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Introduction

This study uses archaeological data to investigate pottery production, mortuary practice, and social complexity in the Majiayao Culture period (ca. 5300–4000 BP) in late Neolithic northwestern China. Historically, the Majiayao Culture represents the first time that the upper Yellow River region was widely occupied by agricultural communities (Figure 1.1). The Majiayao Culture was derived from immigrant farmers of the well-known Yangshao Culture to the east and mixed with local indigenous foragers (Yan 1978). While the Yangshao painted pottery tradition further developed in the upper Yellow River region during the Majiayao Cultural period, the Dawenkou and Longshan cultures (6100–3900 BP)—mainly characterized by black pottery—became widespread in the middle and lower reaches of the Yellow River. The Longshan Culture was the foundation for the formation of state society in ancient China. Therefore, many Chinese and western archaeologists, such as Liu Li (2004) and Ann Underhill (1996, 2002), have paid great attention to the development of sociopolitical complexity of the Longshan Culture. Located in the periphery of this state formation process, the complexity of the Majiayao Culture has, however, received limited attention.

Majiayao painted pottery vessels are an example of very impressive craft goods made by non-state level societies. Pottery vessels painted with intricate designs represent a dominant product of specialized production among these late Neolithic communities. These vessels were used in both residential and mortuary contexts; they had both utilitarian and sacrificial functions. However, most of the current archaeological data are from mortuary contexts. Extremely rich burials contained more than 100 painted pottery vessels, while there were also burials without any grave goods in the same cemetery (e.g., QWG 1991). The great disparity in quantities of ceramic vessels found in burials signifies the development of social inequality among these Neolithic communities. However, what we know about the production, distribution, and consumption of Majiayao painted pottery vessels is very limited. We know almost nothing more than that these vessels were made by Neolithic specialized craftspeople living in village-scale communities. The sociopolitical and economic processes related to the production and consumption of these craft goods has long been overlooked.

Ceramic craft specialization is certainly an important component in the development of social complexity in the Majiayao case. The very interesting question to me is: How did these Neolithic communities manage the production, distribution, and consumption of these craft goods? With this focus, this dissertation investigates the relationship between specialized pottery production and other factors, particularly settlement hierarchy, mortuary rituals, and subsistence strategies. In this dissertation, I use this multidimensional approach to better understand the human society behind the rich material remains known as Majiayao.

1.1 Theoretical Considerations

As a form of economic organization, the essential idea of craft specialization is the production of goods at volumes for exchange beyond the household (Clark 1995; Costin 1991, 2001; Rice 1987). Scholars, building upon the framework of socio-cultural evolution, have advanced craft specialization as one process involved in the development of social complexity (Brumfiel and Earle 1987; Flannery 1972; Fried 1967; Service 1962; Wailes 1996). Different modes of specialized production are usually defined by their context (degree of elite sponsorship), spatial concentration, scale of production, and time intensity (Costin 1991, 2001). Cross-cultural study by Clark and Parry (1990) indicates that the diversity in the types of specialized production increases along with the complexity of sociopolitical organization. Therefore, the development of craft specialization should be viewed as an additive process, rather than the replacement of one mode by another (Costin 2001:274; also see Cobb 1993, Underhill 1991). Although current Western anthropological scholarship has widely incorporated the study of craft specialization into the investigation of social hierarchy in many regions of the world (e.g., Brumfiel and Earle 1987; Clark and Parry 1990; Costin and Hagstrum 1995), this approach is relatively new for Chinese archaeological studies (cf. Bennett 2002; Liu 2003; Peterson 2006; Underhill 1996, 2002).

Among many studies in different regions of the world, Underhill's research (2002) on ceramic and other craft production during the late Neolithic and early Bronze Age in Northern China provides the most relevant model for this dissertation research. Similar to the Majiayao Culture, the late Neolithic Dawenkou and Longshan cultures of the lower Yellow River region investigated in Underhill's study are characterized by the use of great quantities of ceramic vessels as grave goods; these pottery artifacts would have required intensive labor to manufacture. Based on the model she built using ethnographic and Chinese literature, Underhill outlines the relationship between changes in mortuary ritual, craft production, and social inequality in northern China:

> I propose that what distinguished ancient China was a widespread belief, in place by the late Neolithic period, that ancestors were a source of economic and ideological

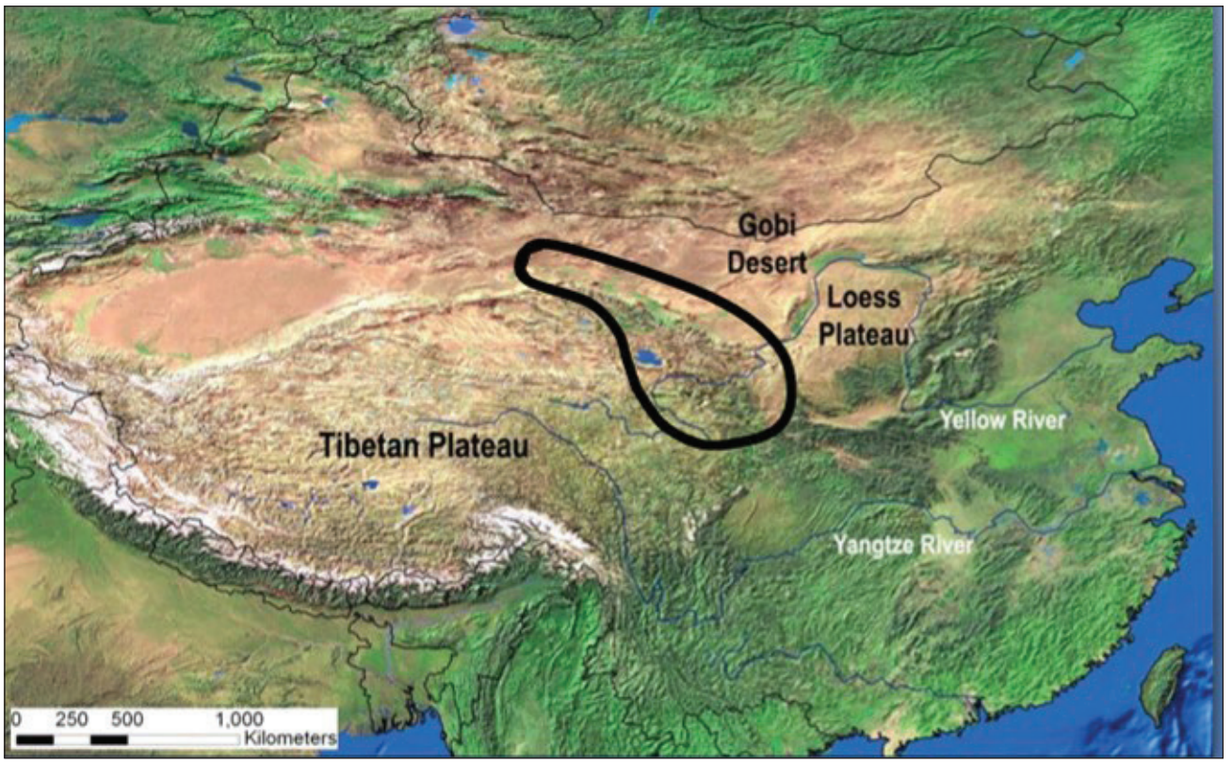

Figure 1.1. The study area of this dissertation: the Majiayao Culture in the Gansu-Qinghai area.

