NON-STATE CRAFTS IN THE EARLY CHINESE STATE: AN ARCHAEOLOGICAL VIEW FROM THE ERLITOU HINTERLAND

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ABSTRACT

The Sino-Australian Yiluo project focuses on the core area of early states in China, and particularly aims to obtain insights into the sociopolitical process in the Erlitou urban center and hinterland. Recent interdisciplinary researches have revealed much new information about the production and distribution of utilitarian and elite goods (stone tools and white pottery), leading to a new understanding of the hierarchical and heterarchical dimensions of the Erlitou state's power structure.

INTRODUCTION: STATE CRAFTS VS. NON-STATE CRAFTS

Since Gordon Childe (1936; 1950) first pointed out that craft specialization was a major component of the urban revolution, many studies have attempted to demonstrate a close link between the development of craft specialization and the emergence of civilization/state (e.g., Adams 1966; Chang 1980). Three general models have been put forward by archaeologists to characterize different forms of craft specialization; these are, (1) attached specialization under elite supervision, for making primarily prestige items used as status symbols; (2) independent specialization without elite involvement, for making utilitarian goods demanded by the general public; and (3) manufacture by embedded specialists who are themselves members of elite groups and who make prestige items for inner circles of the elite (Brumfiel and Earle 1987; Costin 2001). It is not surprising to see that most studies of craft production in state-level societies focus on the first and third categories, to illustrate elite behaviours in the sociopolitical process, while few investigations have particularly targeted the political function of independent non-elite craft production during the process of social change (Schortman and Urban 2004). A similar situation also can be seen in Chinese archaeology, in that most studies are related to state-sponsored crafts, such as bronze ritual items, in the political centres of Erlitou, Zhengzhou and Anyang (Bagley 1990, 1999; Li 2003; Liu 2003; Liu and Chen 2003). This situation needs to be changed, because it has prevented us from gaining a fuller understanding the formation of early states in China.

It has been suggested that early states in China can be described as territorial states, which often show particular characteristics in craft production, particularly with state-involved prestige items (Liu and Chen 2003; Trigger 1999, 2003). In general, territorial states tend to have two tiers of craft production. On the one hand, royal workshops produced specialised products with high symbolic significance at or near the royal court, and craftsmen around the court and provincial centres produced less valuable luxury goods required by the state. On the other hand, farmers used locally available materials to manufacture utilitarian goods for themselves and their neighbours, mostly on a part-time basis (Trigger 2003: 368-374). However, this proposition needs to be tested.

Archaeological studies of early states in China have traditionally focused on large urban centres, where most indicators of a highly stratified society are easily observable. These studies tend to reveal mainly material remains of the urban high elite, but neglect the activities of the lesser elite and commoners in the surrounding areas, which are equally important for understanding the social formation at the regional level. In contrast to these traditional approaches, our recent archaeological project, focused on the Huizui site in the Yiluo region, aims to obtain some insights into the sociopolitical process in the hinterland of the earliest state, centred at Erlitou.

Based on regional surveys in the Yiluo basin, settlement patterns in the Erlitou core area show a highly centralised political system (Erlitou Working Team 2005; Liu et al. 2002-2004; Xu et al. 2004), and material remains uncovered from the Erlitou site indicate a well developed hierarchical society (Erlitou Working Team 2004, 2005; Institute of Archaeology 1999). Huizui appears to have been a regional centre during the Yangshao and Longshan periods (c. 5000-2000 BC), and then to have become a secondary centre of the Erlitou state during the early part of the second millennium BC, followed by settlement in the Eastern Zhou. This site was a stone tool production locus, whose major products, dolomite spades, appear to have been distributed to the surrounding areas (Liu et al. 2002-2004). Huizui therefore provides a unique opportunity for investigating (1) a long-term sociopolitical change at one settlement, (2) inter-settlement relationships in the region, and (3) craft specialization in relation to the production and distribution of utilitarian goods.

This study is unique in several aspects, which have long been neglected by Chinese archaeologists in general.

