

Regional survey and the development of complex societies in southeastern Shandong, China

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This article shows that full-coverage regional survey is an effective tool for understanding change over time in regional settlement patterns in north China. Five seasons of survey in the Rizhao area of southeastern Shandong demonstrate a nucleated pattern of settlement around the Longshan site of Liangchengzhen and a clear settlement hierarchy, with distinctly different patterns for later periods.

Key-words: full-coverage regional survey, Longshan period, Shandong province, Liangchengzhen

An increasing number of publications debate the nature of sociopolitical organization in the Yellow River valley and neighbouring regions of northern China during the late prehistoric and early historic periods (Dematte 1999; Liu 1996; McIntosh 1999; Trigger 1999). However, several factors hinder an adequate understanding of the development of complex societies in this area. Many studies are synchronic and focus on only one type of settlement, sites surrounded by earthen walls. Most of these sites date to the Longshan period (c. 2600–1900 BC), although earlier sites such as Xishan (late Yangshao period, c. 3000–2600 BC) also have surrounding walls (Yang 1997). Several recent publications conclude that Longshan walled sites represent city-states (Dematte 1999; Shao 1999; Yates 1997; Zhang 1997). Two earlier studies (Liu 1996; Underhill 1994), however, suggest that walled sites were centres of settlement hierarchies in chiefdoms and stress the need to investigate regional variation and change over time in the nature of settlement systems.

Studies that focus on only one kind of site and make generalizations for large areas cannot adequately inform us about the development and nature of early complex societies. For example, archaeologists working in northern China could productively investigate the na-

ture of cooperative and competitive relations between villages and towns within individual settlement systems (Shao 2000: 202; Yan 1999: 144). The development of urbanism is a process, not a single event. There may be important regional variation, as documented in Mesoamerica (Blanton *et al.* 1993) and the Near East (Falconer & Savage 1995; Redman 1978). Also, the form and degree of integration between urban centres and their surrounding settlements probably shifted over time (Marcus 1998; Redman 1978: 215–16).

Decades of research in several areas of the world such as highland Mexico (Feinman *et al.* 1985; Feinman & Nicholas 1990; Kowalewski *et al.* 1989; Sanders *et al.* 1979) and the Near East (Adams 1981; Wright & Johnson 1975) have illustrated that full-coverage, systematic regional survey is crucial for understanding the kinds of social and economic interactions that occurred between settlements. Full-coverage survey provides a systematic means to understand change in the degree and nature of sociopolitical integration in a given region such as the growth and decline of centres (Billman & Feinman 1999; Fish & Kowalewski 1989; see also Feinman 1998).

Full-coverage, systematic regional surveys do not have a long history in China (*cf.* Liu

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1996). To date, regional surveys have been implemented successfully in three areas of northern China: Shandong province (Cai *et al.* 1997; Underhill *et al.* 1998), more than one location in Henan (see Murowchick 1997), and Inner Mongolia (Shelach 1997). The previous publication by our Sino-American team describes the first two seasons of full-coverage survey in southeastern Shandong (Underhill *et al.* 1998). This report updates that work by synthesizing the results from five seasons, 1995–2000. Our expanded study underscores our previous conclusion that the method of systematic regional survey is indispensable for investigating the development, organization and decline of complex societies.

Relevant publications tend to focus on Henan province, regarded by most scholars as the core area in northern China where the earliest states developed during the Xia (*c.* 2070–1600 BC, from Erlitou culture remains) and Shang (*c.* 1600–1046 BC) periods (Qiu & Cai 2001). Our survey reveals development of a clear settlement hierarchy in southeastern Shandong, an area generally regarded as peripheral to important sociopolitical changes that occurred during the Longshan period. We also found changes in settlement systems after this period that are not evident from textual data and appear to differ from the histories of settlement in other areas.

The study region, goals and survey methods

The Rizhao area of southeastern Shandong has been recognized as important for understanding the Longshan period ever since initial excavations took place at Liangchengzhen (LCZ) in 1936 (FIGURE 1). From the mid 1950s to 1980s, local archaeologists conducted a few test excavations and reconnaissances in the vicinity (see Underhill *et al.* 1998: 456–7). The fine black pottery and jade artefacts that were recovered led scholars to define Liangchengzhen as a Longshan period centre. This interpretation was fostered by the estimated large size of the site (90 ha). The neighbouring site of Dantu (originally estimated as 25 ha in size) was also notable for its finely made jade artefacts and traces of a rammed earth wall (Zhang 1996).

An original aim of our survey, therefore, was to assess objectively the rise of Liangchengzhen and to discern whether this site was at the centre of a settlement hierarchy. Another goal was to investigate the relationship of Dantu to the site.