> power. The desire for economic security motivated households to engage in continual negotiation with their ancestors through gifts of food and containers. These gifts of sustenance (whether the food was real or only symbolic) were essential for enabling the relationship between past and present members of descent groups to continue. Intensification of social and ritual activities involving food and food containers was part of the process by which social inequality developed and was displayed. This process motivated diversification in production of food containers in more than one region of northern China (Underhill 2002: 257).

Specifically, Underhill argues that social stratification in northern China was caused by increased factional competition among descent groups over basic economic resources (such as good quality land, food surpluses, and labor). This competition spurred competitive feasting in both residential and mortuary contexts to negotiate social relationships with both the living and the dead. As a result, there was greater effort to produce various prestige food vessels, especially those exclusively for the dead. This development led to diversification in ceramic production during the Dawenkou Cultural period, when mourners placed a greater quantity and diversity of ceramic forms in burials over time. In the late Dawenkou Cultural period, potters made a new form of vessel requiring considerable labor to manufacture, tall-stemmed cups, Underhill suggests these cups signified privileged consumption and households probably sponsored specialists as needed or acquired these vessels by exchange. Meanwhile, "cheaper" *minqi* forms of cups appeared in graves, emulating the more finely made ones. Vessels made exclusively for the dead included those made in batches.

In the subsequent Longshan Cultural period, we see ultra-labor-intensive, eggshell-thin, tall-stemmed cups. Underhill suggests these cups must have been made exclusively for the dead and high-ranking individuals could have temporarily sponsored skilled potters who made these vessels and/or people who transported these vessels; the distances involved in the exchange systems of these vessels normally would not be great because of their fragility. During the Longshan Cultural period, diversity of vessel forms seemed to be more important than quantity of vessels at elite's funerals. The continued social demand for food containers also caused diversification of cheaper funeral wares that more households could acquire. Over time, there was an increase in heterogeneity in organization of ceramic production during the Dawenkou-Longshan Cultural period—potters devoted to the production of different kinds of vessels exclusively for the dead: cups requiring intensive labor, finely made vessels, and crudely made vessels. The change of production organization was not due to the development of attached specialization or a shift from household to workshop production.

Among sites of the Majiayao Culture, the greater quantity of painted pottery vessels unearthed from cemeteries as opposed to settlements indicates that serving the dead could also have played an important role in encouraging ceramic production (Andersson 1925:14). Liu Li (2000)

suggests a transition from group-oriented to individual–oriented ancestor worship may have occurred during the Majiayao Cultural period. However, whether the demand for displaying more vessels in funerary contexts was related to belief in the power of ancestors or not, this demand is a sort of social competition to indicate status and wealth among incipiently ranked groups. The issue that needs to be assessed in relation to the remains from the Majiayao Culture is whether competitive feasting and diversification in pottery production seen in the lower Yellow River region also occurred in the upper Yellow River region.

Underhill's conclusion that elites had control over basic subsistence resources is based on the hypothesized relation between using great quantities and/or diversity of food containers as grave goods, feasting, food surplus, and control over subsistence resources. As Allard (2002) has pointed out, a striking difference between funeral vessels unearthed from elite graves dating to the Majiayao Culture and those from the Dawenkou and Longshan cultures is that the former used storage jars as the dominant vessel type when social inequality was most pronounced, but the latter contained a diverse array of serving vessels. Therefore, Allard suggests that storage, and possibly redistribution, rather than feasting, is more likely to be the strategy associated with elites in the Majiayao Culture period. However, elites may gain their power through other strategies, yet still have the benefit of being offered more food containers as grave goods. Control over subsistence resources may not have been or may just have been one mechanism among others that led to elites' power.

For example, the great quantities of vessels in these elite graves may also attest to elites' religious or ritual power, not only their control over subsistence resources. Liu's study (2000) of ancestor worship in Neolithic northern China includes analyses of cemeteries belonging to the Majiayao Culture and the Longshan Culture, suggesting that individuals with higher social status were politically, religiously, and economically influential. Studies of other Neolithic societies in ancient China also reveal the importance of ritual power in the process of social stratification. For instance, based on mortuary analyses, Qin (2003) suggests that the elite groups of the Neolithic Liangzhu society (ca. 5300–4000 BP) who lived in the lower Yangzi River region gained their power through manipulation of ideological belief and control over the production and distribution of jade artifacts. Peterson's study (2006) of the Neolithic Hongshan society (ca. 6500–5000 BP) in northeast China suggests the presence of co-extant social hierarchies: one based on the accumulation of wealth via economic specialization, and the other based on ritual authority. However, Underhill (2002) suggests that prestige goods such as the jade ornaments and symbolic weapons found in Longshan burials were acquired to legitimize power structures already in place.

The social symbolic value associated with Majiayao painted pottery vessels, such as wealth, status, or group identity, may have also played an important role in the intensification of their production. Elites may have used these prestige goods for status display or have gifted them to their supporters in exchange for services (see Bowser 2000; Brumfiel and Earle 1987; Costin and Hagstrum 1995; D'Altroy and Earle 1985; Earle 1991; Peregrine 1991). However, this does not imply that the Majiayao painted pottery vessels were exclusively monopolized by elites. Current studies indicate that both elites and commoners in middle-range societies shard a desire for prestige goods (e.g., Bayman 2002; Vaughn 2004). The increasing demand for more vessels from both elites and commoners may have both affected the production systems of the Majiayao painted pottery.

1.2 Research Questions and Objectives

Along with population growth and the use of agriculture, intensive pottery production characterizes communities of the Majiayao Culture in northwestern China. Archaeological excavations in this area have unearthed tens of thousands of painted pottery vessels from burials. The increasing disparity over time between the numbers of pottery vessels found in lavish burials and more impoverished burials suggests Majiayao painted pottery vessels were used to signify increasing social differences among their owners. While we can observe this clear trend in the data, it is still unclear how the production systems responded to this increasing demand for painted pottery vessels in mortuary practices over time. Although scholars suspect certain of these vessels were made exclusively for funerary use (Allard 2002:17; Andersson 1925:14), this issue has not yet been adequately investigated in regards to any specific vessel shapes, painted motifs, or manufacturing variations.

Majiayao painted pottery vessels were essentially containers of food and liquid. Using large quantities of labor-intensive wares to honor important ancestors has a long history in China and can be plainly seen in the Bronze Age and later historic period uses of bronze vessels, lacquerware and porcelain. Neolithic Majiayao painted pottery is certainly one of the earliest manifestations of this tradition. Furthermore, most of these painted pottery vessels were either serving or storage wares; rarely were they used as cooking wares. The "nonessential" painted decoration on these vessels and their physical function suggest their usage was related to an emphasis on displaying wealth symbolically through the provision of food in funeral contexts. We can further hypothesize the emphasis on food provision in funeral contexts may be associated with increasing food surplus. However, the potential interrelationship between subsistence intensification and ceramic specialization has not yet received proper attention.