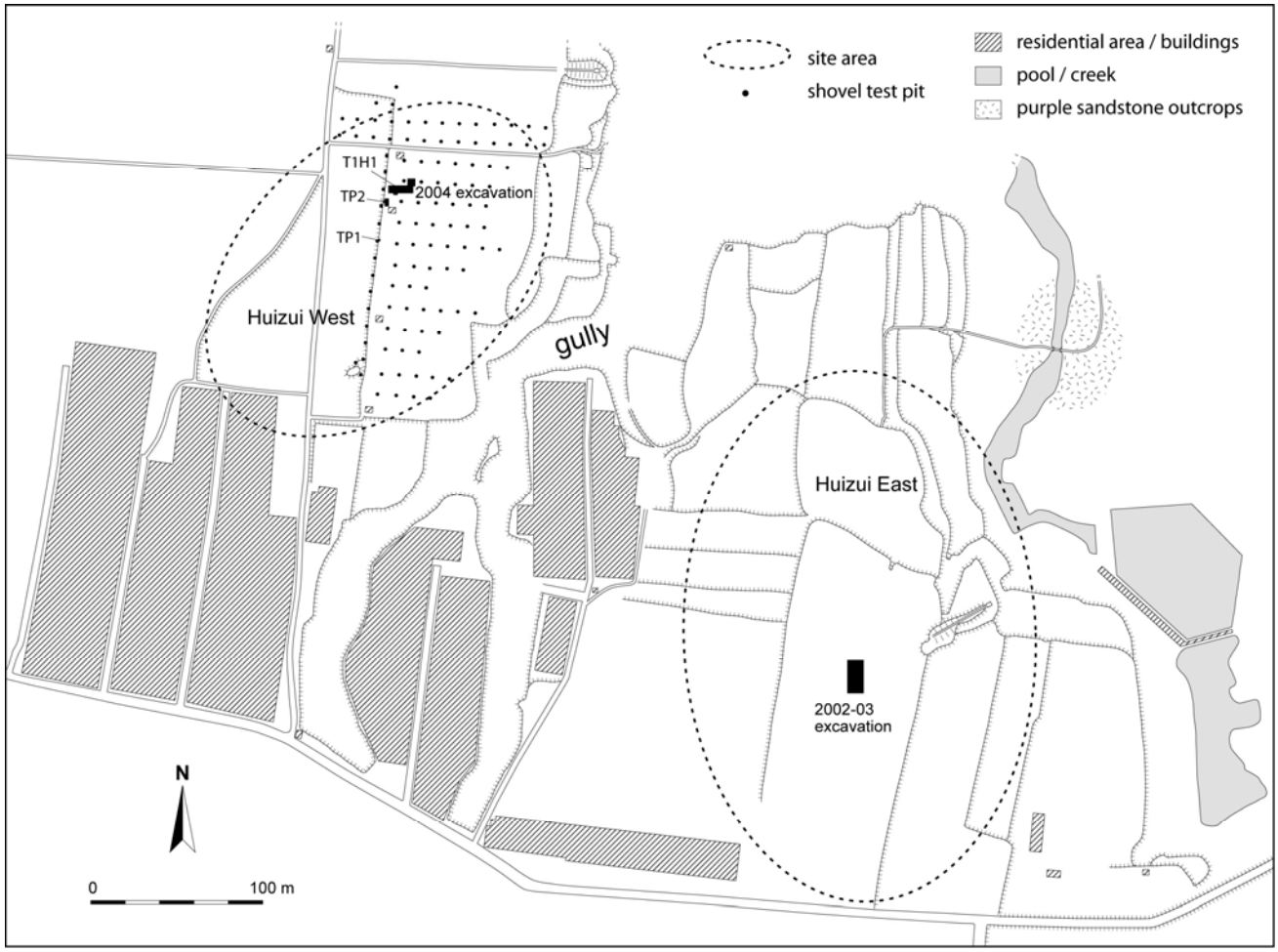

Figure 1. Map of Huizui and location of excavation areas.

The products under study in this project were both utilitarian and prestige items, their production occurred away from the major political centre, and their primary consumers were commoners and lesser elites across the region. These factors manifest a sharp contrast to the circumstances of high prestige items produced at the urban centres, providing a new perspective on the political economy of the Erlitou state.

In order to understand the regional social formation of the Erlitou state, in this paper we will focus on the production and distribution of spades and white pottery around the Yiluo region. We will demonstrate that craftsmen engaged in non-state craft production in regional communities played a significant role in the sociopolitical fabric of the early state.

HUIZUI STONE WORKSHOPS

The Huizui site is located in areas east and northwest of the modern village of Huizui in Yanshi county, Henan province. As the existing site is separated by a wide gully whose time of formation is unclear, we refer to the two areas of the site as Huizui East and Huizui West (Figure 1). The Yangshao and late Longshan people first occupied the site at Huizui East, then the Erlitou people extended their residence to both Huizui East and West, and finally the Eastern Zhou people resided again at Huizui East. The entire site measures about 25 ha, but the occupation area for each cultural phase varied. Soil erosion and modern intensive agricultural practices, particularly land levelling, have dramatically changed the Huizui landscape. Much topsoil, more than 1 m in thickness, has been removed in the past decades, in order to transform the original sloping land into modern terraces for farming. As a result, a large quantity of archaeological deposits have been destroyed, and the remaining occupation areas, particularly for the Longshan and Erlitou periods, are likely to be much smaller than their original sizes. Few remains of Eastern Zhou have been found, including only water wells and burials, suggesting that most Zhou deposits have been eroded by nature or removed by humans (Henan 1st Team 2004).

Huizui was excavated first in the 1950s by Henan archaeologists, and then in 2002-2006 by our Yiluo team. A total area of 665 sq. m at both Huizui East and West has been excavated, revealing deposits up to 4 m in thickness and dating to a long period from Yangshao, through late Longshan, to Erlitou. Archaeologists have identified Hui-

zui as a locus of stone tool manufacture since the 1950s, as suggested by abundant blanks readily visible on the ground surface. In order to determine the development of craft production and the level of specialisation at Huizui, we have employed several methods in our fieldwork; these include intensive survey, shovel tests, and excavation.

The remaining Yangshao occupation area is about 6 ha (Figure 1), which is perhaps fairly close to the original settlement size, as the Yangshao deposits appear to have been the least disturbed, compared to those of the later cultures. The preliminary results of our study show that flakes recovered from the Yangshao deposits are scarce and made of diverse rock types, none of which is particularly dominant. This suggests that the Yangshao population at Huizui produced stone artefacts, using various lithic materials available in the nearby areas, perhaps mainly for their own uses.

The remaining site size for the Longshan period measured about 3 ha. Within this area numerous flakes and blanks were found, sometimes in high concentrations. In two ash pits (H100, H101), for example, many blanks and a few thousand flakes were unearthed; the flakes are small in size, mostly under 5 mm in length. They are predominantly of dolomite, among several other rock types, and the shapes and material of blanks match the stone spades uncovered at the site. The lithic debris in these pits is likely to have been the manufacturing waste associated with nearby lithic workshops. These pits associated with lithic debris also yielded various kinds of domestic refuse, such as animal bones, pottery sherds, plant remains, and tools. They are also found in close proximity to such features as water wells, houses, and burials, indicating that lithic workshops were located within the residential area, and the production was likely operated at the household level. It is quite clear that, starting from the late Longshan period, Huizui became a stone tool production locus, particularly for making dolomite spades. Unfortunately, we are unable to determine the original size of the lithic manufacturing area; but the distribution of lithic production debris over the entire remaining Longshan occupation area suggests that the craft specialisation was most likely practiced by a large part of the community.

During the Erlitou period, lithic manufacture continued, and the production area extended to both Huizui East and West (Figure 1). For the reasons mentioned above, most Erlitou deposits at Huizui East have been destroyed, causing difficulties in estimating the site size. Since the upper deposits of the site were destroyed by recent agricultural activities, it is quite possible that many of those stone artefacts collected from ground survey were derived from disturbed Longshan and Erlitou deposits. This inference, however, does not help us to determine the original site sizes at Huizui East. At Huizui West, the Erlitou deposits are less disturbed, so we estimate an area of 3 ha for the Erlitou occupation. In this area, lithic flakes and blanks were recovered from shovel tests, terrace cuts and excavation trenches situated over the remaining site, confirming that lithic manufacture was carried out over the entire occupation area.

