

ARTICLE

The Southwest Silk Road: artistic exchange and transmission in early China

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Abstract

In examining wares discovered from the cultures of Sanxingdui and Jinsha and from the former site of the ancient kingdom of Dian in Sichuan and Yunnan provinces, this article highlights a number of shared features and trends that suggest a continued artistic, technological and cultural transmission through time and space. The article aims to supplement established theories on the rich material culture of this region. It will look in particular at the development of its striking bronze metallurgy, largely deriving from the established traditions of the Yellow River valley in China's Bronze Age. It highlights the function of a dense network of trading routes, referred to in modern scholarship as the "Southwest Silk Road", as an important facilitator of cultural and artistic exchange and reciprocity from ancient times.

Keywords: Southwest Silk Road; Sanxingdui; Jinsha; Dian; material culture

Introduction

Sanxingdui 三星堆, Jinsha 金沙 and Dian 滇, in today's Sichuan and Yunnan provinces, were the centres of significant artistic and bronze casting traditions in southwest China (Figure 1). The site of the ancient civilization of Sanxingdui, situated 40 kilometres north-east of present-day Chengdu city, has been dated to the late Shang period (c. 1300–1050 BCE) (von Falkenhausen 2003: 191). Archaeological finds, primarily from two pits discovered in 1986, confirm the presence of an advanced culture in the region, referred to as 'the Southwest' in early Chinese sources.¹ For reasons that remain unknown, the people of Sanxingdui abandoned their walled city along the Jian River 濛江, deliberately burning

¹ Some of the important textual sources that include information on the Southwest may be found in the geographical treatises (*dili zhi* 地理志) section of the *Hanshu* 漢書 and the *Hou Hanshu* 後漢書. See Tan 2001 for a collection of annotations on the treatises on administrative geography in the standard histories. Another important textual source for the Southwest is the *Huayang guo zhi yizhu* 華陽國志 (Record of the Kingdoms South of Mount Hua) compiled by Chang Qu 常璩 (fl. 347 CE). Its comprehensive geographical, historical, political and biographical account of the former territories of the Ba 巴, Shu 蜀, Hanzhong 漢中 and Nanzhong 南中 commanderies in early and medieval times provides detailed surveys of the Southwest's mountains, rivers, wildlife, produce, people, customs and culture. It is also a biographical account of the lives of some of its eminent persons and worthy men and women from antiquity to the fourth century of the Eastern Jin period (265–420 CE). In addition to the two pits discovered in 1986 at Sanxingdui, six further ritual pits have been unearthed since 2020. A joint excavation team from several universities and research institutions in China have unearthed more



Figure 1. Map of the locations of the Sanxingdui, Jinsha and Dian cultures in early China

ritual vessels and paraphernalia in sacrificial pits. The Jinsha site, located on the outskirts of Chengdu, was discovered in 2001 and is considered the final phase of the Sanxingdui culture (Ye 2011). Finds from Jinsha have been dated to 1000–650 BCE by archaeologists, which corresponds to the Western Zhou period 西周 (eleventh century–770 BCE) (Chengdu Municipal Institute of Antiquity and Archaeology 2013). The Dian people were settled in the region of Lake Dian 滇池 in present-day Yunnan province, located south of Sichuan, and were active from around 500 BCE until 109 BCE, when they were conquered and attached as a vassal state to the Western Han Empire (202 BCE–9 CE) (Yao 2005: 381). Archaeological excavations at the two principal sites of Shizhaishan 石寨山 and Lijiashan 李家山 revealed them as a highly complex and localized kingdom with a society of significant traditions.

This article aims to supplement established theories that consider the Southwest's early material culture as largely deriving from the established traditions of the Yellow River valley in the central plains of China. Through an examination of ritual wares discovered from Sanxingdui and Jinsha and from the former sites of the Kingdom of Dian, the article highlights a number of shared artistic preferences and metallurgical practices that show a flourishing interaction between the sedentary and pastoral societies in the region which facilitated local transmission and exchange, resulting in the development of a number of advanced artistic traditions over time. This exchange was aided by a network of trading and communication routes, referred to in modern scholarship as the Southwest Silk Road; from early on it played a central role in bringing people with established bronze technology and tradition to the region. While the cultures of Sanxingdui and Jinsha preceded the civilization of the Dian people by several centuries and their centres are at a great distance from each other (over 800 kilometres), we may assume that the

than 500 artefacts, including gold masks and a large number of fine bronzes and bird-shaped gold ornament pieces. As these finds have not yet been officially published, they are not included in this article.

movement of people in the region was continuous and active until the founding of the Qin (221–206 BCE) and Han (206 BCE –220 CE) dynasties when central military and government control over the region was established and consolidated.

A nuanced understanding of local and regional developments challenges arguments that presume the overriding influence of dominant cultures, such as that found in the Yellow River valley, and underplays the possibility of local indigenous developments.² In China's case this paradigm views the Southwest, and indeed most of the early cultures of Southeast Asia – the territory encompassed by modern day Myanmar, Thailand, Laos, Vietnam and Cambodia – as dependent on China for the origin of most technological and artistic innovations. Especially in the field of metallurgy, these views trace the spread of early bronze making from the elite and sophisticated Shang and Zhou cultures to the less complex societies of the Southwest via networks of contact and exchange (White and Hamilton 2009: 357–8).³

Following an examination of some of the key routes associated with the Southwest Silk Road, the article highlights the nature of societies in the region and introduces established theories on the early transfer of metallurgy to the Southwest. After this, it focuses on the cultures of Sanxingdui, Jinsha and the ancient Kingdom of Dian, looking at some of the shared features and trends that indicate a number of related artistic and material traditions facilitated by the presence of different social and ethnic groups and a well-developed network of trading routes in the Southwest.

The Southwest Silk Road

Studies of the Silk Road, a network of overland routes that connected the continents of Europe and Central Asia with northern China across the Eurasian Steppe, and also of the Maritime Silk Road, a number of sea routes that linked southern China with Southeast Asia, the Indian subcontinent and reaching as far as the Arabian peninsula and Europe, are well established. These studies have overshadowed a third system of trading routes constituted by overland passages stretching through the mountainous areas of the eastern Tibetan Plateau and the provinces of Sichuan, Guizhou and Yunnan throughout the Yunnan-Guizhou Plateau and into the neighbouring states of Southeast Asia. Labelled as the Southwest Silk Road in modern scholarship, this complex network of traversable roads played a key role in the exchange of goods; however, its contribution to the transmission of culture and art on a trans-regional level in early times remains to be explored.⁴ Although named as the Southwest Silk Road in association with the great trade routes – the Northern and Maritime Silk Roads – there is little evidence that silk was ever exchanged along it. The term has come to be used as a short reference for the routes of trade and cultural exchange across the region.

Rivers and traversable plateaus in the Southwest were key to traffic from early on, among which the Yunnan-Guizhou Plateau, a southern extension of the Tibetan Plateau, was possibly one of the most heavily crossed routes employed by the many

² For examples of Sino-centric studies on the cultures of the Southwest, see Cao 2016, Li 2018, Qiu 2013 and Wang 2002.

³ In their analysis, White and Hamilton 2009: 358 question Sinocentric models for the source of Southeast Asian bronze technology as flawed for chronological, technological and conceptual reasons.

⁴ For studies on the Southwest Silk Road, see Cao 2016; Fang 2015; Hu 1989; Li 2018; Lin 2008; Luo 1993; Qiu 2013; Wang 2002; Wang and Dai 2020; Yang 2004, 2018; and Zhang 2018. The Southwest Silk Road does not designate a single unbroken passage but refers to a network of interconnected routes that passed through distinct regions. Bin Yang's study on the use of cowrie shells as money among Indian, Chinese, Southeast Asian and West African societies is an example of research on the impact of the Southwest Silk Road in the region. See Yang 2004, 2009, 2011 and 2018.

nomadic and semi-nomadic tribes in the region. It served as an interaction zone between the main cultural centres in the northern, eastern and the southwestern parts of the region (Yang 2004: 315). The Tibetan Plateau itself is a vast area that extends over 2.5 million square kms, and comprises parts of Qinghai, Gansu, Sichuan and Yunnan provinces, as well today's Tibetan Autonomous Region (Guedes and Aldenderfer 2020: 340). Along with land routes, rivers were also of key significance to anyone traversing this region. We find that the major rivers in the Southwest, the Yangtze 揚子江, Pearl 珠江, Mekong 湄公河 and Hong rivers 洪江, mostly originate from the Tibetan Plateau with their main tributaries passing through Sichuan and Yunnan and flowing south towards Southeast Asia. These rivers and their many tributaries functioned as passages for the movement of people as well as goods, ideas and the arts (Hignam 1999: 1). Joyce White and Elizabeth Hamilton (2009: 390), in their examination of the transmission of early bronze technology to Southeast Asia, note how the complex river systems extending out of the southeastern foothills of the Himalayas may have aided the direct and swift spread of the Eurasian Steppe metallurgical traditions, especially the lost-wax casting of ornaments to the south and southwest, reaching today's Thailand as early as 2000 BCE. The dating of the different branches of the Southwest Silk Road remains a matter of debate among scholars, some of whom believe that the route to India across the Southwest, referred to in early historical accounts, may in fact have emerged well before the third century BCE (Yang 2009: 34).