Our current understanding of systems of ceramic production and exchange among the Majiayao communities is limited. Current archaeological records indicate: 1) the Majiayao Culture is characterized by investing significant

energy for making more and more painted pottery vessels over time; 2) more of these craft goods were buried with certain individuals/groups than others; and 3) this disparity of pottery vessels in funeral contexts appears to be increasingly conspicuous in areas where more arable land is available. These patterns suggest the production and consumption of Majiayao painted pottery were interrelated with social hierarchy, mortuary practice, and regional subsistence intensification. As an initial attempt to address this interrelationship, this dissertation investigates archaeological evidence to better understand: 1) how ceramic production, distribution, and consumption during the Majiayao Culture period changed over time; 2) how mortuary practices and regional subsistence intensification interacted with these changes; and 3) how specialized pottery production was incorporated into the development of social hierarchy among Majiayao Culture communities. Results from this dissertation research will improve our current understanding of the Majiayao Culture and provide a regional case from Neolithic China for the comparative study of similar scenarios observed in other regions of the world.

1.3 Environmental Setting

Settlements of the Majiayao Culture are mainly distributed in an area extending from modern Gansu Province to the northeastern portion of Qinghai Province, an area that I refer to the Gansu-Qinghai area in northwestern China (Figures 1.1, 1.2). This region is at the crossroad of different routes of the ancient Silk Road, connecting the heartland of Chinese civilization to central Asia and Southwest Asia. Cultural, commercial, and technological exchange along the Silk Road during the historic period has been well documented. For centuries, the Gansu-Qinghai area has been an ethnic melting pot. Both Gansu and Qinghai provinces are now populated by a mixture of many ethnic groups, which is an end product of long-term inter-regional interactions among central Asia, northern Asia, northern China, and the Tibetan Plateau.

The Gansu-Qinghai area includes diverse environmental settings. It is in the upper reaches of the Yellow River, at the confluence of the Loess Plateau, the Tibetan Plateau, and the Gobi Desert (Figure 1.1). Based on a combination of criteria including geographical location, topography, tectonic movement, climate characteristics, geographic history, and human impact, China is divided into three environmental zones: 1) Eastern Monsoon China, which contains about 89 percent of China's total farmland and about 95 percent of the total population; 2) Northwest Arid China, which has around 10 percent of the total farmland and only 4 percent of the total population; and 3) the Tibetan Frigid Plateau, which has less than one percent of both the total farmland and total population (Zhao 1994: 30–31). The Gansu-Qinghai area is in the intersection of these three zones (Figure 1.2). Gansu Province includes all three of these realms. Except a small portion of its northeastern corner, the vast area of Qinghai Province belongs to the Tibetan Frigid Plateau.

Presumably, different environmental settings that affect modern population distribution would have also contributed to the distribution of ancient populations. Despite the large area, the population in Gansu and Qinghai compose only 2.4 percent of the Chinese population according to the 2000

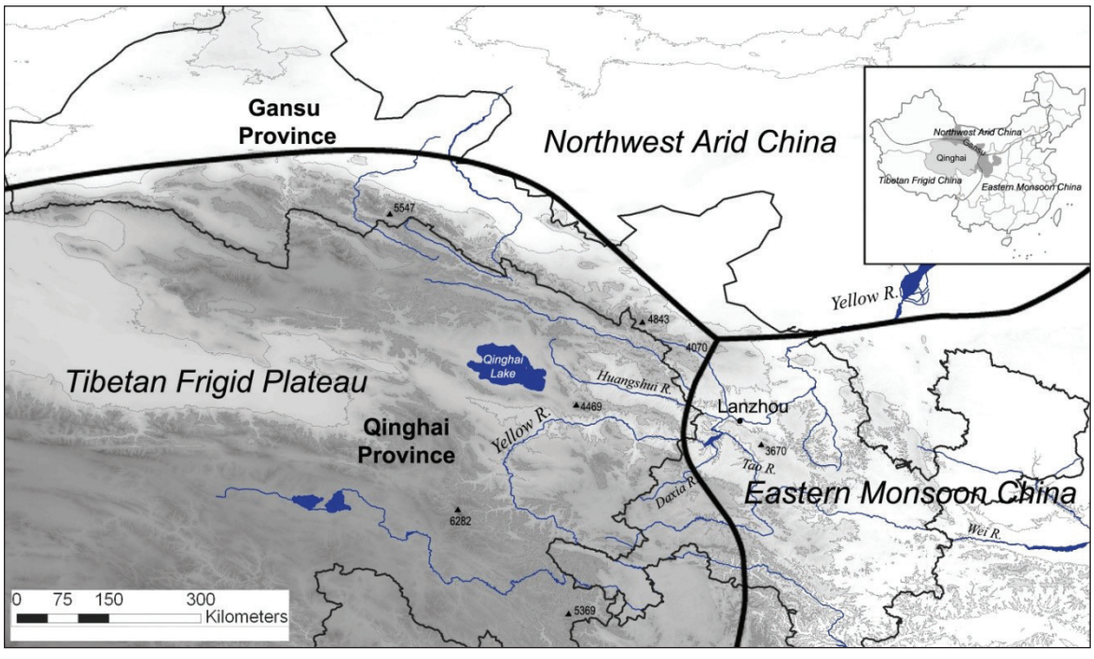

Figure 1.2 The division of three natural realms in the Gansu-Qinghai area.

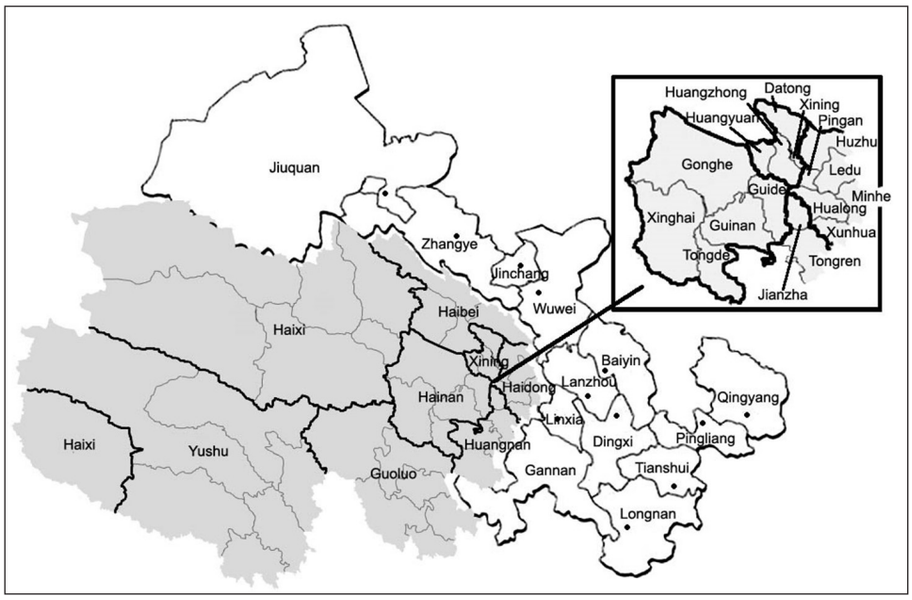

Figure 1.3. Modern districts in Gansu and Qinghai provinces discussed in this study.

population census.[1] The low population reflects the overall poor environmental conditions in the Gansu-Qinghai area. Particularly, a high percentage of the modern population in this region is concentrated in the part of Gansu and Qinghai belonging to Eastern Monsoon China. Below, I address the different environmental settings in the Gansu-Qinghai area.