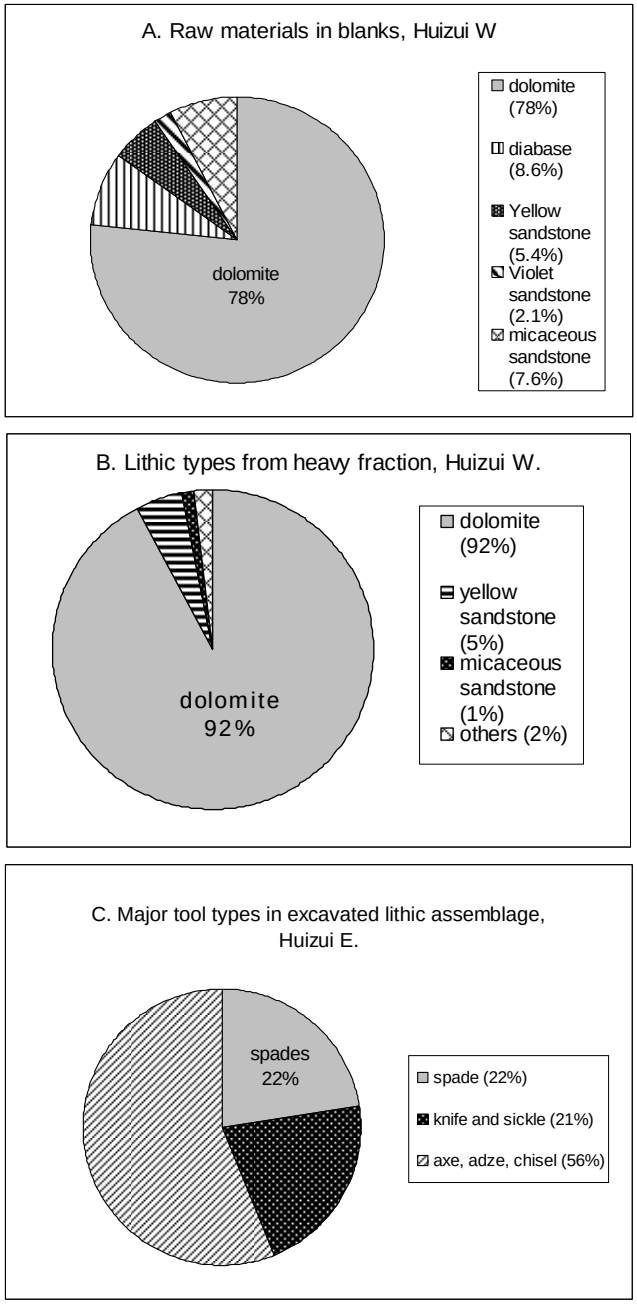

Figure 2. A. Ratio of dolomite blanks from surface survey (total number: 94); B. ratio of dolomite in lithic flakes from 111 heavy fraction samples (total weight: 6654.8 g); C. ratio of spades made of mainly dolomite from excavated tools (total number: 72); Huizui, Erlitou period.

Huizui people appear to have produced various types of tools using different raw materials. These mainly include spades made of dolomite; axes, adzes and chisels made of diabase; knives and sickles made of micaceous fine sandstone; and grinding slabs made of sandstone. Ninety-four blanks and semi-finished tools collected on the surface at Huizui West during the 2000 survey show a pattern in which dolomite is the dominant material (78% by number), followed by much smaller proportions of

other materials (Ford 2001) (Figure 2A). Dolomite flakes account for an even higher proportion (92% by weight) of lithic materials from heavy fractions of 111 flotation samples obtained from a pit (T1H1 spits 2-4) in the 2004 excavation (Figure 2B). Such high ratios of dolomite in blanks and flakes are in sharp contrast to the corresponding ratios seen in the finished tool assemblage from the 1959 excavation, in which spades (mostly made of oolitic dolomite) only account for 22% of the major tool types dating to the Erlitou period (Figure 2C).

At Huizui West, similar to Huizui East, excavations have revealed domestic features (such as houses, water wells, burials, and ash pits) filled with animal bones, pottery sherds, charred plant remains, as well as blanks and flakes. We have identified three locations with high concentrations of dolomite and sandstone blanks and flakes. Based on their depositional forms, the first locale at TP1 was the workplace of a stonemason, the second one at TP2 was a debris dump, perhaps next to a house wall, and the third one at T1H1 was also a debris dump, probably in a courtyard. TP1 and TP2 appear to have been contemporary (Erlitou phase II), and were spaced about 25 m apart, a length perhaps indicating the distance between two households/workshops (Figure 1).

These remains from the Erlitou deposits show a similar pattern that is also observable in the Longshan occupation area at Huizui, suggesting that lithic manufacture occurred continuously within household settings during the Erlitou period; craft specialisation was practiced at the community level, and the major products were dolomite spades, not only for local use but also for trade and exchange.

LITHIC RAW MATERIAL PROCUREMENT

Three types of lithics for making spades have been identified from the Huizui lithic assemblage: oolitic dolomite, dolomite and limestone. The first type is the most dominant in quantity. At Huizui most stone blanks and semi-finished spades are rectangular in shape, ranging roughly 10-40 cm long, 6-15 cm wide, and 2-4 cm thick. The raw materials were quarried from dolomite outcrops along the Songshan Mountains, about 4-5 km to the south of Huizui. The outcrops of oolitic dolomite show thin-bedded formation, distributed along the northern side of the mountain ranges (see John Webb's paper in this volume). Dolomite has no advantages, in terms of its hardness, for making stone tools. But it was easily quarried with Stone Age technology before use of metal tools or explosives, and its thin-bedded formation on the outcrops provides the right thickness for fabricating into thin and long spades. Therefore it makes perfect sense that ancient people choose this raw material for making spades.

Correlating with the distribution of dolomite outcrops about 12 km E-W in our survey area, there are four Erlitou sites located near the foothills of the mountain ranges, including Zhaiwan, Huizui, Xiahousi, and Xikouzi. These sites are spaced 2.5-4.5 km apart from one another, and all with similar distances (3-5 km) to the nearby dolomite outcrops (Figure 3). Our survey team has found dolomite blanks of similar forms from all four sites. Among these four sites, only Huizui shows clear evidence of tool manufacture from the Longshan to Erlitou periods. Zhaiwan has a similar occupation span as Huizui, and may have also produced spades in the Longshan and Erlitou periods. Two other sites appear to have been occupied only during the Erlitou period. If our survey data are reliable, there seems to have been a dramatic increase in spade production in the region, as the number of manufacturing centres increased from probably two during the Longshan period to four at the time of Erlitou. However, this needs to be tested in the future.