The earliest mention in Chinese textual sources of an active trade route in the Southwest may be found in the *Shiji* 史記 where the explorations of the official and diplomat, Zhang Qian 張騫 (138 –126 BCE), are recorded as follows:

及元狩元年，博望侯張騫使大夏來，言居大夏時見蜀布、邛竹杖，使問所從來，曰「從東南身毒國，可數千里，得蜀賈人市」。或聞邛西可二千里有身毒國。騫因盛言大夏在漢西南，慕中國，患匈奴隔其道，誠通蜀，身毒國道便近，有利無害。於是天子乃令王然于、柏始昌、呂越人等，使開出西夷西，指求身毒國。至滇，滇王嘗羌^[3]乃留為求道西十餘輩。歲餘，皆閉昆明，莫能通身毒國。

In the first year of *yuanshou* (122 B.C.E.) Zhang Qian, the Bowang marquis, returned from his mission to the land of Daxia (Bactria) and reported that while he was there he had seen cloth produced in Shu and bamboo canes from Qiong. On inquiring how they had arrived in Daxia, he was told, "They come from the land of Shendu (India), which lies some several thousand *li* west of here. We buy them in the shops of the Shu merchants there." He was told that Shendu was situated some 2,000 *li* west of Qiong. "Daxia, which is situated southwest of our country," Zhang Qian reported to the emperor with enthusiasm, "is eager to open relations with China and is much distressed that the Xiongnu are blocking the road in between. If we could find a new route from Shu via the land of Shendu, however, we would have a short and convenient way to reach Daxia which would avoid the danger of the northern route!"⁵

This passage confirms the presence of an established road between Sichuan and Bactria via India by the Han dynasty, used by traders in the Southwest but not familiar to or explored yet by the Han themselves. Indeed, the mention of Shu 蜀 merchants selling their goods in India suggests the presence of developed trading relations between local

⁵ *Shiji* 116.2996; Watson 1993: II, 256.

societies in the Southwest and distant regions that must have flourished well before Sima Qian's 司馬遷 (c. 145–86 BCE) writing of the *Shiji*.⁶

A further passage in the *Shiji* refers to the attempts made by Han emissaries to locate a safe and more direct route to Bactria in order to avoid dangers encountered by the Qiang 羌 people in the Tibetan Plateau and the Xiongnu 匈奴 in the north.

昆明之屬無君長，善寇盜，輒殺略漢使，終莫得通。然聞其西可千餘里有乘象國，名曰滇越，而蜀賈茲出物者或至焉，於是漢以求大夏道始通滇國。初，漢欲通西南夷，費多，道不通，罷之。及張騫言可以通大夏，乃復事西南夷。

The Kunming tribes have no rulers but devote themselves to plunder and robbery, and as soon as they seized any of the Han envoys they immediately murdered them. Thus none of the parties were ever able to get through to their destination. They did learn, however, that some 1,000 or more *li* to the west there was a state called Dianyue whose people rode elephants and that the merchants from Shu sometimes went there with their goods on unofficial trading missions. In this way the Han, while searching for the route to Daxia, first came into contact with the Kingdom of Dian.⁷

Another passage in the *Hanshu* 漢書 records how Emperor Wu 漢武帝 (r. 141–87 BCE) dispatched envoys in search of the route to India via the Southwest:

於是天子乃令王然于、柏始昌、呂越人等十餘輩間出西南夷，指求身毒國。至滇，滇王當羌乃留為求道。四歲餘，皆閉昆明，莫能通。滇王與漢使言：「漢孰與我大？」及夜郎侯亦然。各自以一州王，不知漢廣大。使者還，因盛言滇大國，足事親附。天子注意焉。

The emperor therefore ordered Wang Ranyu, Bo Shichang, Lü Yueren and others, ten or more, to go on a secret expedition to the region of the Southwestern Yi barbarians, instructing them to search for the Kingdom of Shendu. The expedition reached as far as Dian. The King of Dian, Changqiang made them stay and told them that he would send out a party to search for the road to Shendu. After more than four years of waiting, all the roads were closed off by the inhabitants of Kunming and the search party was not able to get through. The King of Dian told the Han envoy, "Which is greater, my domain or that of the Han ruler?" The Marquis of Yelang asked the same question. They both thought of themselves as kings of one vast region and did not know the vast greatness of the Han. The Han envoys returned and made an effort to claim that the Dian Kingdom was large and should be good enough to have a close relation and binding to the Han. The emperor paid close attention to this matter.⁸

⁶ The region known in early textual sources as the Southwest (*xinan* 西南) primarily occupies the combined areas of northwestern Guizhou, Sichuan and northeastern Yunnan provinces today. It encompasses the geographical landscape referred to as the Ba-Shu 巴蜀 territory, a peripheral region in early Imperial times, which combined the two states or kingdoms known as Ba and Shu within the greater Sichuan Basin. Ba was where today's eastern Sichuan lies, with its capital Jiangzhou 江州 (present-day Chongqing city) on the banks of the Yangtze River; while Shu, with its capital Chengdu 成都, occupied the lowlands of the Chengdu Plain and the adjacent mountainous territories of the western part of the province. Mention of the Shu people refers to those living in the former kingdom of Shu. For a detailed account on the early history of Sichuan, see Sage 1992.

⁷ *Shiji* 123, 3166; Watson 1993: II, 236–7.

⁸ *Hanshu* 95.3841.

From these textual records it is evident that although there was a route from the Western Han capital of Chang'an 長安 to Yunnan via Sichuan, the stretch of road from Yunnan westwards to Bactria in Central Asia via the region of present-day Myanmar and India was blocked by the local ethnic tribes who may have considered the Han as intruders rather than “friends”. Over time, Han government missions deployed to search for a route to Bactria via the Southwest proved not only dangerous but financially costly. As noted in the *Shiji*, “Earlier the Han had tried to establish relations with the barbarians of the Southwest, but the expense proved too great and no road could be found through the region and so the project was abandoned (初, 欲通西南夷, 多道不同, 罷之).”⁹

What is also evident from early writings is the highly localized nature of interaction between different societies in the Southwest and the difficulties encountered by those, such as the Han, who as “outsiders” may have been viewed as encroaching upon their established affairs. Although there was interest in the Southwest and the territories beyond the Han Empire’s borders, primarily for economic purposes, it never became a priority, possibly due to contentious relations between the Han government and the nomadic steppe tribes, united under the Xiongnu and occupying much of the territory north of the empire’s borders, and which had a decisive influence on its political, economic and military life (Di Cosmo 1994).

The Southwest Silk Road comprised a number of key sections. A route labelled in modern scholarship as the Sichuan-Yunnan-Burma-India road linked Chengdu with Kunming in the east and Dali 大理 in the west of Yunnan province (Yang 2004: 287).¹⁰ From Dali the road crossed the Bonan Mountain 博南山 pass to today’s Myanmar and Thailand, eventually reaching India and was thus labelled the “Ancient Road of Bonan (Bonan gudao 博南古道)” (Yang 2004: 287). Another branch of the Southwest Silk Road connected Chengdu with Kunming and then forked southeast towards Vietnam following the course of the Hong River that flows to northern Vietnam. The third major route connected Sichuan and Yunnan with the regions of today’s Laos, Thailand and Cambodia. Key to the discussion in this article is a fourth route that joined Sichuan, Yunnan and the Tibetan Plateau with the north. The Yunnan-Guizhou Plateau, mentioned earlier, is a natural corridor for the northern part of this route. Much later, in the Ming dynasty (1368–1644), tea became an important commodity traded along this route. It was exported from Sichuan and the Puer region in Yunnan, via Dali to Lhasa and from Lhasa to Nepal and India (Yang 2009: 32–3). Known at the time as the “Tea Horse Route”, the Yunnan-Tibet connection started much earlier, even before the custom of tea drinking began among the Tibetan people in the Tang period (618–907) (Yang 2009: 33).

Long before the tea trade, horses from the Zuodu 筓都 people, who lived west of Sichuan at the Tibetan-Yunnan borders, were traded along the fourth major network of routes mentioned above. We read in the *Shiji* how Ba and Shu traders made good profits from the purchase of Zuodu horses, slaves and oxen in the region.¹¹ The earliest geographical treaties in the Southwest – the *Huayang guo zhi*, 華陽國志 (Records of the Kingdoms South of Mount Hua) compiled by Chang Qu 常璩 (c. 291–361 CE) – mentions the presence of “divine horses (*shenma* 神馬)” in the region as follows:

滇池縣郡治。故滇國也。有澤水，周回二百里。所出深廣，下流淺狹，如倒流，故曰滇池。長老傳言，池中有神馬，或交焉，即生駿駒，俗稱之曰“滇池駒”。

The commandery administration is located in Dianchi county, seat of the ancient Dian Kingdom. There is a large lake with a circumference of two-hundred *li*. The

⁹ *Shiji* 123, 3166; Watson 1993: II, 237.

¹⁰ See Yang 2004 for a description of the different network of routes that comprised the Southwest Silk Road.

¹¹ *Shiji* 116.2993 (巴蜀民或竊出商賈，取其筓馬、僂僮、髦牛，以此巴蜀殷富).

source of the lake is deep and wide and at the lower course it becomes shallow and narrow. It is as if it has a reverse flow thus called Dianchi. Rumours according to the chiefs and the elders say that there are spirit horses in the lake. When these horses are bred with other horses then they give birth to spirit colts that are commonly referred to as the “Dianchi colts”.¹²

The *Hou Hanshu* also documents a special breed of horse to be found at Lake Dian.¹³ Archaeological evidence shows that horse husbandry was practised in the Southwest from early times and these legends suggest that high-quality horses were present in the region well before the Qin and Han occupation (Yang 2009: 49).

The importance of horses to societies settled on the Tibetan Plateau is evident from archaeological findings. Entire horse skeletons placed in “sacrificial features”, similar to the horse sacrificial burials known from across the Eurasian Steppe, have been discovered, suggesting that people in the region engaged in ritual practices that were formed among the nomadic steppe peoples of Central Asia.¹⁴ Jade Guedes and Mark Aldenderfer (2020: 376) note how the introduction of the horse most likely changed the way humans occupied the Tibetan Plateau in several ways. Transport on horseback made it easier to cross larger distances in shorter amounts of time, which increased people’s ability to engage in long-distance patterns of trade and exchange that came to characterize subsistence on the Tibetan Plateau.