1.3.1 The Gansu-Qinghai Area in Eastern Monsoon China

This region includes two sub-regions: 1) eastern and central Gansu and the northeastern edge of Qinghai; and 2) southeastern Gansu.

1.3.1.1 Eastern and Central Gansu and the Northeastern Edge of Qinghai

Geographically, this area is in the western Loess Plateau in Gansu extending to the margin of the Tibetan Plateau in northeastern Qinghai. The modern administrative districts in this region include Qingyang, Pingliang, and Tianshui in eastern Gansu; and Lanzhou, Linxia, Dingxi, and southern Bayin in central Gansu (Figure 1.3). Haidong District in northeastern Qinghai is in the intersection between Eastern Monsoon China and the Tibetan Frigid Plateau.

This region contains a section of the upper reaches of the Yellow River. The main tributaries of the Yellow River in this region include (Figure 1.4):

1. the Huangshui River: the Huangshui River flows eastward from northeastern Qinghai to the western edge of central Gansu. The Huangshui River has a length of 349 km. Broader basins along the Huangshui River are separated by narrow and deep gorges. For example, a narrow gorge of 17 km in length separates the Ledu basin in the middle reaches and the Minhe basin in the lower reaches. These river basins along the Huangshui River generally have an elevation ranging from 1600 to 3000 m. Basins at an elevation between 1800 to 2000 m provide ideal farmland.
2. the Zhuanglang River: with a length of 179 km, the Zhuanglang River flows southward, and its drainage area is mainly in the northwestern part of central Gansu.
3. the Daxia River: the Daxia River has a length of 203 km. It flows northward with its upper reaches in the Tibetan Plateau and lower reaches in the Loess Plateau. Its drainage area extends from Gannan District in southwestern Gansu to Linxia District in central Gansu.
4. the Tao river: with a length of 673 km, the Tao River has its middle and lower reaches east of the Daxia River. The Tao River also flows through the Tibetan Plateau in southwestern Gansu and the Loess Plateau in central Gansu. Broad river basins are concentrated in its lower reaches, such as the Lintao basin.
5. the Zuli River: located to the northeast of the Tao River, the Zuli River also flows northward. Different from the above four rivers, the Zuli River has its origin in the Loess Plateau and flows into the Yellow River east of Lanzhou city. The Zuli River has a length of 224 km. A unique characteristic of the Zuli River is that it has a high degree of saline-alkalization and is unsuitable as drinking water for humans and animals. Its southern source is fresh water, but is eastern source is saline water.

[1] Gansu Province has an area of 454,000 km^2 and Qinghai Province has a area of 720,000 km^2.

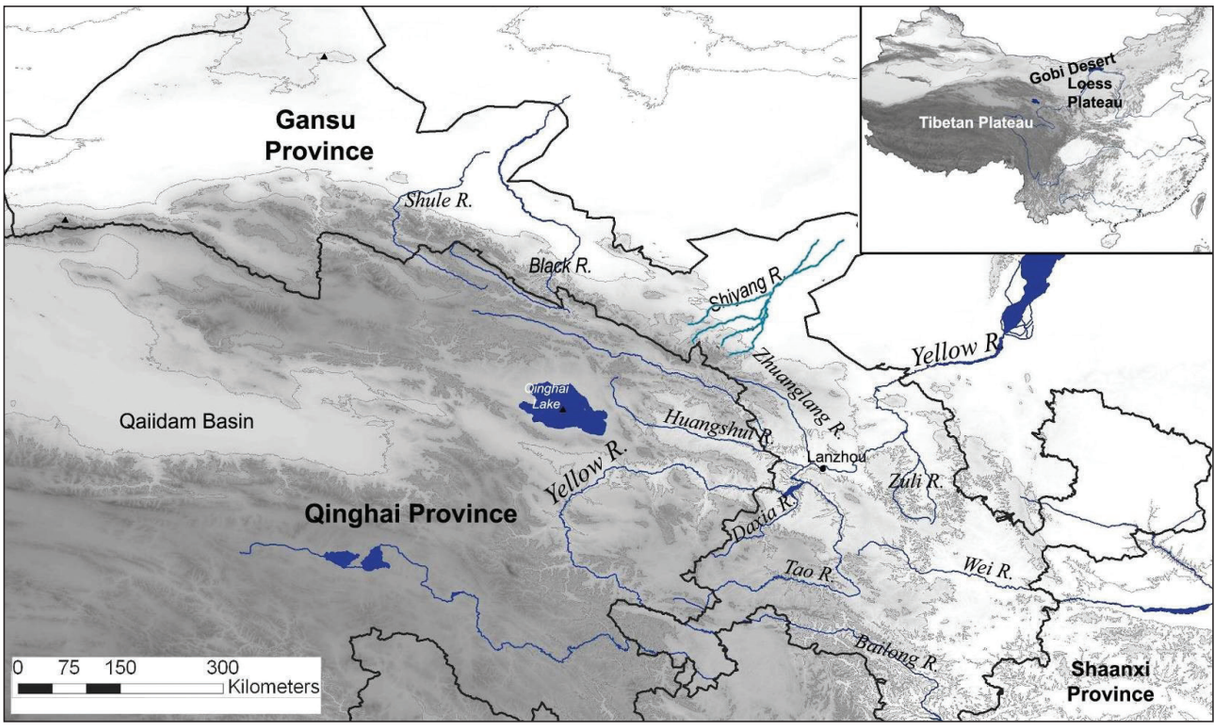

Figure 1.4. River systems discussed in the study area.

6. the Wei River: with a length of 818 km, the Wei River is the largest tributary of the Yellow River. The upper reaches of the Wei River occupy the east part of central Gansu.

The Gansu-Qinghai area in Eastern Monsoon China is in a warm temperate subhumid to semiarid zone, with average annual precipitation between 250 and 500 mm (see Zhao 1986: Figure 2.5). For example, the average annual precipitation is 331 mm in Lanzhou City (see Zhao 1986: Appendix II). This region typically has warm summers and very cold, dry winters. For example, Lanzhou City has its average January temperature at –7 °C, average July temperature at 22 °C, average annual temperature at 9 °C, accumulated temperature during ≥ 10 °C period[2] between 3200° and 4500 °C, and between 150 and 220 frost-free days (Zhao 1986: 7, 88, 207). Compared to river valleys, mountain areas with a lower accumulated temperature during ≥ 10 °C periods and fewer frost-free days would be unsuitable for agricultural production. The dominant vegetation in this region is steppe vegetation (see Zhao *et al.* 2007: Figure 3).

1.3.1.2 Southeastern Gansu

Longnan District is located in southeastern Gansu. Geographically, this region lies in the east ranges of the Qinling-Daba Mountains, with the Loess Plateau in the north and the Tibetan Plateau in the west. The rivers in this region, such as the Bailong River, are tributaries of the Yangtze River rather than the Yellow River. These southward flowing river valleys are important passages connecting the Gansu-Qinghai area in northwestern China to southwestern China.