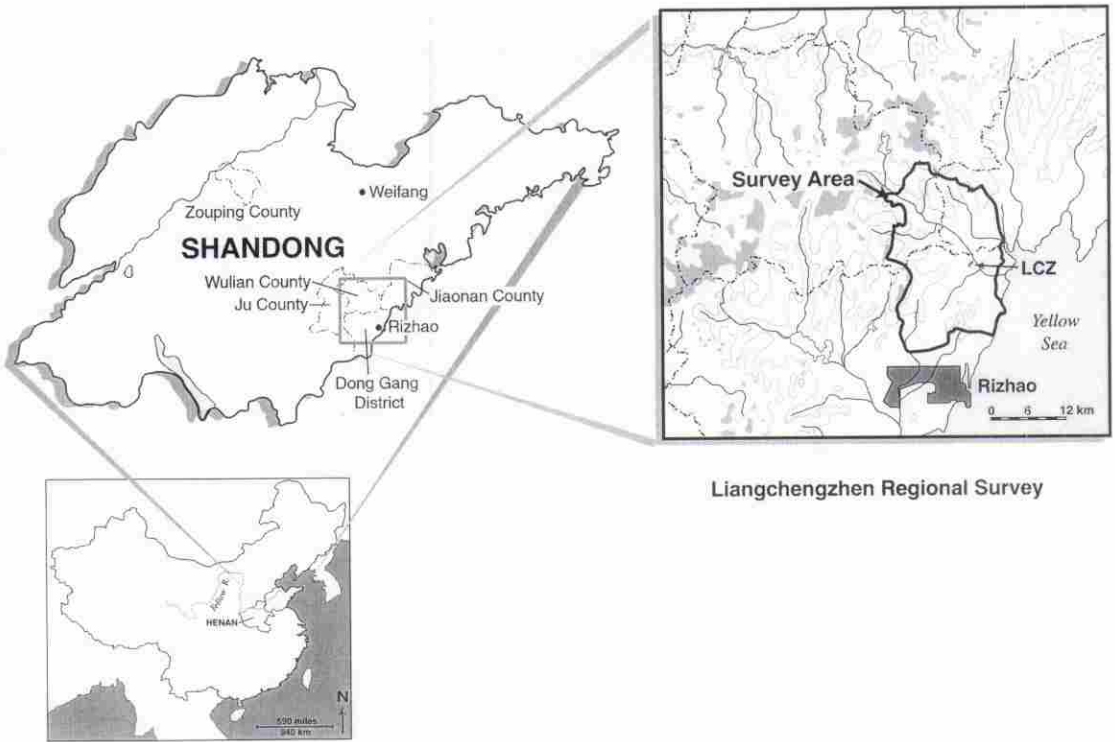
A third priority was to examine the transition from the Longshan period to the early Bronze Age. Settlements occupied after *c.* 1900 BC associated with the Xia and Shang periods are well documented in Henan and western Shandong, but not in southeastern Shandong.

To date, our systematically covered study region includes parts of three counties (Dong Gang, or eastern harbour district of Rizhao city, Wulian and Jiaonan) and four topographic zones: floodplain, low spurs and slight rises above the alluvial plain, higher piedmont ridges and mountains with coniferous trees (for details see Underhill *et al.* 1998: 455–6). Following the methodology of other regional surveys (see Underhill *et al.* 1998 for fuller discussion), crews ranging from five to eight members walk about 30–50 metres apart, systematically covering the entire landscape. All ancient remains are plotted on 1:10,000 topographic maps. Whenever possible we check for subsurface deposits from exposed cutbanks and have found a good correlation between surface sherds and subsurface deposits. We make collections of surface artefacts at every site. Prior to preparing final settlement maps for each phase, we analyse the field artefact collections and accordingly make any adjustments of field assessments.

Results

The following discussion is organized to highlight five key findings from our regional investigation. We present and discuss the observed shifts in settlement patterns from the Longshan, Zhou (*c.* 1046–221 BC) and Han (206 BC–AD 220) periods. Subsequently, we outline on-going issues that require further investigation.

Perhaps the most basic yet significant finding of our study is the documented success of full-coverage systematic settlement pattern survey in southeastern Shandong. Some scholars continue to express concern that systematic regional survey may not be feasible in parts of northern China, due to extensive alluviation (Jing *et al.* 1997). However, surface artefacts, especially potsherds, are readily visible in the Rizhao area. In addition, we survey during the winter, when vegetation and the activities of farmers are at a minimum. In five seasons of survey we have located over 750 sites in a 400-sq. km area. Before our survey, fewer than 10 sites had been identified within this region,



Liangchengzhen Regional Survey

FIGURE 1. Location of the study region and places mentioned in the text.

including Liangchengzhen and Dantu. Although 28% of the sites were occupied during more than one phase, 72% are single component.

A second key discovery was the location of important Longshan and later sites above the alluvial plain. Based on prior, less systematic reconnaissance efforts, some researchers presumed that most, if not all, ancient settlements were situated near rivers in the alluvium. In contrast, we have found sites in a variety of topographic zones. For example, two relatively large sites from the Longshan (21 ha) and Zhou (33 ha) periods were found in hilly piedmont locales. The observed diversity in settlement locations is important for assessing both local subsistence strategies as well as the possible concern for defense.

Third, a distinct settlement hierarchy arose in southeastern Shandong during the Longshan period (FIGURE 2). Judging from the range of site sizes (199 Longshan sites in total), we suggest there were four levels in the settlement hierarchy for the region (TABLE 1). Based on the spread of surface artefacts, the two sites at the top of the hierarchy, Liangchengzhen and

Dantu, are much larger than previously published estimates. The two settlements are at least partially contemporary, occupied primarily during the early and middle phases of the Longshan period, roughly 2600–2200 BC (Luan 1996; 1997). We continue to investigate the relationship between these two sites through excavations at Liangchengzhen.

A fourth finding is delineation of a highly nucleated settlement pattern around Liangchengzhen during the Longshan period. We conclude that Liangchengzhen and smaller, neighbouring settlements clustering around it were functionally connected. The extension of our survey area has revealed a more pronounced pattern of nucleation around Liangchengzhen than we described in 1998 (Underhill *et al.* 1998). Liangchengzhen and other settlements in the core area account for 67% of total occupied area for the survey region during the Longshan period, although this area represents only 26% of the total surveyed area. The average size of sites in this core area is greater (TABLE 2), even if we remove Liangchengzhen from the sample.

