods at Jinsha. In addition to ceramics for daily use, variants of some large pottery vessel types that may have been used in ceremonies or associated feasts in Sanxingdui have been uncovered in Jinsha. The pointed-bottomed saucers (*jiandizhan* 尖底盏) that first appeared in late Sanxingdui are particularly common in Shi'erqiao Culture sites and are found in the Jinsha site cluster in both everyday and burial contexts. This type of pottery vessel was perhaps the most long-lived and representative object type throughout the Bronze Age of the Chengdu Plain.

Even if the production and use of similar objects continued from the Sanxingdui to Shi'erqiao periods, one should not assume that they possessed the same meaning or that production was organized the same way over time. For instance, Jinsha people neither burned luxury goods nor buried them in pits in one batch as Sanxingdui people did, but instead periodically scattered them near Modi River. A transformation in the social meanings of these goods can therefore be seen (Flad 2012). Though scholars could take the luxury or valuable goods yielded from Sanxingdui as evidence of a centralized management system (what might be called “the state”), whether the political form changed between the Baodun and Shi'erqiao (Jinsha) periods is not yet clear. Even if the form changed, it did not necessarily follow an evolutionary trajectory. Scholars have not even agreed on when “the state” form appeared on the ancient Chengdu Plain. This political category can only be applied after using current material remains and spatial patterns to understand how social units (whether geographically bounded households or quasi-consanguineal groups) were organized. Such an approach encourages us to study the social life of such people via their material culture rather than simply apply an absolute label to them.

The concepts of “state” and “city” have sometimes been intermingled (Cowgill 2004; Renfrew 2008; Stoddart 2014). The signs used to identify the appearance of a state, such as monumental architecture, specialized crafters, a writing system, artistic expression, foreign trade, and administrative bureaucracy or ruling classes, have also been used to define urban cities (Childe 1950; cf. Jennings 2016; Jennings and Earle 2016; Wengrow 2010). As the usual foci of polities and locations where political elites often reside, cities are unavoidably considered centers for the demonstration of political power. For instance, Kwang-chih Chang (1974) built on the ideas of Hsiao-Tung Fei (1953), who argued that a city is simultaneously an instrument by which the ruling class enforces its power and a spatial symbol reflecting the lineage hierarchy and

the allocation of uneven power amongst the lineages. However, state and city emphasize the different social dimensions of political organization and lifestyle, respectively, and these are not entirely commensurate. Moreover, urbanism has weaker implications for the hierarchical structure of a society than does evidence of centralized power typical of the state.

Here, I focus my discussion of social life on an urban center (Jinsha) to avoid simplistic assumptions about its political form or the pitfall of tacitly correlating the types and achievements of craft production to the degree of political centralization. Instead, preliminary tests on pottery production, specifically around the spatial patterns of kilns and degrees of standardization of vessels, suggest a bottom-up organization scheme and that social relationships within this society were by no means less complex than the relational webs constructed in top-down planning societies.

THE SETTLEMENT TYPE: THE URBANNESS OF THE JINSHA SITE CLUSTER AND ITS EMERGENT COMPLEXITY

Defining a settlement like Jinsha is difficult. No suitable term for this kind of site cluster seemingly exists. As a settlement center and community, Jinsha (1000–600 B.C.) is certainly not metropolitan in the modern sense. Following the features enumerated by [Gordon Childe \(1950\)](#) and scholars such as [Charles Redman \(1978:216\)](#), there is no evidence of a large population or written records that would unequivocally identify it as a city. However, urbanness is not only about population or site size and, as [Xu Hong \(2000:51\)](#) observes, we should not treat all Childe's conditions for determining urbanness equally. One probably needs to consider them at different levels of abstraction. The development of Jinsha and its emergent complexity as reflected in craft specialization and ritual activities do fit the definition of urbanization to a certain degree. Evidence of communal activities also force our discussion away from the archaeology of households toward the archaeology of communities. Here, "community" not only denotes a type of social organization, it suggests that particular social phenomena and activities occur at the supra- or communal household level ([Stanish 1989](#); [Ur 2014](#)). Forms of social organization such as communities are not simply reflected in objective sites within a space. The space itself contains physical structures and material remains such as residential buildings, ditches, drainages, or monumental architecture (the real sizes of which can be estimated), as well as abstract organization and activities that cumulatively shape social phenomena such as the orientation of architectural features to the cosmos and the segregation of the living from the dead. Because the ways communal spaces are shaped involve both physical and social phenomena, a community constitutes a suitable scale for assessing daily practices, social interactions, and decision-making mechanisms ([Birch 2013](#)).

The evidence of development of such a settlement cluster might resemble that of cities. To understand how cities emerge, scholars consider external factors along with internal social, economic, political, and religious conditions and the interactions among external and internal features ([Cowgill 2004](#); [Flad 2018](#); [Liu 2006](#)). Such diverse approaches reveal that a variety of stimuli lead to the creation of urban centers and that their emergence follow various trajectories. Comparing processes of urban formation in other regions with the development of the settlements on the Chengdu Plain suggests that they shared some attributes, but that the latter were unique in other respects. Before addressing cases outside of this region, one must first look at the

developmental history of the settlement patterns on the Chengdu Plain from which Jinsha took its shape.

Unlike its counterparts in the Yellow River valleys, particularly Zhengzhou and Anyang (Jing et al. 2013; Liu 2006; Liu and Chen 2003), the sociopolitical processes in southwestern China since the late Neolithic period have only recently attracted attention. This attention is partly thanks to increasingly comprehensive regional surveys and the discovery of eight walled sites in the area. The type site of Baodun Culture has nested double walls surrounding the largest (276 ha) of all walled enclosures in the Chengdu Plain and indeed in southwestern China. Given its size and the labor required to produce its rammed-earth walls, ditches, and large buildings, this settlement may have attracted the largest population in the region, which might otherwise have been only sparsely inhabited (Chengdu et al. 2000; He 2015). Despite the difficulty of estimating the population of ancient settlements in the absence of textual records, some attempts have been made. For example, Rowan Flad and Pochan Chen (2013:84) tried to assess the labor required to construct the inner walls of Baodun, which totaled an area of 60 ha. They suggest that around 4000 people would have had to work concertedly for a month to construct these walls. Other scholars have estimated that more than 250,000 m³ of earth would have been required to build the inner walls (Jiang Z. et al. 2000:106). Organizing the labor needed to move and shape this much earth would in turn have demanded certain decision-making mechanisms, whether they were permanent, temporary, or ad hoc. Other settlements emerged in the region concurrently or slightly later than the Baodun site. For example, a large building foundation (ca. 550 m²) without any partitions was found at Pixian 郫縣 (Chengdu and Pixian 2001). Buildings like this were perhaps not simple common residences but had special uses and meanings.

Several theories have been proposed to explain the emergence of the numerous walled sites in the region. Some scholars argue that they coincided with the evolutionary development of “chiefdoms” (*guguo* 古國) (Duan 1999a, 1999b). Others, such as Pochan Chen (2004), mention the possibility of applying Colin Renfrew’s (1982, 1986) concept of “peer polities” to the walled enclosures of the Chengdu Plain. Colin Renfrew noted that early cities or city-states might each have had a population of only several thousand residents. The “peer polities” concept suggests a possible relationship among walled settlements and explains why even low populations might have demanded the construction of so many walled enclosures.

Occupation became more nucleated as the area transitioned to the Sanxingdui period. The Sanxingdui type site had walls and expanded to 500 ha (including only the walled enclosure) or about 1200 ha (if neighborhoods with related remains are included). Sanxingdui seems to have been the only settlement center to remain after the other walled settlements declined at the end of the Neolithic era. Its walled enclosure contained a number of components, also divided by earth walls. Some divisions are thought to demarcate workshop and palace zones. The discovery of two sacrificial pits full of precious goods was astounding. A large building with raised floors was unearthed in the Qingguanshan 青關山 locus near the north wall, suggesting that this was a labor-intensive construction, though its precise nature requires further clarification.