In terms of climate, this region is in a subtropical humid zone. Climate in this region is moister and warmer than other regions of the study area. However, affected by its diverse geographic features, climate conditions show significant differences horizontally and vertically. Average temperatures range between 5 °C and 15 °C and the average annual precipitation is between 500 to 750 mm (see Zhao 1986: Figure 2.5). From the southeast to the northwest, the climate gradually becomes cooler and dryer. As a result, forest is the dominant vegetation, changing from a mixed deciduous-broadleaved evergreen forest zone in the south to a deciduous forest zone in the north (see Zhao *et al.* 2007: Figure 3).

1.3.2 The Study Area in Northwest Arid China

The main concern in this region is the Hexi Corridor (Gansu Corridor) in Wuwei, Jinchang, Zhangyu, and Jiuquan districts. The corridor is part of the northern Silk Road connecting northern China to Xinjiang and Central Asia. Stretching northwestward for about 1000 km from the steep Wushaolin hillside near Lanzhou City to the Jade Gate at the Gansu-Xinjiang border, the corridor is a long passage sandwiched between the border of the northeastern margin of the Tibetan Plateau and the vast gravel Gobi Desert. The corridor is mainly composed of diluvial-alluvial deposits with an elevation from 1000 to

[2] "The accumulated temperature is the sum total of temperatures in the period when the temperature is ≥ 10 °C. The term is also known as active temperature because most plants begin to grow only when the temperature is above 10 °C" (Zhao 1986: 88).

1500 m. Two mountains interrupt the corridor and divide it into eastern (Shiyang River basin in Wuwei), middle (Black River basin in Zhangye), and western (Shule River basin in Jiuquan) sections. Larger populations appear in its eastern section (Wuwei and Jinchang) than its middle and west section (Zhangye to Jiuquan). The melt water from snow and glaciers on high mountains provides the major source for these river systems flowing into the desert (Zhao 1994: 283–284). Many fertile oases have developed along the middle and lower reaches of the perennial rivers (Zhao 1986: 87).

The Hexi Corridor is in a warm temperate and temperate arid desert zone. Summer monsoons have very weak influence in this region. The average annual precipitation is generally below 200 mm and decreases significantly from the southeast to the northwest, averaging 162 mm at Wuwei, 125 mm at Zhangye, and 86 mm at Jiayuguan (Zhao 1994: 284). The climate is extremely dry. Cultivation in this region relies heavily on available irrigation water. In addition, large tracts of grassland have been used for pasture since ancient times (Zhao 1986: 87).

1.3.3 The Study Area on the Tibetan Frigid Plateau

This region includes Gannan District in southwestern Gansu and Xining, Huangnan, and Hainan districts in northeastern Qinghai. This region is dominated by the Tibetan Plateau. The Tibetan Plateau has an elevation of 4000 to 5000 m, with its eastern and northern borders roughly coinciding with the 3000 m contour line (Zhao 1986: 28). River systems in this region include the upper reaches of the Yellow River, Huangshui River, and Tao River. The river basins in this region have a higher elevation than those farther east, such as the Gonghe basin (2400 to 3000 m) in northeastern Qinghai versus the Lanzhou basin (1500 to 2000 m) in central Gansu.

This region is in a temperate zone. The semiarid climate is characterized by long cold winters and short cool summers. This region is dominated by dense, short, low-yielding alpine vegetation, suitable for yak and sheep only (Zhao 1994: 72). Soil profiles are poorly developed and fertility is rather low. Overall, natural conditions in this region as a whole are unfavorable to human activities (Zhao 1986: 87).

1.3.4 Paleoclimate during the Majiayao Cultural Period

Based on the study of two ancient swamps located in eastern and central Gansu, An *et al.* (2004) suggest that the Majiayao Culture developed in a period of semi-arid climate; they argue that the semi-arid climate was favorable for cereal-based agriculture practiced by people of the Majiayao Culture. The end of the Majiayao Culture is around the same time of a sharp transition toward much drier and colder climate ca. 4000 cal. BP, probably indicating the termination of Holocene Maximum moisture interval in the area (An *et al.* 2000). The studies of pollen from the Qinghai Lake show significant fluctuations in precipitation and temperature during the Majiayao Culture period (Figure 1.5). Mo *et al.* (2009: 9) further compare the paleoclimate records from seven sites and indicate that three floods and one drought occurred in the Gansu-Qinghai area during the Majiayao Cultural period. The record of floods are dated to 5160 cal BP, 4950 cal BP, and 4780 cal BP; the record of drought is dated to 4600 cal BP.

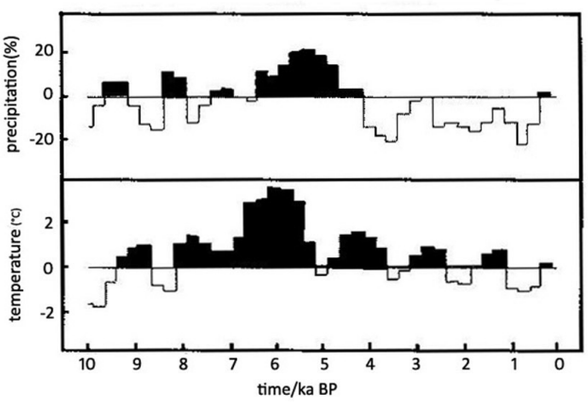

Figure 1.5. Change in precipitation (%) and temperature (°C) during the past 10,000 years, indicated by the studies of pollen from the Qinghai Lake. (after Liu ed. 2004: Figure 2.6)

1.4 The Archaeological Culture Known as Majiayao

The archaeological culture known as Majiayao represents well-developed millet-based agricultural communities associated with intensive painted pottery production. It flourished in the Gansu-Qinghai area in northwestern China approximately 5300 to 4000 BP (Table 1.1). In this area, the development of painted pottery production began with the Laoguantai (Dadiwan) Culture around 8000 BP (Xie 2002). People of the well-known Yangshao Culture further developed and expanded this tradition to a large geographic region in northern China. Interestingly, in the late Yangshao phase (5500–4900 BP), the production of painted pottery suddenly collapsed in most regions in northern China. However, in the Gansu-Qinghai area, intensive painted pottery production became a distinctive regional characteristic through the Majiayao Cultural period.

Based on stratigraphic and typological studies of pottery, the Majiayao Culture is divided into the Majiayao, Banshan, and Machang types, representing three phases of a sequential development: i.e. Majiayao phase (5300–4650 BP), Banshan phase (4650–4300 BP), and Machang phase (4300–4000 BP). The Majiayao Culture is mostly assigned to the late Neolithic period, but sometimes it is also placed in the Chalolithic period (cf., Yan 1986; Yan *et al.* 2004). Two cast bronze knives have been found from sites of the Majiayao Culture. One is from the Linjia site in Linxia District dated to the Majiayao phase and one is from the Jiangjiaping site in Lanzhou District dated to the Machang phase (GWG *et al.* 1984; Sun and Han 1981). These are the earliest bronze artifacts found in China to date. Apart from these rare findings, the Majiayao Culture

Table 1.1. The sequence of archaeological cultures in the Gansu-Qinghai area

Cultural sequence	East Qinghai and Central Gansu	East Gansu
	Qijia Culture (4200–3600 BP)	
	Majiayao Culture: MCP (4300–4000 BP) BSP (4650–4300 BP) MJYP (5300–4650 BP) Shilingxia type	Changshan type
		Late Yangshao (5500–4900 BP)
	Miaodigou/Middle Yangshao (6000–5400/5500BP)	
		Early Yangshao (7000–6000 BP)
		Laoguantai (8000–7000 BP)

is fundamentally associated with Neolithic technology, using stone, ceramic, bone, and wooden tools.

