The ‘Crescent-Shaped Cultural-Communication Belt’: Tong Enzheng’s Model in Retrospect

An examination of methodological, theoretical and material concerns of long-distance interactions in East Asia

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Metal, Salt, and Horse Skulls: Elite-Level Exchange and Long-Distance Human Movement in Prehistoric Yanyuan (Southwest China)

Anke Hein

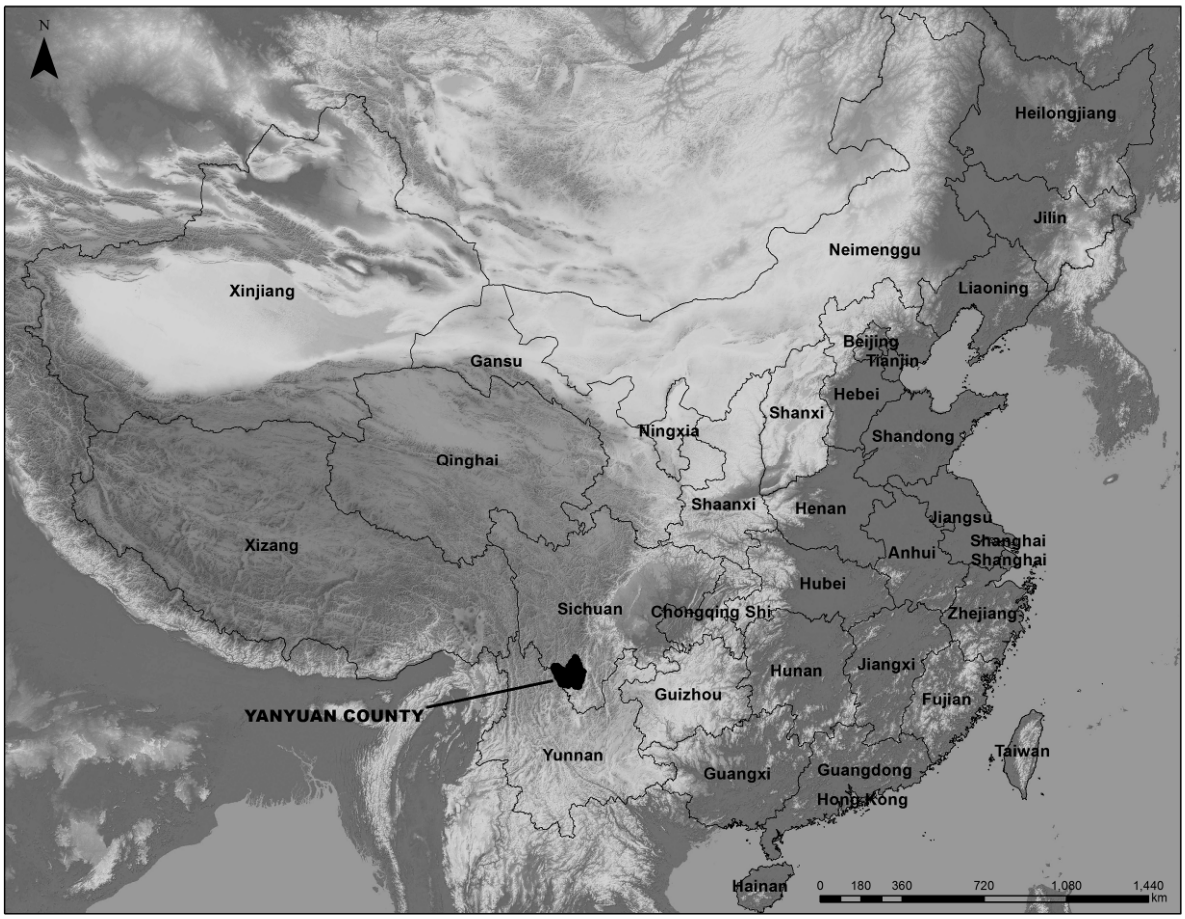

Figure 1. Location of Yanyuan County in East Asia.

Located on a high-altitude plateau surrounded by steep mountains, Yanyuan County (Sichuan) 四川省鹽源縣 is a fairly remote place. Not surprisingly, therefore, its archaeological materials — ritual objects and grave structures in particular — exhibit local particularities. Other cultural elements, such as weapon forms and even certain burial customs, bear witness to a wide range of connections to regions as distant and diverse as the Eurasian steppelands to the North, central Yunnan to the South, and the Han Chinese-inhabited Sichuan Basin to the East. None of these finds have been extensively discussed so far. In introducing them here, I shall pay particular attention to the origin of foreign objects and to the mechanisms through which they may have been obtained. I shall argue that it was in all likelihood the area's rich salt resources that attracted people to this remote place, eventually triggering the development of an elite-level exchange network. Their far-ranging connections in turn allowed the horse riders of Yanyuan to acquire high-quality metal objects from other regions and to furnish the graves of their high-ranking family members lavishly. Even more significantly, the majority of foreign or foreign-influenced objects found in Yanyuan come from a small number of graves that also contained horse skulls as well as weapon types and ornaments typical for the northern steppe, thus suggesting a foreign origin of the tomb occupants.

To demonstrate these foreign connections concretely, this study compares the archaeological assemblages from Yanyuan and other regions, discussing object types, decoration motifs, metallic composition, and mortuary customs. But the early material culture of Yanyuan is more than the sum of its outside influences. It has many particularities of its own, which are likewise highlighted below. Before embarking on a discussion of outside influences vs. local particularities, however, it is necessary to consider the geographical preconditions of life in Yanyuan, which shaped the routes that connected Yanyuan with the outside world, as well as determining the modes of contact available.

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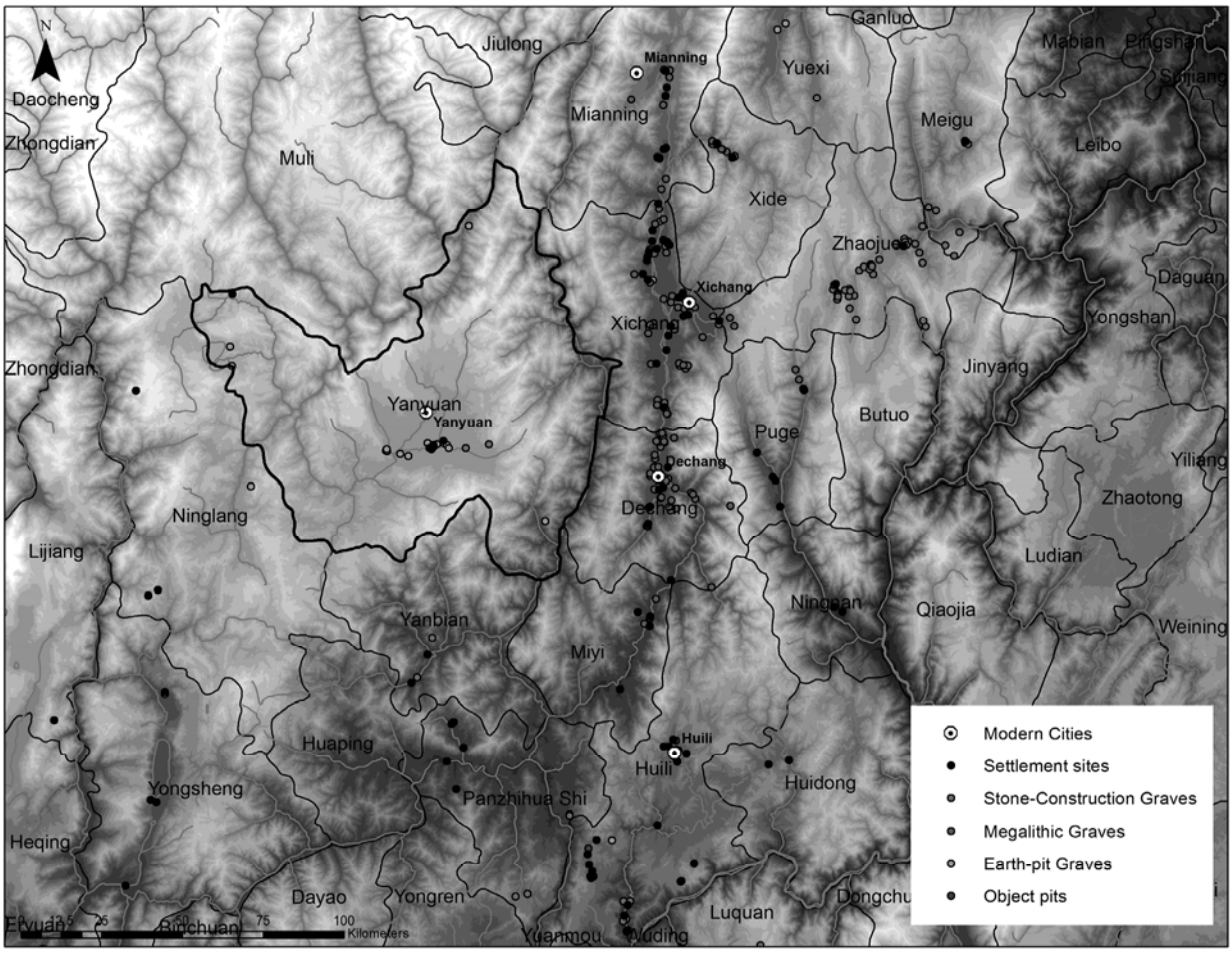

Figure 2. Location of Sites by Site Type in Liangshan Yi Autonomous Prefecture.

Geographic Preconditions

Yanyuan is a county in the western mountains of Liangshan Yi Autonomous Prefecture 涼山彝族自治州. It covers an area of about 8,388 km^2 (a little smaller than New Jersey [8,721 km^2]). Located at the southeastern rim of the Tibetan Plateau 青藏高原, it is dominated by the towering ranges of the Hengduan Mountains 横斷山, which rise to an elevation of 3,500-5,900 m. A multitude of narrow, intersecting river valleys have eroded deep ridges in the landscape (Figures 1-2).

Ample flat ground exists chiefly in the Yanyuan basin, which is located in the center of Yanyuan County at ca. 2,500 m asl. The Meiyu River 梅雨河 in its middle provides access to water, which is crucial because the region has very little rainfall. The fertile alluvial soil is ideal for agriculture, making the Yanyuan Basin attractive for human settlement (Yanyuan Xianzhi 2000). While the surrounding mountains are cold and forbidding, the basin itself has an agreeable climate with cool summers, mild winters, and the largest number of sunshine hours and strongest sunshine intensity in the entire Liangshan region. The main water courses are the Litang River 裏塘河 and its tributaries, most prominently the Meiyu River 梅雨河, traversing Yanyuan from West to East. The largest body of water in the region is Lake Lugu 瀘沽河 at the border between Yanyuan and Ninglang Yi Autonomous County 寧蒗彝族自治縣 in Yunnan Province.

One cannot grow rice in Yanyuan; the temperatures are too low and precipitation is too scarce and too unevenly distributed throughout the year. Today as no doubt in the past, the main local staples are millet, buckwheat, wheat, and various kinds of root vegetables. Since the 17th century potatoes and feeding-grade maize have become common. Cash crops such as apples, nuts, and tobacco are prevalent (Chengdu Ditu 2010, Yanyuan Xianzhi 2000). Goats/sheep, pigs, and chicken are the main meat resources, while cattle are less common. Animal bones known from ancient graves comprise mostly goat/sheep — the most suitable animals to rear in this mountainous area — as well as pigs, chicken, and surprisingly horses (the latter likely a riding animal of ritual importance rather than a food item), but cattle bones have so far not been reported.