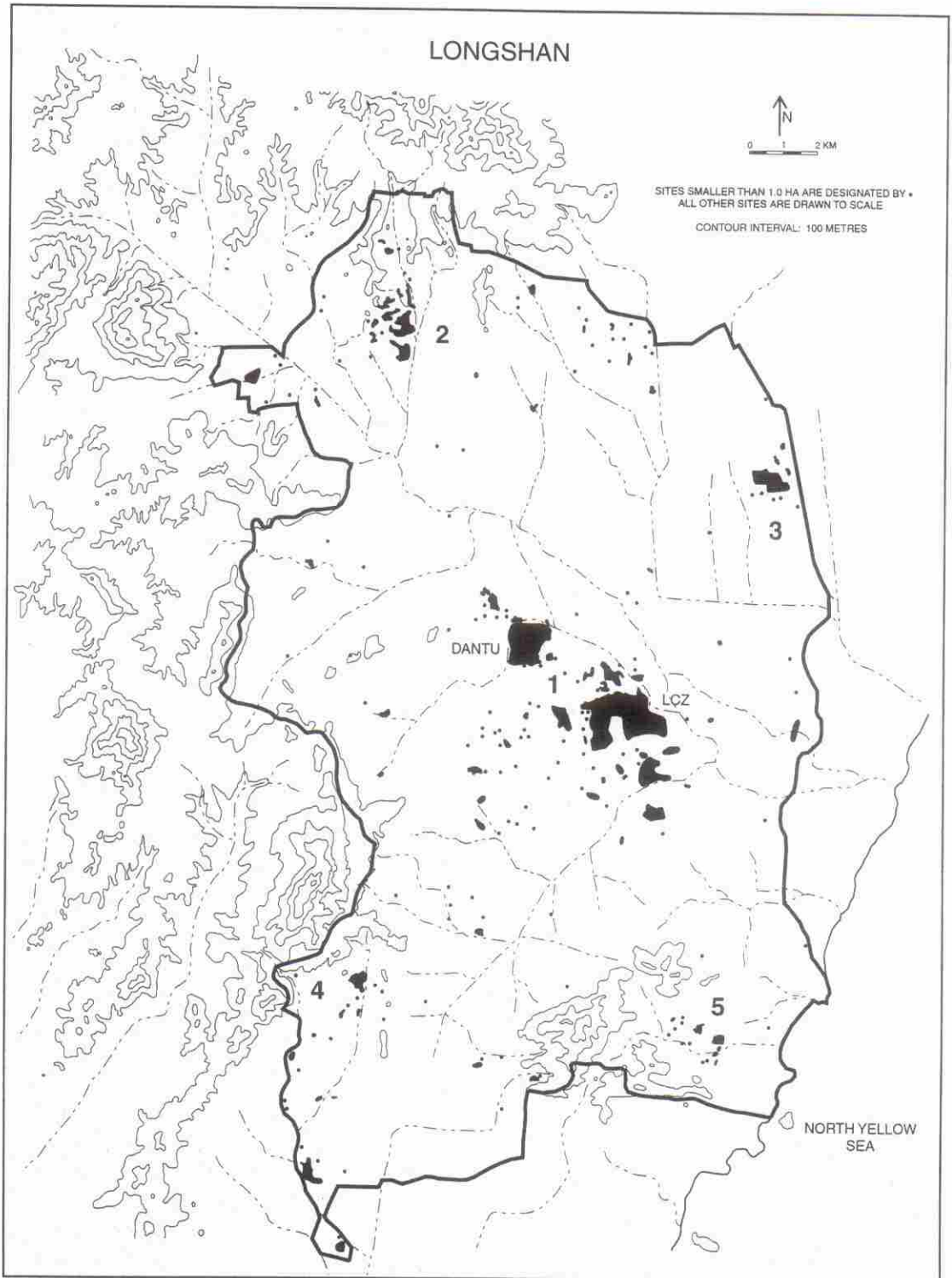


FIGURE 2. Longshan period settlement pattern (numbers refer to site clusters).

As we have expanded our survey region, smaller clusters of settlement have become visible in the outlying areas. We have identified four smaller clusters of sites, each centring around one relatively large site (FIGURE 2, Clusters 2-5). These small clusters are located roughly equidistant from Liangchengzhen. Also, each cluster is spaced relatively evenly from the central, core area around Liangchengzhen (Cluster 1). Yet the outlying clusters themselves are variable in terms of number of sites, settled area and settlement tiers (TABLE 3). These patterns of settlement for the Longshan period contrast sharply with the picture of widely dispersed walled towns presented in many publications. Our findings not only lead us to question traditional models of Longshan period settlements, but they also provide some significant parallels with settlement patterns for early complex societies in other global regions (e.g. Wright 1986).

An important topic requiring further investigation is the chronological relationship between sites in Longshan Clusters 1-5. Our survey collections indicate occupation primarily during the early and middle Longshan periods. Continued refinement of our ceramic chronology and eventual excavations at other sites could determine if some small settlement clusters (Clusters 2-5) originally included competing centres that declined as Liangchengzhen rose to dominance. The much smaller sizes of the largest sites in these outlying clusters, however, indicate instead that while these clusters may not have been as closely tied to Liangchengzhen as sites in Cluster 1, they probably were not autonomous rivals either.