1.4.1 J. G. Andersson's Discoveries and Hypotheses

The splendid painted pottery vessels of the Majiayao Culture were brought to light by the Swedish scholar J. G. Andersson through his archaeological expedition to the Gansu-Qinghai area during 1923 and 1924. The main purpose of Andersson's expedition was to test the popular theory of Western origins (Central and Western Asia) of Chinese culture. This theory became particularly appealing to him after his discovery of late Neolithic painted pottery at Yangshao and other sites in Henan Province in the Chinese heartland (Andersson 1923). The striking similarity between Yangshao painted pottery—an exotic cultural trait in Chinese history known at that time—and those found in Central and Western Asia encouraged Andersson to extend his research further west to regions where he expected to find relics of the hypothetical connection between these sites (Andersson 1925).

As a result, Andersson identified six prehistoric stages characterized by six distinctive ceramic types dated from the late Neolithic to the early Bronze age in the prehistoric Gansu-Qinghai area. Among these six stages, materials from the Yangshao stage and the succeeding Machang stage are discussed in this dissertation. In Andersson's framework, the Gansu and the Henan Yangshao belong to the same period with reasonable differences caused by geographical differentiation. With the assumption of a Western origin of painted pottery, he concludes:

> Under the generally accepted view that the original home of the painted pottery was in the Near East, we feel inclined to believe that the art of making the fine pottery with painted decoration reached Kansu [Gansu] first and Honan [Henan] later. This is undoubtedly true, but the spread of this western art must have been comparatively rapid, because there is at present very little de facto archaeological evidence that the painted ceramics reached Gansu earlier than Henan (Andersson 1925: 48).

However, the current data suggest the painted pottery tradition in northern China actually expanded from the middle reaches of the Yellow river to modern-day Xinjiang. The earliest painted pottery vessels found in Xinjiang are dated to around 2000 years ago, but this tradition can be traced back to at least 7000 years ago in the middle Yellow River region.

Andersson's other influential argument is that there is a deep contrast between dwelling-site vessels and mortuary vessels. He considers the two most elaborate ceramic types of his collections—represented by vessels found at a dwelling site at Majiayao in Lintao, central Gansu versus several burial sites in the nearby Banshan hills—are both contemporary to his previous findings at Yangshao in Henan Province. Therefore, he (1925, 1934, 1943) suggests the Gansu Yangshao stage includes distinctive dwelling-site vessels and mortuary vessels. Vessels unearthed from Majiayao in Lintao and several other dwelling sites were for daily-use, while burial vessels unearthed from the Banshan hills were exclusively for the dead in the same time period. Andersson (1925: 14) suggests a "death pattern"—the design formed by a red band surrounded by two black bands with saw-like dentations projecting towards the central red band—found on those burial vessels was specially connected with funeral rites. Further, Andersson's Machang stage mainly includes ceramic vessels unearthed from several graves at modern Machangy(u)an in Minhe, Qinghai. He considers these vessels as a continuative development of the burial vessels found in the BS hills in a phase of "decadent maturity" (1943: 215).

The above two hypotheses made by Andersson were proved to be invalid with subsequent archaeological findings. However, his focus on the issue of early Eurasian interaction and his query about vessels made specifically for the dead are still critical issues for our current study. Further, the three ceramic types—respectively unearthed from the representative sites of Majiayao, Banshan, and Machangy(u)an—defined by his pioneering research set up a classification foundation for all the subsequent studies, which also form the body of what has been commonly known as the Majiayao Culture (Gansu Yangshao Culture), discussed in this dissertation.

1.4.2 The Definition of the Majiayao Culture

The term Majiayao Culture was first proposed by Xia Nai (1949). He indicated that the decorative designs between the Gansu Yangshao and Henan Yangshao are very different. Therefore, he replaced the term Gansu Yangshao Culture with Majiayao Culture to refer to vessels of the Majiayao and Banshan types. Soon after this proposal, stratigraphic evidence found at the Majiayao site in Lintao further suggested that Yangshao Cultural remains are earlier than remains of the Majiayao type (GWGW 1958). Meanwhile, many scholars advocated that remains of the Machang type, along with the Majiayao and Banshan types, belong to the so-called Gansu Yangshao Culture or Majiayao Culture (e.g., An Zhimin 1956, 1959; GB 1960a). Therefore, by the 1950s the common idea about the Majiayao Culture (Gansu Yangshao Culture) was already quite different from Andersson's original definition. It has been commonly recognized that the Majiayao Culture (Gansu Yangshao Culture) includes three ceramic types dated to later than the Yangshao Culture and earlier than the Qijia Culture. Furthermore, although the distinction between dwelling-site and funerary vessels is still commonly accepted, the distinctive contrasts suggested by Andersson are not recognized (see An Zhimin 1956, 1959).

Yang Jianfeng's 1962 monograph provided a fundamental framework for the current common definition of the Majiayao Culture. He illustrates available archaeological evidence to deny the differentiation between dwelling-site pottery and funerary pottery and regards the Majiayao, Banshan, and Machang types as a sequential development of the Majiayao Culture. Without ideal stratigraphic data, Yang's chronological framework of the Majiayao phase (MJYP), Banshan phase (BSP), and Machang phase (MCP) is built on a typological approach with the understanding of the relative chronology among the Yangshao, the Majiayao, and the Qijia cultures.

With more available archaeological data, Yan Wenming (1975) demonstrated that the Majiayao Culture in the Gansu-Qinghai area represents a regional development of the Yangshao Culture expended from Chinese heartland. First, he emphasized that the strata at Shilingxia in eastern Gansu and a few other sites demonstrate the existence of a transitional phase, named Shilingxia, between the Miaodigou type of the Yangshao Culture and the Majiayao type. Second, he compared stone tools, ceramic shapes, colors, and decorations to illustrate the cultural continuity from the Miaodigou, Shilingxia, to Majiayao types. Third, he adopted ^{14}C data to support his argument about the Miaodigou type being earlier than the Majiayao type. With these multiple approaches, he concluded that the theory of a Western origin of Yangshao painted pottery is invalid.

Later, Yan (1978) used more available archaeological and ^{14}C data to refine the previous chronological framework proposed by Yang Jianfeng: i.e., the sequence of the MJYP, BSP, and MCP. Different from others, Yan emphasizes the cultural continuity between the MJYP and the BSP (cf., An Zhimin 1972; Shi Xingbang 1962; Xia Nai 1977). He identifies a ceramic type (the Xiaopingzi type) illustrating transitional characteristics between vessels dated to the MJYP and BSP. Overall, Yan provides a solid foundation for the subsequent and current discussions of the chronological and regional framework of the Majiayao Culture. Also, he suggests that the regional development of painted pottery during the Majiayao Cultural period was associated with westward agricultural immigrants of Yangshao groups and cultural contributions from indigenous hunter-gatherers in the Gansu-Qinghai area.