Indeed, representations of horses and riders on bronze vessels, showing horsemen with a cape similar to that worn by the Yi 彝 people in the Liangshan 凉山 region of southern Sichuan today, are prominent in the arts of the Dian people.¹⁵ The modern Yi are the descendants of the ancient Di 氐 and Qiang ethnic tribes, the former from the lowlands of northwest Yunnan and the latter from the highlands of Tibet.¹⁶ The cost or value of a horse is recorded on a Dian tally plaque unearthed from a tomb at Shizhaishan and dated to the height of the Dian Kingdom. This tally contains an unusual engraved drawing in the form of an inventory list. Along with a horse head, there are representations of slaves, heads of sheep and ox and cowrie shells, all of which appear to represent forms of moveable wealth. The inclusion of cowrie shells on the plaque is noteworthy, especially because the large quantities of these small sea snails found at the sites of Sanxingdui and Dian have raised scholars’ interest in their role and meaning for the region’s early societies.¹⁷ While cowries have been found at the Shang and Zhou sites in Central China, its prevalence in the Southwest and the production of elaborate bronze vessels for their storage, suggest their significance to local societies in the region. The most frequent cowrie type found in the Southwest is the Gold Ring cowrie which came primarily from the Indian Ocean, more specifically from the Maldive Islands. They were probably brought to the Southwest by traders who followed the land route that connects Sichuan and Yunnan with Thailand and Burma, extending to India and thereby reaching the shores of the Indian Ocean and the Maldives (Pirazzoli-t’Serstevens 1990: 47). In the Southwest, at least, they appear to have functioned as a form of exchange in a society

¹² *Huayang guozhi yizhu*, 4.267–8.

¹³ *Huayang guozhi yizhu* 4.153; *Hou Hanshu* 86.2847.

¹⁴ See Guedes and Aldenderfer 2020: 376, where the authors note that, while there is no direct radiocarbon date associated with these finds, nevertheless, horses have been unearthed from the region’s cist tombs that have been dated to between 2710 and 2360 BCE.

¹⁵ See Figure 3 which is examined in more detail later.

¹⁶ On the subject of ethnic tribes in the Southwest, see Peters 2002 and Harrell 2001.

¹⁷ Although to date no cowrie shells have been unearthed at the Jinsha site, we have an example of a jade carving in the form of a shell that suggests its continued importance at the time. The shell-form jade carving is in the collection of and on display at the Jinsha Museum in Chengdu city.

that did not have coins or any other form of currency and had ritual or religious connotations. Their long journey is a testament to their significance as a valued commodity available primarily through trade along the Southwest Silk Road.¹⁸

Another important commodity produced and transported via the road and river networks in the Southwest, especially along the fourth route mentioned above, was metal ore. Today's Yunnan and the region of Myanmar contain some of the richest deposits of copper, lead and tin in the wider region.¹⁹ A recent discovery of primary metallurgical activities at six smelting sites dated to the middle to late second millennium BCE in Yunnan highlight the early exploitation of ores in the Southwest (Yao et al. 2020: 2). It is worth noting that the production of quality bronze work requires a copper content of about 90 per cent and a tin content of about 10 per cent. While copper was readily available throughout the region, in Sichuan and Yunnan, tin was more scarce and a far more precious material, with deposits found primarily in Yunnan and today's Myanmar.²⁰ This suggests that early cultures and societies in the region, such as the three examined in this article, must have been in contact with metal traders along the Sichuan-Yunnan branch of the Southwest Silk Road, obtaining precious raw material from local deposits. Furthermore, as noted by Rubin Han and Li Xiaocen (2009: 181) in their examination of early metallurgies in the Southwest, in particular the ancient sites of the Dian, "the appearance of tinned bronzes (and other products) unquestionably documents experimentations with the appearance of an 'outsider' technology. The tinning technique can be seen as one important invention of the bronze cultures in the steppe area of the Northern Frontier." The use of tin-plating or the application of tin-enriched surfaces, giving objects a shiny and attractive appearance, required tin that was available and sourced locally from mines in the Southwest.

Buoyant trade along the Southwest Silk Road also connected nomadic and semi-nomadic societies with sedentary ones. Pastoral nomadism does not normally exist in isolation from farming communities, as the pastoral nomadic economy cannot provide all basic necessities, and their contact, commercial exchange and mutual dependency with settled people played an important role in the shaping of early societies in China (Di Cosmo 1994: 1092). Below let us examine some of the theories on the transfer of bronze metallurgy in the Southwest.

Transfer of bronze metallurgy in the Southwest

While there is an ongoing debate over the exact dating of the transfer and development of metallurgy to societies in the Southwest, it is commonly asserted that there was contact with "outside" that served as the main stimulus for local metallurgical experimentation.²¹ Established views explain the appearance of bronze production in the Southwest by looking north to the early states of the Yellow River in the Central Plains and their sophisticated bronze tradition. However, the metallurgy of the Central Plains had a prior source in the Eurasian Steppe, entering China via the north and northwest where cultures such as the Qijia 齊家 (2200–1800 BCE) and Siba 四坝 (1950–1550 BCE) were settled along the Gansu corridor and interacted with the steppe peoples from Eurasia from the late third

¹⁸ For an in-depth study on cowrie shells in early China, see Yang 2004, 2011 and 2018.

¹⁹ On the Southwest's deposits and the locations of casting moulds discovered, see Han and Li 2009.

²⁰ See Han and Li 2009: 183, who discuss the Southwest, in particular Yunnan province, as a region rich in mineral resources. They note that the region's rich mines and the presence of ancient moulds demonstrate the possibility and conditions for bronze manufacturing in the region.

²¹ See von Falkenhausen 2003 and Xu 2001b.

millennium BCE.²² Mei Jianjun (2009: 10–14) notes how many of the metal objects associated with these two cultures, made of copper, tin bronze or leaded tin bronze and in the form of knives, axes, spearheads and smaller accessories, show a similarity in typology to metal objects found in the Eurasian Steppe which strongly suggests cultural connections. He further observes how various steppe features from different areas coexisted among the early bronze cultures in the Qinghai-Gansu region, suggesting that contacts between northwest China and the Eurasian Steppe were made over an extensive period rather than in the form of a direct influence due to a specific migration. This argument suggests a more local or regional development that was aided by, but not dependent on, “outside” sources with a high level of bronze metallurgical know-how. It represents a pattern of interregional interaction rather than a simple process of one-way diffusion (Mei 2009: 40–41).

Scholarship on the anthropology of technology transmission can help us understand the complex questions of how and why certain technologies move or transfer from one society to another. White and Hamilton alert us to the importance of differentiating technology – the application of knowledge of the material properties of physical things to achieve practical purposes – from a technological system that refers to the way knowledge is implemented in a specific context.²³ During the second and first millennia BCE, states in China’s Central Plains and cultures in the Southwest undeniably had a high level of knowledge of bronze technology, but the technological systems for producing and using bronze vessels and artefacts in the two regions differed. The amount of knowledge and the skills involved in metal production are complex and the transfer of any, even the simplest, technology to a society with no prior experience of working with metals is almost impossible. Therefore, transmission of complex metal technologies to an area with no prior experience in metalworking is not likely to have occurred by mere exposure to the idea of smelting, particularly in areas lacking evidence of a period of experimentation (White and Hamilton 2009: 361). White and Hamilton further note how the smelting of copper and the production of bronze artefacts are part of a complex technological system that involves the acquisition and manipulation of ores and fuels, the creation of refractory ceramics, the refining of molten metal, alloying, casting, fabrication and manipulation of moulds and the management of post-casting treatments such as working. To determine the source of the knowledge of metalworking in a culture requires not merely looking at who produced the geographically nearest metal artefacts in a suitable period of time, but who produced the nearest artefacts using a similar technological system (White and Hamilton 2009: 360–01). If there was no similar system employed, then the technology was indeed special to that culture or cultures within a region. We shall see how this aptly applies to the Southwest where techniques, such as the lost-wax process, and decorative styles not commonly employed in the Central Plains were used. Peng Peng’s study of the use of lost-wax technique in Bronze Age China highlights its importation from the Eurasian Steppe along with other metallurgical processes such as tinning, gilding, chasing and inlay, strengthening the argument that they were not only introduced to the Southwest via exchange with the northern nomadic steppe people, but also that the communication routes of the Southwest Silk Road may have played a role in its transfer to other regions within China and Southeast Asia (Peng 2017, 2020). It appears that key to the transfer of bronze technologies is the movement of peoples and interaction between sedentary and non-sedentary societies of the Southwest, the subject of our next discussion.

²² See White and Hamilton 2009: 373, for a discussion on the Qijia culture where it is mentioned that the metallurgy of the Central Plains had a prior source in the Eurasian Steppe, entering China via the north and northwest where cultures such as the Qijia and Siba were settled.

²³ See White and Hamilton 2009: 360, for a detailed analysis of this concept and argument.