A fifth, key finding of the survey is documentation of significant Zhou and Han occupation in southeastern Shandong (TABLE 4). The settlement patterns for these two periods are distinctively different from that for the Longshan period (FIGURES 3, 4). After that period the regional settlement pattern became somewhat less nucleated and more dispersed. There was a slight decrease in total occupied area in the Zhou and Han periods, although the number of sites increased. Nucleation of settlements continued around Liangchengzhen, although this pattern was not as pronounced as during the Longshan period. Liangchengzhen and Dantu decreased markedly in size after the Longshan period, with a corresponding drop to a three-tiered site hi-

rank	size range (ha)	no. of sites
Tier 1 (LCZ)	246.8	1
Tier 2 (Dantu)	130.7	1
Tier 3	52.1-10.0	13
Tier 4	8.7-0.1	184

TABLE 1. *Tiers in the Longshan settlement hierarchy.*

area	total occupied area (ha)	no. of sites	average site size (ha)
Cluster 1 (core)	604.3 (67.0%)	83 (41.7%)	7.3
Cluster 2	106.7 (35.9%)	27 (23.3%)	4.0
Cluster 3	60.5 (20.3%)	10 (8.6%)	6.1
Cluster 4	79.7 (26.8%)	37 (31.9%)	2.2
Cluster 5	21.8 (7.3%)	15 (12.9%)	1.5
all outlying areas, total*	297.6 (33.0%)	116 (58.3%)	2.6

* note: includes 27 small sites not part of any cluster

TABLE 2. *Comparison of core area around Liangchengzhen and outlying areas for the Longshan period.*

cluster	rank	site size (ha)	no. of sites
Cluster1	Tier 1	246.8	1
	Tier 2	130.7	1
	Tier 3	42.9-21.0	4
	Tier 4	13.7-0.1	77
Cluster2	Tier 1	30.1	1
	Tier 2	18.3-14.4	2
	Tier 3	8.3-0.1	24
Cluster3	Tier 1	52.1	1
	Tier 2	2.3-0.3	9
Cluster4	Tier 1	21.1-20.0	2
	Tier 2	4.1-0.3	35
Cluster5	Tier 1	11.0	1
	Tier 2	5.4	1
	Tier 3	1.0-0.3	13

TABLE 3. *Site size tiers for Longshan settlement Clusters.*

phase	no. of sites	total hectares	average site size (ha)
Longshan	199	901.9	4.5
Zhou	409	791.6	1.9
Han	461	847.4	1.8

TABLE 4. *Archaeological sites and hectares occupied per phase.*

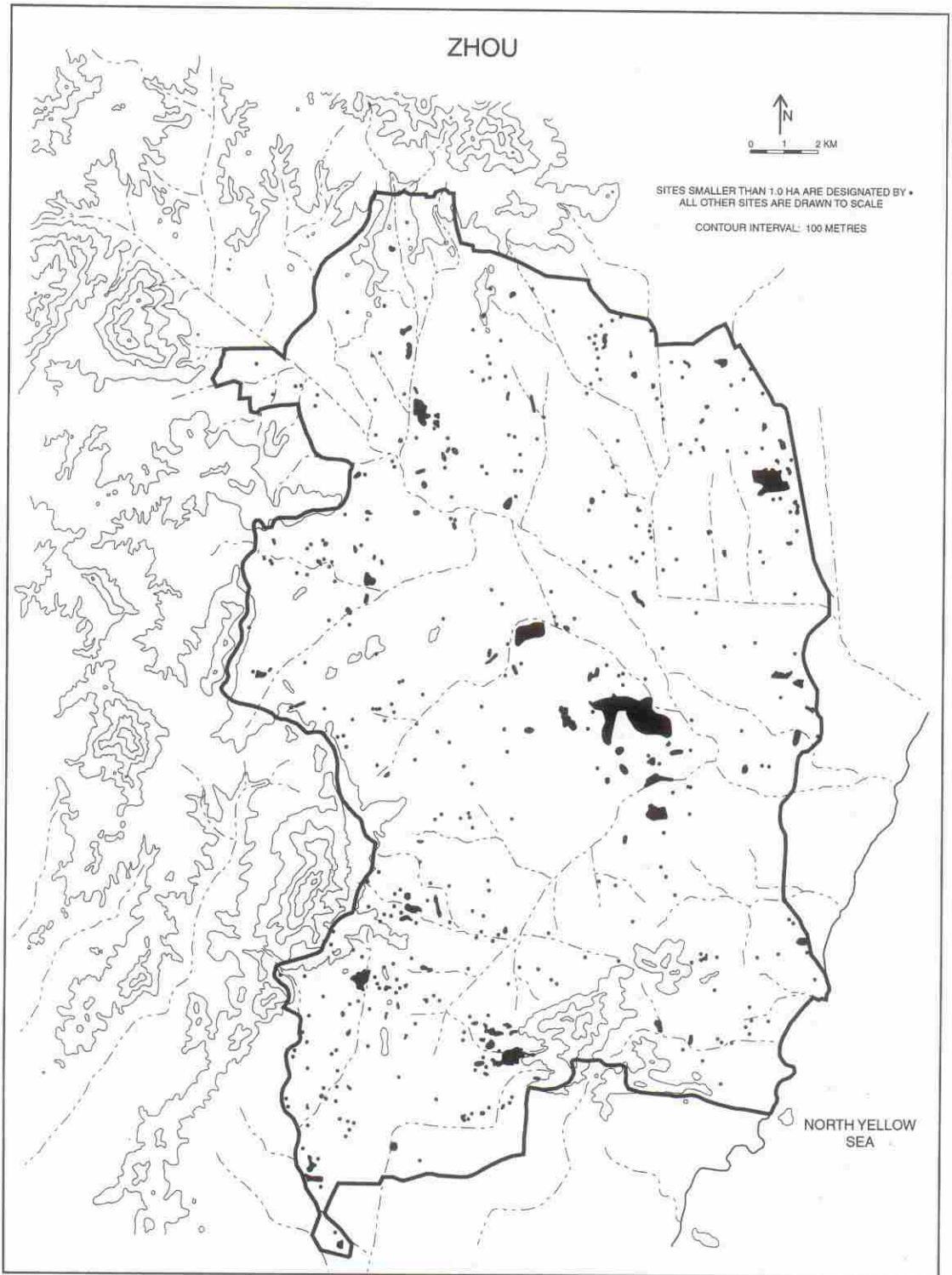


FIGURE 3. Zhou period settlement pattern.