Although the settlement compound containing Qingguanshan is still under excavation and many details are undisclosed, the overall settlement distribution pattern of Sanxingdui Culture can be distinguished from the earlier Baodun Culture and later

Shi'erqiao Culture. Beyond this super-settlement, only a few contemporaneous Sanxingdui sites have been found on the Chengdu Plain. They are all smaller in size, suggesting that most of the population remained concentrated on the Sanxingdui site. Apparently, settlements in this region became increasingly integrated following the rank-size rule (Johnson 1980) as they progressed from the Baodun to the Sanxingdui period. Based on level of public construction and the many prestige goods found in the sacrificial pits, many scholars believe that Sanxingdui society was highly stratified (Sun 2013; Zhao 2005). The production or import of these valued goods indeed hint at the inhabitants' ability to exploit natural resources and organize highly technical craft production and long-distance exchange. Nonetheless, no further evidence of social hierarchy (e.g., differentiation in burials or residential structures) has been found.

The number of sites drastically increased on the Chengdu Plain during the Shi'erqiao period. Recent surveys and discoveries found during modern construction projects have uncovered 64 pre-Qin sites, of which 79.6 percent are dated to the Shi'erqiao period. Many of these Shi'erqiao sites were only small villages or hamlets, however (Chengdu Pingyuan 2010; Flad et al. 2013; Jiang Z. 2015). These less-nucleated populations suggest that the region became less integrated during this period. The sociopolitical process undergirding such changes did not seem to follow an evolutionary route. Unlike the Sanxingdui type site, which integrated all functions, no single Shi'erqiao settlement center dominated the region. It is possible that dual or even multiple centers coexisted at some point in time; perhaps one was more politically oriented and the others had more ideological or economic functions. Such differentiation of functionality is only conjectural, however, and how these centers complemented or competed with each other remains unclear.

In the long term, population growth became more obvious and gradually moved to the city center from the foothills, according to material remains and the size of Jinsha proper. Its growing size also led to the appearance and increase of specialized activity areas and signs of urbanization, particularly diverse craft production (discussed below). The segregation and aggregation of space, such as the separation of residential areas and cemeteries, also grew clearer in Jinsha. Another contrast to Baodun and Sanxingdui settlements is that Jinsha was a "city" not surrounded by walls. In this way it was like Yinxi in the Yellow River valley, among other examples (Xu 2013). These un-walled cities remind us not to assume that being enclosed in walls is a criterion for identifying cities (von Falkenhausen 2008). However, a lack of walls or moats makes it difficult to delineate the scope of a central settlement as well as its differentiation from and relationships to more rural areas nearby.

This brief overview and comparison of settlement centers on the ancient Chengdu Plain suggest that settlement patterns were neither static nor followed any developmental route. This is a salutary reminder to maintain an open view on how to define a city. As Renfrew (2008) observed, cities existed in diverse types with differing levels of complexity. Studying a populated place such as the Jinsha settlement from the community perspective fills in the gap between region-level and household-level archaeology. I refer to Jinsha as both a "community" and an "urban center" in an attempt to bypass earlier discussions about the functionalities of individual site components (Chengdu Shi 2003a, 2004d, 2006d). Instead, I consider the settlement cluster to be an organic integration of different social parts.

According to archaeological records, the Jinsha site cluster contained a considerable number of residential units with building foundations, ash pits or middens, pottery

Fig. 2. Shi'erqiao type site (1) and Jinsha site cluster loci: (2) Sanhe Huayuan; (3) Lanyuan; (4) Boya; (5) Gangzheng; (6) Qianhe Xingcheng; (7) Urban-rural integration No. 3 at Jinniu; (8) Urban-rural integration No. 5B at Jinniu; (9) Urban-rural integration No. 5C at Jinniu; (10) West Xinghe; (11) Languang; and Meiyuan (▲) (redrawn from [Chengdu and Chengdu 2017:12](#), fig. 5; [Flad and Chen 2013:97](#), fig. 4.9).

kilns, and cemeteries.³ There was also a spectacular ceremonial center, Meiyuan 梅苑, about 3625 m² in size, located along the south bank of Modi 摸(磨)底 (a.k.a., Old Pijiang 故鄆江) river; a cluster of large buildings (Sanhe Huayuan 三合花園) was situated on the other side of the river ([Chengdu Shi 2001](#), 2004d; [Zhu et al. 2004](#); [Zhu et al. 2003](#)) (Fig. 2). This combination of spaces is intriguing. It suggests that the community may not merely have constituted a collection of households. Instead, such spaces may have created an atmosphere for interactions beyond the household level.

Defining this type of settlement remains uncertain not only because of its organic combination of smaller units (which means the community kept changing) but also because any definition must accommodate critical differences between sites, including scale, function, and interconnection. Ceremonies held at Meiyuan were probably performative occasions for asserting community consolidation; they also might have

been a means of mediating and managing social relations and any increasing tensions that accompanied population growth in this settlement cluster (Flad 2012). As Jennifer Birch (2013) has argued, rituals function like social norms. The craft-production loci scattered around the site (including semi-finished and finished products of different kinds and pottery kilns) also suggest a pattern and scale of production organization. Based on the evidence, I suspect that how pottery production was organized at Jinsha does not conveniently fit patterns previously defined by scholars as household production, workshops, manufactories, and industry or institutional production (Costin 1991; Peacock 1982:6–11; van der Leeuw 1977:70–71). Although these concepts are useful and help us to understand craft production in different cultures, our archaeological finds do not always fit perfectly into such categories. Scholars may thus find it necessary to add or adjust categories of production according to diverse social contexts. For instance, based on her study of prehistoric Tiryns in Greece, Ann Brysbaert (2014:46) has suggested that many categories might have occurred “in-between” the level of domestic production and permanent craft workshops. Based on my inspection of multiple types of craft production in Jinsha, I similarly provide alternative formulations of production organization.

PRODUCTION AS A MEANS TO SOCIAL COMPLEXITY

In Childe's (1950) definition of urbanization, he pointed to specialized spaces and activities that increased the complexity of the attendant societies. Specialized activities including craft production is interconnected with the development of social complexity. Specialized crafters and bureaucrats alike relied on food surplus to do their work. Food production *per se* may also involve specialized activities. Whether top-down or bottom-up, there can be more than one way to organize these activities in correspondence with different situations and technologies. These in turn produce divergent social meanings. For instance, the sacrificial zone at Meiyuan was apparently used for worshipping supernatural powers through the repeated burial of a variety of valued goods at the riverbank. Judging from the deposition of the objects, craft products had a use that differed from the contexts of Sanxingdui; devotional activities were also organized in a seemingly less strict way (Flad 2012). In this sense, although the Jinsha sacrificial zone has yielded ritual implements comparable to those found in Sanxingdui, suggesting close, successive relationships between these two settlement centers, the ceremonies that created these deposits in Jinsha would have differed from the ritual events that produced Sanxingdui sacrificial pits. As a result, we can surmise that those events and objects must have acquired distinct social meanings. I return to this issue below.