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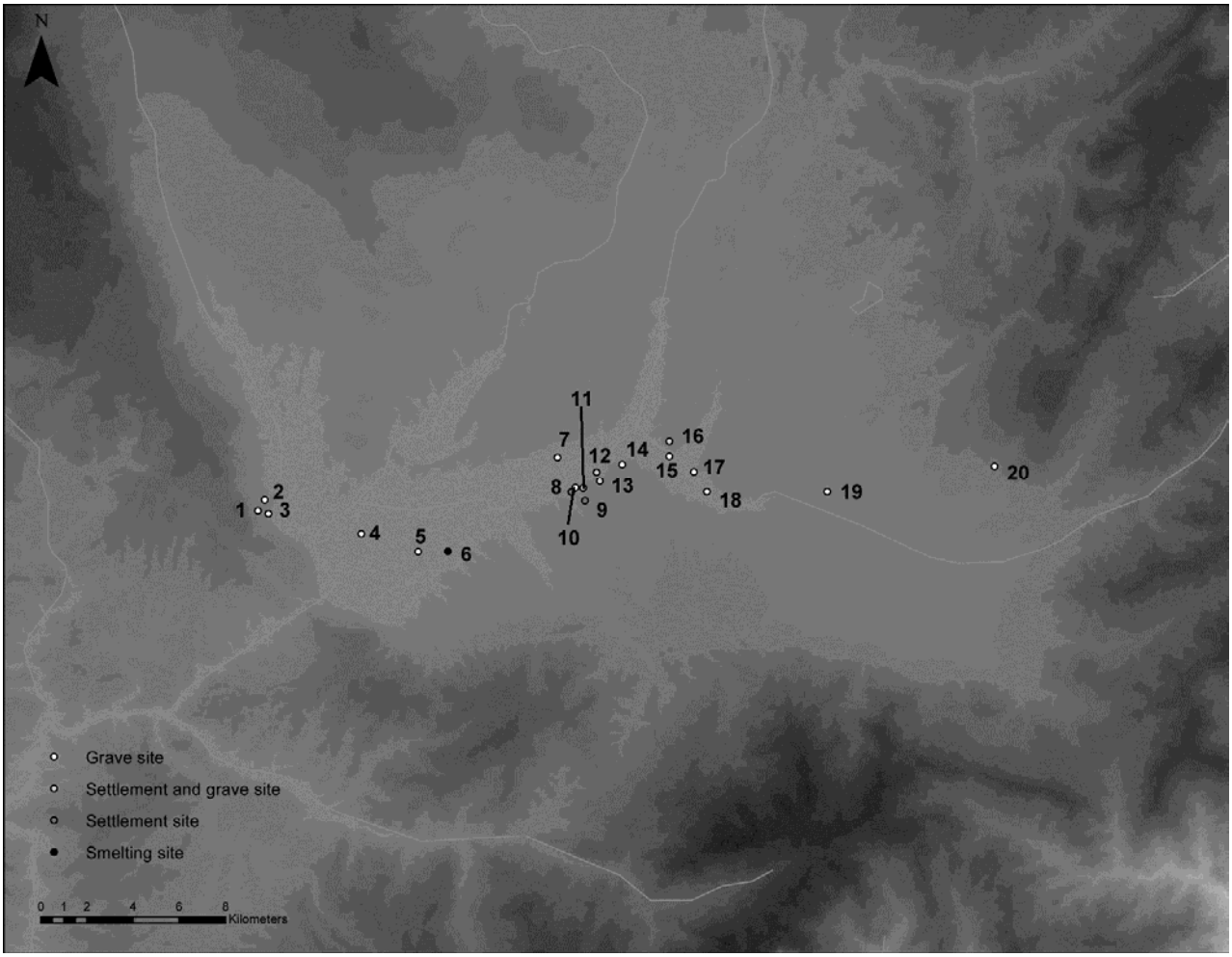

Figure 3. Sites in the Yanyuan Basin (for site names consult Table 1).

The mountains are rich in timber and medical plants, as well as mineral resources, the most important of which is the salt that gave the region its name (Yanyuan means "salt source"); the region also has iron and gold, and small amounts of granite, coal, copper, as well as other metal ores (Shi et al. 2006). Tin, however, which is indispensable for bronze production, is lacking; in the past it would have had to be traded from such nearby places as Huili 會理縣 or Mianning Counties 冕寧縣, or from Southeast Asia. At any rate, salt was the most abundant resource in Yanyuan throughout historical times. So far, no early sites connected with salt production have been found, but a preliminary survey has shown that the local salt was exploited at least from the Tang Dynasty and possibly as early as the Han Dynasty (206 BC – 220 AD) (Zhou and Jiang 2011).

The surrounding high mountains block access into the Yanyan Basin from any direction; the terrain toward the Southwest is somewhat less forbidding than the rest. High mountain ranges separate Yanyuan from the Anning River Valley 安寧河流 and the roads become completely impassable during periods of rain or frost. The best way to reach Yanyuan from Huili County in the East, from which a considerable number of objects from Yanyuan are known, is thus to follow the local waterways flowing into the Jinsha River 金沙江 which in turn provides a westward connection. The main artery connecting Yanyuan to the North is the Yalong River 雅礱江, which likewise flows into the Jinsha River. It reaches Yanyuan through the Meiyu River, entering the Yanyuan Basin from the Southwest.

All these rivers are too wild, too shallow, and/or too narrow to navigate. During the dry season they are reduced in width and one can travel along them, but even then the roads are largely unsuitable for large vehicles. The mountain roads are even more difficult to travel. On the famous Tea-Horse Route (*Chamadao* 茶馬道), traditionally Yanyuan's principal link to central Sichuan, Yunnan, Tibet, and India, horses and mules had to move in single file (Sichuan Daxue Lishixi 1994). Many mountain passes could be traversed only on foot along dangerously narrow paths. This harsh terrain naturally restricted the volume of traffic and the kinds of products that could be traded through Yanyuan in the past.[79] It also strongly limited the range of subsistence practices sustainable in the region.

[79] For a study of contact routes throughout the Liangshan region consult Hein in press.

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Daily Life in Prehistoric Yanyuan: Settlement Patterns and Subsistence Practices

Both settlement remains and grave sites are found at relatively low altitude (2,000-2,500 m), indicating that lower elevations were preferred. This situation holds true for the finds from Yongsheng County 永勝縣, Yunnan, which borders Yanyuan in the South (Table 2), but it contrasts with conditions in Ninglang County in Southwest Yunnan (i.e., southwest of Yanyuan). In Yongsheng, wide river valleys with fertile soil and agreeable temperatures are more ample than in Yanyuan, and nearly all sites occur at the lowest elevations (1,200-1,600 m asl.) In Ninglang, on the other hand, both settlement and grave sites can be found on medium to high-altitude mountain slopes (2,500-3,000 m asl.) and not in the lower-elevation river valleys (1,700-1,900 m asl.). This preference for higher altitudes among the groups in Ninglang as opposed to the low-elevation settlements in Yanyuan and Yongsheng indicates a difference in mode of subsistence and possibly cultural and even ethnic affiliation. Given the close geographic proximity, in the following I am comparing the finds from Yanyuan, Yongsheng, and Ninglang to highlight the particularities of Yanyuan itself and its relationship with the neighboring areas.

None of the settlement sites in Yanyuan have been excavated, but surveys and test pits have shown that the sites are mostly single-layer with shallow culture deposits and a few refuse pits. The ceramics from these settlements range from coarse hand-thrown reddish pottery with rare instances of line decoration to grey fine ware with various line and appliqué patterns. Due to the lack of settlement excavations and multi-layered deposits, the chronology of both settlement and grave sites is still rather unclear, but comparison with securely dated finds from neighboring regions suggest that the coarse ware dates between ca. 1200 and 700 BC, while the fine ware is of later date.[80]

The stone tools found in surface scatters at these sites include perforated knives, axes, adzes, and chisels hinting at forest clearing and agricultural activities, as well as numerous arrowheads and net weights showing at least partial reliance on hunting and fishing. Choppers, pestles, and loom weights attest food processing and cloth production. In some graves, horse skulls, horse gear, and bones of goat/sheep have been found, always associated with metal weapons and sometimes with stone arrowheads, but never with agricultural or domestic tools. This suggests that domestic and agricultural activities were of limited importance. Due to the scarcity of settlement remains and the thinness of the occupation layers at the few known sites, it seems likely that the local population at least partially relied on a pastoral economy, potentially connected with semi-permanent settlements or seasonal migration.

The situation in Ninglang is similar, with very few settlement sites, all of which are shallow and seemingly unstratified, and even fewer agricultural tools. The settlement sites in Yongsheng, on the other hand, are significantly larger. They consist of multiple, thick cultural layers; and they contain ample evidence for agriculture, such as double-perforated half-moon shaped knives with sickle gloss, as well as grinding equipment (Yunnansheng, Lijiangshi, and Lijiangshi 2010). Furthermore, the ceramic repertoire, material, and decoration techniques seen at Yongsheng are rather different from those at Yanyuan, showing that the ancient inhabitants of these two areas belonged to separate groups, even though they shared a preference for low-elevation settlement locations.

A Society of Warriors and Horse-Riders? – Social Structures as Reflected in the Burial Record

The majority of finds from Yanyuan and adjoining counties in Yunnan were retrieved from graves that by comparative typological analysis can be dated between ca. 400 BC and AD 9 (i.e., from the late Warring States Period to the end of the Western Han). The only scientifically excavated graves in this area are Laolongtou 老龍頭 M4-M11 and Maojiaba 毛傢垻 M1-M2 in Yanyuan, Daxingzhen 大興鎮 M1-M11 in Ninglang, and the over 140 as-yet unpublished graves at Duizi 堆子 in Yongsheng (Tables 1-2). In addition, more than 80 graves have been recorded during survey work and many more can be seen throughout the landscape. In the Yanyuan Basin they occur in particularly large concentrations on flat and slightly elevated platforms in the vicinity of river courses, but also on some mountain slopes (Figure 3). Most graves are significantly disturbed, generally by looters in search of the rich metal assemblages that these graves are known to contain. Not surprisingly, a considerable number of objects similar to the ones found during excavations have appeared on the antiques market. Consequently, it is reasonable to assume that the particular burial tradition and material culture reported from the excavated sites was very common throughout the Yanyuan Basin and possibly in the surrounding mountain areas as well.

The excavated graves show an astonishing variety of structures, burial rituals, and objects, reflecting complex mortuary customs and a highly stratified society. Graves of different sizes and with various amounts of construction parts made of stone and wood occur side by side within the same cemeteries. Some are small earth-pit graves, others are rather large with a stone cover, a wooden coffin, internal stone walls, and in one case even a stone coffin. The smaller graves generally contain only one skeleton in extended supine position; the larger graves contain one or two principal interments (mostly secondary burials) and up to three subsidiary interments (Tables 3-4). Additionally, some graves contained traces of cinnabar, burnt ashe in various parts of the graves, as well as animal bones (mostly horse skulls and long bones,

[80] For a discussion of the chronology of the Liangshan region consult Hein 2013.

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but also pig bones and calcinated sheep/goat shoulder blades). All these features indicate a complex burial ritual.

Throughout Yanyuan and also in Ninglang, we can see a similar custom of burying the deceased with a small number of handled vessels, which probably contained food offerings, and a set of personal ornaments and/or weapons of similar type. Some of these graves furthermore yielded bones of other kinds of animals and traces of red colorant. Horse skulls and bones, on the other hand, occur only in graves holding a sword and at least one other weapon; such graves are richly equipped, have a complex construction, and contain several skeletons dressed in richly decorated clothes with a belt, hair ornaments, and other ornaments. Remarkably, such particularly lavish burials are limited to the Yanyuan Basin; only modest single burials have been found in the surrounding mountains.