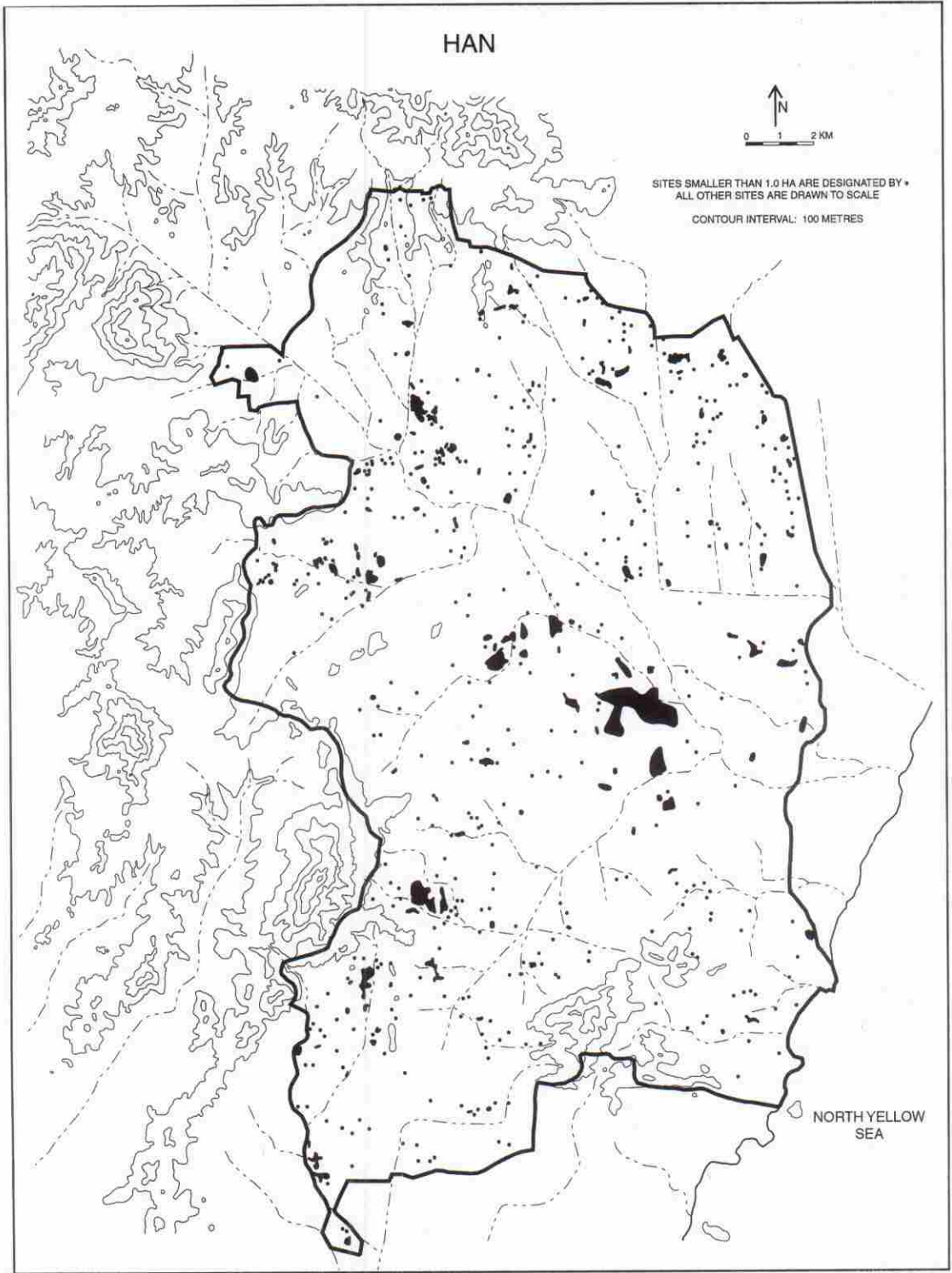


FIGURE 4. Han period settlement pattern.

rank	size range (ha)	no. of sites
Tier 1 (LCZ)	170.9	1
Tier 2	37.0-12.2	6
Tier 3	9.0-0.1	402

TABLE 5. *Tiers in the Zhou period settlement hierarchy.*

rank	size range (ha)	no. of sites
Tier 1 (LCZ)	174.3	1
Tier 2	40.4-12.6	8
Tier 3	11.0-0.1	452

TABLE 6. *Tiers in the Han period settlement hierarchy.*

area	total occupied area (ha)	no. of sites	average site size (ha)
core area	352.8 (44.6%)	82 (20.0%)	4.3
outlying area	438.8 (55.4%)	327 (80.0%)	1.3