Considering the large area of the Yiluo basin, within which most settlements were not near lithic resources, the oolitic dolomite outcrops along a 12 km range of the Songshan Mountains were by no means a widely available raw material. However, since we have not surveyed the entire northern range of the Songshan Mountains, it is difficult to estimate how many more stone tool production sites still await discovery. The oolitic dolomite rock bed occurs in Upper Cambrian deposits along the northern side of the Songshan Mountains; its western part ends a few kilometres to the southwest of Zhaiwan, while its eastern part stretches many kilometres into the mountain ranges. So, it is possible more oolitic dolomite outcrops are available in the eastern areas. Nevertheless, not all oolitic dolomite outcrops would attract settlers and become sources of stone tools, since several factors may have restricted the suitability of a locale as a stone tool production centre. Given that the stonemasons were most likely agriculturalists with part-time craft specialisation, and also that stone raw material is heavy and difficult to transport over long distances, a ground stone production community should (1) have sizable farmland near the toolmakers' settlement, to provide sufficient agricultural supplies; (2) be located within a single day's return journey of the lithic sources; and (3) be close to sandstone sources for grinding slabs. The full-coverage regional surveys in the Yiluo basin (Erlitou Working Team 2005; Liu et al. 2002-2004) have not encountered many such optimal locations elsewhere, although more investigations have been planned to search for sites particularly suitable for lithic production.

Our surveys have revealed some interesting characteristics of the process of raw material procurement. A stone ball and a hammer stone of non-local materials, along with many oolitic dolomite flakes, were found scattered over a small site, Jiulongshuiku W (about 1500 sq. m in area), on a foothill, less than 100 m from an ancient quarry to the south of the Xikouzi site. It may have been a locale where stonemasons flaked the preforms after quarrying. No site has been found between the four spade-making settlements mentioned above and the dolomite outcrops, indicating direct access to the raw material by the production communities. The distance of 3-5 km between the settlements and outcrops appears to have been the optimal distance for craftsmen to complete several tasks for the raw material procurement within a day. These tasks include: walking to the lithic outcrops, quar-

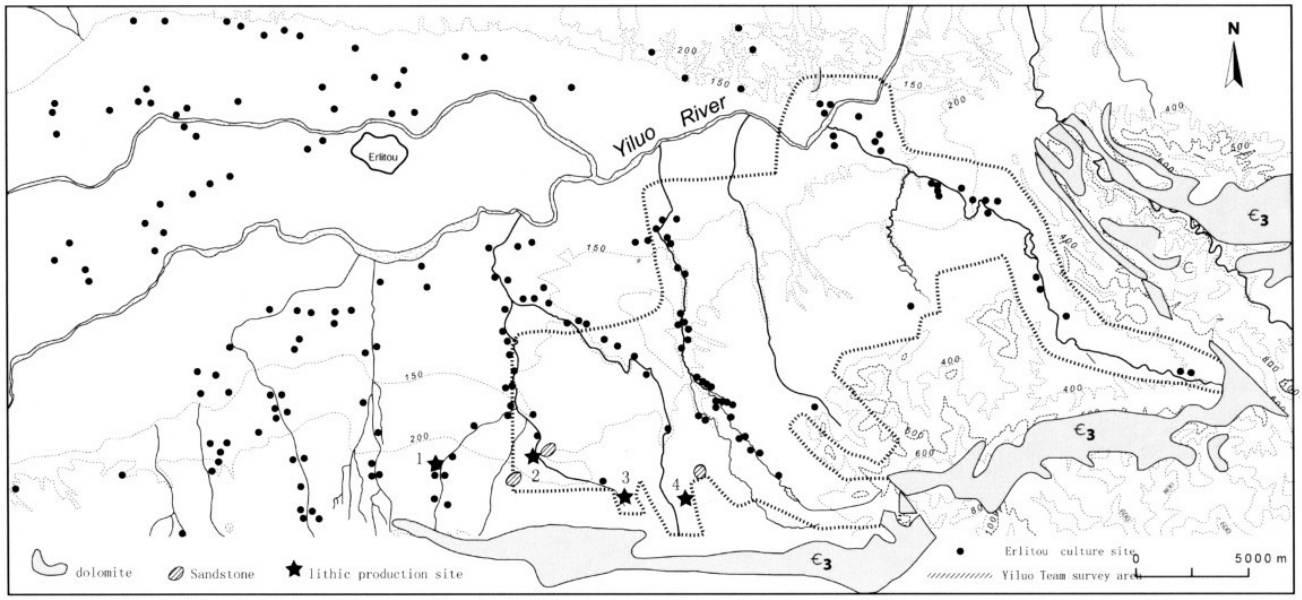

Figure 3. Distribution of Erlitou culture sites in the Yiluo region, showing the locations of spade production sites in relation to dolomite resource. Oolitic dolomite outcrops are in embedded in the dolomite deposits. Sites are surveyed by the Yiluo Team and Erlitou team (Erlitou Team survey results based on Erlitou Working Team 2005). Spade production sites: 1. Zhaiwan; 2. Huizui; 3. Xiahousi; 4. Xikouzi.

rying the stone, roughly flaking the stone into preforms, and carrying the preforms home. The fact that our excavations at Huizui have yielded few large flakes (Chen 2005) supports the scenario that the first stage of manufacture, flaking preforms, may have been completed near the quarries before the raw material reached the tool production sites. This hypothesis nevertheless needs to be tested in the future.

That the production communities obtained the raw material directly from the mountains suggests that these communities may have controlled the access to these outcrops, many of which are situated on the pathways to the mountains. The relatively equidistant distribution of the four spade production settlements also suggests a competitive relationship between them. Huizui may have been in competition with its counterparts for controlling the raw material resources and for trading their products. This proposition will be tested in future by excavating the three other settlements, to see whether or not a similar manufacture process took place there.