The occupants of the rich burials from Laolongtou and Maojiaba therefore probably were individuals of high standing (their sex is unclear), who engaged in combat, horse-riding, and/or hunting, were richly adorned (always including hair ornaments), and were buried with special decorum. Nevertheless, the range of artifacts revealed by these graves was not very different from what is encountered locally in single interments with less elaborate assemblages. The situation in Yongsheng, although reasonably nearby, seems to be different. As far as I could ascertain during a presentation given in 2010 on the still unpublished material from Yongsheng Duizi (Yunnansheng, Lijiangshi, and Lijiangshi 2010), the grave forms differ vastly. At Duizi, both multiple secondary and single primary interments were equipped with personal ornaments, ceramic vessels, and weapons that differ from those found further north; these are combined with objects such as spindle whorls, hair pins, and shells, none of which are common in Yanyuan. Metal weapons are rare at Duizi and other grave sites in Yongsheng, while small stone tools and modest ornaments are encountered more frequently than in Yanyuan. Particularly richly equipped graves such as those at Laolongtou are likewise missing. All this shows a clear difference in social structure, culture, and subsistence between the two regions.

A First Glance at Local Particularities vs. Outside Connection: The Evidence from the Art Market

Much richer but archaeologically much more questionable than excavated objects are the collections of material confiscated by the authorities from the illegal antiques market in Yanyuan (Liangshan and Chengdu 2009). As they constitute a vast body of material and can be compared to objects retrieved from graves in Yanyuan and Ninglang, one cannot ignore them. In fact, they provide some of the main evidence for the long-distance exchange networks that connected the high-altitude plateau of Yanyuan to the rest of the world (Table 5). Indeed, most metal objects (732 out of 1073) and nearly half of all ceramics (82 out of 188) known from Yanyuan have been acquired from looters. While some of them (e.g., locally specific arrowhead types, grinding-rollers, double-handled ceramic jars, and flat chicken-shaped staff-heads) belong to types that have so far only been found in graves in Yanyuan and Ninglang, most objects show similarities to finds from a variety of places in Southwest China, and some do not resemble any objects of known provenance at all.

These unique objects comprise a double-handled jar with protruding double-spiral decoration and a considerable number of personal ornaments and objects of probable ritual function. These include bronze plates with animal figures on them, staffs and staff heads of various forms, as well as zoomorphic and anthropomorphic ornaments. As many graves in neighboring parts of Yunnan likewise contain similar ornaments, we cannot be sure whether these unprovenanced items, though sold in Yanyuan, had actually been found there. The bird-shaped staff heads and swallow-shaped ornaments, however, sufficiently resemble the coarse chicken-shaped staff-head from Laolongtou M4 to suggest a local origin of this kind of objects. The horse motives on other staff-heads are also consistent with the emphasis on horse-riding reflected in some of the richest graves of Yanyuan, and their metal composition and low-quality execution identify them as local products as well. *Ling* 鈴 bells are common in western Yunnan, Yanyuan, and the Anning River Valley, but the execution of the specimens from the Yanyuan antiques market is most similar to objects found in the Laolongtou graves, thus indicating a local origin as well. The drums retrieved from the antiques market are similar in form and metal composition to items from Chuxiong Wanjiaba 楚雄万家坝 in Yunnan and were probably made there, but they could have come out of the ground locally since comparable objects have also been found at Maojiaba M1 and M2 in Yanyuan.

Other objects are even more problematic. Double-circle ornaments have parallels at Laolongtou, while various kinds of button-shaped plaques are known from graves in Yanyuan but also from megalithic graves in the Anning River Valley, making their origin questionable. In Southwest China, horse harnesses, body armor, and shield bosses have mostly been reported from graves in Yanyuan (at Laolongtou M4 and M5 and Maojiaba M2), but they are also common to neighboring areas of Yunnan. Han coins and bronze *mou* 鍪 vessels are widely distributed throughout Southwest China, but they are not very common in Yanyuan itself. Such parallels seemingly anchor the similar objects from the antiques market of Yanyuan in the general vicinity of Yanyuan, but not necessarily in Yanyuan itself.

The majority of objects retrieved from the antiques market in Yanyuan are bronze weapons, which show clear stylistic connections to Laolongtou and other graves sites in Yanyuan, and to stone-cist graves in Yunnan and along the upper Minjiang River. Swords are particularly numerous, especially those of the three-pronged variety with torqued handle, but also those with double-circle

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pommel and various straight and trapezoidal handles. All of these types are common in graves in Yanyuan, Ninglang, and stone-cist graves throughout Southwest China. Other metal weapons from the art market that have parallels in grave finds from Yanyuan and Ninglang are scabbard tips, knives, dagger-axes, *fu* 斧 and *yue* 鉞 axes, spear-heads, and shafted arrowheads; however, many subtypes have no exact local parallels but are close in form to objects found in Yunnan. Some of the dagger-axes even have parallels in the Ba-Shu cultural realm, pushing the range of connections even farther.

Overall, it is difficult to ascertain where exactly the objects confiscated in Yanyuan came from. Given that they are mainly bronze and ceramic objects similar to those known from graves in various parts of Southwest China and particularly Yanyuan, it is likely that most of them did indeed come from local graves. What makes the original place of deposition so difficult to ascertain for most of these objects is the highly composite nature of the provenanced grave assemblages from Yanyuan. They too comprise objects that show similarities to a wide range of different places, cultures, and periods. To pinpoint the origin of objects, forms, and design motives retrieved through excavation as well as from the antiques market, detailed comparative analyses of form and decoration are necessary. These in turn must be considered in conjunction with production techniques and material composition.

Foreign Techniques and Local Execution: Metal Objects from Yanyuan

So far, the metallic composition of 52 objects from Yanyuan has been analyzed, many of them retrieved from the antiques market rather than from archaeological excavation. The results show that the composition and production technique for typologically similar objects from these two contexts are largely identical, indicating a shared origin (Table 6). Most staff-heads are of similar composition (ca. 85% copper, 10% tin, 5% lead); small *ling* bells have a high lead content that distinguishes them from similar objects from other parts of Southwest China. Most of the weapons studied so far are relatively homogenous in composition as well, but of considerably lower quality than similar objects from surrounding regions.

Exceptions are a few high-quality specimens otherwise known from the Dian culture realm, such as one particularly finely-made three-dimensional staff-head retrieved from the antiques market. This staff-head shows water-bearers that strongly resemble human representations in Dian bronzes (Dewall 1967), suggesting a foreign origin not only of the motif but also of the object itself. None of the excavated graves in Yanyuan contained any similar items of comparable composition, and similar objects from Yunnan have not been analyzed so far, making it impossible to verify any connection based on material analysis. The Wanjiaba-type drum found on the antiques market, on the other hand, exhibits a metallic composition similar to specimens from Yunnan; however, objects of likely Dian origin have been excavated from graves in Yanyuan as well, such as the Shizhaishan 石寨山-type drum from Laolongtou M4 whose composition and technical details are largely identical with finds from the site of Shizhaishan itself (Yunnansheng 1959; Pirazzoli-t'Serstevens 1974), marking it as a likely import.[81] Dian objects from the antiques market in Yanyuan could therefore indeed have come from local graves rather than directly from Yunnan.

In addition to likely imports of high quality, there are a considerable number of low-quality objects, mainly weapons and ritual objects that resemble forms or carry decoration motives otherwise known from Yunnan or Northwest China. The most striking example is the *bianzhong* 編鐘 bell found in Laolongtou M4 that strongly resembles objects reported from Huili Zhuanchangba 會理轉場坝 (Tao Mingkuan 1982) and several sites in central Yunnan.[82] The bells from Yunnan mostly consist of 70-80% copper, 13-16% tin, and up to 13.7% lead (Falkenhausen 1993:105; Murowchick 1989:225-226). The bell from Laolongtou has an even higher tin percentage (30.46%) but a fairly low lead content (2.19%) (Liu and Tang 2006:219), and the bells from Huili consist of nearly pure copper (92.49% copper, 7% tin) (Falkenhausen 1993:105). Given the trace elements of titanium, bismuth, and silver in the bells from Huili, it is certain that the mining source at least for these specimens was local (Tao Mingkuan 1982). The low tin content and the lack of deliberate alloying with lead, combined with the casting technique used, all indicate local production. The case of the Laolongtou bell is less clear. Too high a percentage of tin would have influenced the playing behavior unfavorably, making it brittle and thus prone to breakage (Falkenhausen 1988:225). The tin might have been added to aid in the casting process and/or to enhance the color of the object, suggesting that the object's qualities as a musical instrument were but a secondary concern. Considering that the bell at Laolongtou is a single piece and not part of a set, as is common in Yunnan, it is likely that it was a local imitation of a foreign item, made by casters who lacked an understanding of its original function. Indeed, many tools and weapons from Yanyuan are of low quality, reflecting a limited mastery of metal technology.

For the objects deemed to be from Yanyuan, simple mold-casting is by far the most common technique and occurs in combination with hot forging, cold-working, re-heating after casting, and plating (Cui et al. 2010: Table2). Many ornaments — bracelets, rings, as well as some

[81] The analyses of material from Yunnan are cited after Murowchick 1989, Li, Chao, and Jiang 2004, and Yunnansheng, Kunmingshi, and Jinningxian 2009.

[82] These include Jinning Shizhaishan (Yunnansheng 1959:80-81), Xiangyun Dabona 大波那 (Yunnansheng 1964), Xiangyun Jiancun 祥雲檢村 (Li Chaozhen 1983), and Fushilong Village in Mouding County 牟定縣福士龍村 (Renmin Ribao 1979).

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zoomorphic and anthropomorphic plaques — were forged, either exclusively or in order to refine their shape after casting. The composite weapons from both graves and the art market in Yanyuan furthermore show a mastery of casting-on techniques that are likewise known from objects found in numerous stone-cist graves in other parts of Southwest China. Use-wear and re-sharpening has been observed only on one knife and one sword, both from graves at Yanyuan Laolongtou, showing that they had been in actual use before deposition; by contrast, the majority of weapons found in graves at Yanyuan show no such traces, and they are mostly too soft or too brittle to be functional. Obviously they were made for representation only. A number of weapons were cast in a single-valve mold with little reworking, showing that they were produced solely for the grave and/or symbolic purposes.

On a small number of ornaments — bracelets, head ornaments, belt plaques, and button-shaped fittings — gilding has been observed. Some of the staff-heads typical to Yanyuan were silvered at temperatures below 350 degrees, which is very different from the silvering techniques common with Dian objects from Yunnan. The basic technique of silvering is common with Ordos bronzes as well, and its significantly later occurrence in Southwest China has been attributed to northern influence (Cui et al. 2010). If this is indeed true, groups in Yanyuan may have received the same influence from the North, developing their own variety of silvering.

Foreign Contacts and Local Particularities

The results of the metal analyses presented above make it sufficiently clear that the material from Yanyuan combines strong local idiosyncrasies with foreign elements. To gain a deepened understanding of the nature and development of the groups that inhabited this high-altitude plateau in the past, these various connections and their relative importance now need to be considered in detail.

Northwest Yunnan

Considering that Ninglang borders on Deqin, the close resemblance in both burial mode and object assemblage between the burials from Ninglang Daxingzhen and Deqin Yongzhi 德欽永芝 is not surprising (Yunnansheng 1975).

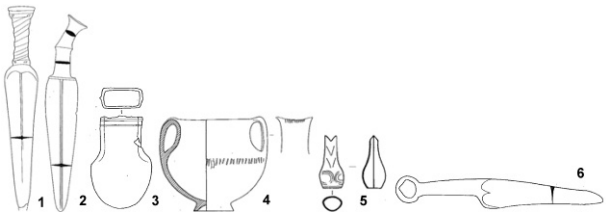

Figure 4. Artifacts from Yanyuan Showing Parallels to Finds from Northern Yunnan (after Liangshan and Chengdu 2009: 1. Fig. 6.8, 2. Fig. 27.1, 3. Fig. 63.1, 4. Fig. 36.4, 5. Fig. 118.2, 6. Fig. 72.3).