TABLE 7. *Comparison of core area around Liangchengzhen and outlying areas for the Zhou period.*

area	total occupied area (ha)	no. of sites	average site size (ha)
core area	406.0 (47.9%)	109 (23.6%)	3.7
outlying area	441.4 (52.1%)	352 (76.4%)	1.3

TABLE 8. *Comparison of core area around Liangchengzhen and outlying areas for the Han period.*

area	rank	site size (ha)	no. of sites
core	Tier 1	170.9	1
	Tier 2	37.0-12.2	4
	Tier 3	8.2-0.1	77
outlying	Tier 1	56.3-21.0	4
	Tier 2	9.0-0.1	323

TABLE 9. *Ranking of site sizes for core and outlying clusters in the Zhou period.*

area	rank	site size (ha)	no. of sites
core	Tier 1	174.3	1
	Tier 2	30.1-17.4	3
	Tier 3	9.8-0.1	105
outlying	Tier 1	40.4-21.8	3
	Tier 2	13.2-0.1	349

TABLE 10. *Ranking of site sizes for core and outlying clusters in the Han period.*

erarchy for the entire survey region (TABLES 5, 6). Liangchengzhen remained the largest site but declined in size to about 170 hectares in both the Zhou and Han periods.

There also was an increase in the occupation of outlying areas farther away from Liangchengzhen (FIGURES 3, 4). Although clusters of settlements were still evident in the survey region, they were smaller and less clearly delineated than for the Longshan period. For comparison, we superimposed the Longshan core area on the Zhou and Han maps. During both the Zhou and Han periods, much smaller proportions of the population lived in this core area (TABLES 7, 8). As in the Longshan period, the settlement hierarchy was less developed in the outlying areas (TABLES 9, 10). Even though the general patterns for the Zhou and Han periods are similar, there was some shifting and relocating of major centres, especially outside the Liangchengzhen core area.

We propose that these changes in settlement pattern reflect the declining importance of Liangchengzhen after the Longshan period, as regional political centres arose in western Shandong and/or Henan during the late Longshan period. It appears that centres of power were situated in other areas of Shandong during the Zhou and Han periods. The closest substantial Eastern Zhou settlement known from historical records and archaeological fieldwork is the capital of the Ju state, located in Ju county, to the west (Su *et al.* 1993).

On the basis of textual data, it would appear that there was little occupation in the Rizhao area of southern Shandong after the Longshan period. Historical documents from the Han period do not accurately depict the distribution or level of population in our study region (see Bielenstein 1947). Significantly, our survey identified hundreds of small and middle-size settlements that previously had been 'invisible', probably representing a relatively large population of farming villages and towns.

Issues for further research

We continue to assess key questions regarding the cultural and demographic history of the Rizhao region. One important issue is occupation of our study region during the early Bronze Age, c. 1900-1046 BC. The Yueshi (c. 1900-1600 BC) and Shang (c. 1600-1046 BC) periods are poorly understood in Shandong. Relatively little

archaeological fieldwork has been carried out in eastern Shandong, compared to areas further west. The Yueshi period, regarded as contemporary with the Xia period in Henan, has only recently been recognized in the province (Fang 1998; Luan 1996; 1997). There are few Yueshi sites even in areas like Zouping county in west-central Shandong, where a large quantity of Longshan sites have been discovered (Shandong University 1989).

Similarly, identification of Shang sites in Shandong has been the subject of debate (Gao 2000; Luan 1996; Shandong Province Institute of Archaeology 2000a). The only previously excavated Shang period sites are located in more westerly areas of Shandong (see Underhill *et al.* 1998). Gao (2000) proposes that more people moved into eastern Shandong during the late Shang period, resulting in the mixing of indigenous and classic Shang cultural traits. Following this process, areas farther east should have fewer Shang ceramic traits. In more than one area of Shandong, archaeologists are reassessing ceramic typologies and identifying new cultures contemporary with Shang and Zhou sites in Henan province (for the Weifang area, see Shandong Province Institute of Archaeology 2000b).

In our survey region, we have tentatively identified six sites with one or more ceramic diagnostics of the Yueshi period and only 18 sites with probable Shang period diagnostics. It is possible that the extremely small quantity of sites with Yueshi and Shang potsherds compared to the Longshan and later Zhou periods does not stem from a low density of occupation in the region during the early Bronze Age. Our expectations for characteristics of sherds from the Yueshi and Shang periods have derived from work done in other areas of Shandong. Instead, it may be more appropriate to rely on different ceramic attributes for identifying post-Longshan sites.

The rate of ceramic change for the relatively isolated area of southeastern Shandong may have been markedly slower than in areas farther west. Beginning in the late Longshan period, when the centre of Liangchengzhen began to collapse, populations may have become further isolated, so that vessels continued to be produced with Longshan attributes for a longer period of time than in areas farther west, where there was more interregional interaction. There may have been

a considerable time lag before potters in the Rizhao area began to produce vessels exhibiting ceramic attributes with Shang or Western Zhou characteristics. In other words, some of what we have identified as Longshan pottery in our region may actually be later in time than traditionally believed based on excavations in other areas of Shandong province.

Finally, we continue to address the issue of pre-Longshan sites in the Rizhao area. Five years of survey have yielded only four sites dating to the late Dawenkou period (c. 3000–2600 BC). Few excavated remains identified as late Dawenkou have been found in southeastern Shandong (see Underhill *et al.* 1998). Additionally, we have not located any sites dating to earlier cultural phases, which have been identified in more western areas of Shandong. This pattern is striking, given the large quantity of later sites (primarily early and middle Longshan) that we have discovered in a variety of environmental settings across the study area.