1.4.3 Modeling Pottery Production during the Majiayao Cultural Period

The manufacture of Majiayao painted pottery vessels requires considerable specialized skills and labor investment compared to the manufacture of unpainted vessels (Ma 2000; Li and Huang 1993). Particularly, symmetric vessel shape and precise brushwork indicate they are products of master artisans. Therefore, scholars commonly assume that Majiayao painted pottery vessels were made by specialized potters, and maybe painters, who were not responsible for making unpainted pottery vessels (Chen 2002:144; Li 1998:190). The implication is that the production of painted pottery was spatially nucleated, while the production of unpainted pottery was more evenly distributed (Costin 1991). A large ceramic workshop containing at least 12 kilns dated to the MCP has been recovered at the Baidaogouping site in central Gansu. There are also raw materials, tools, thousands of potsherds, and wasters found around these kilns, indicating that the manufacture was conducted around the kilns (GWGW 1957). It is the largest Neolithic ceramic workshop found in China to date. Most likely, this belongs to the workshop production mode as described by Rice (1987), or Costin's (2001) production typology, in which exchange would be much more common than in the household production mode. Yan (1986) proposes that Baidaogouping is an example of a production center supplying painted pottery vessels for consumption among multiple villages, but he does not further discuss the form of exchange between producers and consumers.

Zhang Chi's study (1994) of BSP[3] painted pottery vessels and cemeteries represents one of the most important attempts to investigate the organization of pottery production and consumption during the Majiayao Cultural period. His study defines several different ceramic assemblages in the BSP and suggests different ceramic assemblages tend to be associated with different burial groups. He argues that: 1) these burial groups represent different descent groups, such as clans; 2) different ceramic assemblages in a cemetery were used by different kin groups indicated by criteria like burial posture and location; and 3) the production,

[3] Zhang's classification of BSP painted pottery vessels includes the early MCP materials discussed in this dissertation.

distribution, and consumption of pottery vessels were based on kinship organization. Zhang's fundamental idea is that the economic organization for both pottery production and consumption was built upon kin relations during the Majiayao Cultural period. Although he recognizes that some cemeteries in the Huangshui River valley did contain a few vessels probably obtained from central Gansu, he suggests this kind of interaction was occasional and implies that only communities with more complex organization and wider interaction network had access to these imported goods. It is important to point out that there is geochemical evidence to support the identification of imported goods discussed in Zhang's study (QWKY 1990).

Recent excavations at two outlying sites—the Zongri site in eastern Qinghai and the Yingpanshan site in northwestern Sichuan—raise another question: Were MJYP painted pottery vessels found in the periphery imported from the core area of site distribution or made locally? Chen Honghai's study (2002: 144) of remains found at the outlying Zongri site in northeastern Qinghai suggests most MJYP painted pottery vessels found at Zongri were probably imported goods. However, as for the few MJYP painted pottery vessels found at Yingpanshan and other sites in northwestern Sichuan, the researchers suggest these vessels were mainly locally made. This opinion is based on subjective naked-eye observation of potsherd color, decoration styles, temper materials, and firing technique (Chen Jian 2006, 2007:69; Jiang and Chen 2001:30). One thing we should be aware of is that these painted pottery vessels unearthed from Zongri and northwestern Sichuan all reveal the same high quality control as those unearthed from the core area of site distribution in central Gansu. We need to investigate their origin with physicochemical approaches.

1.5 Study Materials and Methods

To better understand pottery production and consumption during the Majiayao Cultural period, I use different kinds of data and methods. The materials discussed in this dissertation are composed of settlement survey data, mortuary data, and ceramic data. In addition to published materials from site reports and catalogues of pottery, ceramic data include results from my firsthand observation of accessible vessels and physicochemical analysis of diagnostic potsherds selected from multiple sites.

1.5.1 Survey Data

More than 1700 sites dating to different phases of the Majiayao Culture are recorded in the Qinghai and Gansu volumes of the Atlas of Chinese Cultural Relics (ZWDBW 1996, in press). In this dissertation, I use these two volumes as primary sources to investigate site distribution and general settlement patterns during the Majiayao Culture period. I supplement this data set with two important additional sources—the Majiayao phase sites recorded in the Hexi Corridor (Li Shuicheng 2001) and results from recent surveys in the upper reaches of the Yellow River in northeastern Qinghai (Chen Honghai 2002: 136; Chen Honghai *et al.* 1998).

These recorded sites in Gansu and Qinghai volumes of the Atlas of Chinese Cultural Relics (henceforth, the volumes) are mostly results from unsystematic surveys conducted by local archaeologists of county-level institutes. It is not clear if all the surveyors follow the same survey methods and standards. The volumes do not specify how the survey locations were chosen. Further, the volumes record some archaeological remains obtained from a "site" and some from a "cemetery". There is no way to know if the size assigned to a "site" includes only the residential area and if the size assigned to a "cemetery" includes no residential area. For my comparison of site distribution and site-size distribution in this dissertation, I do not distinguish these two types of entries recorded in the volumes. The detailed location of each site is not provided in the volumes. For example, the location of the Dibaping site is recorded as "300 m west of the Dibaping village". Despite these deficiencies, the survey data still provides valuable information for understanding chronological and regional variations in settlement patterns during the Majiayao Cultural period. Based on the maps in the volumes, we see that most of these sites are distributed along river valleys and oases, where arable lands are available.

1.5.2 Excavated Data

Since the current excavated results already have produced abundant archaeological materials, this dissertation uses existing materials rather than relying on further excavation to obtain new study data. However, most of the excavated materials are from cemeteries. Data from residential areas dating to each phase are available but limited, particularly for the BSP and MCP. In addition, public constructions, such as fortifications, temples, and irrigation systems, which require control of corporate labor and also indicate increasing social complexity, are not known to be present in this area. Based on the current archaeological data, different social standing among individuals and communities during the Majiayao Cultural period is most clearly articulated in mortuary contexts.

It is important to point out that there are different kinds of limitations resulting from using secondhand information from site reports. Particularly, some sites have a published final excavation report, but some sites only have the preliminary report published. In excavation reports, data regarding certain variables—such as burial posture, head orientation, grave construction, and the content of grave goods—of the mortuary remains are usually listed in a table or an appendix. However, images of graves and/or the assemblage of grave goods, and detailed descriptions of each grave are only selectively included. A map that illustrates within-cemetery location of graves is usually provided, but sometimes not.

In total, the current published data include more than 2000 excavated burials from more than 30 sites/cemeteries located in Gansu and Qinghai provinces. There are around 90 burials dated to the MJYP, 700 burials dated to the BSP, and 1350 burials dated to the MCP. The most abundant data are from the Liuwan site in Ledu County, Qinghai, including 257 BSP burials and 872 MCP burials (QWGK and ZSKKY 1984). I use these abundant burial data to study how funerary ceramic assemblages and different mortuary practices changed over time and across regions. These abundant mortuary data provide valuable sources for investigating the development of social complexity during the Majiayao Cultural period.