Unlike other valued goods, pottery comprised the majority of craft products and were employed both in everyday and ritual activities, which produced differing social values. The end products that have been uncovered nearly everywhere in the area, along with the devices and tools that produced them, give us a glimpse into production processes and their spatial structures. More than 200 pottery kilns, some of which contained semi-finished products, have been recovered from successive excavations (Chengdu Shi 2003a, 2003b, 2004a, 2004b, 2004c, 2004d, 2005a, 2005b, 2005c, 2006a, 2006b, 2006c; Chengdu and Beijing 2002; Chengdu and Xindu 2010). Temporary bonfire-style kilns that would have left little archaeological evidence might also have existed. Identifiable remains including fireplaces, waste and refuse, and finished or

semi-finished products found in situ give us an idea of the prevalence of pottery production in common residential areas and nearby cemeteries. Vessels undergoing firing in mixed batches were preserved like living fossils so that we know they were locally made and that one locale might have been employed to produce multiple types or even categories of artifacts simultaneously. In other words, each crafting locale did not necessarily reflect “site specialization,” wherein only a single type of product was produced (Flad and Hruby 2007:3; Muller 1984). Some vessel types are especially noteworthy because they are found in many contexts between the late Sanxingdui and early Shi'erqiao periods, sometimes in large quantities. Two examples are the jars with small bases known as *xiaopingdi guan* 小平底罐 and the pointed-bottomed saucers known as *jiandizhan* 尖底盏.

Jars with Small Bases [xiaopingdi guan 小平底罐]

Xiaopingdi guan type vessels were first found in Sanxingdui second phase contexts. These coarse wares with relatively smooth surfaces are regularly found in residential areas, ash pits, and burial contexts (Fig. 3). They are also one of only a few types of ceramics buried along with other valued goods in sacrificial pit no. 1. They continued

Fig. 3. Jar with small base (*xiaopingdi guan*), Jinsha-Meiyuan site (ca. 900 B.C.) (Photo by author).

to be used in the early Shi'erqiao phases and have been found in batches in many Jinsha loci, even inside kilns. While burials at Jinsha rarely include grave goods, those that do usually contain one or a few pieces of *xiaopingdi guan* or *jiandizhan* (or occasionally both). *Xiaopingdi guan* gradually disappeared during the transition to the apex of Shi'erqiao Culture between 1200 and 1100 B.C.; they were ultimately replaced by *jiandizhan*.

Pointed-bottomed Saucers [jiandizhan 尖底盏]

During earlier research, I noticed that the *jiandizhan* type ceramic was widely distributed across the entire Sichuan Basin, middle and southern Shaanxi, and western Hubei (Fig. 4). The prevalence of *jiandizhan* lasted a long time, from the late Sanxingdui to the Warring States period. Like *xiaopingdi guan*, these pointed-bottomed saucers appeared in diverse sacred and secular contexts. This type of vessel therefore had special meanings beyond its use in daily life. Perhaps the most spectacular finding included two sets of *jiandizhan* ($n = 12$ and $n = 10$) along with a few vessel stands uncovered from Sanxingdui sacrificial pit no. 1. Each set is comprised of vessels of nearly identical size with CV values of 2.5 and 6.1 percent, respectively (Lin 2013).⁴ These coefficients of variation fall between the value for pots made by specialized potters (2–6%) and those that seem to be “cut-outs from [a] mental image” (2.5–8%) (Eerkens and Bettinger 2001:499; Longacre 1999). The little variation in size exhibited among the *jiandizhan* in these two sets suggest that they were probably produced by one or two skilled specialist potters. Their standardized sizes hint at the crafters' experience and skill, their production processes and organizations, and even transportation or storage needs. Although their appearances are simple, and lack decoration, their distribution denote the scope of the culture.

Fig. 4. Pointed-bottomed saucer (*jiandizhan*), Jinsha-Meiyuan site (ca. 900 B.C.) (Photo by author).

TABLE 1. JINSHA LOCI FROM WHICH *XIAOPINGDI GUAN* AND *JIANDIZHAN* SAMPLES WERE OBTAINED

LOCUS	SAMPLES	FEATURES FOUND AT LOCUS	SOURCES
Jinniu 5B, 5C ^a	N = 69	Ash pits, trenches, houses, burials, kilns	Jiang M. et al. 2011
Languang	N = 59	Ash pits, trenches, houses, burials, kilns	Unpub.
Gangzheng	N = 45	Ash pits, trenches, burials, kilns	Unpub.
West Xinghe Road	N = 32	Ash pits, trenches, burials, kilns	Chengdu & Xindu 2010
Qianhe Xingcheng	N = 22	Ash pits, trenches, burials, kilns	Unpub.
Lanyuan	N = 16	Ash pits, houses, burials, kilns, caches	Chengdu Shi 2003a
Jinniu 3 ^b	–	Ash pits, houses, burials	Unpub.
Boya	–	Ash pits, trenches, burials	Chengdu Shi 2004c

^a Urban-rural integration No. 5B and 5C at Jinniu.
^b Urban-rural integration No. 3 at Jinniu.
– loci with too few samples for analysis not included.

Production Patterns and their Implications

Both types of vessels were so plentiful that I suspect they were once mass-produced and standardized. To test for this proposed production pattern, I compared metric measurements, texture (coarse or fine), and locus (location within site) of different vessel batches from different contexts of deposition (i.e., ash pits, trenches, houses, burials, kilns, excavation pits, or caches). This enabled me to detect notable differences or patterns among each set of attributes. The contexts of samples drawn from eight loci are listed in Table 1. Each of these loci possessed between 0 and 44 kilns. Most kilns seem to have produced their own batches of vessels.

After measuring the rim diameter, base diameter, width, height, shoulder height, and maximum perimeter of each vessel in centimeters, I noticed several interesting trends. Having applied one-way ANOVA to compare the mean values of these measurements, the results show that, of all the attributes for *xiaopingdi guan*, vessel height seems to have varied relative to locus and texture, but not to context (e.g., ash pits, houses, burials, kilns, and caches). Among these loci, *xiaopingdi guan* from Lanyuan 蘭苑 tend to be squatter and thicker, making them significantly different from the rest. Furthermore, fine-textured *xiaopingdi guan* tend to be taller, more slender, and more standardized (CV = 6.7%) than coarser wares, revealing that potters paid more attention to the production of fine pottery. Not only was their clay better prepared, but these jars were more carefully shaped than the coarser ones. Fine and coarse wares may have had different uses. It is also worth noting that *xiaopingdi guan* found in cemeteries tend to be smaller and thicker than in other contexts, but this tendency is not statistically significant.

As for *jiandizhan*, those found at Lanyuan are generally more standardized than those found at other loci. For instance, the CV values for rim diameter, maximum perimeter, and height of *jiandizhan* at Lanyuan are 6.8%, 4.2%, and 8.9%, respectively. Given the likelihood of having more than one crafter at each locus (which would magnify variation), specialized potters were probably responsible for producing such standardized vessels. Post hoc tests of one-way ANOVA on *jiandizhan* mean heights suggest that *jiandizhan* from graves are significantly shorter compared to those from middens and pits excavated by archaeologists (Table 2, Fig. 5).⁵ *Jiandizhan* from cemeteries are also significantly smaller in terms of rim diameter, base diameter, and maximum perimeter

TABLE 2. POST HOC TESTS OF ONE-WAY ANOVA ON MEAN HEIGHTS OF *JIANDIZHAN* FROM DIFFERENT CONTEXTS OF DEPOSITION

COMPARISON BY CONTEXT OF DEPOSITION ^a (i)		MEAN DIFFERENCE (i-j)	STD. ERROR	SIG.	95% CONFIDENCE INTERVAL	
DEPENDENT VARIABLE: HEIGHT (CM) DUNNETT T3					LOWER BOUND	UPPER BOUND
3	4	.7463 ^b	.1294	.000	.433	1.060
	5	-.0232	.2089	.999	-.564	.518
4	3	-.7463 ^b	.1294	.000	-1.060	-.433
	5	-.7694 ^b	.2293	.007	-1.349	-.190
5	3	.0232	.2089	.999	-.518	.564
	4	.7694 ^b	.2293	.007	.190	1.349

^a 3 = midden; 4 = grave; 5 = excavation pit.
^b Mean difference significant at the 0.05 level.

than those from other contexts. It seems these smaller *jiandizhan* could have been *mingqi* 明器, that is, objects intentionally produced for dedication to the deceased. They replaced the smaller *xiaopingdi guan* as grave goods and shrank in size more obviously than the *jiandizhan* not interred in graves. This may explain why Jinsha's pottery kilns were often situated in the proximity of cemeteries. For instance, housing structures are located in the northeastern part of the Lanyuan locus, while kilns are in the southwest, where they often overlap with cemeteries clustered in the west and south.