It suggests that the groups in Ninglang and Deqin likely shared the same cultural traditions. The metal weapons and ornaments from Yanyuan show a close affinity with Northwest Yunnan as well (Figure 4), but similar objects occur just as commonly in the mountains of Northwest Sichuan. Prominent examples include swords with three-pronged hilts, daggers with spiral handles, daggers with double-circle pommels, daggers with fish-tail shaped handles, mirror-shaped objects, *ling* bells, button-shaped clothing plaques, and double-handled vessels. All these occur in graves in all three places, mostly in connection with the so-called stone-cist graves (Aba and Chengdu 2009). In Northwest Yunnan, however, these objects are often associated with bird-shaped ornaments similar to the simple staff-heads reported from Laolongtou and retrieved from the antiques market in Yanyuan (Li Chaozhen 1983, Aba and Chengdu 2009: 409-436). These staff-heads, which in Yanyuan occur in considerable numbers as opposed to their rare occurrence in Northwest Yunnan, are uniform in metal composition and in their low quality. They are objects made exclusively for use in local-style mortuary rituals; they are not a sign of cultural influence from Northwest Yunnan.

Northwest Sichuan

Similarities in assemblage between Yanyuan and Northwest Sichuan are particularly close, especially in weapon and ornament forms (Figure 5). This applies particularly to ring-pommel knives, scabbard tips, and certain types of belthooks that usually do not occur in Yunnan. Stout double-handled ceramic vessels occur throughout Northwest Sichuan and Northwest Yunnan, but those with double-spiral motives (often referred to as ram's-head decoration) have so far only been reported from Northwest Sichuan, Yanyuan, and Deqin.

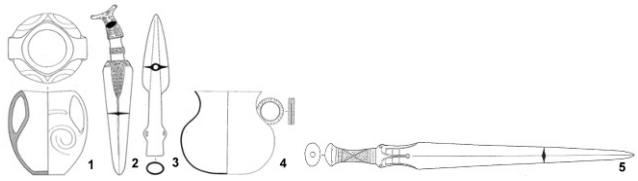

Figure 5. Artifacts from Yanyuan Showing Parallels to Finds from Northwest Sichuan (after Liangshan and Chengdu 2009: 1. Fig. 31.3, 2. Fig. 24.7, 3. Fig. 24.1, 4. Fig. 100.3, 5. Fig. 42.8).

Button-shaped ornaments are common to graves in Yanyuan and along the upper Min and Dadu Rivers, but they have also been found in Huili and in the megalithic graves of the Anning River Valley, albeit in smaller number (Sichuansheng, Liangshan, and Huilixian 2009). The composite swords from Yanyuan, as well, are closely matched by specimens from the upper Min River, but similar weapons are even more common in Ningxia and Inner Mongolia, pointing to an even more far-flung northern connection.

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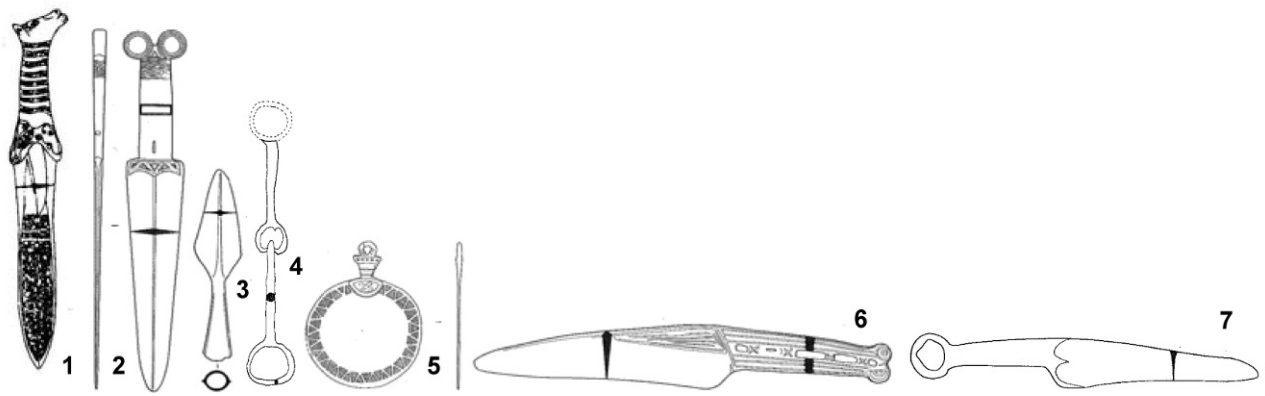

Figure 6. Artifacts from Yanyuan Showing Parallels to Finds from the Northern Steppe (after Tang 1996: 1. Fig. 1.2, and after Liangshan and Chengdu 2009: 2. Fig. 44.3, 3. Fig. 68.6, 4. Fig. 99.2, 5. Fig. 100.4, 6. Fig. 69.2, 7. Fig. 72.3).

The Northern Steppe and Central Asia

Ring-pommel knives, arch-backed knives, and double-circle headed daggers as have been found in Yanyuan as well as Northwest Sichuan and Yunnan are most common throughout the Northern Zone (Figure 6). The same applies to daggers with fish-tail shaped handles as have been retrieved from the antiques market in Yanyuan. Similar to what we see in the graves in Yanyuan, the finds from the northern zone are often combined with riding equipment, mirror ornaments, and other clothing ornaments similar to those excavated from Laolongtou (Yang Jianghua 2004). The particular type of horse gear found in Yanyuan most closely resembles objects associated with the Upper Xiajiadian Culture (1000-600 BC) that are linked in turn to the tradition of the Central Asian Seima-Turbino Complex (Kohl 2007:168-171). Furthermore, the interment of horse heads and bones and the application of ocher as we see it in Yanyuan is essentially foreign to southern Sichuan and Yunnan, but is common in the northern steppe, the Ordos region, and Central Asia, and sometimes occurs in Northwest Sichuan as well.[83]

The same is true of horse depictions, although in the northern zone they tend to appear on daggers and plaques or sometimes as three-dimensional yoke ornaments, whereas in Yanyuan they are seen on flat staff heads (Wu'en Yuesitu 2008). Furthermore the northern finds, which date to to the 9th to 7th century BC, are at least 500 years older than the graves in Yanyuan. Another *comparandum* that has been mentioned in connection with the Yanyuan finds are staff heads with juxtaposed rams and horses from Iran (Jiang Zhanghua 2009), but they likewise date considerably earlier (1500-500 BC) and are very different in quality and form (Moorey 1974). In spite of superficial similarities with traditions of the northern zone, therefore, the staff heads from Yanyuan are unique in form and execution and were likely developed independently, perhaps because the Yanyuan elite shared a cultural emphasis on horse riding with earlier groups in northern China, Central Asia, and the Near East.

Huili Guojiabao

Huili Guojiabao is one of the few sites east of the Anning River that shares close similarities with Yanyuan (Table 4, Figure 7). While the majority of sites in Huili show strong local particularities with only a few connections to Northeast Yunnan or the Anning River Valley, the graves of Guojiabao contained swords, spear-heads, arrowheads, and other weapons that are typologically identical with those from Yanyuan. They are combined with beads, belt hooks, and bronze ornaments of types that are otherwise only known from Laolongtou (Sichuansheng, Liangshan, and Huilixian 2009).

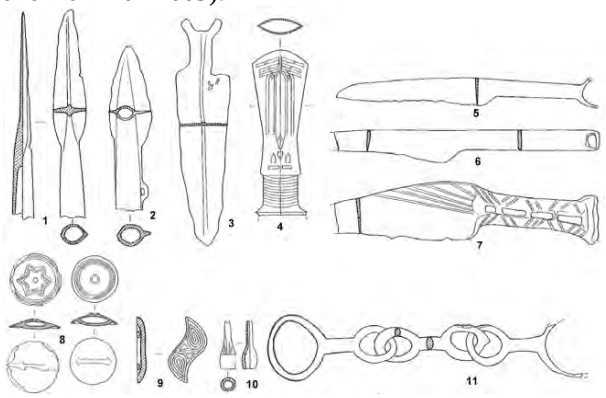

Figure 7. Artifacts from Huili Guojiabao Showing Parallels to Finds from Yanyuan (after Chengdu et al. 2010: 1. Fig. 6.3, 2. Fig. 6.8, 3. Fig. 7.4, 4. Fig. 7.5, 5. Fig. 8.3, 6. Fig. 8.4, 7. Fig. 8.5, 8. Fig. 10.3-4, 9. Fig. 11.7, 10. Fig. 11.8, 11. Fig. 11.1).

Huili and Yanyuan are connected by traffic routes along the river networks of Southwest China, and Huili is rich in metal resources, especially in tin which Yanyuan lacks; Yanyuan in turn possesses salt. If these resources were indeed exploited at the time under discussion, it is likely that the people buried at Huili Guojiabao were involved in an exchange of metal and salt between the two regions.

[83] The interment of horse bones together with dog and cow skulls has been observed at Ganzi Jililong 甘孜縣吉裏龍, and Guri Munianggang, Xinlong County, 新龍縣谷日木娘崗 in stone-construction graves containing single- and double-handled jars, bronze knives, and personal ornaments (Sichuansheng and Ganzi 1986, Ge Le 1987).

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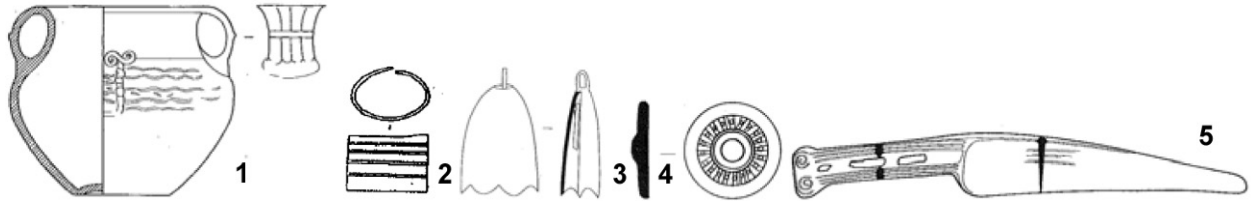

Figure 8. Artifacts from Yanyuan Showing Parallels to Finds from Megalithic Graves in the Anning River Valley (after Liangshan and Chengdu 2009: 1. Fig. 10.2, 2. Fig. 107.1, 3. Fig. 5.3, 4. Fig. 14.9, 5. Fig. 69.2).

In any case, the similarity in assemblages between Guojiabao and grave sites in Yanyuan, combined with the lack of similarities with other sites in Huili, indicates that the people buried at Guojiabao had relocated from Yanyuan. The richness of the grave assemblage indicates, furthermore, that these people were of high status.

The Anning River Valley and the Han-Culture Realm

Although the Anning River Valley is geographically much closer to Yanyuan than Huili, their cultural connections are not very strong (Figure 8). The most important connecting elements are double-handled vessels with a stout body and water-ripple pattern and the grinding rods that commonly occur in megalithic graves in the Anning River Valley and have been reported in small numbers from Yanyuan and Ninglang as well. Conversely, some megalithic graves contain certain types of metal weapons common to graves in Yanyuan, Ninglang, and northwest Yunnan, which might have reached the Anning River Valley from either of these places (Sichuansheng, Liangshan, and Xichangshi 2006). The relationship between the Anning River Valley and Yanyuan/Ninglang is therefore clear.