Because I use mortuary data as my primary source, it is important to emphasize that these remains have been consciously constructed by those who organized the funeral. When archaeologists use mortuary remains to infer the behavior of living societies, they operate with two complementary assumptions. First, mortuary remains may directly manifest the social roles, status, and wealth of the deceased individuals before death (e.g., Saxe 1970; Binford 1971; Tainter 1973). Second, to a certain degree, this manifestation may be distorted by the ideology associated with funeral rituals and decisions made by people who buried the deceased (e.g., Hodder 1980, 1982; Parker-Pearson 1982, 1999). In other words, social organization is likely to be the primary factor that determines mortuary practices, but funeral ritual and the intentions of people who organized the funeral are also active factors that contribute to archaeological patterns of mortuary remains.

Carr's ethnographic survey (1995) illustrates cross-culturally that some mortuary practices frequently reflect social organization while others are commonly associated with philosophical-religious factors. Carr's study demonstrates the value of investigating social organization through mortuary data. One of his most important findings is that the hierarchical social position of the deceased was most often reflected in the overall amount of energy expended on graves. This criterion is mostly true in ancient China as well. Both textual and archaeological data suggest the quantity and quality of grave goods tended to symbolize directly the economic and social position of the deceased and the living relatives who organized the funeral (Underhill 2002:16). In the context of the Majiayao Culture, ceramic vessels, mostly painted, represent the primary type of grave goods.

1.5.3 Field Data

Compared to firsthand observation, excavation reports provide only limited information on ceramic vessels. In the excavation reports, the ceramic data are mostly concerned with typological and stylistic information for the purpose of determining the chronological sequence of different ceramic assemblages. Attributes such as pastes and the execution of painting—criteria useful for classification of pottery vessels probably made by different production groups—almost never receive proper attention. Therefore, in 2007 and 2008 I visited some accessible museums and archaeological institutes in Gansu, Qinghai, and Sichuan provinces. Altogether, I was able to see excavated and collected vessels/potsherds in exhibitions or in the storage rooms at 23 museums/institutes in Gansu and Qinghai and 1 institute in Sichuan (Chengdu City Institute of Archaeology). Figure 1.6 shows locations of those museums/institutes in Gansu and Qinghai, including the Gansu Provincial Museum, Gansu Provincial Institute of Cultural Relics and Archaeology, Lanzhou City Museum, Linxia Painted Pottery Museum, Qinghai Provincial Institute of Cultural Relics and Archaeology, Liuwan Painted Pottery Museum, and some other regional museums and institutes.

In my field research, I spent most of my time at the Liuwan Painted Pottery Museum, a facility built at the Liuwan site and containing most of the remains unearthed at the site (approximately 15,000 painted ceramic vessels). During four months at Liuwan, I was able to select ceramic assemblages from more than 200 burials dating to BSP or MCP for firsthand investigations. Along with a graduate student (Miss Chen Pin) from Xibei University, we took pictures and conducted quantitative measurements of almost 3500 painted and unpainted ceramic vessels unearthed at Liuwan. Based on the foundation of firsthand observations, I collected diagnostic samples from these excavated data for physicochemical analysis. In addition to Liuwan, my samples for physicochemical analysis also include those I collected from the surface at several archaeological sites or those provided by archaeologists who conducted site excavations or surveys at Majiayao sites. I also visited three modern ceramic factories in Gansu and collected 10 samples from two factories for comparison with archaeological samples.

1.5.4 Laboratory Data

Among my collected samples, I conducted physicochemical analysis of 687 archaeological samples obtained from 33 sites and 10 modern samples from 2 ceramic factories in Gansu. The 687 archaeological samples are composed of 275 samples dated to the MJYP, 53 samples dated to the BSP, and 359 samples dated to the MCP. At Peking University, I took microscopic pictures to compare the pastes of these samples. Further, with Dr. Cui Jianfeng at Peking University, we used the LA-ICP-AES (laser-ablation inductively coupled plasma-atomic emission spectrometry) technique to obtain the geochemical composition of these samples. We measured the content of 11 chemical elements of each sample (Appendix A). The benefit of using ICP-AES instead of other techniques is that both the major and the minor components of either paste or paint can be identified from a small sample in five minutes. Among these samples, samples from Liuwan and Xiahaishi mostly belong to vessels unearthed from burials; I have more detailed information about their archaeological contexts, vessel forms, and decorative

Figure 1.6. Locations of museums and archaeological institutes visited in this study.

designs. For example, Figure 1.7 shows the microscopic images of four samples obtained from similar *hu* vases decorated with two different motifs at Liuwan. Results from physicochemical analysis add invaluable new data to the traditional typological studies of Majiayao Cultural pottery.

1.6 Outline of the Dissertation

In this introductory chapter, I have addressed research questions, research objectives, theoretical considerations, study materials, and study methods. I also defined the archaeological culture known as Majiayao and outlined the current understanding about the production and distribution of Majiayao painted pottery vessels. The remainder of this study consists of four chapters and is organized as follows:

Chapters 2, 3, and 4 investigate changes in pottery production and consumption in the Majiayao, Banshan, and Machang phases. In each chapter, I examine the settlement, ceramic, and mortuary data to explore the relationship between regional settlement distribution, pottery production, mortuary practice, and social inequality. By synthesizing

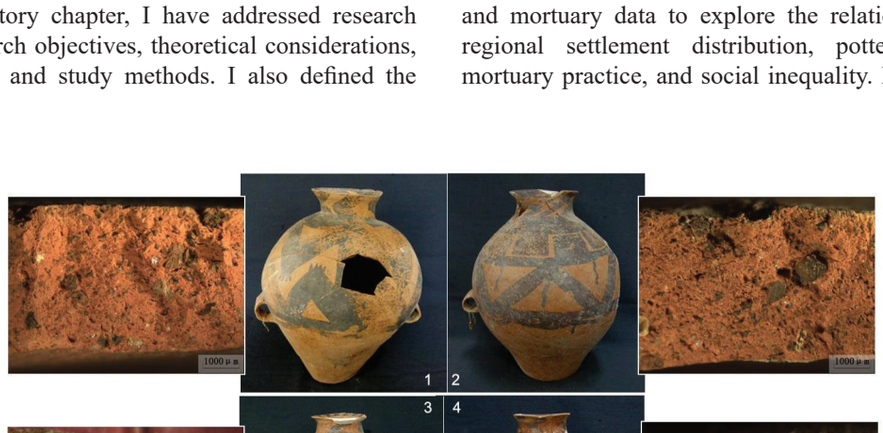

Figure 1.7 Pictures of the vessels and microscopic images of the profiles among four samples for physicochemical study obtained from Liuwan. (Sample ID: 1. QLL025; 2. QLL032; 3. QQL023; 4. QLL076)

these data, this study illustrates a positive correlation between regional density of settlement distribution, intensification of pottery production, and degree of social inequality in each phase. Rather than showing a simple linear process of social complexity, however, there are distinct regional variations in each phase and significant regional fluctuations over time.

Chapter 5 concludes this study by providing interpretation of patterns defined in this dissertation research and discussing the relationship between the development of pottery production and social complexity in the Majiayao Culture. In addition, I suggest a few possible avenues for future investigation of pottery production and social complexity in late Neolithic northwestern China.