Our current working hypothesis is that sedentary farming people did not settle southeastern Shandong until relatively late in the Neolithic period. No shellmounds, which would be indicative of earlier coastal occupation, are evident in the area. One factor may have been the predominance of marshy land, partially because of higher sea levels (Chang 1986: 73). Recent research on sediments in the southern Yangzi River delta area near Shanghai supports the earlier studies cited by Chang for the east coast of China and indicates rising sea levels during the early Holocene, followed by rising groundwater levels and poor drainage conditions (Stanley & Chen 1996). Similarly, Shao (2000: 198) suggests that after 3000 BC temperatures dropped and sea levels fell, allowing occupation of previously marshy areas in several parts of eastern China. Firmer support for this hypothesis in our survey region will require geological studies in areas closer to Rizhao.

Conclusions

Archaeological projects in several world areas have demonstrated the utility of full-coverage, regional survey for investigating the development of complex societies. Regional survey provides a necessary empirical foundation for exploring social, economic and political relations at both the intra- and interregional levels. On-going debates about the development

and nature of early complex societies in northern China cannot be resolved without diachronic data from systematic regional surveys. Regional survey is essential for investigating variation in processes of social change in individual areas of the vast Yellow River valley and its environs.

Five seasons of survey in the Rizhao area of Shandong have yielded a very different pattern of development than other researchers previously had surmised for northern China as a whole. The high degree of nucleation around Liangchengzhen during the Longshan period indicates a considerable degree of economic and sociopolitical interaction between the centre and smaller neighbouring sites (Cluster 1). The regular spacing of smaller centres and their subsidiary sites around Liangchengzhen during this period also raises the possibility that this centre had some political and economic influence over a relatively large area. Of course, more research is necessary to assess the nature and degree of these relationships.

Liangchengzhen continued to dominate the region during the Zhou and Han periods. The more striking feature of these later periods, however, is the large quantity of small settlements dispersed across the landscape. These

settlement patterns indicate that the Rizhao region as a whole had declined in power and importance in comparison to areas farther west. Yet we still do not understand all of the factors and processes that lay behind this decline.

Finally, we encourage the implementation of more full-coverage systematic regional surveys in China. Such research would not only facilitate the necessary comparison of long-term changes in different regions of China, but it would continue to foster our ability to compare and contrast the processes associated with these changes with our perspectives on similar transitions in other world regions.

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References

- ADAMS, R.McC. 1981. *Heartland of cities*. Chicago (IL): University of Chicago Press.
- BIELLENSTEIN, H. 1947. The census of China during the period 2-742 AD, *Bulletin of the Museum of Far Eastern Antiquities* 19: 125-63.
- BILLMAN, B. & G. FEINMAN (ed.). 1999. *Settlement pattern studies in the Americas*. Washington (DC): Smithsonian Institution Press.
- BLANTON, R., S. KOWALEWSKI, G. FEINMAN & J. APPEL. 1993. *Ancient Mesoamerica. A comparison of change in three regions*. 2nd edition. Cambridge: Cambridge University Press.
- CAI, FENGSHU, HAIGUANG YU, FENGSHI LUAN, HUI FANG, A. UNDERHILL, G. FEINMAN, L. NICHOLAS & G. BENNETT. 1997. Shandong Rizhao Shi Liangcheng Diqu de Kaogu Diaocha [= Archaeological survey in the Liangcheng Region of Rizhao City, Shandong], *Kaogu* 4: 1-15.
- CHANG, K.C. 1986. *The archaeology of ancient China*. 4th edition. New Haven (CT): Yale University Press.
- DEMATTE, P. 1999. Longshan-era urbanism: the role of cities in Predynastic China, *Asian Perspectives* 38(2): 119-53.
- FALCONER, S. & S. SAVAGE. 1995. Heartlands and hinterlands: alternative trajectories of early urbanization in Mesopotamia and the southern Levant, *American Antiquity* 60(1): 37-58.
- FANG, HUI. 1998. Yueshi Wenhua de Fenqi yu Niandai [= Periodization and dating of the Yueshi Culture], *Kaogu* 4: 55-71.
- FEINMAN, G. 1998. Scale and social organization. Perspectives on the Archaic state, in Feinman & Marcus (ed.): 95-133.
- FEINMAN, G., S. KOWALEWSKI, R. BLANTON, L. FINSTEN & L. NICHOLAS. 1985. Long term demographic change: A perspective from the Valley of Oaxaca, Mexico, *Journal of Field Archaeology* 12: 333-62.
- FEINMAN, G. & J. MARCUS (ed.). 1998. *Archaic states*. Santa Fe (NM): School of American Research Press.
- FEINMAN, G. & L. NICHOLAS. 1990. At the margins of the Monte Alban state: settlement patterns in the Ejutla Valley, Oaxaca, Mexico, *Latin American Antiquity* 1(3): 216-46.
- FISH, S. & S. KOWALEWSKI (ed.). 1989. *The archaeology of regions*. Washington (DC): Smithsonian Institution Press.
- GAO, GUANGREN. 2000. Haidai Qu de Shang Dai Wenhua Yicun [= Cultural remains from the Shang Period in the Eastern Coastal Region], *Kaogu Xuebao* 2: 183-98.
- JING, ZHICHUN, G. RAPP & TIANLIN GAO. 1997. Geoaerchaeological aids in the investigation of early Shang civilization on the floodplain of the Lower Yellow River, China, *World Archaeology* 29(1): 36-50.
- KOWALEWSKI, S., G. FEINMAN, R. BLANTON, L. FINSTEN & L. NICHOLAS. 1989. *Monte Alban's hinterland, Part II: The Prehispanic settlement patterns in Tlacolula, Etla, and Ocotlan, the Valley of Oaxaca, Mexico*. Ann Arbor (MI): University of Michigan. *Memoirs of the Museum of Anthropology* 23.
- LIU, LI. 1996. Settlement patterns, chiefdom variability, and the development of early states in north China, *Journal of Anthropological Archaeology* 15(3): 237-88.
- LUAN, FENGSHI. 1996. *Dongyi Kaogu* [= Archaeology of the Eastern Yi]. Jinan: Shandong University Press.
1997. *Haidai Diqu Kaogu Yanjiu* [= Archaeological research on the Haidai area]. Jinan: Shandong University Press.