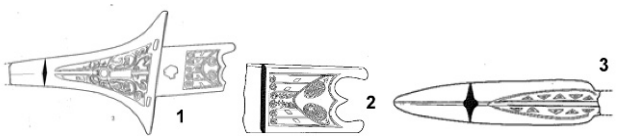

Figure 9. Artifacts from Yanyuan Showing Parallels to Shu Objects (after Liangshan and Chengdu 2009: 1. Fig. 48.2, 2. Fig. 59.3, 3. Fig. 67.9).

The inclusion of domestic pottery of foreign types in the graves at Yanyuan/Ninglang indicates the relocation and integration of people from the Anning River Valley, but that a movement in the opposite direction took place is likewise clear. Another element of some of the megalithic graves and a few of the graves in Yanyuan is the inclusion of Han objects, mainly coins, but also bronze *mou* and *fu* vessels and iron objects indicate some connections with the Han-culture realm. In Yanyuan, most of these finds come from the antiques market and evne then they are rare, showing that the connection with the Han was remote and likely took place through one or several intermediaries such as the builders of the megalithic graves in the Anning River Valley.

Shu and Dian

The belt buckles retrieved from the antiques market in Yanyuan are largely identical with Shu objects, but they also occur in various kinds of graves throughout Northwest Yunnan and Sichuan, making their origin unclear (Figure 9). If they were indeed unearthed in Yanyuan, they may have reached the local groups either directly or indirectly through one or several intermediaries to the North or South. Some of the axes and belt buckles found in Yanyuan show forms and decoration elements that are typical of the Shu cultural realm, but the *ge* dagger-axes from Yanyuan carrying Shu decoration have the elongated form commonly found with Dian objects. They are therefore hybrid products, likely produced locally.

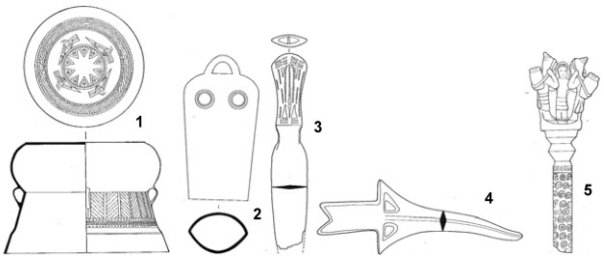

Figure 10. Artifacts from Yanyuan Showing Parallels to Dian Objects (after Liangshan and Chengdu 2009: 1. Fig. 4.5, 2. Fig. 5.2, 3. Fig. 40.9, 4. Fig. 53.3, 5. Fig. 93).

The same applies to other weapons that resemble Dian objects in type or decoration, but are rather different in overall form and execution (Figure 10). The *bianzhong* bell from Laolongtou M4, which was of poor quality and not functional, was likewise likely a local imitation and not an import from the Dian culture realm. The form, execution, and metal composition of the drums, three-dimensional staff head, and some of the dagger axes found in Yanyuan, on the other hand, indicate that these were imports and not local products. The nature of all of these objects and elements of likely Dian or Shu origin – ritual objects, highly-ornate weapons, or associated decoration motives – indicates that they arrived through some form of elite-level exchange or gift giving rather than because of a permanent relocation of people.

Local Particularities

The wide range of foreign objects or their imitations described above are associated with items and traditions unique to Yanyuan (Figure 11).

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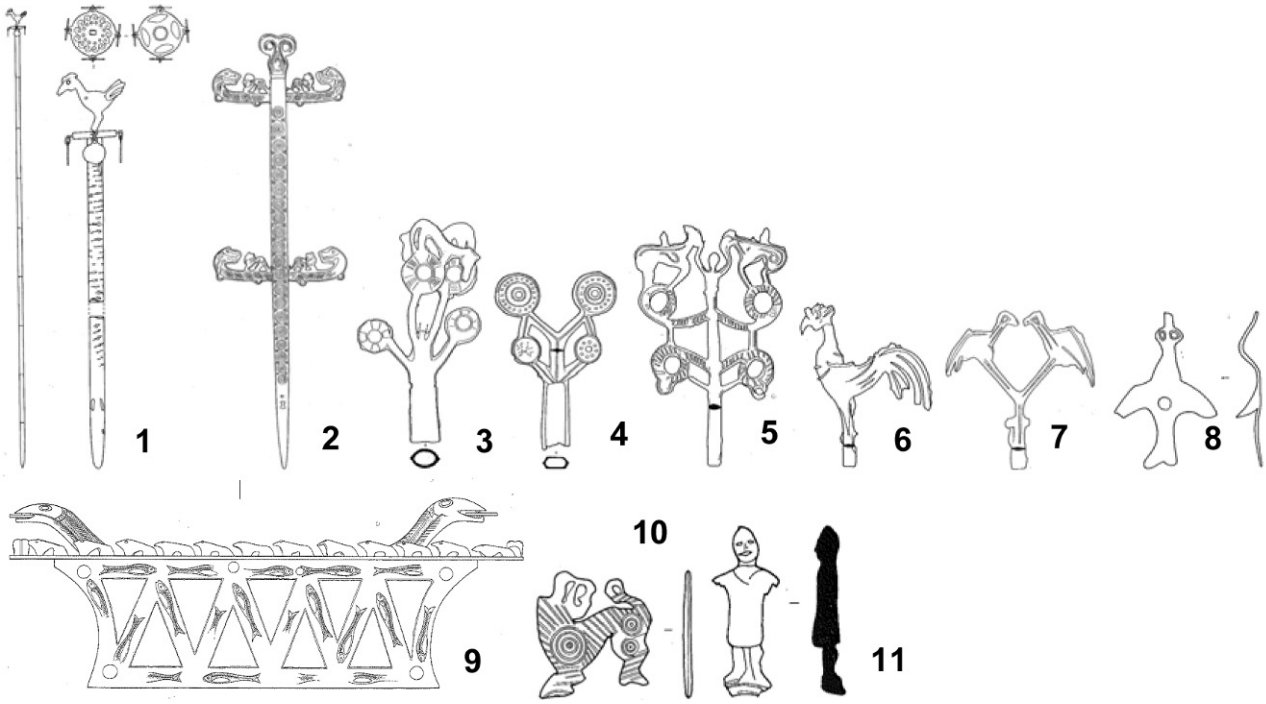

Figure 11 Artifacts from Yanyuan Displaying Strong Local Particularities (after Liangshan and Chengdu, 2009: 1. Fig. 88, 2. Fig. 89, 3. Fig. 94.8, 4. Fig. 95.3, 5. Fig. 95.1, 6. Fig. 114.2, 7. Fig. 114.9, 8. Fig. 115.1, 9. Fig. 86, 10. Fig. 111.2, 11. Fig. 111.3).

While simple bird-shaped ornaments are known from Northwest Yunnan, complex staff-heads with horses and men as well as swallow-shaped clothing plaques have so far only been found in the Yanyuan Basin. The same applies to bronze stands with snake, frog, and/or bird depictions, swallow-shaped bird plaques, double-cross staffs, and other kinds of staffs and staff heads. Furthermore, the complex set of burial customs involving wooden coffins, stone cists, stone covers, multiple interments, burning of objects or bones in the graves, application of cinnabar, and the interment of horse skulls and bones and parts of other animals, seems to be unique to Yanyuan as well.

Discussion and Conclusion

Through comparative analysis of the archaeological assemblages from Yanyuan and other regions, it has become clear that the region had particularly close connections with Northwest Sichuan on the one hand and Northwest Yunnan on the other, while at the same time showing strong local characteristics of its own. The similarities in weapons and ornaments from Yanyuan and the mountainous areas of Ninglang, Deqin, and Yongsheng are remarkably strong. Furthermore, the assemblages from all four places show more similarities with those found in the stone-cist graves in the upper Minjiang and Dadu River Valleys than with the assemblages typically seen in earth-pit graves with or without stone installations in other parts of Yunnan. It is therefore likely that the people living in Ninglang and Deqin as well as Yanyuan shared a certain sense of community with those in northwest Sichuan, possibly having migrated from there. An extraneous origin for the inhabitants of Yanyuan seems particularly likely considering that these people clearly emphasized armed combat, while the burial assemblages of groups living in adjacent parts of the Liangshan region and Yunnan predominantly contain ceramic vessels accompanied by a few tools, arrowheads, and limited amounts of simple personal ornaments. These findings thus confirm close connections and various types of interaction between the inhabitants of the western part of the crescent-shaped cultural-contact belt as defined by Tong Enzheng (1990).

The special burial customs observed in the Yanyuan Basin, such as the interment of horse gear and bones, are uncommon in other parts of Southwest China, but can be frequently seen in the northern zone. It is therefore likely that the occupants of the “warrior graves” in Yanyuan are indeed of northern origin, coming by way of the Dadu and Yalong River valleys – possibly with a stop and some exchange of traditions and/or people with groups in Northwest Sichuan – and finally settling in the Yanyuan Basin. There, new local traditions developed with complex rituals involving staffs, special tables, and objects connected to horses, birds, and other animals. What happened during the encounter of these immigrants with the former inhabitants of Yanyuan is unclear. The newcomers may have merged with the local population, or they may have expelled them. From the considerably lower number of weapons in their graves, one may infer that the indigenous residents had a less combative nature than the immigrants. While people in the river valleys of Yongsheng and neighboring parts of Yunnan focused on agriculture, the groups in Yanyuan and Ninglang likely practiced a pastoral or mixed economy suited to the high-

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altitude terrain and the scarcity of resources. This harsh environment might have led to the development of an even more combative and more strongly stratified society. It is remarkable, furthermore, that all known graves with especially rich furnishings were located in the Yanyuan Basin, while the graves in the mountains all show humbler assemblages and mostly lack horse-gear and bones. Considering that Yanyuan is rich in salt, a resource that was exploited at least since Han times and probably earlier (Zhou and Jiang 2011), it is likely that it was the monopolized access to salt that lead to the development of this highly stratified society.

It is obvious that the elite of the Yanyuan Basin must have had some kind of commodity that allowed them to trade widely and acquire considerable amounts of high-quality metal objects from a wide variety of places. Their own metal products were low-quality, comprising mostly idiosyncratic bird-shaped plaques and staff heads of ritual meaning, as well as a small number of personal tools and simple ornaments. The "salt lords of Yanyuan" — if one may call them that — thus needed raw copper and tin, and at least the latter had to come from outside, potentially from Huili. The Yanyuan-type grave at Huili Guojiabao might thus have served as the last resting place for people from Yanyuan involved in such exchange. The richness of the graves at Guojiabao, which contained horse gear and other objects associated with the elite of Yanyuan, indicates that exchange of salt and metal — if it indeed took place at that time — was not the business of professional merchants but was managed as an elite transaction. This kind of exchange seems to have mainly taken place with Huili, the Dian culture realm, and to a certain extent Shu. Objects from the Han culture sphere reached Yanyuan only infrequently and likely through one or several intermediaries. Contact with the groups in the Anning River valley was more direct but largely did not take place as elite-level exchange of prestige goods or other commodities; instead, it involved the relocation of a small number of people to Yanyuan, where they were integrated with the indigenous population.

From this combination of local idiosyncrasies, signs of elite-level exchange, and movement of people in and out of Yanyuan, it becomes clear that this region was a node of various contact networks running along the Daduhe, Jinshajiang, and Yalongjiang rivers, as well as their tributaries. Likely attracted by the fertile plain of the Yanyuan Basin, the builders of the rich local graves moved into the region from the considerably colder North and soon established themselves as mediators between not only North and South but also East and West. Relying on the resources to which they had exclusive access, the Yanyuan elite established a far-ranging exchange network that allowed them to attain visually impressive objects from many different places. Some of these objects were clearly not understood in their original function but came to be employed as prestige goods and status markers in graves. Foreign motives and forms were readily imitated and freely combined in local artifact production. At the same time, the inhabitants of the Yanyuan Basin and the surrounding mountains developed and preserved their own particularities in object repertoire, clothing customs, and burial traditions that clearly distinguished them from their contemporaries both in Southwest China and in their northern places of origin. The material from Yanyuan thus provides an interesting case study for a variety of topics of general interest to archaeologists and anthropologists, including exchange networks, social stratification, culture contact, and human-environment interaction. To reach the full research potential of this region, however, further work in and around Yanyuan is needed, including geological survey, archaeological excavation, and material analysis.