Early societies in the Southwest

In our attempt to understand the Southwest's population during the period of our examination, we have to rely on information from later textual sources, such as the *Hanshu*, which mentions the complex amalgam of ethnic groups in the region before its conquest by Qin and Han forces. While these accounts are from a later period, they nevertheless provide us with valuable insight into the complex nature of societies in the region in earlier times, a situation that continues to exist to this day.²⁴ The many ethnic tribes who subsisted in different ways are described in the *Hanshu* as follows:

[西南] 夷君長以十數，夜郎最大。其西，靡莫之屬以十數，滇最大。自滇以北，君長以十數，邛都最大。此皆椎結，耕田，有邑聚。其外，西至桐師以東，北至葉榆，名為焉、昆明，編髮，隨畜移徙，亡常處，亡君長，地方可數千里。自焉以東北，君長以十數，徙、苴都最大。自苴以東北，君長以十數，冉駹最大。其俗，或土著，或移徙。在蜀之西。自駹以東北，君長以十數，白馬最大，皆氏類也。此皆巴蜀西南外蠻夷也。

There are dozens of chiefs ruling amongst the Yi (Southwest) barbarians, but Yelang amongst them is the greatest. To the West of Yelang live the chiefs of Mimo in their dozens, amongst them the Dian are the greatest (or most important). North of the Dian there are dozens of chiefs and amongst them the Qiongdu are the greatest (or most important). All of these tribes wear their hair in the mallet-shaped fashion, work the fields and gather in their own cities and settlements. Beyond them, in the West from Tongzhi going East, to the north one reaches Yeyu where all the tribes are called Sui and Kunming. People here braid their hair, move from place to place following their herds of domestic animals, and do not have a fixed place to live and chieftains. Their land measures several thousand li. From Sui heading towards the north-east there are dozens of chiefs amongst whom the Xi and Zuodu are the greatest (or most important). Northeast of Zuo, there are a dozen of chiefs amongst which the Ran and Mang are the greatest (or most important). Their custom include those who are settled on the land and those who move about from place to place. Their territory is west of Shu. Northeast of Ran and Mang there are a dozen of chiefs amongst which the Baima are the greatest (or most important). They all belong to the category of the Di tribe. These are all the foreign Yi barbarian groups of the Southwest of Ba and Shu.²⁵

Collectively called the Southwestern Yi (*Xinan Yi* 西南夷), inhabitants of the Southwest were ethnically, culturally, linguistically and in their appearance distinguished from the Han in early historiography, with a clear separation of “us” versus “them” or “civilized” versus “barbarian”. While they may be called various names in different sources, the Southwest's indigenous population can be broadly divided into three different economic and cultural groups. Those working the fields and tied to their land, such as the Yelang, the Dian and the Qiongdu; those with a nomadic lifestyle included the Sui and the Kunming; and those leading a semi-nomadic semi-agricultural existence were the Xi,

²⁴ I have hesitated to term these cultures “multi ethnic”, since the meaning of ethnicity in that time and context is a topic fraught with difficulties. My aim is to simply highlight the coexistence of peoples in the Southwest with distinct characteristics (at least as represented in their art) as opposed to cultures where one ethnic group is dominant to the apparent exclusion of others.

²⁵ *Hanshu* 95.3837. The *Hanshu* provides a detailed description of the different social and cultural groups in the Southwest. Research into the identity of these groups is both complex and inconclusive. On the Di and Qiang in the Southwest, see Wang 1992, 1999.

the Zuodu, the Ran and Mang. All these are subgroups of the Di and the Qiang who were important groups in early migration. Interestingly, a possible ethnic relatedness between the Qijia in the north, mentioned earlier, and the Qiang ethnic peoples in the west and southwest, may be seen when we look at the burial practices of these two groups. The discovery of cremated burials in the Qijia site of Mogou 魔沟 in Gansu province confirms the use of cremation by the Qijia in the Bronze Age. The *Lüshi chunqiu* 吕氏春秋 (*The Spring and Autumn [Annals] of Mr Lü*) compiled by Lü Buwei 吕不韋 (c. 290–235 BC) mentions how the Qiang also used cremation as a form of burial ritual. According to this text, when captured, the Qiang did not grieve for their relations but were anguished at the notion that they were not going to be cremated.²⁶ More specifically, the discovery of the custom of piling white stones in Qijia burials, a practice continued to this day by the Qiang, further confirms a cultural connection between the two (Guedes and Aldenderfer 2020: 369). The link between the Qijia and the Qiang is significant, especially in the context of the early dissemination of bronze technologies and production. As mentioned earlier, northern pastoralists would have made their way along the eastern rim of the Tibetan Plateau to the metal-rich Southwest in order to obtain necessary raw material for their craft. Their nomadic way of life facilitated long-distance travel and, with their advanced metalworking abilities and trading skills, as well as bringing highly valued domesticated animals, such as horses, they were invaluable to societies in the region.

Another group of significance for this overview are the Sui people (mentioned above) who led a nomadic form of existence in the area of Yuexi 越巂, located in the northwest territories of Yunnan province and along the eastern borderland of the Tibetan Plateau (Huang 2020).²⁷ The Sui played an intermediating role in the Southwest's cultural exchange, forming relations with societies along a "Crescent-Shaped Cultural-Communication Belt", a term coined by the late historian Tong Enzheng (1935–1997) (Huang 2020: 101). Tong explains how a crescent-shaped belt, containing territories stretching from northeast and northwest China, along the Tibetan borderlands to Yunnan in the southwest, formed a far-reaching network of exchange across an area where parallel practices and cultural traits may be found due to similarities in ecological, topographical and typological conditions. Along this belt different social economies were formed, with a high degree of migration, fusion and exchange between various cultural groups that had similar needs and material conditions (Tong 1990: 266–7). The Sui are known to have utilized the network of passages across the eastern part of the Tibetan Plateau within the belt. For example, Kazuo Miyamoto sees the emergence of bronze working in the Southwest as a direct result of the active exchange that took place between the Sui and other social groups, including those from the northern steppe. He notes how this exchange is reflected in the shared artistic forms and the use of the lost-wax technique seen in the region's metallurgy (Miyamoto 2014: 79–80). Miyamoto's examination of the contents of grave sites along the upper and middle Yalong River 雅砻江 in the eastern rim of the Tibetan Plateau confirms that the bronze objects found there originated from northwest China, today's Gansu and Qinghai provinces, and date to the fifteenth–twelfth centuries BCE, a period considerably earlier than formerly ascribed to the first bronze culture in the region and which predates interaction with the Zhou cultural sphere of the ninth–eighth centuries BCE (Miyamoto 2014). Significantly for our study here, these finds are dated slightly earlier than the Sanxingdui culture of the Chengdu Plain and proposes that the beginnings of the Southwest's bronze tradition may

²⁶ *Lüshi chunqiu xin jiaoshi* (氏羌之民，其虜也，不憂其係纆，而憂其死不焚也；皆成乎邪也). For the importance and meaning of the act of piling white stones in Qiang culture, see Su 2018: 291.

²⁷ Yuexi commandery was established in 111 BCE on the orders of Emperor Wu. The character 巂 may be read as *sui* or *xi*.

well have developed not only earlier but independently from the Shang and Zhou practices, and that it is connected with the bronze working cultures of the north and northwest.

One part of the “Crescent-Shaped Cultural-Communication Belt” is the “Tibetan-Yi Corridor” mentioned first by Fei Xiaotong in his examination of early migration movements in the Southwest. Fei notes how the Qiang and Di played a key role along this corridor, spreading from eastern Qinghai and southwestern Gansu in the north through to western Sichuan and northwestern Yunnan in the southwest.²⁸ Over a period of time, stretching from the late Neolithic to the Bronze Age, these peoples relocated southwards, first establishing a number of relatively large settlements along the Upper Mekong, Dadu 大渡 and Min 岷 rivers in the northern part of the “Tibetan-Yi Corridor”, forming a mature and prosperous culture, and thereafter migrating further south along the river valleys and establishing exchange and relations with the population of the Yangtze River basin and in southwestern and central Yunnan (Shuo 2018: 4).

In summary, we see three aspects that are key to the development of early bronze casting traditions in the Southwest: first, the movement and flow of peoples from the northwest and northern regions along the “Crescent-Shaped Cultural-Communication Belt” and the “Tibetan-Yi Corridor”; second, the multi-ethnic nature of societies who relied on trade and interaction with each other for their livelihood; and third, the availability of precious metal ore in the region for the development of its metalworking tradition. It may also be said that different societies in the Southwest appear to have coexisted with each other. Their presence may be seen in the many artefacts discovered at the sites of Sanxingdui, Jinsha and Dian, which is examined below.

The Sanxingdui and Jinsha cultures and the ancient site of the Dian Kingdom

The small village of Sanxingdui, where the remains of the ancient city and culture of Sanxingdui were discovered, is located in today’s Guanghan city 廣漢市. It covers an area of approximately 10–17 square kms determined by the distribution of walls, foundations and artefacts found since excavations started in 1980. The main finds at the site were placed in two pits, known as Pit 1 and Pit 2, which were accidentally exposed during excavations in the summer of 1986, and contained hundreds of bronzes, stone and jade implements, gold objects and elephant tusks (Xu 2001a: 25). Although a further six pits have been discovered at the site more recently, their contents have not yet been officially published. The contents of the original two pits represent the height of a culture that is not recorded nor was known until this discovery. Some of the findings in the two pits are highly unusual and fantastic in nature. Bronzes of a kind never seen before include an impressive human figure over 2.5 metres high, bronze trees soldered with figures and giant bronze human heads covered with gold foil masks. In addition to finished objects, the pits also contained raw material, half-finished products and even waste material and stones used for grinding. These findings suggest the existence of workshops for producing stone and jade wares located at the site or nearby; however, no bronze foundry has been discovered to date (Xu 2001a: 27).

Objects in both pits were arranged in a purposeful and orderly fashion, suggesting that they were intentionally destroyed and not in haste (Chen 1999: 171). Thus it has been suggested that the pits were most likely of a sacrificial ritual nature, which involved either the strategic renunciation of wealth, as was often the case in ethnographically documented potlatching behaviour, or the proper disposal of religious objects, an important

²⁸ See Fei 1982, in which the author uses the label “Tibetan-Yi Corridor” because in China today the Tibetan and Yi peoples are the two most populous groups in the corridor. This corridor is also known as the Tibeto-Burman Corridor which reflects more accurately its ethnic connotation. For further information, see Shuo 2018: 2, and Feuchtwang et al. 2010: 904.

procedure for controlling the supernatural power invested in religious objects so that they do not harm the community. Rowan Flad and Pochan Chen (2013: 213–14) note how the bronze figures and anthropomorphic heads were almost certainly important ritual objects used in public display and played critical roles in ritual representation, a feature of Sanxingdui material culture that sets it distinctly apart from the traditions of North China.