Distribution of the oolitic dolomite spades

At Huizui 64% of spades were made of oolitic dolomite, while 36% were made of fine dolomite, siltstone, micaceous fine sandstone and fine sandstone. This suggests that oolitic dolomite was the chief material, but not the only material, for manufacturing spades used by Huizui people. In contrast, the predominant stone tool debitage from the lithic concentration areas, for example at Pit 04T1H1, is oolitic dolomite, indicating that oolitic dolomite was the exclusive raw material for the spades made for exporting to elsewhere. This phenomenon helps us to identify the spatial distribution of Huizui spade products in the region.

Unfortunately, the lithic materials used for ordinary tools are normally not identified in archaeological reports, so it is difficult to trace the distribution of certain stone products, even if their location of manufacture is known. In order to investigate the distribution sphere of oolitic dolomite spades, we examined stone artefact assemblages from seven Erlitou culture sites, including Huizui, in the Yiluo and Zhengzhou regions, distributed about 200 km from east to west (Table 1).

It would be ideal to analyse the ratios of oolitic dolomite spades in the stone tool assemblages from all these sites, in order to observe the correlations between the proportion of the raw material in tool assemblages and the distance from the production centre. However, since we were unable to obtain the complete assemblages of stone artefacts from these sites, our samples are not systematically collected. This prevents us from conducting further statistical analysis.

Oolitic dolomite spades have been identified from Erlitou culture sites up to 100 km from Huizui, as exemplified by Zhengyao at the western end of the Yiluo basin (Fig. 4). It is notable that dolomite spades account for a very low percentage in the spade assemblage (24%) at the Erlitou site as compared to other sites (Table 1). These data suggest that, as an urban population with rather heterogeneous origins, the Erlitou people obtained tools from various sources. It is also possible that Erlitou, as a political and economic centre, received tributary goods and labour from all surrounding regions where various raw materials were used for making spades. In any event, a part of the tool assemblage at the Erlitou site, no matter how small it might be, may have derived from Huizui.

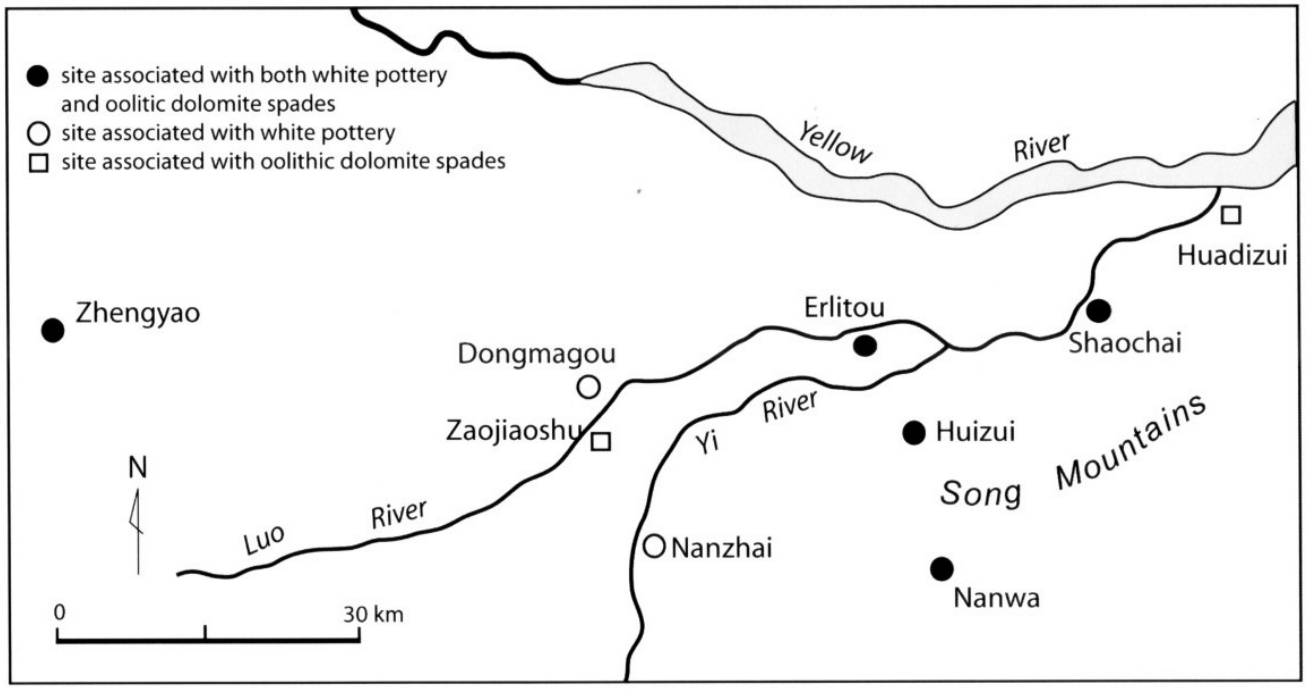

Figure 4. Location of Erlitou sites which yielded white pottery and oolitic dolomite spades around the Yiluo region.

The distribution of oolitic dolomite spades and other types of goods in the regional exchange networks is a complex issue, and more trace-element analyses on raw materials and artefacts are needed in order to establish detailed trade patterns.

Production and distribution of white pottery

White-ware shards, which are remains of prestige items, have been unearthed from the residential area at Huizui West. These white wares appear to have been used as ritual drinking vessels and status symbols during the Erlitou period, as they have been often found in burials of high elite at Erlitou, as well as of lesser elite in regional centres. At least seven Erlitou sites in western Henan have yielded such vessels, including Erlitou, Huizui, Shaochai (in Gongyi), Nanzhai (in Yichuan), Nanwa (in Dengfeng), Dongmagou (in Luoyang), and Zhengyao (in Mianchi). These sites were either primary or secondary centres of the Erlitou state, distributed in an area no more than 100 km in radius from Erlitou (Figure 4). It was previously hypothesised that white pottery was possibly made at locales near white clay sources, but the elite at Erlitou urban centre may have played an important role in controlling the distribution of these prestige goods (Liu and Chen 2003).