Fig. 5. Bar chart comparing mean heights (cm) of *jiandizhan* from various contexts of deposition: 3 = middens; 4 = graves; 5 = excavation pits.

Potters intentionally or unintentionally regulate culturally significant dimensions through talent, skill, or bodily memory encoded in repetitive practice and physical gesture (Brysbaert 2014; Dietler and Herbich 1998:246; Dobres 2010; Herzfeld 2004). The measurements for the *jiandizhan* suggest that not every dimension was culturally meaningful, however. Some dimensions such as base diameter and thickness vary greatly in size and so seem to have been produced with little care, while other dimensions demonstrate clearer patterns.

Comparison of the two types of vessels shows that *xiaopingdi guan* were generally less standardized than *jiandizhan* in loci that produced both types. This is probably because the category *xiaopingdi guan* actually lumps together two or more vessel types, including those called pointed-bottomed cups (*jiandibei* 尖底杯). *Jiandibei* look similar to *xiaopingdi guan* but differ in texture and sometimes in neck length and total height. Most importantly, *jiandibei* were popular in and probably originated from the eastern part of the Sichuan Basin and were later brought to the Chengdu Plain, possibly through human migration (Jiang Z. 2007:400; Sun 2000:14). Coming from either end of the Sichuan Basin, these two similar types of vessel met on the Chengdu Plain, probably signaling the interplay of two populations. Though the material cultures of the Chengdu Plain were disseminated widely to other places, the people who lived here were also influenced by other groups, including their immediate neighbors and people from distant regions. An influence from the east can be seen in the interplay of *xiaopingdi guan* and *jiandibei*, for instance. That these similar types are often confused reminds us of the importance of the cultural contexts in which such things were shaped and used. The use and texture of these two kinds of objects are different enough that they seem to have been independently invented and produced by different archaeological cultures. To lump them together, artificially producing a single type category, is thus a mistake.

Jiandizhan, on the other hand, is a more bounded type and can be considered characteristic of Shi'erqiao Culture. The distributional scope of this vessel type signifies Shi'erqiao's cultural sphere. Throughout the periods in which this vessel was prevalent, *jiandizhan* were produced at various scales and used in diverse contexts and acquired multiple and variable meanings and values. The initial appearance of *jiandizhan*, which exhibit a high degree of standardization, in the Sanxingdui sacrificial pits implies their distinguished role as ritual paraphernalia. Ritual *jiandizhan* could be used individually or in sets that came with vessel covers and stands. Note that the vessel covers were shallower pointed-bottomed saucers. The smaller batch of *jiandizhan* found in the Sanxingdui pits possibly served as vessel covers.

Such ritual vessels should not be confused with their counterparts made for daily use. Their ordinary use perhaps as dining utensils singles out the culture and idiosyncrasies of the people of Shi'erqiao. Like their *xiaopingdi guan* predecessors, *jiandizhan* created for daily use often became the lone grave goods in burials that otherwise bore no special burial treatment. Although they were sometimes made of inexpensive materials, their ubiquity suggests that these vessels were among the most important goods accompanying the dead.

Kilns and Craft Networks

Available archaeological data allows us to deduce that many loci at Jinsha contained kilns. Nearly half of the Jinsha loci currently known contain more than one pottery

kiln. Many are associated with graveyards, but they also accompany residential structures and public buildings. Using such kilns, crafters would have been able to form workshops of various scales. Near two exceptionally large graveyards, two groups of simple kilns ($n = 41$ and $n = 44$) were found within about a 1.5 ha area (Zhou Zhiqing and Wang Zhankui, pers. comm. 18 December 2015). Such cemeteries, with the burials oriented in the same direction, were well arranged and planned in tandem with nearby residential units. The spatial divisions of the cemeteries related to how the society was divided into subgroups, with different populations being buried in different graveyards. However, neither the housing structures nor the graves suggest any differentiation in social status, as some scholars might expect of a society that had metallurgy. The lack of evidence for status distinction in this society suggests we should consider possibilities for production organization other than top-down planning.

A collection of so many small kilns in a single area is a significant sign not only of their productivity in serving a community of the deceased, but also of how pottery production might have been organized from the bottom up by the living. We should not forget that many small-scale pottery kilns were scattered around houses and graves beyond the nucleated production loci. These scattered kilns, whose products were offered to small residential units or graveyards, perhaps constituted the major production modes at the site.

Though scattered, I suspect that the crafters at these individual workshops maintained a loose production network. Crafters working individually were in close enough proximity to observe each other's work and exchange ideas, knowledge, and information through daily communications. This would have enabled them to achieve a certain consensus around fashioning the vessels, which ultimately manifested in the production of culturally salient items such as *xiaopingdi guan* and *jiandizhan*. The wares produced at the Jinsha settlement thus constitute a model of production transmitted through webs of interaction and human mobility. Vessel variants in part signal chronological transitions, but they are also signs of distribution that suggest the scope of cultural spheres. Crafters might have cooperated when necessary, but they otherwise served individual residential groups in a self-sufficient manner. In other words, production was organized in a flexible way and its scale was possibly between that of individual and nucleated workshops. This could reflect what Anne Underhill (1991) has called a "complex household industry." Other scholars have posited that a "communal mode of production," wherein production labor is organized above the level of the nucleated family, may develop based on (fictive) lineages or shared land (Goldstein 2000). Neither of these production models were fixed types nor were they controlled by an imposed, institutional power. In addition, it is very likely that multiple modes of production coexisted within any given society (Underhill 1991).

Multicraft Production at Jinsha

Production of different materials, besides pottery, also existed. They might have been complementary, or competed with or imitated each other; they might also have demanded the same natural resources, shared similar production processes, fulfilled similar purposes or needs, or served as up- and down-stream producers. For instance, extraction and reduction technologies might have been amalgamated while pyro-technology and chemical processes or transformative technologies could have coexisted (Li 2007; Miller 2007:37; Shimada 2007; Stone 2013).

Many loci at Jinsha, particularly Meiyuan, show evidence of multicraft production besides pottery, including bone, horn, and stone tools and jade and other stone ornaments. Bone and horn tools often appear alongside modified animal bones left by butchery, with the latter being the byproducts of food production and serving as raw materials for the former. Bone tools have often been found in association with stone rings. Both kinds of craftwork relied on cutting and drilling techniques. Stone and bone objects were manufactured using both stone and bone tools; they could also have been worked with metal tools. Small, simple metal tools such as awls are commonly found near households with ceramic, bone, and stone products. All these daily goods and tools served households. Their concurrence would have caused the multiple *chaînes opératoires* or life histories of the objects to become interlaced (Dobres 2000:164; Edmonds 1990:56, 67; Leroi-Gourhan 1993; Read 2007: 188; Sellet 1993) and further promoted “cross-craft interactions” (Brysbaert 2014; McGovern 1989).