As already mentioned, some scholars are keen to emphasize the nature of the Sanxingdui culture as one that evolved against the backdrop of developments in Central China. According to Jay Xu, the century from 1300 to 1200 BCE was marked by regional diversification (commonly referred to by archaeologists as the “transition period”) and China’s Bronze Age civilization spread out from the Central Plains and diversified regionally over the next three centuries (Xu 2001a: 27–8). Although the Sanxingdui finds are accepted to be radically different, and as such represent a unique culture that is in sharp contrast with that of the Central Plains, it is nevertheless suggested that there was heavy borrowing and importing from the middle Yellow River valley, the middle Yangtze valley and the northern region of modern day Gansu and Shaanxi provinces. Advocates of this theory see this as the ultimate source for Sanxingdui’s bronze casting technology (Xu 2001a: 32). We shall return to this theory after a brief examination of the Jinsha and Dian sites below.

The settlement at Jinsha, discovered in 2001, occupies an area of about 3 square kms and is believed to be contemporaneous with the late Shang to the early Western Zhou periods (Zhu et al. 2003: 248). The site itself can be divided into four separate areas: the eastern part reserved for religious and ceremonial activities and workshops; the south and central areas of a residential nature with a cemetery; and the area in the north-east was most likely reserved for the elite, as it includes the remains of a large palace structure. Current scholarship in China considers Jinsha as the political, cultural and economic centre of the ancient Shu state in the Chengdu Plain during the late Shang and Western Zhou periods (Chengdu Municipal Institute of Antiquity and Archaeology 2013: 13). Since its discovery, more than 2,000 artefacts have been unearthed at Jinsha, including approximately 40 gold objects, more than 700 bronze items, over 900 jade pieces, nearly 300 stone carvings and more than 40 ivory and bone artefacts, in addition to a large number of elephant tusks and approximately 10,000 pottery vessels and sherds (Zhu et al. 2003: 261). Decorative motifs found on objects include the prominent use of birds, fish and the sun, all of which are notable features on objects found at Sanxingdui. The decoration of birds and fish pierced by arrows on a gold leaf band from the Jinsha site is almost identical to that on a gold sheath from Pit 1 at Sanxingdui. However, most of the objects from Jinsha, especially bronze wares, are much smaller in size compared to those from Sanxingdui. An example is a bronze human figure about 20 cm in height standing on a base. With arms stretched out in the gesture of holding an object, its pose closely resembles some of the magnificent standing figures from Sanxingdui’s Pit 2. There is little doubt that the Jinsha culture was substantially derived from, or at least very closely related to, Sanxingdui. It is reasonable to suggest that Jinsha became a major political, economic and cultural centre on the Chengdu Plain as a consequence of the collapse of the Sanxingdui site.

The discovery of a richly furnished royal tomb at Shizhaishan in December 1956, containing the golden seal of the Dian king, proved the existence of the Dian Kingdom as recorded in the *Shiji*. Sima Qian describes how in 109 BCE the chief of the Dian Kingdom received a gold seal from Emperor Wu, acknowledging its position as a vassal state and tributary kingdom to the Han.²⁹ The gold seal bears the characters “Seal belonging to King of Dian (Dian wang zhi yin 滇王之印)”, accurately corroborating Sima Qian’s account

²⁹ *Shiji* 116.2997 (滇王離難西南夷，舉國降，請置吏入朝。於是以為益州郡，賜滇王王印，復長其民).

of events at the time. Our knowledge of the Dian people comes primarily from historical texts such as the *Shiji*, *Hanshu* and the *Huayang guo zhi*. From these writings it is evident that the Dian were much advanced in their social and political organization, settled in the region around the shores of Lake Dian and were led by a ruler with a large following. They wore their hair pulled up in a mallet-shaped bun, worked the fields and lived in cities and settlements. Early writings indicate that the wider region around Lake Dian was inhabited by a number of different ethnic groups (just as today), such as the Sui and Kunming who braided their hair and subsisted on pastoralism, moving around with their herds and leading a nomadic life without a fixed place or, according to the texts, a chieftain. They were part of the Di tribe who led a semi-nomadic lifestyle. The Di lived primarily in the highlands near the Jinsha River in the west, northwest of the Mimo territory. The Mimo were a confederation of ethnic groups who were settled in the region corresponding to today's southern Sichuan, eastern Yunnan and western Guizhou.³⁰

According to records in the *Hanshu*, the first king of Dian derived originally from the state of Chu 楚國 who settled in the region, taking over their custom and habits and becoming their ruler prior to the invasion of the Qin. Events from this time are documented as follows:

始楚威王時，使將軍莊躑將兵循上，略巴、黔中以西。莊躑者，楚莊王苗裔也。躑至滇池，方三百里，旁平地肥饒數千里，以兵威定屬楚。欲歸報，會秦擊奪楚巴、黔中郡，道塞不通，因乃以其眾王滇，變服，從其俗，以長之。

In earlier times, when King Wei ruled the state of Chu, he dispatched his general Zhuang Qiao to lead an army along the upper reaches of the Yangtze River and invade west of Ba and Qianzhong commanderies. This Zhuang Qiao was a descendant of King Zhuang of Chu. Zhuang advanced reaching the Lake of Dian, a body of water of 300 li in circumference surrounded by several thousand li of fertile rich flatland. By means of his military might he subdued the region and brought it under Chu rule. Zhuang Qiao wished to return to report his achievements but encountered the Qin army that attacked Chu and seized the commanderies of Ba and Qianzhong and blocked the road not allowing him to pass through. Because of this he returned to Lake Dian and with the men under his command he made himself King of Dian. He changed his clothes and followed the Dian custom and acted as their chief.³¹

There is an argument made for some possible Chu influence in Dian art, such as the use of bronze drums that appear to have been vital to both cultures; however, the greater part of Dian material draws from the indigenous cultures of the Southwest, borrowing from those who had migrated down the narrow mountain passes of Sichuan and the corridors of the Tibetan Plateau (Mei 2009: 12). It is a culture of a multifaceted hybrid society of pastoral nomads and sedentary agriculturalists with mixed economies, lifestyle, customs and traditions. In the arts of the Dian, nomadic steppe influence may be seen in the prevalence of animal combat scenes on plaques (Figures 2–3). However, Dian artists presented this kind of subject matter in a more natural fashion, stripping away some of the opulence created through gilding and precious stone inlay characteristic of the northern steppe tradition. The composition of Dian animal sculptures is, on the whole, well balanced and extremely detailed, displaying the craftsman's understanding of the subject matter (Li 1999: 156).

Among some of the most striking Dian bronze ritual objects are the bronze kettle-drums, typical of the rice-cultivating cultures of Southeast Asia, which included the

³⁰ See *Hanshu* 95.3837 on the different categories of ethnic population in the region.

³¹ *Hanshu* 95.3838.



Figures 2 (left) and 3 (right). Bronze plaques depicting scenes of animal combat, Western Han period (206 BCE–24 CE), excavated from Shizhaishan (left) and Lijiashan (right), Yunnan. Yunnan Provincial Museum, Kunming. Images reproduced with permission from the Yunnan Provincial Museum.

cultures of present-day Myanmar, Thailand and Vietnam. Known as the “Shizhaishan Drums” or Heger Type I drums, in Dian culture these musical instruments came to be placed in an inverted position in graves to store precious cowrie shells (Han 1998: 16). Bronze vessels were also made specifically to contain cowrie shells, some of which had lids decorated with realistic narrative scenes in a three-dimensional form. These bronze containers show lively genre scenes of warfare, markets, ritual sacrifices, tribute processions, weaving and other images covering a wide range of subject matter that appears to document aspects of life in Dian society (Figures 4 and 5a) (TzeHuey 2008: 226). Apart from cowrie containers and drums, large quantities of agricultural implements and weapons have also been found at the Dian culture sites, many of which contain elaborate decoration, suggesting their use as ritual or grave goods rather than as utilitarian wares (Zhang 1993).

An important aspect to note is the technology used in the production of the Dian bronzes which suggests a substantial metalworking tradition that existed prior to the Han conquest. The prevalent use of lost-wax casting, mentioned earlier, is distinct to Dian. Although the technique was familiar in the Shang and Zhou bronze tradition of the Warring States period (475–221 BCE) and Western Han times, it was not adapted on a wide scale, certainly not as we see it in Dian, until much later (Peng 2017, 2020). The fluid and intricate modelling of human figures and animal forms, often in freestanding relief, is evidence of the use of lost-wax casting. Scholars remain divided on the origins of lost-wax casting in the Southwest, with some convinced that, as no local technical tradition is known, it must have been imported, possibly from the Eurasian Steppe, most likely with other metallurgical techniques such as tinning, gilding, chasing and inlay (Peng 2017: 18). However, the construction of objects in a piecemeal manner, whereby sculptural figures and architectural forms are all cast separately and then assembled by the process of soldering, was also extensively employed at Sanxingdui, suggesting that these techniques were well established in the wider Southwest region. We see this especially on the bronze tree which shall be discussed below (Figure 6). Dian bronze casters, perhaps inspired by their example, created sculptural forms in component parts, but with the use of the lost-wax technology which allowed more varied and complex designs. Interestingly, after the Han takeover of the Dian in 109 BCE, characteristic features of Dian art and culture were completely abandoned. Iron implements and weapons replaced bronze ones, and bronze vessels were made in imitation of Han models or were imported from the Central Plains to be placed in tombs (Fong 1980: 327).



Figure 4. Bronze cowrie container showing scene of a rider with cattle, Western Han period (206 BCE–24 CE), excavated from Shizhaishan, Yunnan. Yunnan Provincial Museum, Kunming. Image reproduced with permission from the Yunnan Provincial Museum.