White wares unearthed at different sites share similar stylistic characteristics, but no evidence of white ware production has been found at these sites, and their locations of manufacture are unknown. At the Nanwa site, archaeologists have found a wide range of artefacts made of white clay, including not only ritual vessels but also utilitarian items, such as fish-net sinkers and spindle whorls (Zhengzhou University and Zhengzhou Institute of Cultural Relics 2006). In addition, a layer of whitish soil, 30-40 cm in thickness, is widely distributed in the area near the Nanwa site, about 1 m below the ground, and the archaeologists suggest that this soil was used as clay for making white ware. It is possible, therefore, that Nanwa was a production centre of white pottery, which supplied white pottery vessels to Erlitou (Zhu Junxiao 2005 pers. comm.). This is a very interesting suggestion; but since no evidence of white ware production has been found at Nanwa, this proposition still needs to be tested.

Composition analysis has proven to be an effective tool in ceramic provenance studies. To investigate the provenance of white pottery, a total of 32 samples of white shards from Nanwa (14), Huizui (7, with 2 from the same pot, thus representing 6 objects), Erlitou (9), and Nanzhai (2) have been analysed for their elemental compositions. The analysis was performed using an ICP- MS (inductively coupled plasma mass spectrometry) method developed at the University of Queensland, which achieved reproducibility of 0.5-3% (relative standard deviation) for most of the 40 trace elements routinely measured (Li et al. 2003; Li et al. 2006). Trace elements are present in clays (and ceramics) with concentrations typically below 1000 part per million (ppm). Compared with major elements (Si, Al, etc.) which are hosted in the constituent minerals of ceramic raw materials, the presence of trace elements in clay is effectively “accidental”, and their concentrations largely depend on the compositions and geological histories of the original source rocks. As a result, trace elements are usually very powerful data for chemical grouping and differentiation of ceramics made of different sources of raw materials, as implied below.

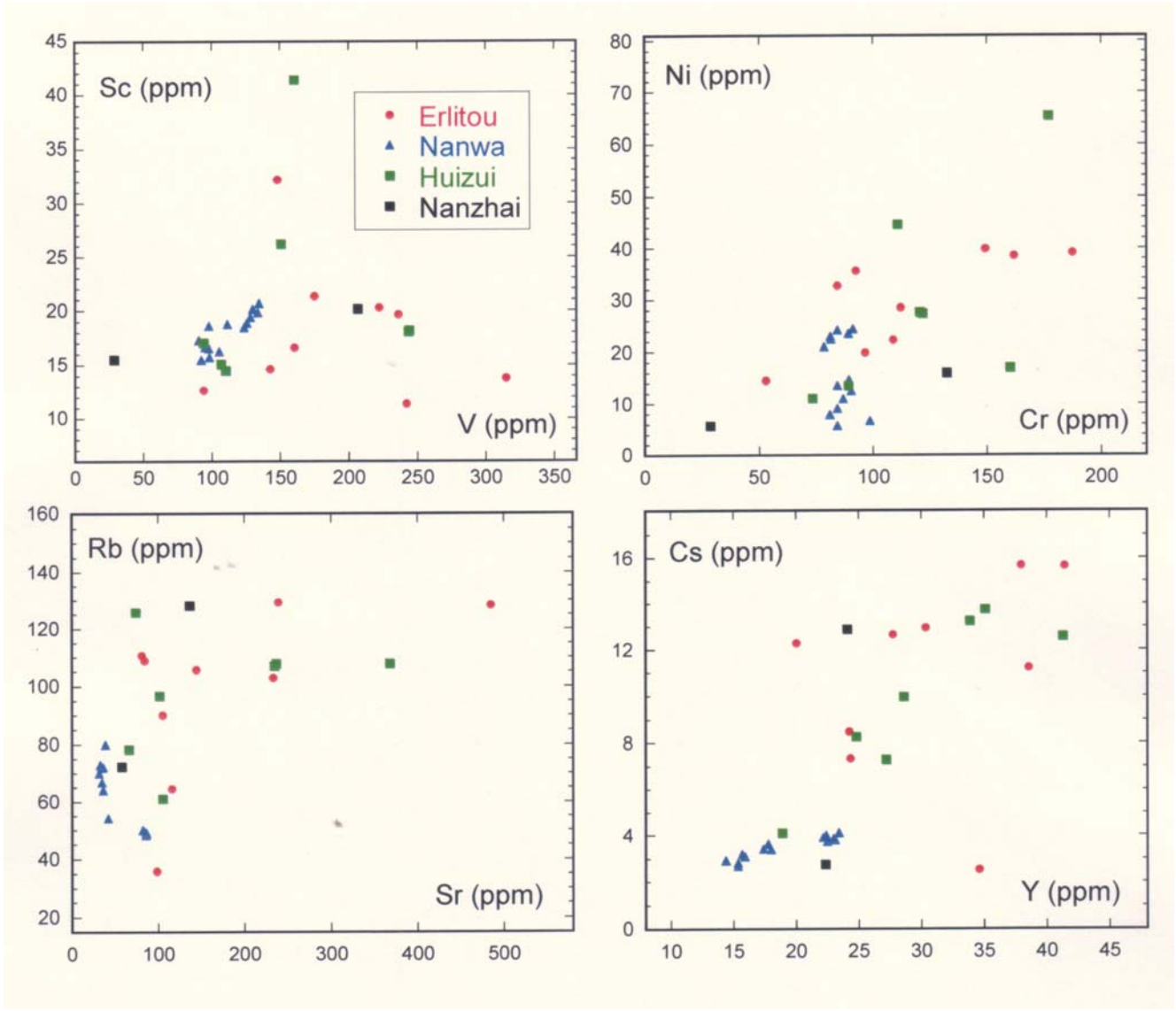

Figure 5. Chemical element grouping of white ware shards from the Nanwa site and comparison with other three sites of the Erlitou state.

Amongst the 14 shards from Nanwa, 6 small ones look to have the same colour and texture. They were possibly fragments from a single pot and thus not good for the purpose of representative sampling, but had to be included for analysis due to rarity of white ware shards. It turned out that these 6 shards have very similar concentrations for most of the 40 elements analysed, and thus form a sub-cluster independent of the other Nanwa shards (Figure 5). This observation further implies that they possibly belonged to the same artefact, or a few pots made from the same batch of clays. Although we cannot differentiate between the two possibilities, their identical elemental concentrations do give some idea of the high precision of the ICP-MS method, and the chemical homogeneity of the white wares.