Another example of up- and downstream relations is presented by the ritual bronzes that have been found at Jinsha, although no evidence (i.e., ceramic or stone molds or models) of loci responsible for producing the bronzes have been discovered there. Such coexisting craft production involves “networks of knowledge” in which knowledge was shared and transmitted among crafters working together (Dobres 2014; Rebay-Salisbury et al. 2014). As Marcia-Anne Dobres (2014) notes, several situations need to be considered in the study of such cross-craft interactions, including the use of different raw materials to produce the same products, the applications of different tools or craft traditions, and the practices of different and similar *chaînes opératoires* to produce different types of objects. Rebay-Salisbury, Brysbaert, and Foxhall (2014) have pointed out that artifacts are repositories of knowledge. They are also repositories of social relationships when produced in an interactive sphere and subject to transmission from one hand to another. The juxtaposition of multiple kinds of materials in one locus (e.g., Meiyuan) further reveals how different production systems might be incorporated and social relationships interwoven.

Combining different materials to form a single artifact demonstrates even closer cooperative relationships among crafters. For example, bronze plaques inlaid with turquoise (including those in a tiger shape) have been discovered on the Chengdu Plain. They were first found at Sanxingdui and then at Jinsha. Such inlay was influenced by the Central Plains, particularly the Erlitou site, and perhaps also indirectly by the Qijia or earlier cultures (Fitzgerald-Huber 1995; Huang 2015; Qin 2016). The partnership between bronze and turquoise crafters in these cases must have been close. Another example is a piece of painted wood furniture found at Meiyuan that was inlaid with pieces of jade or other stones and combined at least three types of material (Chengdu and Chengdu 2018:316–317, No. L58①:2). Wood, which is perishable, often served as a base material to which metals and jades were attached. Attaching these expensive materials required increasingly complex local crafts skills and enhanced the value of the products. It is also possible that local products were decorated with imported precious goods to enhance their value. Objects that brought together domestic and imported materials therefore constituted a new mode of production. As W. Brian Arthur (2009) observes, new technologies always come from new ways of combining earlier technologies. A technology can be partitioned into multiple parts or stages that are also technologies in themselves and are therefore recursively self-contained (Arthur 2009:33). He further argues that if these smaller

parts or stages are heavily used, they become standardized modules, which are then potentially subject to recombination with different components or other modules. There are many possible, flexible ways to combine the different parts. The coexistence of standardization with fluidity is an important source of technological innovation.

There seems to have been no constraints on the raw materials or the production knowledge and skills used at Jinsha, at least in the cases of pottery and stoneware production. Since such complex craftworks might have exceeded the skill levels of part-time crafters, who would have been required to work on more than one type of production activity or undertake other subsistence endeavors to sustain their daily lives, specialists who were fully engaged in a single form of craft production and made a livelihood from their work might have existed. No evidence supports the inference that such specialists were attached to elite classes at Jinsha, however. Furthermore, the interplay between domestic and long-distance materials was complicated and flexible and involved different levels of organization. Relying on the existence of a single powerful entity to explain the management of resource exploitation and exchange might be convenient, but would neglect details about the transmission of production knowledge or the possibility that production depended upon the social networks of common people. Moreover, the symbolic meanings of things and how they are replaced with altered meanings may be beyond the control of top-down governance.

Because jade and stone objects make up most of the deposits at Meiyuan, we know that stoneworking specialists in Jinsha had developed a variety of crafting methods, including grinding, drilling, cutting, polishing and burnishing, carving, hollowing, and coloring to work these materials, perhaps more skillfully than Sanxingdui crafters. Archaeologists have found large quantities of raw materials and semi-finished products in both Meiyuan and other residential areas. It is very likely that some, if not all, were locally made and their circulation was not constrained. The materials discovered also suggest that Jinsha crafters exploited wider resources for stoneworking. Jinsha people seemed especially fascinated with jade or other stone *cong* 琮 cuboids.⁶ Aside from the Liangzhu 良渚 Culture (ca. 3300–2000 B.C.) sites, the largest number of such artifacts have been found at Jinsha: a total of 27, not including many semi-finished products (Chengdu Shi 2006d). The *cong* made at Jinsha contrast sharply with those made at Liangzhu located more than 1000 km away. Jinsha *cong* were often made from low quality jade or stone and were mostly undecorated. Jinsha crafters probably knew about the more delicate Liangzhu import, however. A ten-tiered jade *cong* cuboid found in Jinsha is believed to have come from Liangzhu even though it dates to about 1000 years earlier than Jinsha. It is not clear when or how it was transmitted to the people of Jinsha, though it was possibly transported by several intermediaries (von Falkenhausen 2003). Locally manufactured *cong* were probably imitations of the Liangzhu artifact, but were executed in much simpler designs. Since it was not until Jinsha that this kind of artifact became interesting on the Chengdu Plain, Jinsha people apparently had their own interests and needs that differed from the people of Liangzhu in producing such objects. One should also not assume that the people of either Liangzhu or Jinsha held the same cosmology or ideology as the Zhou people who used similar objects (as recorded in the undated Zhouli 周禮 [1981]).

Not only were objects imitated in the same category of material, they were sometimes made of different materials to meet different needs. The use of jade and stone increased both in volume and variety over time in Jinsha. Some replaced the frequently seen bronze items in Sanxingdui. For example, bronze shapes might

have been imitated in jade to borrow the symbolic meaning of the original or overcome resource shortages. Resource limitations also led to imitations being smaller than the original objects from which they were copied. Thus, some bronze items from Jinsha are reminiscent of those from Sanxingdui, but are often smaller. This is exemplified by a small figurine with a whirling crown (Chengdu and Chengdu 2018:78–79, No. C:2); the Jinsha version is only 20 cm high, while a similar bronze figure is life-sized at Sanxingdui (Sichuan 1999:544, No. K2②:149–150). Finally, bronze vessels such as those found in Sanxingdui pits are so far absent from Jinsha. The reduced usage of bronze corresponds with the growing use of jade and might signal either a lack of metal resources or a transformation in taste. The decline and depopulation of Sanxingdui perhaps resulted in a loss of the exchange networks necessary for acquiring metal resources or importing objects such that its successor, Jinsha, could not fully replicate all the products and life styles of Sanxingdui.

Meanwhile, Jinsha people added new materials such as turtle shells to their ritual paraphernalia. These were used in ceremonies that had not been previously seen in the Chengdu Plain. The custom of using turtle shells for divination was probably transmitted from the people around the Middle Yangzi River who had in turn been influenced by the Central Plains (Flad 2008, 2013). The peoples of the Yangzi River used both turtle carapaces and plastrons and sometimes even fish gills for divination, possibly because of the rich fishery resources especially in the Middle Yangzi River (Flad 2005; Flad and Chen 2013:226–227; Yuan et al. 2008). Diviners from this region drilled holes in shells to produce cracks in a similar way to the Shang people of the Central Plains, but left no inscriptions, so we can only speculate about their purposes or contexts of use. Once again, divination practices might have emerged from differing cosmologies in different regions. Differences in the exploitation of natural resources suggest once again that, although the production traditions of the Jinsha site can mostly be traced back to Sanxingdui, they probably represented different economic modes with distinct environmental exploitation strategies. Further, their long-distance connections might have shifted over time. Although the extent of social control and the external connections to other societies remain unknown, we might eventually be able to deduce them by examining the resources available to this society and the distribution of some important items.