Figures 5a and 5b (detail). Bronze cowrie container with scene depicting a ritual offering, Western Han period (206 BCE–24 CE), excavated from Shizhaishan, Yunnan. Yunnan Provincial Museum, Kunming. Image reproduced with permission from the Yunnan Provincial Museum.



Figure 6. Bronze tree, twelfth century BCE, excavated from Sanxingdui Pit 2, Guanghan Sanxingdui Site Museum, Sichuan. Image reproduced with permission from the Sanxingdui Site Museum.

Continuity and parallels

It has been suggested that bronze casters of the bronze casting tradition of Sanxingdui were in close touch with Shang centres, evidenced by the presence in the pits of bronzes of common Shang shapes made in North China since Erligang times (c. 1500–1300 BCE) (Pirazzoli-t’Serstevens 1990: 52). Although there may well have been contact and influence from northern and Central China, such a Sinocentric view can obscure the important connection between the different cultures of the Southwest. A number of distinctive features and artistic preferences that are not mainstream in the early bronze tradition of Central China are evident in the arts of the Southwest. For example, the employment of gold leaf decoration is a common feature seen in Sanxingdui, Jinsha and Dian but was rarely (if ever) used in the Central Plains’ bronze tradition. The practice of employing gold on bronze wares is most likely to have derived from the influence of the northern steppe cultures where gold and the technique of gilding was readily employed for the decoration of small objects, such as jewellery, ornaments and plaques.³² On the sourcing of gold ore, scholars have noted how the western part of Yunnan is particularly rich in copper, tin, iron, lead and gold, much of which was exploited from early times (Zhang 1954). To this day, the junction of Yunnan, Guizhou and Guangxi provinces is known as the “Golden Triangle” as it has one of the largest concentrations of Carlin-type gold deposits in the world (Su et al. 2018: 157).³³ Six of the bronze heads from Pit 2 at Sanxingdui have mask coverings made of gold leaf. Gold leaf about 0.2 mm thick was pressed against the

³² See So and Bunker 1995 for illustrations of artefacts from the northern steppe cultures decorated in gilt and made of gold.

³³ See Su et al. 2018: 157, where the authors explain how Carlin-type gold deposit, named after a type of gold found in Carlin, Nevada, may be characterized by being an invisible gold that can only be found through chemical analysis.

bronze head and rubbed to make it adhere to the surface. The gold mask covered the entire face except for the eyes and eyebrows. The use of gold undoubtedly enhanced the value of the object, which may have had other religious or auspicious connotations, perhaps associated with local sun worshipping traditions (Bagley 2001: 91).

The employment of gold leaf as a decorative technique remained a popular choice for the people at Jinsha where an especially large number of gold artefacts have been unearthed. Gold was used for jewellery and for the making of masks, although substantially smaller in scale compared to those at Sanxingdui. Figures covered in gold leaf are also a distinct feature of Dian bronzes. Some of the prominent figures in scenes welded on to the lids of cowrie containers are wrapped in gold leaf. A particularly fine example is found on the cover of a bronze container with a large gilded figure on horseback surrounded by cattle (see Figure 4). The composition is not only impressive for its sculptural style, but the gold leaf draws the viewer's attention to the rider, marking his form with a sense of importance and luxury.

The stylistic preference for the use of sculptural components that are welded onto vessels and ritual objects, mentioned earlier, may be seen on Sanxingdui and Dian bronzes. Pre-eminent examples are the bird ornaments that formed part of the "spirit tree" excavated from Sanxingdui (see Figure 6). A tree from Pit 2 consists of at least a hundred separate compositions, mostly made in two-part moulds then joined and cast together. This impressive tree-form sculpture has nine branches attached to the trunk in groups of three with each branch bearing blooming flowers at the top of its arc and a bird seated on it. Jay Xu suggests that the bronze tree must have been heavily decked with movable pendants and ornamental components in various media at some stage, hanging from the branches or from the beaks of the birds (Xu 2001b: 118). There are conflicting opinions on the use of this fascinating bronze object, with some suggesting that it was made for display on a sacrificial altar as an embodiment of worship, while others propose that it was developed by the ancient Shu people and is linked to their legendary "cosmic tree". In Shu culture birds were regarded as symbolic of the sun and thus composites of this type may have been seen as tools of communication between Heaven and Earth (Sanxingdui Museum 2006: 69–70). The Sanxingdui tree may have also been the precursor for the later, Eastern Han period (25–220 CE) bronze trees known as "money trees" discovered in tombs in Sichuan.³⁴

The technique of soldering different components onto a main bronze piece and creating a complex composition of multiple parts is described by some as unlike anything ever attempted in the Central Plains (Xu 2001b: 62). On the casting of the many birds standing on flowers hanging from the tree branches, scholars note how a metal worker from Anyang would probably have cast the bird in one piece, using a complex mould, while the Sanxingdui caster seems to have cast it in four separate pours of metal, each made of a simple two-part mould. The bird's wings were joined onto its shoulders, its head attached to its neck by a collar of solder and solder beneath its claws joins it to the flower on which it stands (Xu 2001b: 62). A more developed form of the technique seen on Sanxingdui bronzes for the placement of sculptural components may be seen on Dian bronzes where lost-wax casting was employed for this purpose. The *raison d'être* for lost-wax casting is to produce complex shapes that are impossible or difficult to make by piece-mould casting as seen at Sanxingdui. Some of the most realistic and highly three-dimensional bronzes in lost-wax casting were made by Dian craftsmen who, as mentioned earlier, are likely to have acquired their skills from the nomadic steppe cultures that readily employed different metallurgical techniques in their art (Peng 2017: 18). Tzehuey Chiou-Peng notes how perceptible signs of incipient copper-based metallurgical activities

³⁴ On Eastern Han money trees, see Su 2004, He 2006 and Erickson 1994.

at second-millennium sites in western and northwestern Yunnan point to steppe-related cultures as the source for the inspiration of metallurgical activities in other parts of the region, which commenced during the latter part of the second millennium BCE. The arrival of metallurgical technology revolutionized the tool-making industry in the region, and knowledge of metal production and the making of artefacts were also disseminated through interconnected valleys and flat lands along the eastward-flowing Jinsha River (Tzehuey 2009: 83). It is worth noting that Tzehuey's dating coincides with the height of the Sanxingdui culture, which suggests the existence of a direct transmission route from Sichuan where similar stylistic choices were made in the use of sculptural ornamentation. Dian craftsmen were aided by imported metallurgical know-how but were also creatively selective in their employment of different and unusual techniques that had a more localized origin. Apart from the use of lost-wax casting, they also incised bronzes with sharp tools as evident from the excavated bronze tally plaque mentioned earlier (Whitfield and Wang 1999: 154–5).

Representations of social groups

The bronze culture of the Southwest was the outcome of the merging of different bronze production technologies and cultures, most likely influenced by the migration of peoples over many centuries who brought their skills and know-how with them (Han and Li 2009: 170). Among Sanxingdui bronze heads there is a clear distinction between those that have their hair pleated and those who do not. These are stylistic markers that may have been intended to set apart groups of different ethnic or social status, or perhaps both. We have already noted how early texts described the Di and Qiang peoples as wearing their hair in mallet-shaped buns, while the Sui and Kunming wore theirs in plaits. These texts go further in their demarcation of distinctive traits such as clothing, noting on which side it is buttoned, and body features that include the presence of tattoos and facial hair. What seems apparent is that a number of the distinctive traits – a particular hairstyle, a tattoo, a mode of dress, a type of hat or piece of personal adornment – were used by bronze makers at Sanxingdui to distinguish between different peoples (Peters 2002: 86).

So who were those memorialized on Sanxingdui bronzes? A bronze head discovered in Pit 1 is a comparatively realistic modelling of a face that sets it apart from more stylized heads. It shows a hairline that is clipped straight across the back of the head and pulled back into a bun under a headdress that is now lost (Figure 7). However, a different hairstyle may be seen on another head from Pit 2, where the hair is formed into a long pigtail at the back (Figures 8a–b). There are further examples where headdresses are cast with the head in a number of styles and shapes. Square tall-form caps appear to be common, such as the example decorated with a pattern of rectangular spiral design seen on a head from Pit 2 (Figure 9) where the hair is tied up in a bun under the cap. Another type of headdress is the distinct braided crown or garland seen on a head from Pit 2 (Figure 10). Below the garland the hairline is indicated all the way around the head, clipped short over the forehead, trimmed to modest sideburns at the temples and descending at the back as far as the bottom of the ear (Bagley 2001: 100).

The multi-ethnic make up of the Dian Kingdom is represented in the variety of figures portrayed on the many bronze drums and cowrie receptacles which differentiate between a number of ethnic or social groups. Wang Ningsheng has analysed Dian figures on the basis of their hairstyle and costumes, labelling those with their hair tied up in a bun as the dominant population in the Dian region and thus members of “the kinds of Me-mo” (better known as the Mimo), and others with braided or loose hair belonging to “the kinds of Kun-Ming” (better known as the Kunming) (Wang 1979). An example of a typical Dian figure of the Mimo type is the rider on horseback, decorated with



Figure 7. Bronze head, thirteenth–twelfth century BCE, excavated from Sanxingdui Pit 1, Guanghan Sanxingdui Site Museum, Sichuan. Image reproduced with permission from the Sanxingdui Site Museum



Figures 8a and 8b. Bronze head, twelfth century BCE, excavated from Sanxingdui Pit 2, Guanghan Sanxingdui Site Museum, Sichuan. Images reproduced with permission from the Sanxingdui Site Museum.

gold leaf, with his hair tied in a topknot and dressed in a distinctive cloak over trousers on the lid of a cowrie container (see [Figure 4](#)). A member of the Kunming with loose hair may be seen on the cover of another cowrie container decorated with a scene of sacrificial offering and ritual celebration (see [Figures 5a–b](#)). Following Wang’s explanation, this person should be a prisoner or a war victim. However, in the same scene we see another male figure with his hair in a bun tied to a post, perhaps waiting to be sacrificed or punished. The theory that those wearing their hair in a bun represent the Dian elite is therefore problematic. A cowrie container decorated with a scene of 17 figures dressed in different styles of costumes and wearing their hair in varying ways is a good example of the range of appearance across societies in the region ([Figures 11 a–b](#)). A line drawing of the scene (see [Figure 11b](#)) illustrates the distinctive hats, turbans and even a type of headdress with an ornament attached to the front. Hair may be seen worn pulled up in a bun or left long in plaits in the back. Both hairstyles are worn by figures of apparent status, carrying



Figure 9. Bronze head, thirteenth–twelfth century BCE, Sanxingdui Pit 1, Guanghan Sanxingdui Site Museum, Sichuan. Image reproduced with permission from the Sanxingdui Site Museum.