References

Aba Zangzu Qiangzu Zizhizhou Wenwu Guanlisuo 阿坝藏族羌族自治州文物管理所, and Chengdu Wenwu Kaogu Yanjiusuo 成都文物考古研究所, eds. 2009. *Zhongguo Xinan diqu shiguanzang wenhua diaocha yu fajue (1938-2008)* 中國新南地區石棺葬文化調查與發掘（1938-2008）. Chengdu: Sichuan Daxue Chubanshe 四川大學出版社.

Bao Yuehe 包月河. 1989. Huili Guoyuanxiang chutu tonggu 會理果園鄉出土銅鼓. *Sichuan wenwu 四川文物* (5):66.

Chengdu Ditu Chubanshe 成都地圖出版社, ed. 2010. *Sichuansheng dituji 四川省地圖集*. Chengdu: Chengdu Ditu Chubanshe 成都地圖出版社.

Chengdu Wenwu Kaogu Yanjiusuo 成都文物考古研究所, Huilixian Wenwu Guanlisuo 會理縣文物管理所, Sichuan Daxue Kaoguxi 四川大學考古係, and Liangshan Bowuguan 涼山博物館. 2010. 2009 niandu Huilixian xin faxiang kaogu diaocha jianbao 2009 年度會理縣新發鄉考古調查簡報. *Chengdu kaogu faxian* 成都考古發現 2008:212-30.

Cui Jianfeng 崔劍鋒, Wu Xiaohong 吳小紅, Zhou Zhiqing 周志清, Jiang Zhanghua 江章華, Liu Hong 劉弘, and Tang Liang 唐亮. 2010. Sichuan Liangshanzhou Yanyuanxian chutu qingtongqi fenxi baogao 四川涼山州鹽源縣出土青銅器分析報告 Metallurgical microscope and chemical analysis of the bronzes from Yanyuan County, Liangshan, Sichuan. *Nanfang minzu kaogu* 南方民族考古 *Southern Ethnology and Archaeology* 6:217-34.

Dewall, Magdalene von. 1967. The Tien culture of Southwest China. *Antiquity* 40:8-31.

Falkenhausen, Lothar von. 1988. Ritual music in Bronze Age China: an archaeological perspective. PhD Dissertation, Department of Anthropology, Harvard University, 1988.

Copyright material: no unauthorized reproduction in any medium

Falkenhausen, Lothar von. 1993. *Suspended music: chime bells in the culture of Bronze Age China*. Berkeley: University of California Press.

Ge Le 格勒. 1987. Xinlong Guri de shiguanzang ji qi zushu wenti 新龍谷日石棺葬的族屬問題. *Sichuan wenwu* 四川文物 (3):11-4.

Guojia Wenwuju 國家文物侷, and Yunnansheng Wenhuating 雲南省文化庭, eds. 2001. *Zhongguo wenwu dituji: Yunnan fence* 中國文物地圖集：雲南分冊. Kunming: Yunnan Keji Chubanshe 雲南科技出版社.

Guojia Wenwuju 國家文物侷. 2009. *Zhongguo wenwu dituji: Sichuan fence* 中國文物地圖集・四川分冊. Beijing: Wenwu Chubanshe 文物出版社.

Hein, Anke Marion. in press. Interregional contacts and geographic preconditions in the prehistoric Liangshan region, Southwest China. In *Quaternary International* http://dx.doi.org/10.1016/j.quaint.2013.12.011.

Hein, Anke Marion. 2013. Cultural Geography and Interregional Contacts in Prehistoric Liangshan (Southwest China). PhD Dissertation, Interdepartmental Program of Archaeology, University of California Los Angeles (UCLA), Los Angeles.

Huang Chengzong 黃承宗. 1983. Lugu hupan chutu wenwu diaocha ji 瀘沽湖畔出土文物調查記. *Kaogu* 考古 (10):952-4.

Huilixian Wenhuaguan 會理縣文化館. 1977. Sichuan Huili chutu de yimian tonggu 四川會理出土的一面銅鼓. *Kaogu* 考古 (3):215-6.

Jiang Zhanghua 江章華. 2009. Dui Yanyuan Pendi qingtong wenhua de jige wenti 對鹽源盆地青銅文化的幾個問題. In *Chengdu kaogu yanjiu (yi)* 成都考古研究（一） edited by Chengdu Wenwu Kaogu Yanjiusuo 成都文物考古研究所. Beijing: Kexue Chubanshe 科學出版社: 404-418.

Kohl, Philip L. 2007. *The making of Bronze Age Eurasia*. Cambridge, UK; New York: Cambridge University Press.

Li Xiaoqin 李曉琴, Chao Rufen 朝汝玢, and Jiang Zhilong 蔣志龍. 2004. Yunnan Jinning Shizhaishan chutu jinshuqi de fenxi he yanjiu 雲南晉寧石寨山出土金屬器的分析和研究. *Wenwu* 文物 (11):75-85.

Liangshan Yizu Zizhizhou Bowuguan 涼山彝族自治州博物館, and Chengdu Wenwu Kaogu Yanjiusuo 成都文物考古研究所, eds. 2009. *Laolongtou mudi yu Yanyuan qingtongqi* 老龍頭墓地與鹽源青銅器. Beijing: Wenwu Chubanshe 文物出版社.

Li Chaozhen 李朝真. 1983. Yunnan Xiangyun Jiancun shiguomu 雲南祥雲檢村石槨墓. *Wenwu* 文物 (5):33-41 and 99.

Liu Shixu 劉世旭. 1991. Sichuan Yanyuanxian Maojiaba gumuzang chutu zaoqi tonggu de chubu yanjiu 四川鹽源縣毛家垻古墓葬出土早期銅鼓的初步研究. *Zhongguo wenwu shijie 中國文物世界* 70:113-27.

Liu Shixu 劉世旭, and Li Rongyou 李榮友. 1991. Yanyuan Hanmu chutu zhanguo tonggu 鹽源漢墓出土戰國銅鼓. *Zhongguo wenwubao 中國文物報*, 1991.5.12:2.

Li Rongyou 李榮友, and Liu Hong 劉弘. 1992. Yanyuan faxian Handai shishimu 鹽源發現漢代石室墓. *Sichuan wenwu 四川文物* (4):71.

Moorey, P. R. S. 1974. *Ancient bronzes from Luristan*. London: British Museum.

Murowchick, Robert Edwin. 1989. The ancient bronze metallurgy of Yunnan and its environs: development and implications. PhD Dissertation, Department of Anthropology, Harvard University, 1989.

Pirazzoli-t'Serstevens, Michèle. 1974. *La civilisation du royaume de Dian à l'époque Han d'après le matériel exhumé à Shizhai shan, Yunnan*. Paris: École française d'Extrême-Orient.

Renmin Ribao 人民日報. 1979. Yunnan xinjin chutu yitao Zhanguo shiqi de qingtong bianzhong 雲南新近出土一套戰國時期的青銅編鐘. *Renmin Ribao 人民日報* 02/23/1979.

Shi Yulin 石玉林, Yue Yanzhen 岳燕珍, and Shi Zhujun 石竹筠. 2006. Zhongguo tudi ziyuan tuji 中國土地資源圖集. Beijing: Zhongguo Dadi Chubanshe 中國大地出版社.

Sichuan Daxue Lishixi 四川大學歷史係. 1994. *Zhongguo Xinan de gudai jiaotong yu wenhua 中國西南的古代交通與文化*. Chengdu: Sichuan Daxue Chubanshe 四川大學出版社.

Sichuan Liangshan Yizu Zizhizhou Bowuguan 四川涼山彝族自治州博物館, and Sichuan Yanyuanxian Wenhuaguan 四川鹽源縣文化館. 1984. Sichuan Yanyuanxian Jiaodingshan faxian xinshiqi shidai yizhi 四川鹽源縣轎頂山發現新石器時代遺址. *Kaogu 考古* (9):849-50.

Sichuansheng Wenwu Guanli Weiyuanhui 四川省文物管理委員會, and Ganzi Zangzu Zizhizhou Wenhuaguan 甘孜藏族自治州文化館. 1986. Sichuan Ganzixian Jililong gumuzang 四川甘孜縣吉里龍古墓葬. *Kaogu 考古* (1):28-36.

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Sichuansheng Wenwu Kaogu Yanjiuyuan 四川省文物考古研究院, Liangshan Yizu Zizhizhou Bowuguan 涼山彝族自治州博物館, and Huilixian Wenwu Guanlisuo 會理縣文物管理所. 2009. Sichuan Huili Chenghe liuyu kaogu diaocha baogao 四川會理城河流域考古調查報告. *Sichuan wenwu 四川文物* (4):15-22.

Sichuansheng Wenwu Kaogu Yanjiuyuan 四川省文物考古研究院, Liangshan Yizu Zizhizhou Bowuguan 涼山彝族自治州博物館, and Xichangshi Wenwu Guanlisuo 西昌市文物管理所. 2006. *Anninghe liuyu dashimu 安寧河流域大石墓*. Beijing: Wenwu Chubanshe 文物出版社.

Tao Mingkuan 陶鳴寬. 1982. Sichuan Huili chutu yizu bianzhong 四川會理出土一組編鐘. *Kaogu 考古* (2):216-7.

Wu'en Yuesitu 烏恩岳斯圖. 2008. *Beifang Caoyuan kaoguxue wenhua bijiao yanjiu: Qingtong Shidai zhi Zaoqi Xiongnu Shidai 北方草原考古學文化比較研究——青銅時代至早期匈奴時代*. Beijing: Keji Chubanshe 科技出版社.

Tong Enzheng 童恩正. 1990. Shilun woguo cong dongbei zhi xinan de biandi banyuexing wenhua chuanliudai 試論我國從東北至西南的遍地半月形傳播帶. In *Zhongguo Xinan minzu kaogu lunwenji* 中國西南民族考古論文集, edited by Tong Enzheng 童恩正, pp. 252-278. Beijing: Wenwu Chubanshe 文物出版社.

Yanyuan Xianzhi Bianzuan weiyuanhui 鹽源縣志編纂委員會. 2000. *Yanyuan Xianzhi 鹽源縣志*, *Zhonghua Renmin Gongheguo Difangzhi Congshu 中華人民共和國地方誌叢書*. Chengdu: Sichuan Minzu Chubanshe 四川民族出版社.

Yunnansheng Bowuguan Kaogu Fajue Gongzuodui 雲南省博物館考古發掘工作對. 1959. Yunnan Jinning Shizhaishan gu yizhi ji muzang 雲南晉寧石寨山古遺址及墓葬. *Kaogu xuebao 考古學報* (1):43-63 and 146-55.

Yunnansheng Bowuguan Wenwu Gongzuodui 雲南省博物館文物工作隊. 1975. Yunnan Deqin Yongzhi faxian de gu muzang 雲南德欽永芝發現的古墓葬. *Kaogu 考古* (4):244-8.

Yunnansheng Bowuguan Wenwu Gongzuodui 雲南省博物館文物工作隊. 1983a. Yunnan Ninglangxian Daxingzhen gumuzang 雲南寧蒗縣大興鎮古墓葬. *Kaogu 考古* (3):226-32.