THE RE/CONSTRUCTION OF IDENTITY THROUGH PRODUCTION AND EXCHANGE

Without written records, it is nearly impossible to know how many social groups constituted the Jinsha site cluster or their ethnic identities. Nonetheless, material remains might provide some clues about their shared traditions and customs and their differences. As many scholars have argued, a community is defined by the social identity shared by a group of people with common interests and affiliations (Goldstein 2000). At Jinsha, it is likely that a number of nearby residential structures, production areas, and a cemetery would have jointly constituted a lineage group and formed a single group identity. Because we have seen combinations of these components at a number of loci, each combination might point to a different lineage-based social group. It is possible that the society was composed of segmentary organizations in which lineage-based social divisions could have been integrated into a larger unit (Tang and Jing 2009). The inner structure of each component is replicated amongst the other associated components. For example, a graveyard may articulate a lineage by

replicating the structure and membership of the kinship structure in its layout. Temples may have filled this function at a later period (Lewis 2006:119). Kin structures would have influenced the division of labor in craft production and other social activities. As social structures, lineages and kinship networks may also be fundamental to supporting city or state societies (von Falkenhausen 2006, 2008).

Communal activities (including rituals) and the exchange and consumption of commodities provided contexts for interaction that helped to maintain or enhance consolidation at Jinsha. As these interactions accumulated, the widespread distribution of several ceramic types, especially pointed-bottomed vessels, provided material signatures which reinforced the people's identity. Community identity was thus structured and expressed through commonly shared craft products, particularly ceramics for daily as well as ritual use. Community-wide styles, therefore, simultaneously promoted or helped maintain social integration while also creating distinctions amongst groups (Barlett and McAnany 2000). By using pottery production and its products as a medium for making social distinctions as well as sustaining common consensus, people are able to (re)create, express or even deny their social identities (Barlett and McAnany 2000; Brysbaert 2014). This is because cultural identities exist in multiple layers and can intersect through people's participation in different activities. However, what binds different social parts together is largely subjective and might only be revealed from an emic view.

Since people move in and out of groups over several generations, Jinsha's social groups may not have been composed solely of relatives. Over time, they may have acted more like corporate landholding groups than descent groups. It was probably at this turning point that Jinsha, originally a society based on lineage, developed into a society with mixed ethnic groups. New alignments and readjustments of power shaped the forms of social interactions. Scholars have examined archaeological remains in an attempt to identify specific ethnic groups in the Chengdu Plain. For instance, based on the hairstyles and dresses represented on bronze statues uncovered in sacrificial pits, Sun Hua (2013; Sun and Su 2003:214–235) has proposed that different ethnic groups could have lived together in Sanxingdui society (Flad 2012).⁷ Some scholars have even traced the formation of Ba and Shu ethnic groups to an earlier time and believe that the shift from Sanxingdui to Shi'erqiao was related to the westward migration of the Ba group, who brought their own artifact types (Jiang Z. 2015). After Sanxingdui people dispersed and moved to Jinsha, Jinsha became the new focal point of interregional exchange, a site at which both goods and raw materials of different origin were present. Different social relationships and identities intersected then with each other. In such a society, the development of social groups with their own interests continued to exist (Cohen 1969). Variations in the size of different social divisions might have been considerable, however.

In this scenario, beyond its internal demographic growth, Jinsha developed into a somewhat "coalescent society" that attracted people of diverse origins, especially after Sanxingdui's decline. Stephen Kowalewski (2006) has elaborated on the concept and meaning of a "coalescent society" to emphasize that it involves a rapid rather than gradual process of settlement intensification driven by outside forces. Several other authors have argued that aggregation in a bounded area presents more social costs than does dispersed living in which villagers enjoy greater privacy and autonomy and have more direct access to their environmental resources (Kuijt 2000). Forces such as wars or natural disasters may explain why many people are suddenly compelled

to concentrate in one place (Kowalewski 2013). We have seen that Jinsha people displayed a strong affiliation with Sanxingdui's craft traditions, but employed a more diverse array of raw materials and artifact styles. Perhaps having experienced social collapse, some Sanxingdui remnants or refugees migrated to Jinsha, where they founded a multiethnic community that still included some of the original inhabitants of the area and perhaps migrants from the east. Regardless of the driving force, the social units of Jinsha were not homogeneous and probably came from multiple places or ethnic origins. Each group brought different knowledge and experience to support broadening exploitation of resources in the area.

Though different social groups were physically spaced apart from one another, the proximity of some site segments reveals that they may have had close relationships. Jinsha went through several stages of development. Meiyuan was important from the beginning because it was the ceremonial focal point of the site. Lanyuan and Sanhe Huayuan became important because of their proximity to and possible association with Meiyuan. Lanyuan not only contained a residential area and an extensive graveyard, but also yielded pottery vessels of increasingly greater standardization, as we saw above. Sanhe Huayuan, on the other hand, provided public spaces for interactions. The foundations of several large individual rooms and entire buildings have been uncovered at this locus; building F9 was about 1000 m² and contained five partitions. Due to their proximity to the sacred Meiyuan locus, these were likely the foundations of public buildings. The buildings were surrounded by 16 pottery kilns (Chengdu Shi 2001).

In his study of Greek and Roman cities, Edwin Owens (1991:3) suggests that public buildings and their location within the urban environment reflect the function of a city in terms of its religious, political, or economic importance. Likewise, the proximity between Sanhe Huayuan and Meiyuan might reveal the central role of ceremonies held in Jinsha. The production loci, including pottery kilns found nearly everywhere in the open spaces of Sanhe Huayuan, probably served the needs of public gatherings, which were in turn associated with ritual ceremonies held in Meiyuan. Even though no city walls or moats have been discovered at Jinsha, constructing such large public buildings probably required intensive collective labor. Extending north along Modi River, this compound likely formed the center of the settlement. Together, Sanhe Huayuan and Meiyuan provided inhabitants with opportunities to gather diverse social groups together and reveal the emphasis on religious life at Jinsha.

SACRED VERSUS MUNDANE LIFE AT JINSHA

The Modi River (along which Meiyuan was located) cut through the community and connected the region with outside villages. A major water resource for the area, it may have flooded from time to time (Sun 2000:393). Scholars have proposed that the rites held at Meiyuan would have been devoted to river deities (Zhou 2010).

Meiyuan may have been used periodically over the long-term. Since at least the Sanxingdui period, potters had traditionally produced large serving vessels for ceremonies and perhaps feasts. While such feasts might have been connected to ritual occasions, the appearance of large vessels at Meiyuan further suggests the place was a specialized sacred space. Production at Meiyuan fits the category of prestige technology rather than practical technology, as proposed by Brian Hayden (1998), since products were created there not to fulfill basic survival needs but to display social wealth or

power and accomplish other social tasks. As Katherine Spielmann (2002) notes, both the scarcity of raw materials acquired from far-flung regions and skilled crafting can enhance the value of artifacts. She also stresses that both ceremonial feasts and valued goods are critical in ritual performances. Developing prestige technologies to serve social needs cannot therefore be rationalized within the logic of economic profit.

Periodic rituals may also have regulated phases in craft production and other subsistence economic activities intended to produce valued goods and surplus for ceremonial feasts. Spielmann (1998, 2002) suggests that ritual needs may drive both economic intensification and community specialization and define the nature and scale of production. She is also right in proposing that, to fulfill the needs of ritual ceremonies, crafters could be intrinsically attached to ritual contexts instead to particular elite classes (Spielmann 2002:202). Following this logic, craft production practiced around Meiyuan may have been more standardized and specialized than at other loci not because of commands from an elite authority, but because of the needs presented by ritualistic occasions. Jinsha people practiced prestige technologies to meet ritual needs and used valued goods, ritual performance, and feasts to create room to negotiate social relations and provide opportunities for the accumulation of social wealth and power. Because there are no signs of social stratification at Jinsha, some scholars have argued that it was a religious rather than political center (Jiang Z. 2015). This is probably true. However, social accumulation might nonetheless have been achieved as a side effect of the need for prestige products in its religious activities.