Figure 10. Bronze head thirteenth–twelfth century BCE, excavated from Sanxingdui Pit 1, Guanghan Sanxingdui Site Museum, Sichuan. Image reproduced with permission from the Sanxingdui Site Museum.

swords suspended from their sides with a shoulder strap. There is an air of ceremonial formality to the scene, lending credence to the theory that this is a procession expressing fealty (Peters 2002: 95).

Finally, a small bronze figure of a kneeling man from Pit 1 at Sanxingdui may be identified as “special” for its unusual hairstyle, with the front fringe combed back but then swept into a curl in reverse (Figure 12). The figure is dressed in a robe with distinct striped cuffs. Remarkably, centuries later, the same unusual hairstyle may be found on figures depicted on Dian bronze plaques, an example of which is a scene of three male figures



Figures 11a and 11b. Bronze cowrie container with scene depicting a procession of tribute bearers, with a line drawing showing detail, Western Han period (206 BCE–24 CE), excavated from Shizhaishan, Yunnan Provincial Museum, Kunming. Image reproduced with permission from the Yunnan Provincial Museum; line drawing by the author.



Figure 12. Bronze seated human figure, thirteenth–twelfth century BCE, Sanxingdui Pit 1, Guanghan Sanxingdui Site Museum, Sichuan. Image reproduced with permission from the Sanxingdui Site Museum.

leading a bull (Figure 13). All three figures wear their hair in a similar fashion and are clothed in robes and wear striped cuffs, reminiscent of the Sanxingdui figure and suggestive that this type of hairstyle and attire may have been worn by a specific group of people over a long period of time.

Identifying early ethnic groups based on descriptions found in early textual sources may not be possible as these texts are often prejudiced and restricted in their views. As noted by Heather Peters (2002: 98), the nature of ethnicity is subjective, flexible and dynamic, and is better expressed in terms of the ethnic identities or ethnic roles a



Figure 13. Bronze plaque with a scene showing three men and an ox, Warring States period (475–221 BCE), Yunnan Provincial Museum, Kunming. Image reproduced with permission from the Yunnan Provincial Museum.

particular group holds or plays at a particular period in time. What we can say about the variety of visual representations in the arts we have examined is that societies in the Southwest were made up of a rich mixture of peoples, even if their precise identification is not possible.

Concluding remarks

Examining the three sites of Sanxingdui, Jinsha and Dian, this article set out to explore some of the possible traits and influences that may have connected them over time and geography. It has been argued that the ancient network of trading routes known as the Southwest Silk Road played a key role not only in the transmission of commodities and goods, but also that the movement of people, especially those with established metallurgical technologies, had a special part in the development of bronze cultures in the Southwest. Secondly, the multi-ethnic nature of the Southwest, inherent in its topography, was a significant factor in the transmission and sharing of culture, art and technology, in particular bronze metallurgy. The employment of a new technological system, that is, the lost-wax production and the use of multiple sculptural components, born out of established practices but advanced independently in order to produce the desired effect, reflect exceptional workmanship and is distinct to the Southwest. Thirdly, the Tibetan-Yi corridor inhabited by nomadic and semi-nomadic peoples with long-standing connections with the steppe cultures in Central Asia probably contributed to the development of bronze technology in the Southwest. This corridor seems to be a likely, or likelier, route for transmission to the Southwest than that conventionally assumed from the Central Plains of China. Finally, the richness of the region in scarce minerals such as lead, gold and especially tin (the rarest constituent in bronze metallurgy) makes the Southwest a natural place for the development of bronze technology. Given the expertise provided by the movement of the nomadic and semi-nomadic tribes, with their long-standing links to the steppe cultures, the appearance of distinctly local metallurgical cultures should not surprise anyone.

Many of the ideas presented in this article suggest the need for further investigation. Any substantial bronze culture needs not only the knowledge and practice of bronze mining, metallurgy and casting, but also the resources and organization to support and manage it. Although steppe cultures may have had the technical know-how, it was only when they came into contact with sedentary societies with considerable resources that more

substantial bronze manufacture was enabled. Therefore, an important next step in this research is to understand more fully the requisite structural features of sedentary societies that were able to embrace bronze culture successfully in the Southwest. Given the lack of textual records for the period examined and the uncertainties inherent in researching and understanding the cultural movements of multi-ethnic peoples, it is hoped that this article may be regarded as part of a much larger body of study that awaits further investigation by comparative research.

The recent announcement of the discovery of a further six sacrificial pits at Sanxingdui, reported to contain over 500 artefacts and cultural relics, is exciting news. At the time of writing this article, the archaeological report detailing the new finds has not been published. It is hoped that the finds will provide new information and evidence that will give further insight into some of the hypotheses discussed in this article.

Acknowledgements. I wish to express my deepest gratitude to the Leverhulme Trust for their generous funding of my research on the Southwest Silk Road. The completion of this article would not have been possible without the support the Trust offered over the past three years. I also wish to thank the two anonymous reviewers of this journal for their insights and constructive comments which helped greatly improve the content of this article. In addition, I thank those in the field for the advice I received and my husband, Hugo Macey, for his endless patience and encouragement.

Bibliography

Primary literature

- Hanshu* 漢書. Compiled by Ban Gu 班固 (32–92 CE). Beijing: Zhonghua, 1962.
- Hou Hanshu* 後漢書. Compiled by Fan Ye 范曄 (398–445 CE) et al. Beijing: Zhonghua, 1965.
- Huang guo zhi yizhu* 華陽國志譯註 (Record of the Kingdoms South of Mount Hua). Compiled by Chang Qu 常璩 (fl. 347 CE). Translated and annotated by Wang Qiming 汪啟明. Chengdu: Sichuan University Press, 2007.
- Lüshi chunqiu xin jiaoshi* 呂氏春秋新校釋. Compiled under the auspices of Lü Buwei 呂不韋 (290–235 BCE). Annotated by Chen Qiyou 陳奇猷. Shanghai: Guji chubanshe, 2002.
- Shiji* 史記. Begun by Sima Tan 司馬談 (d. 112 BCE), primarily composed by Sima Qian 司馬遷 (c. 145–c. 86 BCE). Beijing: Zhonghua, 1959.

Secondary literature

- Bagley, Robert W. (ed.). 2001. *Ancient Sichuan. Treasures from a Lost Civilisation*. Princeton: Princeton University Press.
- Cao, Xue 曹雪. 2016. “Xinan sichou zhi lu ji qi dui xinan jingji de yingxiang 西南絲綢之路及其對西南經濟的影響”, *Tangshan zhiye jishu xueyuan xuebao* 唐山職業技術學院學報 14/4, 57–62, 66.
- Chen, Xiandan. 1999. “The sacrificial pits at Sanxingdui: their nature and date”, in Roderick Whitfield and Wang Tao (eds), *Exploring China’s Past*, 165–71. London: Saffron Books.
- Chengdu Municipal Institute of Antiquity and Archaeology. 2013. “Discovery and studies of the Jinsha site”, *Kaogu* 3, 7–13.
- Di Cosmo, Nicola. 1994. “Ancient Inner Asian nomads: their economic basis and its significance in Chinese history”, *The Journal of Asian Studies* 53/4, 1092–126.
- Erickson, Susan N. 1994. “Money trees of the Eastern Han dynasty”, *Bulletin of the Museum of Far Eastern Antiquities* 66, 5–115.
- Fang, Tie 方鐵. 2015. “Jianlun xinan sichou zhi lu 簡論西南絲綢之路”, *Journal of Chang’an University Social Science Edition* 17/3, 114–20.
- Fei, Xiaotong 費孝通. 1982. “Tan shenru kaizhan minzu diaocha wenti 談深入開展民族調查問題”, *Journal of South-Central University for Nationalities* 3, 2–6.
- Feuchtwang, Stephan, Michael Rowland and Wang Mingming. 2010. “Some Chinese directions in anthropology”, *Anthropological Quarterly* 83/4, 897–925.
- Flad, Rowan and Pochan Chen. 2013. *Ancient Central China*. Cambridge: Cambridge University Press.
- Fong, Wen (ed). 1980. *The Great Bronze Age of China*. New York: Metropolitan Museum of Art.