Yunnansheng Bowuguan Wenwu Gongzuodui 雲南省博物館文物工作隊. 1983b. Yunnan Deqinxian Nagu shiguanmu 雲南德欽縣納古石棺墓. *Kaogu 考古* (3):220-5.

Yunnansheng Wenwu Gongzuodui 雲南省文物工作隊. 1964. Yunnan Xiangyun Dabona muguo tongguan mu qingli baogao 雲南祥雲大波那木槨銅棺墓清理報告. *Kaogu 考古* (12):607-14.

Yunnansheng Wenwu Kaogu Yanjiusuo 雲南省文物考古研究所, Kunmingshi Bowuguan 昆明市博物館, and Jinningxian Wenwu Guanlisuo 晉寧縣文物管理所, eds. 2009. *Jinning Shizhaishan - Diwuci fajue baogao 晉寧石寨山——第五次發掘報告 Shizhaishan at Jinning - the fifth excavation report*. Edited by Yunnansheng Wenwu Kaogu Yanjiusuo 雲南省文物考古研究所, *Yunnansheng Wenwu Kaogu Yanjiusuo tianye kaogu baogao 雲南省文物考古研究所田野考古報告*. Beijing: Wenwu Chubanshe 文物出版社.

Yunnansheng Wenwu Kaogu Yanjiusuo 雲南省文物考古研究所, Lijiangshi Bowuguan 麗江市博物館, and Lijiangshi Yongshengxian Wenwu Guanlisuo 麗江市永勝縣文物管理所 2010. Yongsheng Duizi yizhi fajue 永勝對子遺址發掘. Kunming.

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Tables

Table 1. Overview over Sites in Yanyuan County (the number under "Map" lists the number assigned to the site on the map in Figure 3).

Name	Characters	Feature types	Map	Elevation	Graves	Excavated	Sources
Bei Ganhaixiang	北干海乡	earth-pit grave(s)	21	2386	1+	No	Liangshan and Chengdu 2009
Boshucun	博樹村	earth-pit grave(s)	22	2696	1+	No	Zhongguo Wenwuju 2009
Caojiawan	曹傢灣	earth-pit grave(s), stone-cist grave(s)	15	2355	7+	No	Zhongguo Wenwuju 2009, Li and Liu 1992
Ganhai Sandadui	干海三大隊	settlement site	9	2376		No	Data collection
Gesa	格撒	earth-pit grave(s)	23	2697	3+	No	Huang Chengzhong 1983, Zhongguo Wenwuju 2009
Haimatang	海馬塘	earth-pit grave(s)	17	2357	1+	No	Zhongguo Wenwuju 2009
Jiaodingshan	轎頂山	settlement site, earth-pit grave(s)	11	2390	1+	Yes	Sichuan and Sichuan 1984, Zhongguo Wenwuju 2009
Jiejiafen (Bajiacun I)	解傢墳（八傢村二）	earth-pit grave(s)	1	2449	1+	No	Zhongguo Wenwuju 2009, data collection
Laolongtou	老龍頭	earth-pit grave(s)	19	2406	13+	Yes	Liangshan and Chengdu 2009, Zhongguo Wenwuju 2009, data collection
Luowa	洛瓦	earth-pit grave(s)	24	1985	1+	No	Liangshan and Chengdu 2009
Maojiaba	毛傢垻	stone-cist grave(s), earth-pit grave(s)	20	2603	4+	Yes	Liu Shixu 1991, Liu and Li 1991, data collection
Meiyu Bacun Sanzu	梅雨八村三組	earth-pit grave(s)	4	2324	1+	No	Data collection
Meiyuzhan	梅雨鎮錢幣窯藏	smelting site	6	2338		No	Zhongguo Wenwuju 2009
Nanbianhe	南边河	earth-pit grave(s)	18	2361	1+	No	Liangshan and Chengdu 2009
Tangguang Liandi	唐光連地	earth-pit grave(s)	14	2378	1+	No	Liangshan and Chengdu 2010
Tangshidi	唐氏地	earth-pit grave(s)	10	2340	20+	No	Zhongguo Wenwuju 2009
Wuming Baobao	無名包包	earth-pit grave(s)	25	2344	20+	No	Zhongguo Wenwuju 2010
Wuqiu	烏丘	settlement site	8	2350		No	Huang Chengzhon 1983, Liangshan and Chengdu 2009
Wushidi II (Bajiacun II)	伍氏地（八傢村一）	earth-pit grave(s)	3	2378	3+	No	Liangshan and Chengdu 2009, Zhongguo Wenwuju 2009
Wushidi III (Bajiacun III)	吳氏地（八傢村三）	earth-pit grave(s)	2	2397	3+	No	Zhongguo Wenwuju 2009
Xiaoguan Liangzi	小官梁子	settlement site, earth-pit grave(s)	16	2398	1+	No	Zhongguo Wenwuju 2009, Liangshan and Chengdu 2009, data collection
Xiaohebian	小河邊	earth-pit grave(s)	5	2334	2+	No	Liangshan and Chengdu 2009, Zhongguo Wenwuju 2009
Xifan	西藩	settlement site	26	3006		No	Zhongguo Wenwuju 2009
Yanyuan Gong'anju	鹽源公安局	single find	27			No	Liangshan and Chengdu 2009
Yingpanshan (North)	營盤山（北區）	settlement site, earth-pit grave(s), stone-cist grave(s)	12	2341	10+	No	Zhongguo Wenwuju 2009
Yingpanshan (South)	營盤山（南區）	settlement site, earth-pit grave(s)	13	2380	1+	No	Liangshan and Chengdu 2009, Zhongguo Wenwuju 2009
Zhushiba	豬屎垻	earth-pit grave(s)	28	1768	1+	No	Liangshan and Chengdu 2009

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Table 2. Overview over Sites in Northwest Yunnan.

County	Name	Characters	Feature types	Elevation	Graves	Excavated	Publications
Ninglang	Cunyi	翠依銅器出土點	single find	2560		No	Zhongguo Wenwuju 2001
Ninglang	Daxingzhen	大興鎮	earth-pit grave(s)	2799	11+	Yes	Zhongguo Wenwuju 2001, Yunnansheng 1983
Ninglang	Jinyangcun	金錫村	settlement site	2880		No	Zhongguo Wenwuju 2001
Ninglang	Kaijicun	開基村	settlement site	3775		No	Zhongguo Wenwuju 2002
Ninglang	Pijiangcun	皮匠村	settlement site	2954		No	Zhongguo Wenwuju 2003
Yongsheng	Duizi	堆子	earth-pit grave(s), stone-cist grave(s), urn grave(s), object pit(s), settlement site	1203	140+	Yes	Data collection
Yongsheng	Haiyancun	海沿村	settlement site	1519		No	Zhongguo wenwu dituji
Yongsheng	Laoying	老營箐銅器出土點	single find	1581		No	Zhongguo wenwu dituji
Yongsheng	Longtan	龍潭銅器出土點	single find	1604		No	Zhongguo wenwu dituji
Yongsheng	Lujiajie	陸傢界	settlement site	1609		No	Zhongguo wenwu dituji
Yongsheng	Qiaodiping	蕎地坪	stone-cist grave(s)	1529	1+	No	Zhongguo wenwu dituji
Yongsheng	Sankuaishi	三塊石	settlement site	1876		No	Zhongguo wenwu dituji
Yongsheng	Taoyingcun	陶營村	settlement site	2676		No	Zhongguo wenwu dituji
Yongsheng	Yanjiaqing	嚴傢箐銅鼓出土點	single find	1603		No	Zhongguo wenwu dituji

Table 3. Construction Details of Excavated Graves in Yanyuan, Ninglang, and Related Finds in Huili

Site	Grave Number	Grave form	Measurements	Installations	Number interred	Burial ritual	Animal bones	Horse bones
Yanyuan Laolongtou	M4	rectangular earth-pit grave with cover stone	ext. 4 x 3.2 x 1 m	second-level lege, foot compartment, wooden coffin	2	extended supine primary burial on second-level ledge in the West; in the East set of human teeth with traces of cinnabar		2 horse skulls
Yanyuan Laolongtou	M5	rectangular earth-pit grave	badly disturbed					
Yanyuan Laolongtou	M6	rectangular earth-pit grave with stone cover	6.1 x 2.8 x 0.3 m	wooden coffin with foot compartment; middle-partitioning splitting grave in larger southern and smaller northern half	5	heads in the West, all extended supine, 3 in southern compartment, 1 in northern part, lower long bones of 1 human skeleton found south of the coffin	1 set of animal bones	1 horse skull, long bones of 2? Horses
Yanyuan Laolongtou	M7	rectangular earth-pit grave with stone cover, top wider than bottom	4.7 x 2.3 m, bottom 4.2 x 1.9 m, depth 1.7-1.9 m	wooden coffin, stone coffin, platform in the West, oval niche in northern wall	0 (robbed)		calcinated 10 sheep shoulder blades, other animal bones, oyster shells	
Yanyuan Laolongtou	M8	rectangular earth-pit grave	destroyed and robbed		fragments			

Yanyuan Laolongtou	M9	rectangular earth-pit grave with stone cover, top wider than bottom	6.6 x 3.3 x 1.45 m	wooden coffin, stone coffin, in middle irregular stone-slates, in SW stone frame with ash layer, human skull bones, teeth, ceramic sherds, and other objects, all burned; in West stone-slate with composite-sword and bronze fragments	4?	single human rib bone in west of stone coffin; human long-bones in the south outside of coffin; in south and middle ash, scattered human palate bone and teeth; human skull bones and teeth in ash layer in SW surrounded by stones, all calcinated		horse long bones
Yanyuan Maojiaba	M1	rectangular earth-pit grave						
Yanyuan Maojiaba	M2	rectangular earth-pit grave						1 horse skull and long bones
Ninglang Daxingzhen	M1	rectangular earth-pit grave, south-oriented	1.5 x 0.6 x 1.1 m					
Ninglang Daxingzhen	M2	rectangular earth-pit grave, south-oriented	2 x 0.9 x 1.6 m					
Ninglang Daxingzhen	M3	rectangular earth-pit grave, south-oriented	2.4 x 0.8 x 2.4 m					
Ninglang Daxingzhen	M4	rectangular earth-pit grave, south-oriented	2.3 x 0.8 x 2.5 m					
Ninglang Daxingzhen	M5	rectangular earth-pit grave, south-oriented	2.5 x 0.8 x 3.3 m					
Ninglang Daxingzhen	M6	rectangular earth-pit grave, south-oriented	1.6 x 0.6 x 2 m					
Ninglang Daxingzhen	M7	rectangular earth-pit grave, south-oriented	2.5 x 1 x 1.8 m					
Ninglang Daxingzhen	M8	rectangular earth-pit grave, south-oriented	1.8 x 0.7 x 1.7 m					
Ninglang Daxingzhen	M9	rectangular earth-pit grave, south-oriented	2.1 x 0.8 x 2.2 m					
Ninglang Daxingzhen	M10	rectangular earth-pit grave, south-oriented	2.1 x 0.9 x 2.5 m					
Ninglang Daxingzhen	M11	rectangular earth-pit grave, south-oriented	1.8 x 0.6 x 1.1 m				chicken bones, antler, other animal bones	
Huili Guojiabao	M1	rectangular earth-pit grave						
Huili Guojiabao	M2	rectangular earth-pit grave						

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Table 4. Contents of Excavated Graves in Yanyuan, Ninglang, and Related Finds in Huili