Given the discovery of so many valued goods at Meiyuan, it seems to have been the focal point of Jinsha. However, signs of social stratification, which would have conveniently explained the formation of Meiyuan, the acquisition of long-distance resources, and the use of public spaces in Sanhe Huayuan, remain obscure. Archaeologists have not discovered or identified differential treatments of burials or residential structures nor found defensive structures such as city walls or moats at Jinsha. Moreover, scholars have failed to find a corresponding secular center to complete the social structure at Jinsha. Questions thus remain regarding whether any permanent political power existed there or whether a ruling class lived elsewhere beyond the Jinsha site cluster. However, scholars drawing on political economy theory note that status-seekers sometimes attempt to earn social prestige by using ritual ceremonies or valued goods (Brumfiel and Earle 1987; Hirth 1996). In such a situation, high-status individuals may have acted as if they controlled everything and worked toward their own goals or plans.

While this is one way to interpret the Jinsha social structure, the existence of powerful elites would hardly explain the fluidity, scale, and various forms of production organization at Jinsha. The organization of social activities can develop in diverse ways, including self-organization through the continuing accumulation of social interactions that have no obvious goal. In addition, collective activities like rituals, which create opportunities for interactions, often perform multiple social functions. Thus, just as we see in today's societies, centers with various functions (i.e., political, commercial, transport, or religious) and differing levels of importance could have been located in multiple locations. For instance, preserved wooden structures of longhouses have been found at the type site at Shi'erqiao, five kilometers away from the Jinsha site cluster (Sichuan and Chengdu 2009). These buildings could be candidates for civic architecture, where collective decision-making would have taken place. Oracle bones uncovered from the site also suggest the existence of divinatory activities

associated with decision-making processes. Divination would have required specialized knowledge, in which maybe only a few people were proficient. However, no further evidence suggests how this knowledge was related to the political or economic life of the people of Shi'erqiao at either site. Indeed, we know little about how social differentiation would have been interlaced with ritual ceremonials or which religious or mundane political powers dominated their social life.

It is unreasonable to assume that religious life at Jinsha can be clearly separated from mundane life or expect to draw a line between the ritual/ideological and economic realms. It is not necessary to consider the functions of centers in distinctly economic or non-economic terms. Since Shi'erqiao society was likely divided socially according to lineage groups, it is possible that those living at the Shi'erqiao type site represented a specific lineage but maintained social relationships with Jinsha residents. Ritual occasions provided context for the aggregation of these different social groups. Such ritual ceremonials and architecture including big houses might be viewed either as indicative of the accumulation of power and social wealth or simply as evidence of large public gatherings. In either case, there could have been tension and competition between different social groups, since competition is a main driving force for both surplus production and the specialization of ritual goods (Spielmann 2002). Ceremonials also provide a locus for the renegotiation of social relations. Observing that religious behaviors can be an important factor in economies, Renfrew (2001) has argued that scholars should not ignore the secular aspects of sacred sites. Meiyuan provides one example of a locus where the ritual met the mundane. It suggests that Jinsha society demonstrated collective decision-making and labor activities and consolidation through its ritual ceremonials. This does not automatically mean that a strict hierarchical stratigraphy existed or that elites formed a central power to organize these ritual and economic activities, however.

BETWEEN THE RURAL AND THE CENTER: IF THIS WAS THE CENTER,
WHERE WAS THE RURAL?

The above discussion suggests that the Jinsha site cluster served as one, if not the lone, settlement center of Shi'erqiao Culture. However, we still know little about its city plan, if there was one. It was an urban center without any clear physical boundaries like the city walls or moats found at the Baodun type site and Sanxingdui. Thus, we do not know the scope of the Jinsha site cluster or its external connections to other regions. Such lack of urban demarcation can result in controversy or confusion over the identification of center-rural relationships. Some theorists believe that residents of urban settlements always differ significantly in terms of roles, practices, and identities from those who reside in rural settlements (Cowgill 2004). Others suggest there may be a lifestyle continuum, especially when there are no clear boundaries between a city and its hinterlands (Yusuf 1974). The difficulty of separating the urban from the rural is clearly demonstrated in the settlement pattern studies of Mesoamerica, where several settlement levels have been discovered in both the archaeological record and ethno-historical documentation (Chase and Chase 2017; Chase et al. 2014; Hare 2000). Although some scholars still maintain that city centers are places without agricultural production and that they were mainly occupied by ceremonial and administrative elites who obtained food from the hinterlands (Cowgill 2004; Liu 2006), such emphases on the roles of cities have specific historical contexts. Just as is the case today, rural spaces in the

past did not merely provide food surpluses to managerial elites in cities, they also mutually exchanged nonmaterial things (cf. Childe 1950; Redman 1978:216). Furthermore, the city not only provides services, but also creates new needs.

Implicit in this inquiry are the social divisions of labor, including how and where different types of craft specialization came into being. We must also recognize that the flows of materials and information tie together different social segments, including those between any given center and its distant peripheries. Through recurrent exchange, such relationships do not remain unchanged over time (Flad 2018). As Jason Yaeger and Marcello A. Canuto (2000) have observed of Mesoamerica, peripheral villages can be affiliated with different centers at different times and their material cultures (particularly craft goods) can be transformed accordingly. Given this inseparability and fluidity, many researchers have stressed that we should study regions in their entirety rather than dismissing small sites (Blanton 1976; Falconer and Savage 1995). It is therefore better, perhaps even unavoidable, to conceptualize the social complexity of the Chengdu Plain in holistic terms. The rank-size rule may perhaps be applied to suggest a degree of integration in the region (Johnson 1980; Stein 1994). Following this rule, if a population nucleates at a single site, while many other sites remain small, the region can be considered more integrated.

From this point of view, Sanxingdui probably represented a highly integrated urban society. We find only an isolated center where wealth was extremely concentrated and few supporting villages in rural areas. By comparison, Baodun and particularly Jinsha possessed many satellite villages with varying connections to their centers. Many of Jinsha's smaller sites are located along the Modi River, such as those found in modern Pixian County, Xinfan 新繁 County, and the Gaoxin West District 高新西區 at the northwestern fringes of Chengdu City (Chengdu Shi 2005d, 2005e, 2005f, 2007a, 2007b, 2008a, 2008b, 2008c, 2010a, 2010b; Deng 1959; Jiang Z. 2015) (Fig. 2). Most of these sites are composed of farmland, ash pits or middens, and occasionally pottery kilns similar to the kilns found at the center of the Jinsha site cluster. These production loci contain *xiaopingdi guan* and *jiandizhan* among other ceramic types. Some of the farmlands have been exploited since the Baodun period. Other villages featuring Shi'erqiao ceramics are located much farther away in the mountainous areas west of Chengdu City, including Ya'an 雅安 and Hanyuan 汉源 (Daduhe 2003; Sichuan, Sichuan, and Ya'an 1990; Sichuan, Ya'an et al. 2008; Zhongguo et al. 2006). These distant sites might not have been intimately connected to the settlement center in Chengdu City, but were situated en route to the pathways that later constituted the southern overland silk route.

During the Shi'erqiao period, archaeological remains showed that people not only grew crops (mostly rice) in the many smaller agricultural villages in the northwest region mentioned above, but also practiced this subsistence economy inside the Jinsha urban center.⁸ According to the remains of fauna and flora found in Jinsha and other contemporaneous sites, hunting (e.g., deer, muntjac), foraging, and perhaps fishing also played important roles in the local economy. It is still unclear if the residents living in the Jinsha urban center were self-sufficient, but whether they were or not, subsistence practices do not seem to have distinguished the settlement center from the surrounding countryside. What is clear, however, is that people in the center led more elaborate and materialized religious lives, which would have intensified other economic activities.