- Guedes, Jade d'Alpoim and Mark Aldenderfer. 2020. "The archaeology of the early Tibetan plateau: new research on the initial peopling through the Early Bronze Age", *Journal of Archaeological Research* 28, 339–92.
- Han, Rubin and Li Xiaocen. 2009. "The bronze-using cultures in the northern frontier of Ancient China and the metallurgies of Ancient Dian area in Yunnan Province", in Bryan K. Hanks and Katheryn M. Linduff (eds), *Social Complexity in Prehistoric Eurasia. Monuments, Metals and Mobility*, 168–86. Cambridge: Cambridge University Press.
- Han, Xiaorong. 1998. "The present echoes of the Ancient Bronze drum: nationalism and archeology in modern Vietnam and China", *Journal of the Southeast Asian Studies Student Association* 2/2, n.p.
- Harrell, Stevan (ed.). 2001. *Perspectives on the Yi of Southwest China*. Berkeley: University of California Press.
- He, Zhiguo 何志國. 2006. *Han Wei yaoqianshu chubu yanjiu 漢魏搖錢樹初步研究 (Initial Research on Money Trees from the Han and Wei Dynasties)*. Beijing: Kexue chubanshe.
- Hignam, Charles. 1999. *The Bronze Age of Southwest Asia*. Cambridge: Cambridge University Press.
- Hu, Shaohua 胡紹華. 1989. "Xinan sichou zhi lu 西南絲綢之路", *Lishi jiaoxue* 8, 15–19.
- Huang, Wei 黃維. 2020. "Zai lun Dian wenhua de jinshu shijian 再論滇文化的金屬飾件", *Sichuan Cultural Relics* 4, 101–09.
- Li, Kunsheng. 1999. "The Bronze Age of Yunnan", in Roderick Whitfield and Wang Tao (eds), *Exploring China's Past*, 165–71. London: Saffron Books.
- Li, Si 李斯. 2018. "Wen Weng hua Shu yu zaoqi xinan sichou zhi lu kaituo 文翁化蜀與早期西南絲綢之路開拓", *Xinan minzu daxue xuebao (renwenshe keban)* 12, 200–03.
- Lin, Xiang 林向. 2008. "Linqiong yu xinansichou zhi lu 臨邛與西南絲綢之路", *Zhonghua wenhua luntan* 12, 23–27.
- Luo, Erhu 羅二虎. 1993. "Sichou zhi lu de kaogu diaocha 絲綢之路的考古調查", *Nanfang minzu kaogu* 5, 372–409.
- Mei, J. 2009. "Early metallurgy in China: some challenging issues in current studies", in J. Mei and Th. Rehren (eds), *Metallurgy and Civilisation: Eurasia and Beyond*, 9–16. London: Archetype.
- Miyamoto, Kazuo. 2014. "The emergence and chronology of early bronzes on the eastern rim of the Tibetan plateau", in Anke Hein (ed.), *The "Crescent-Shaped Cultural-Communication Belt": Tong Enzheng's Model in Retrospect*, 79–88. Oxford: Archaeopress.
- Peng, Peng. 2017. "A study on the origin of Chinese lost-wax casting from the perspectives of art, technology, and social agency", *Sino-Platonic Papers* 265, 1–51.
- Peng, Peng. 2020. *Metalworking in Bronze Age China. The lost-wax process*. Amherst, New York: Cambria Press.
- Peters, Heather. 2002. "Ethnicity along China's southwestern frontier, *JEEA* 3/1–2, 75–102.
- Pirazzoli-t'Serstevens, M. 1990. "Cowry and Chinese copper cash as prestige goods in Dian", *Southeast Asian Archaeology Special Issue* 45–52.
- Qiu Dengcheng 邱登成. 2013. "Cong Sanxingdui yizhi kaogu faxian kan nanfang sichou zhi lu de kaitong 從三星堆遺址考古發現看南方絲綢之路的開通", *Zhonghua wenhua luntan* 4, 37–44, 190.
- Sage, Steven. 1992. *Ancient Sichuan and the Unification of China*. Albany: State University of New York Press.
- Sanxingdui Museum. 2006. *The Sanxingdui Site. Mystical Mask on Ancient Shu Kingdom*. Beijing: China International Press.
- Shuo, Shi. 2018. "Ethnic flows in the Tibetan-Yi corridor throughout history", *International Journal of Anthropology and Ethnology* 2/2, 2–22.
- So, Jenny and Emma Bunker (eds). 1995. *Traders and Raiders on China's Northern Frontier*. Seattle and London: University of Washington Press.
- Su, Bai 宿白. 2004. "Sichuan qianshu he Changjiang zhong xiayou bufen qiwu shang de foxiang 錢錢樹和長江中下游部分器物上的佛像", *Wenwu* 10, 61–71.
- Su, Wenchao, Dong Wendou, Zhang Xingchun, Shen Nengping, Hu Ruizhong, Albert H. Hofstra, Cheng Lianzheng, Xia Yong and Yang Keyou. 2018. "Carlin-type gold deposits in the Dian-Qian-Gui 'Golden Triangle' of southwest China", *Reviews in Economic Geology* 20, 157–85.
- Su, Yanfei. 2018. "A study of the cultural meanings of Qiang's traditional dress and adornment", *Cultural and Religious Studies* 6/5, 285–93.
- Tan, Qixiang 譚其驤 (ed.). 2001. *Zhenshi dili zhi huishi congkan 正史地理志匯釋叢刊*. Anhui: Anhui jiaoyu chubanshe.
- Tong, Enzheng. 1990. "Shilun woguo cong dongbei zhi xinan de biandi banyuexing wenhua chuanliudai 詩論我國從東北至西南的遍地半月形傳播帶", in Tong Enzheng (ed.), *Zhongguo xinan minzu kaosu lunwenji*, 252–78. Beijing: Wenwu chubanshe.
- TzeHuey, Chiou-Peng. 2008. "Horses in the Dian culture of Yunnan", in Elisabeth A. Bacus, Ian Glover and Peter D. Sharrock (eds), *Interpreting Southeast Asia's Past*, 225–38. Singapore: NUS Press.
- TzeHuey, Chiou-Peng. 2009. "Incipient metallurgy in Yunnan: new data for old debates", in J. Mei and Th. Rehren (eds), *Metallurgy and Civilisation: Eurasia and Beyond*, 79–84. London: Archetype.
- von Falkenhausen, Lothar. 2003. "The external connections of Sanxingdui", *Journal of East Asian Archaeology* 5, 191–245.

- Wang, Lijiao 王立教 and Dai Rong 戴蓉. 2020. "Nanfang sichou zhi lu kaizao dui xinan sichou zhi lu dui xinan bianjiang wenhua suzao tanxi 南方絲綢之路開鑿對西南邊疆文化探析", *Guizhou shehui kexue* 365/5, 102–08.
- Wang, Ming-ke. 1992. 'The Ch'iang (Qiang) of Ancient China through the Han dynasty: ecological frontiers and ethnic boundaries', PhD thesis, Harvard University.
- Wang, Ming-ke. 1999. "From the Qiang barbarians to the Qiang nationality: the making of a new Chinese boundary", in Shu-min Huang and Cheng-kuang Hsu (eds), *Imaging China: Regional division and national unity*, 43–80. Taipei: Academia Sinica Institute of Ethnology.
- Wang, Ningsheng 汪寧生. 1979. "Jinning Shizhaishan qingtong tu- xiang suojian gudai minzu kao 晉寧石寨山青銅圖象所見古代民族考", *Kaogu xuebao* 4, 423–39.
- Wang, Qinghua 王清華. 2002. "Xinan sichouzhi lu yu zhong Yin wenhua jiaoliu 西南絲綢之路與中印文化交流", *Social Sciences in Yunnan* 2, 81–85.
- Watson, Burton (trans.). 1993. *Records of the Grand Historian. Han Dynasty*. Vols. I–II. Hong Kong and New York: Columbia University Press.
- White, Joyce C. and Elizabeth G. Hamilton. 2009. "The transmission of early bronze technology to Thailand: new perspectives", *Journal of World Prehistory* 22, 357–97.
- Whitfield, Roderick and Wang Tao. 1999. *Exploring China's Past. New Discoveries and Studies in Archaeology and Art*. London: Saffron Books.
- Xu, Jay. 2001a. "Sichuan before the warring states period", in Robert Bagley (ed.), *Ancient Sichuan. Treasures from a Lost Civilization*, 21–37. Princeton: Princeton University Press.
- Xu, Jay. 2001b. "Bronze at Sanxingdui", in Robert Bagley (ed.), *Ancient Sichuan. Treasures from a Lost Civilization*, 59–151. Princeton: Princeton University Press.
- Yang, Bin. 2004. "Horses, silver, and cowries: Yunnan in global perspective", *Journal of World History* 15/3, 281–322.
- Yang, Bin. 2009. *Between Winds and Clouds: The Making of Yunnan (Second Century B.C.E. to Twentieth Century C.E)*. New York: Columbia University Press.
- Yang, Bin. 2011. "The rise and fall of cowrie shells: the Asian story", *Journal of World History* 22/1, 1–25.
- Yang, Bin. 2018. *Cowrie Shells and Cowrie Money: A Global History*. New York: Routledge.
- Yao, Alice. 2005. "Scratching beneath iconographic and textual clues: a reconsideration of the social hierarchy in the Dian culture of southwestern China", *Journal of Anthropological Archaeology* 24, 378–405.
- Yao, Alice, Valentin Darre, Jiang Zhilong, Wengcheong Lam and Yang Wei. 2020. "Bridging the time gap in the Bronze Age of Southeast Asia and southwest China", *Archaeological Research in Asia* 22, 1–13.
- Ye, Shuxian 叶舒憲. 2011. "Sanxingdui yu xinan yushi zhi lu 三星堆與西南玉石之路", *Minzu yishu* 4, 33–43.
- Zhang, Dunsheng 張囤生 (ed.). 1993. *Zhongguo qingtongqi quanji*. Vol. 14: Dian. Kunming 中國青銅器全集. Beijing: Wenwu chubanshe.
- Zhang, Hongzhao 章鴻釗 (ed.). 1954. *Gu kuang lu 古鑛錄*. Beijing: Geological Press.
- Zhang, Xuejun 張學君. 2018. "Lun xinan sichou zhi lu de maoyi huodong 論西南絲綢之路的貿易活動", *Wenshi zazhi* 4, 35–42.
- Zhu, Zhangyi, Zhang Qing and Wang Fang. 2003. "The Jinsha site: an introduction", *Journal of East Asian Archaeology* 5, 247–76.