Site	Grave Number	Object number	Ceramic	Weapons / tools	Ornaments	Ritual objects	Wooden objects	Horse equipment
Yanyuan Laolongtou	M4	153	7 (5 double- and 2 single-handled jars)	4 metal weapons (1 sword, 1 *ge* halberd, 1 knife, 1 iron spear-head), armor plates	41 pieces of bronze ornaments, 21 bone ornaments (1 *jue* ring, 10+ large and 10 small beads), 3 turquoise and 10 agate beads	1 drum, 2 cauldron, 1 *ling* bell, 1 *bianzhong* bell, 1 cock-shaped staff-head		2 horse bits and other horse harness
Yanyuan Laolongtou	M5	1+		fragments of bronze body armor				
Yanyuan Laolongtou	M6	78		9 metal weapons and tools (2 double-handled jars; 1 composite knife/sword, 1 bronze ge halberd, 1 chisel, 4 arrowheads, 1 point-tool), 21 stone weapons and tools (2 polishing stones, 19 arrowheads)	27 bronze ornaments (1 hairpin, 18 belt-ornaments, 1 long handle, 7 clothing ornaments), 1 jade earrings, 8 agate beads	1 *ling* bell		
Yanyuan Laolongtou	M7	10	10 (sherds)	1 bronze sword		10 sheep shoulder blades with burn marks		
Yanyuan Laolongtou	M9	65	1 double-handled jar	14 metal weapons (1 composite sword, 1 bronze battle-axe, 2 *ge* halberds, 10 arrowheads)	10 bronze clothing ornaments, 18 belt parts, 27 other decorative elements	2 *ling* bells		
Yanyuan Maojiaba	M1	4		1 three-pronged short bronze sword, 1 double-winged bronze arrowhead		2 bronze drums		
Yanyuan Maojiaba	M2	11		1 three-pronged short bronze sword, 1 iron *ge* halberd with bronze handle, 1 composite and 1 iron *mao* spear-head, 1 bronze *yue* axe, 1 bronze arm-guard, 1 bronze wrist-guard		1 bronze drum		
Ninglang Daxingzhen	M1	3	3 beakers					
Ninglang Daxingzhen	M2	10	6 beakers (2 double-handled, 3 single-handled, 1 without)	4 bronze objects (1 axe, 2 *mao* spear-heads, 1 *xiao* knife)				
Ninglang Daxingzhen	M3	5	2 single- and 3 double-handled beaker					
Ninglang Daxingzhen	M4	5	1 single- and 2 double-handled beaker	2 bronze objects (1 composite sword, 1 axe)				
Ninglang Daxingzhen	M5	27	9 single-handled and 5 double-handled guan beaker, 2 beaker without handles	1 bronze *xiao* knife	1 turquoise bead		1 lid, 1 oval object, 1 footed bowl, 2 arrowheads, 2 quiver, 1 stick, 1 spoon	
Ninglang Daxingzhen	M6	4	4 single-handled beakers					
Ninglang Daxingzhen	M7	12	5 beakers, 2 single-handled, 1 double-handled, 2 without	2 bronze objects (1 sword, 1 axe)				

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			handles					
Ninglang Daxingzhen	M8	2		2 bronze objects (1 sword, 1 *mao* spear-head)				
Ninglang Daxingzhen	M9	4	3 beakers		1 mirror-shaped bronze object			
Ninglang Daxingzhen	M10	4	1 single- and 3 double-handled beaker					
Ninglang Daxingzhen	M11	1	1 single-handled beaker					
Ninglang Daxingzhen	surface finds	4		4 bronze objects (3 swords, 1 axe)				
Huili Guojiabao	M1	2	2 (1 double-handled and 1 single-handled beaker)					
Huili Guojiabao	M2		1 spindle whorl		44 stone beads (2 agate and 41 turquoise beads, 1 jade ring), 2 bronze bracelets			
Huili Guojiabao	surface finds		11 vessels (7 double-, 1 single-, and 3 beakers without handles), 1 spindle whorl	88 bronze weapons and tools (4 *ge* halberds, 39 *mao* spear-heads, 10 swords, 7 *xiao* knives, 1 knife, 1 axe, 1 arrowhead, 1 scabbard-tip)	2 stone beads (1 turquoise and 1 agate bead), 49 bronze ornaments (48 wave-shaped, 1 drop-shaped), 14 bronze bracelets, 10 bronze buttons, 1 belt hook			1 horse bit

Table 5. Objects from the antiquities market in Yanyuan.[*]

Ceramic objects (80)	48 flat-bottomed and 24 ring-bottomed double-handled beaker, 2 single-handled beakers, 2 other beakers; 4 small double-handled beaker
Bronze weapons, armor, and tools (308)	54 swords, 52 *ge* halberds, 47 *yue* axes, 22 *mao* spear-head, 1 spear handle, 16 *ren* and 37 *xiao* knives, 6 arm-guard plates, 46 arrowheads, 2 shield ornaments, 1 cap, 20 axes, 4 chisel
Iron tools (2)	2 axes
Composite weapons (24)	16 swords, 2 *mao* spear-heads, 1 trident, 5 *xiao* knife
Horse gear (22)	9 horse bits, 2 pieces of halfter decoration, 11 rein guides,
Stone weapons/tools (47)	38 arrowheads, 9 single-perforated grinding-rods
Ornaments (172)	bronze (171): 3 belt hooks, 26 belt ornaments, 3 ox-horn shaped decorative elements, 1 head-ornament, 31 zhuo and 1 huan bracelet,16 pendants, 19 button-shaped ornaments, 9 finger-rings, 3 tiger-shaped, 1 human-shaped, 1 spiral-shaped, 20 chicken-shaped, 20 swallow-shaped, 2 double-bird shaped, 4 bird-shaped ornaments, 1 pen-shaped object, 4 tubular objects, 3 wheel-shaped objects, 1 decorated band, 1 lid with tiger-decoration; 1 gold strip
Ritual objects (68)	2 drums, 35 *ling* bells, 5 stands, 4 staffs, 21 tree-shaped staff-heads, 1 mirror,
Other (3)	2 sea shells, 1 bronze beaker

[*] The Information was compiled from Liangshan and Chengdu 2009.

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Table 6. Results of Composition Analysis for Metal Objects from Yanyuan and Huili.[*]

Object type	Assemblage	Object ID	Cu	Sn	Pb	Fe	Zn	As (ppn)	Sb (ppn)	Ni (ppn)	Material type
fu axe	Yanyuan Market	YY40	90.01	9.94							tin-bronze
yue axe	Yanyuan Market	YGJC199	80.94	10.01	1.32	0.37	0.2	3883	1.88%	216.3	tin-bronze
yue axe	Yanyuan Market	YGJC730	78.66	10.13	0.63	0.03	0.01	1257	492	34.6	tin-bronze
yue axe	Yanyuan Market	YGJC6a	76.12	13.31	0.61	0.03	0.02	957	975	155.4	tin-bronze
dagger-axe	Yanyuan Market	YGJC332	79.19	10.46	0.08	0	0	0	0	0	tin-bronze
sword	Yanyuan Market	YGJC226	55.57	15.35	0.16	0.05	0.14	88	55	10.5	tin-bronze?
sword	Yanyuan Market	YGJC248	54.9	5.1	12.28	0.05	0.2	124	124	11.8	lead-tin bronze?
sword	Yanyuan Market	YGJC365	75.16	19.03	0.07	0.03	0.08	711	209	41.6	tin-bronze?
sword	Yanyuan Market	YGJC730	72.23	25.7	0.42	0.04	0.08	225	111	39.9	tin-bronze
sword	Yanyuan Market	YGJC195	73.26	20	0.19	0.06	0.04	945	126	8.3	?
knife	Yanyuan Market	YGJC614	44.51	7.77	16.62	0.23	0.65	282	10935	303.9	lead-tin bronze
knife	Yanyuan Market	YY41	98								copper
knife	Yanyuan Market	YGJC697	75.11	19.96	0.56	0.17	0.08	992	805	119.6	tin-bronze?
knife	Yanyuan Market	YY11	85.42	13.53	4.05						lead-tin bronze
knife	Yanyuan Market	YY38	86.45	10.34	3.21						lead-tin bronze
arrowhead	Yanyuan Market	YY16	85.8	7.25	6.95						lead-tin bronze
arrowhead	Yanyuan Market	YGJC629	48.94	15.03	9	0.02	0.06	347	88	13.5	lead-tin bronze
spearhead	Yanyuan Laolongtou	YLLM11.2	67.11	19.85	2.83	0.29	0.04	2994	926	97.5	lead-tin bronze
body armor	Yanyuan Laolongtou	YLLM5.1	64.17	26.85	1.14	0.04	0.04	285	554	31.6	tin or lead/tin?
body armor	Yanyuan Laolongtou	YLLM5.2	71.63	29.08	0.13	0.03	0.06	2405	313	5307	tin-bronze
body armor	Yanyuan Market	YGJC158.1-3	72.16	24.78	0.12	0.61	0.04	2776	903	225.8	tin-bronze
body armor	Yanyuan Market	YY09	87.46	12.54							tin-bronze
horse harness	Yanyuan Market	YY28	94.22	4.22	1.56						lead-tin bronze
horse harness	Yanyuan Market	YY47	79.86	6.03	14.11						lead-tin bronze
bracelet	Yanyuan Market	YGJC526	79.59	0.22	0.24	0.02	0.03	0.94%	424	44.5	?
bracelet	Yanyuan Market	YY19	93.97					6.03%			arsenic bronze
bracelet	Yanyuan Market	YY12	85.6	14.4							tin-broze
bracelet	Yanyuan Market	YY13	91.43	3.7	1.37	3.51					arsenic tin bronze
bracelet	Yanyuan Market	YY04	85.99	14.01							tin-broze
decorative band	Yanyuan Market	YY02	88.73	9	2.27						lead-tin bronze
bronze application	Yanyuan Market	YY39	77.52	12.44	10.04						lead-tin bronze
bird-shaped application	Yanyuan Market	YY03	91.84	8.16							tin-bronze

[*] The information was compiled from Chengdu et al. 2010, Cui Jianfeng et al. 2010, Liangshan and Chengdu 2009:219, Murowchick 1989, Tao Mingkuan 1982.

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chicken-shaped ornament	Yanyuan Market	YGJC400	50.17	36.92	0.75	0.02	0.01	997	513	20.8	tin-bronze
staff-head	Yanyuan Market	YGJC643	57.64	24.53	1.71	0.15	0.16	1547	0.83%	64.1	tin-bronze
staff-head	Yanyuan Market	YY14	83.5	11.72	4.79						lead-tin bronze
staff-head	Yanyuan Market	YY15	86.85	9.63	2.96						lead-tin bronze
staff-head	Yanyuan Market	YY50	87.87	7.89	4.24						lead-tin bronze
staff-head	Yanyuan Market	YY13	83.5	11.72	4.79						lead-tin bronze
bianzhong bell	Yanyuan Laolongtou	YLLM4.12	43.65	30.46	2.19	0.21	0.06	1186	312	16.7	lead-tin bronze
bianzhong bell	Huili Zhuanchangba	HZCU1	92.49	7							tin-bronze
ling bell	Yanyuan Market	YGJC425	76.57	12.71	2.01	0.01	0.02	202	99	34.3	lead-tin bronze
ling bell	Yanyuan Market	YY07	88.76	7.29	3.62						lead-tin bronze
drum	Yanyuan Laolongtou	YLLM4.11	75.45	17.93	0.8	0.03	0.04	792	384	4.5	tin-bronze
drum	Yanyuan Market	YGJC641	99		1						copper
bronze plate	Yanyuan Market	YGJC375	68.49	22.82	2.71	0.06	0.08	210	18	37.6	lead-tin bronze
container	Yanyuan Market	YY29	86.38	13.62							tin-bronze
nail	Huili Hunshuitang	HHS1	76	8.1	14.2						lead-tin bronze
nail	Yanyuan Market	YY06	67.55	17.64	14.42						lead-tin bronze
coin	Huili Hunshuitang	HHS2	81.3	1.9	15.8						lead-tin bronze