Religious activities at Meiyuan might have facilitated the development of strong social bonds among Shi'erqiao populations that did not necessarily live within a single

bounded space. The social space of such affiliations could have been very extensive yet remained fluid. Though not as standardized as those found in the Jinsha center (Lin 2013), the vessel types shared among people in the hinterlands indicate that they may also have shared a social identity with the settlement center. We also don't know the extent to which any cultural idiosyncrasies were preserved in pottery forms. Could the sites in the mountainous areas that featured Shi'erqiao vessel types have been outposts of the settlement center? And if so, were these outposts responsible for exploiting mountain resources and delivering them to the settlement center? Or did the rural sites occasionally obtain Shi'erqiao ceramics and then imitate them at their own production loci? If the latter is true, would these rural sites be considered an integrated part of the Shi'erqiao Culture or not?

Gailey and Patterson (1987) point out that emerging states only possessed uneven control over surrounding regions, even those inside their own domains. We therefore need to consider the dynamics of peripheral societies. Perhaps the settlements in the far mountainous areas of the Chengdu Plain should be considered separately from those on the fringes of the urban center. Operating independently of the Jinsha center, I suspect that they were self-sufficient and enjoyed a high level of autonomy. This does not mean that they departed from the cultural sphere of Shi'erqiao, however. On the contrary, while adapted to mountainous environments, these sites imitated the ceramics from the settlement centers on the Chengdu Plain. They produced some forms more coarsely, however, and did not adopt the entire assemblage of Shi'erqiao as a package. They selectively received a material culture that was more prevalent and dominant in the center, but met their production needs with available raw materials and techniques.

CONCLUSIONS

Archaeological sites around modern Chengdu City and its suburbs have become known to scholars after decades of regional surveys and city construction projects. It is now clear that many of the sites feature material remains identified with Shi'erqiao Culture, suggesting that its influence reached far beyond the Chengdu Plain. This identification has been derived from the assemblage of Shi'erqiao ceramics, in particular the existence of the pointed-bottomed vessels known as *jiandizhan*, which first appeared in the Sanxingdui period along with *xiaopingdi guan*, but only became popular during the Shi'erqiao period. Both vessel types were used as ritual paraphernalia in late Sanxingdui but had additional diverse functions including as daily household items and grave goods. Practical and prestige technologies converged in the loci of these two vessel types.

Space is never neutral. Space shapes and is in turn shaped by human activities and sensory experiences bearing memories, emotions, and personal cognitions. Space thus plays an active role in the development of a community and spatial segregations suggest social distinctions and specialized activities. This is seen both in the sacrificial zone at Meiyuan and the aggregation of production in particular loci. Communal households co-residing in a locus based on lineage may have operated a few inter-household pottery kilns. Different social groups produced vessels at varying levels of standardization at these supra-household workshops.

While potters mostly adopted raw materials in situ and produced similar ceramic petrographic structures, subtle differences in vessel dimensions could not be

recognized without systematic metric measurements. By measuring the vessel types uncovered from the Jinsha site cluster and related sites, I found that some dimensions were more patterned and consistent than other dimensions. The maintenance of these dimensions became especially clear when I compared vessels from different contexts of use. Both *xiaopingdi guan* and *jiandizhan* from cemeteries tend to be smaller than the same vessel types found in other contexts (though only the latter are statistically significant). It is through such measurements that the distinctiveness of *jiandizhan* used as grave goods could be detected.

The spatial distribution of production loci and the standardization of pottery products suggest that most pottery production relied on daily practices based in a few households or neighborhoods. Social segments of the Jinsha population were loosely organized in a dynamic and complex network into which different production types and subsistence activities were incorporated. In contrast with the precious objects used at ritual occasions, what made the more utilitarian goods culturally salient is not immediately clear. However, their patterns and features become evident if we investigate the scattered individual workshops in a holistic manner, along with their *chaînes opératoires* and where they interplayed with other categories of production. In this way, features unrelated to the functions of the vessels were discerned. These features reflect crafters' tacit agreements concerning the shape of the vessels. The remarkable achievement in craft production at Jinsha probably signals that the settlement was a regional center that regularly received diverse raw materials from rural areas and then disseminated its ceramic types and lifestyles to those areas. Both ceremonies and public events such as feasts promoted social consolidation among segmentary residential units and ultimately the formation of a cultural identity.

To argue that the Jinsha settlement was an urban center requires assessing not only its material remains, but tracing the uses, social meanings, and social relationships involved in the production of the objects. The ritual paraphernalia discovered in the Meiyuan sacrificial zone and Meiyuan's proximity to the large houses and cemetery of Sanhe Huayuan and Lanyuan further reveal that these loci formed the core of Jinsha. This settlement core ultimately grew into a regional center after the Sanxingdui period. The multiple types of craft products found at Meiyuan also suggest that the space was a locus for the intermingling of domestic production and long-distance exchange. It provided occasions for heterogeneous inhabitants of Jinsha to negotiate or reconstruct their social relations and thus became a convergent point of sacred and secular life. The potters' participation in these ceremonial occasions also allowed them to develop a common consensus regarding vessel types.

Some remaining questions regarding urban-rural relationships and the political forms of Shi'erqiao Culture demand further examination. The large number of burials at Jinsha also raise questions about population size, nutrition, community sanitation, and possible social divisions around age and gender. Although human bones in the area are normally poorly preserved, dental tests might be useful for learning more about ancient diets and biogenetic distance. This could then assist us in identifying multiple ethnic groups at the Jinsha site cluster and beyond, including at related sites in mountainous areas. Our efforts have so far been directed at the settlement center, so we await future application of a rural approach to examining the center and its hinterlands in a more balanced manner (Schwartz and Falconer 1994). This would allow us to understand the complexity of the hinterlands and the active role they played in shaping the cultures of the Chengdu Plain.

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NOTES

1. Arguments relating to changing values of objects by context and through time have been widely discussed by many scholars who have studied the life histories of things (Appadurai 1986; Chen 2004, 2006; Clark 2007; Costin 1991; Costin 2001; Flad 2011:24, 2012; Flad and Hruby 2007; Mintz 1985).
2. It is not unusual for Chinese archaeologists to use the same name to refer to an archaeological culture, its type site, and the period in which it prevailed. This is the case for Baodun, Sanxingdui, and Shi'eriqiao. The two major Shi'eriqiao Culture sites are the Shi'eriqiao type site and the Jinsha site.
3. I use "site cluster" here because there are multiple sites within what I consider to have belonged to a settlement. The archaeological situation at Jinsha is complicated. Local archaeologists used the term "loci" rather than "site" as a temporary expedient. The area was excavated as part of a salvage operation and the excavators did not expect Jinsha to encompass so many independent units. At the time, they called the units loci because they did not have any other strategy for naming them. I argue that some of the "loci" should be considered individual sites because they were not all used simultaneously and some were spatially separated. Thus, the original so-called "Jinsha site" actually contains a cluster of sites which arguably constituted an urban center, community, or settlement.
4. CV (Coefficients of Variation) values are calculated as the standard deviation $\times$ 100/sample mean. A CV value is often used to measure degrees of standardization (Costin and Hagstrum 1995; Longacre et al. 1988; Underhill 2003). A lower percentage of variation means a higher degree of standardization.
5. Houses, trenches, and kilns did not contain enough samples for statistical analysis, so were skipped here.
6. Note that the "jade" category sometimes includes non-jade stone objects in modern mineralogy. They were considered precious by ancient people, however.
7. This follows Lewis's (2006) notion that the human body is a realm for the demonstration of social roles and identities. He argues that "both hair and clothing became sites for the transformation of the body as a means of assigning social roles and meanings" (Lewis 2006:7).
8. In addition to millet, people gradually adopted rice cultivation before the dawn of the Baodun period. Rice was more productive and sustained larger populations, so became increasingly popular from then on in the Chengdu Plain (D'Alpoim Guedes 2011; Yu and Xia 2015).

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