Bearing in mind that they may possibly represent only 9 pots, the 14 shards from Nanwa show remarkably more restricted variation for contents in most of the 40 trace elements analysed when they are compared with samples from Huizui, Erlitou and Nanzhai. Consequently, Nanwa defines a considerably smaller field on binary plots of elemental compositions than the other three sites, (Figure 5). These observations have several implications.

Nanwa white wares were made of more restricted sources of raw materials, indicating more limited location of manufacture. The trace element features of Nanwa white wares thus support archaeologists' proposition that these ceramics were locally produced, and Nanwa was a production centre for white wares.

Many white wares from Huizui, Erlitou and Nanzhai fall out of the restricted field defined by Nanwa; they hardly look like Nanwa products. This indicates that Nanwa was not the only producer and supplier of white wares during the Erlitou period.

The above three sites are remarkably more scattered in the elemental compositions of their white wares than

Table 1. Inventory of dolomite artefacts from eight Erlitou culture sites in the Yiluo and Zhengzhou regions.

Site	No. of spades of all types of raw materials	No. of oolitic dolomite spades (% of oolitic dolomite in all spades)	Distance from Huizui (as bird flies)	References
Huizui in Yanshi	11	7 (64%)		(Henan Institute of Cultural Relics 1990)
Erlitou in Yanshi	41	10 (24%)	15 km to NW	Data collected by Xie, Liye
Shaochai in Gongyi *	23	5 (22%)	20 km to NE	(Henan Institute of Cultural Relics 1993)
Huadizui in Gongyi	14	2 (14%)	35 km to NE	Identified by John Webb, 2006
Zaojiaoshu in Luoyang	6 examined (reported 16)	6 (100%)	30 km to W	Identified by John Webb, 2006
Zhengyao in Mianchi	24	3 (12.5%)	100 km to W	(Henan Institute of Cultural Relics 1987)
Nanwa in Dengfeng	9 examined (total number unknown)	5 (56%)	20 km to S, on the southern side of the Song Mountains	Identified by John Webb, 2006
Luodamiao in Zhengzhou	34 examined (reported 47)	0 (0%)	70 km to E on the eastern side of the Song Mountains	(Henan Institute of Cultural Relics 1989)

* The Shaochai spades include both Erlitou and Erligang periods, and it is not possible to separate them based on the data available to us.

Nanwa. This demonstrates that they were made of more variable of raw materials. Therefore, the white wares at these sites possibly come from multiple locations of manufacture.

To date, no evidence has been discovered at Erlitou for manufacture of white wares, despite intensive archaeological surveys and excavations for over half a century. There are no signs of white ware manufacture at Huizui and Nanzhai either (although Nanzhai was a burial site and its residential area has not been found). In view of these situations and the trace element implications in sections 1-3, it is possible that the production of white wares was carried out at multiple locations outside the Erlitou urban centre, Nanwa being one of them. The white wares at Huizui, Erlitou and Nanzhai were probably not locally produced.

Some of the white wares from Huizui, Erlitou and Nanzhai fall in the small field defined by the Nanwa samples, suggesting that these three sites obtained some of their white wares from Nanwa. The samples from Huizui and Nanzhai do not seem to define the same field as the Erlitou white wares, although they partially overlap. These indicate variable sources of raw materials. Even if Erlitou was a redistribution centre, it is likely that Huizui and Nanzhai obtained their white wares not solely from Erlitou, but to some extent directly from production centre(s) apart from Nanwa that still await discovery.

It is noteworthy that the closely clustered distribution of the Nanwa white wares on the graph may be biased due to the small sample size. Larger numbers of white ware shards from a larger number of sites (when available) will be analysed to achieve a better chemical characterisation and grouping based on more representative, systematic and comprehensive sampling.

Summarising the above implications, white pottery products may have been distributed among regional elite groups in a decentralized pattern. Although it was a part of the network for exchange of these prestige items, the Erlitou urban centre was unlikely to have totally monopolized the production and distribution of the white pottery.

Several sites yielded both white pottery and oolitic dolomite spades (Figure 4). This correlation points to the existence of regional exchange networks in the Erlitou hinterland, through which both utilitarian and prestige goods (including stone tools and elite ceramics) were traded. Among these sites, Zaojiaoshu (100%) and Nanwa (56%) show high percentages of oolitic dolomite in their spade assemblages (Table 1). As Nanwa was likely making white pottery while Huizui produced dolomite spades, it is possible that people in these two settlements traded their products directly.

Local elite individuals, including some from Huizui, therefore, could have used these goods to express and negotiate for power, status, and wealth through exchange networks. As stone spades were the surplus products of Huizui, it is plausible that Huizui people exchanged spades for other goods, including both utilitarian and luxury items. White wares may have been sought by some individuals at Huizui to facilitate their participation in the elite circles of the region. This proposition, however, needs to be tested by trace-element analysis of white pottery and stone tools from a large number of sites in the Yiluo region.

CONCLUSION

Our research on the production and distribution of stone spades, and our analysis of white wares in the Erlitou hinterland, provide an opportunity to test Trigger's proposition on the modes of craft production in territorial states,

described above. Based on our data we see a craft production system with multi-faceted operations, rather than a polarized two-tiered entity as Trigger suggested.

During the Erlitou period the state craft system may have indeed controlled the most valuable status symbols, such as ritual bronzes, whose distribution was strictly limited to the highest elite individuals, as such items have primarily been found at the Erlitou urban centre. These products, although providing wealth and legitimacy to the state rulers, were withheld from lesser elite groups in a broader region. The locale elite individuals, however, appear to have actively participated in power negotiations, by producing and exchanging other types of prestige items, such as white wares in the forms of drinking vessels for ritual purposes. These vessels were the proto-forms of the major bronze vessels (Liu 2003), and continued to share the same forms with their bronze counterparts throughout the Erlitou period. To date, only Nanwa has been identified as a likely location of white pottery manufacture, and it is unclear if there were more settlements involved in such production. As an ongoing project, we are investigating the possibility that more than one site was in competition for making white wares in the Erlitou core area.