- MARCUS, J. 1998. The peaks and valleys of ancient states: an extension of the dynamic model, in Feinman & Marcus (ed.): 59–94.
- MCINTOSH, R. 1999. Clustered cities and alternative courses to authority in prehistory, *Journal of East Asian Archaeology* (Festschrift in honor of K.C. Chang) 1: 63–86.
- MUROWCHICK, R. 1997. The state of Sino-foreign collaborative archaeology in China, *Orientations* 28(6): 26–33.
- QIU, SHIHUA & LIANZHEN CAI. 2001. Xia Shang Zhou Duandai Gongcheng zhong de Tanshisi Niandai Kuangjia [= A C14 Chronological Framework for the Xia-Shang-Zhou Chronology Project], *Kaogu* 1: 90–100.
- REDMAN, C. 1978. *The rise of civilization*. San Francisco (CA): W.H. Freeman & Co.
- SANDERS, W., J. PARSONS & R. SANTLEY. 1979. *The Basin of Mexico*. New York (NY): Academic Press.
- SHANDONG PROVINCE, INSTITUTE OF ARCHAEOLOGY (ed.). 2000a. *Shandong Sheng Gaosu Gonglu Kaogu Baogao Ji 1997* [= Collection of Archaeological Reports from Highway Construction in 1997]. Beijing: Science Press.
- 2000b. Shandong Kaogu de Shiji Huigu yu Zhanwang [= Reflections on Shandong Archaeology at the New Millennium and Prospects for the Future], *Kaogu* 10: 1–14.
- SHANDONG UNIVERSITY, ARCHAEOLOGY SPECIALTY, HISTORY DEPARTMENT & ZOUPIING COUNTY CULTURAL RELICS BUREAU. 1989. Shandong Zouping Xian Gu Wenhua Yizhi Diaocha [= Survey of Ancient Sites in Zouping County, Shandong Province], *Kaogu* 6: 505–23.
- Shao, Wangping. 2000. The Longshan period and incipient civilization, *Journal of East Asian Archaeology* (Festschrift in honor of K.C. Chang) 2(1–2): 195–226.
- SHELACH, G. 1998. A settlement pattern study in northeast China: results and potential contributions of western theory and methods to Chinese archaeology, *Antiquity* 72: 114–27.
- STANLEY, D. & ZHONGYUAN CHEN. 1996. Neolithic settlement distributions as a function of sea level-controlled topography in the Yangtze Delta, China, *Geology* 24(12): 1083–6.
- Su, Zhaoqing, Zhaoli Xia & Yuntao Liu. 1993. *Ju Xian Wenwu Zhi* [= Record of cultural relics in Ju County]. Jinan, Shandong: Qi Lu Press.
- TRIGGER, B. 1999. Shang political organization: a comparative approach, *Journal of East Asian Archaeology* (Festschrift in Honor of K.C. Chang) 1: 43–62.
- UNDERHILL, A.P. 1994. Variation in settlements during the Longshan period of northern China, *Asian Perspectives* 33(2): 197–228.
- UNDERHILL, A.P., G. M. FEINMAN, L. NICHOLAS, G. BENNETT, FENGSHU CAI, HAIGUANG YU, FENGSHI LUAN & HUI FANG. 1998. Systematic, regional survey in SE Shandong Province, China, *Journal of Field Archaeology* 25(4): 453–74.
- WRIGHT, H. 1986. The evolution of civilizations, in D. Meltzer, D. Fowler & J. Sabloff (ed.), *American archaeology. Past and future*: 323–65. Washington (DC): Society for American Archaeology/Smithsonian Institution Press.
- WRIGHT, H. & G. JOHNSON. 1975. Population, exchange, and early state formation in southwestern Iran, *American Anthropologist* 77: 267–81.
- YAN, WENMING. 1999. Neolithic settlements in China: latest finds and research, *Journal of East Asian Archaeology* (Festschrift in Honor of K.C. Chang) 1(1–4): 130–47.
- YANG, ZHAOQING. 1997. Shilun Zhengzhou Xishan Yangshao Wenhua Wanqi Gu Chengzhi de Xingshi [= A discussion of the character of the ancient city from the Late Yangshao Culture at Xishan, Zhengzhou], *Huaxia Kaogu* (1): 55–9, 92.
- YATES, R. 1997. The city-state in ancient China, in D. Nichols & T. Charlton (ed.), *The archaeology of city-states*: 71–90. Washington (DC): Smithsonian Institution Press.
- ZHANG, XUEHAI. 1996. Shilun Shandong Diqu de Longshan Wenhua Cheng [= Discussion of cities from the Shandong region of the Longshan Culture], *Wenwu* (12): 40–52.
1997. Dong Tu Gu Guo Tansuo [= A discussion on ancient states in the East], *Huaxia Kaogu* (1): 60–72.