For spade production, although the products were utilitarian in function, the sources of raw material were not widely available to every village, and some communities/social groups may have taken advantage of their settlement locations to control access to the raw material. Production most likely operated on a household basis, and the products were not only meant to fulfil the subsistence needs of makers and their neighbours, but also helped some individuals to gain higher social status and wealth through trade.

The fact, that dolomite spades and white wares found their way to places some 100 km away from their locations of manufacture, indicates the existence of region-wide trade networks in the Erlitou hinterland (Figure 4). Through these networks both elite goods and utilitarian items were circulated, and lesser elite and commoners in the Erlitou hinterland created their own opportunities in the competition for power, prestige and wealth.

Archaeological evidence suggests that the Erlitou core area was a highly centralised political system, and the Erlitou site represents a well developed hierarchical society. It is very possible that some elite items, including white wares, were redistributed through the Erlitou high elite. However, our research also points to a heterarchical dimension in the Erlitou power structure. Independent craftsmen making both elite and non-elite artefacts in the hinterland did not just play a subordinate role in support of the urban elite, but actively pursued status and wealth through their craft skills.

There were many competing interests involving agencies at all levels of society during the period of state formation in the Erlitou core area. Our research on non-state craft specialisation opens a window for further research along this line of investigation.

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REFERENCES:

Adams, R.M. 1966. *The Evolution of Urban Society: Early Mesopotamia and Prehispanic Mexico*. Chicago: Aldine.

Bagley, R. 1990. Shang ritual bronzes: casting technique and vessel design. *Archives of Asian Art* 43: 6-20.

---. 1999. Shang archaeology. In M. Loewe and E. Shaughnessy eds, *The Cambridge History of Ancient China*, pp. 124-231. Cambridge: Cambridge University Press.

Brumfiel, E. and T. Earle. 1987. Specialization, exchange, and complex societies: an introduction. In E. Brumfiel and T. Earle eds, *Specialization, Exchange, and Complex Societies*, pp. 1-9. Cambridge: Cambridge University Press.

Chang, K.-c. 1980. *Shang Civilization*. New Haven: Yale University Press.

Chen, X. 2005. Lithic production of early states in China: An examination of the development of craft specialization. *Workshop on Early Chinese Civilization*, University British Columbia, Vancouver, Canada.

Childe, V.G. 1936. *Man Makes Himself*. London: Watts and Co.

---. 1950. The urban revolution. *Town Planning Review* 21(1): 3-17.

Costin, C.L. 2001. Craft production systems. In G. M. Feinman and T. D. Price eds, *Archaeology at the Millennium: A Sourcebook*, pp. 273-328. New York: Kluwer Academic/Plenum Publishers.

Erlitou Working Team, Institute of Archaeology, CASS. 2004. Henan Yanshishi Erlitou yizhi gongcheng ji gongdianqu waiwei daolu de kancha yu fajue (Survey and excavation of the palatial city and its outer roads at the Erlitou site in Yanshi, Henan). *Kaogu* 11: 3-13.

---. 2005. Henan Luoyang pendi 2001-2003 nian kaogu diaocha jianbao (Report of the 2001-2003 archaeological survey in the Luoyang basin, Henan). *Kaogu* 5: 18-37.

---. 2005. Henan Yanshi Erlitou yizhi zhongxinqu de kaogu xinfaxian (New finds from the central area of the Erlitou site in Yanshi, Henan). *Kaogu* 7: 15-20.

Ford, A. 2001. *States and Stones: Ground Stone Tool Production at Huizui, China*. Honours Thesis. Department of Archaeology, La Trobe University. Melbourne.

Henan 1st Team, I.o.A., CASS. 2004. Henan Yanshi Huizui yizhi dongzhoumu fajue jianbao (Excavation of an Eastern Zhou Tomb on the Huizui Site in Yanshi, Henan). *Kaogu* 12: 27-32.

Institute of Archaeology, C. 1999. *Yanshi Erlitou*. Beijing: Zhongguo Dabaikequanshu Press.

Li, B., J. Zhao, K.D. Collerson and A. Greig. 2003. Application of ICP-MS trace element analysis in study of ancient Chinese ceramics. *Chinese Science Bulletin* 48(12): 1219-1224.

Li, B., J. Zhao, A. Greig, K.D. Collerson, Y. Feng, X. Sun, M. Guo and Z. Zhuo. 2006. Characterisation of Chinese Tang sancai from Gongxian and Yaozhou kilns using ICP-MS trace element and TIMS Sr-Nd isotopic analysis. *Journal of Archaeological Science* 33(1): 56-62.

Li, Y.-t. 2003. *The Anyang Bronze Foundries: Archaeological Remains, Casting Technology, and Production Organization.* Ph.D dissertation. Department of Anthropology, Harvard University. Cambridge, Mass.

Liu, L. 2003. "The products of minds as well as of hands": Production of prestige goods in the Neolithic and early state periods of China. *Asian Perspectives* 42(1): 1-40.

Liu, L. and X. Chen. 2003. *State Formation in Early China*. London: Duckworth.

Liu, L., X. Chen, Y.K. Lee, H. Wright and A. Rosen. 2002-2004. Settlement patterns and development of social complexity in the Yiluo region, north China. Journal of Field Archaeology 29(1-2): 75-100.

Schortman, E.M. and P.A. Urban. 2004. Modeling the roles of craft production in ancient political economies. *Journal of Archaeological Research* 12(2): 185-226.

Trigger, B. 1999. Shang political organization: A comparative approach. *Journal of East Asian Archaeology* 1(1-4): 43-62.

---. 2003. *Understanding Early Civilizations -- A Comparative Study*. Cambridge: Cambridge University Press.

Xu, H., G. Chen and H. Zhao. 2004. Erlitou yizhi juluo xingtai de chubu kaocha (Preliminary investigation of settlement patterns of the Erlitou site). *Kaogu* 11: 23-31.

Zhengzhou University and Zhengzhou Institute of Cultural Relics. 2006. Henan Dengfeng Nanwa yizhi 2004 nian chun fajue jianbao (Brief report of excavation at the Nanwa site in Dengfeng, Henan, in Spring 2004). *Zhongyuan Wenwu* 3: 4-12, 22.