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A Legendary Sibling Rivalry and Competing Astral Traditions in Early China

ABSTRACT:

Aspects of ancient Chinese cultural astronomy have survived in an etiological myth about feuding brothers. The myth encodes early-Bronze Age astral lore and calendrical science. In Zhou-dynasty (1046–256 BC) texts, it is a tale of sibling rivalry, but also the seasonal stars. The rivalry encodes two competing cultural traditions with distinct origins. One evolved into the mainstream lunisolar scheme familiar from the classical canon. The other survives only in unique calendrical practices still found among ethno-linguistic groups of China's southwest like the Yizu 彝族 and Naxizu 纳西族. Their astronomical traditions and calendrical practices are traceable to the ancient Qiang-Rong 羌戎 people, millennia-long highland neighbors and adversaries of both the Shang (1562–1046 BC) and Zhou, from the mid-second millennium BC through to the Han (i.e., ca. 481 BC–221 AD). The present study illustrates how the classic theme of sibling rivalry may be read not merely as a didactic myth about ancient seasonal stars, which it certainly was, but also as an allegory of the millennia-long relations between Central Plains and highland polities.

KEYWORDS:

Bronze Age China, Yizu, Qiang-Rong, Hua-Xia, astral myth, Xia xiao zheng, cultural astronomy, calendars

INTRODUCTION

Etiological myths and legends are traditional narratives that inform how certain things came to be as they are. One important category of such narratives imparts astral lore about the stars and seasons and how the stars impinge on human activity. Astral stories from ancient Egypt, Mesopotamia, and Greece to Australia and the Americas are well-known to ethnographers and cultural astronomers.

In early China, the star Spica (α Virginis) marked one horn of the Dragon constellation in the Eastern Palace of the heavens (Arcturus, or Great Horn *dajiao* 大角, marked the other). Spica's evening setting in autumn and rising at dusk in spring corresponded to the end of the farming season in fall and its renewal in spring, as the celestial Dragon

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progressively returned to the evening sky. This was followed by the harvest of winter wheat, a grain that had arrived in China from the West by about 2500 BC. The lore of the Cerulean Dragon found in the first two hexagrams of the *Changes of Zhou* 周易 preserves this relationship in much the same way as the myth of Demeter and Persephone in ancient Greece.¹ Here, however, we are not concerned with the Celestial Dragon's correlation with the seasons but with a variation on the family drama theme.

AN ASTRAL MYTH OF SIBLING
RIVALRY FROM EARLY BRONZE AGE CHINA

In part, the etiological myth from early China has to do with the same seasons and stars as that concerning Demeter and Persephone. Delving into its history suggests that it may be more than simply a “stars and seasons” teaching story designed to transmit vital seasonal knowledge down the generations. It can also be seen as an allegory of the fraught relations between two cultural traditions in ancient China attributable to ethno-linguistic competition. The legend concerns the feuding brothers E Bo 閼伯 and Shi Chen 實沈, as recorded in early narrative histories. Early informative accounts appear in the annalistic history the *Tradition of Zuo* (*Zuozhuan* 左傳) and *Discourses of the States* (*Guoyu* 國語), both late 4th c. BC).

The Dramatis Personae

(For a visual flow of the genealogy, see the appendix.)

- Zi Chan 子產: (d. 522 BC; Ji 姬 lineage) reformist prime minister of the state of Zheng 鄭 in the late Springs and Autumns period renowned for his wise counsel and deep learning.
- Di Ku 帝嚳: grandson of Xuanxiao 玄囂, the eldest son of the legendary Yellow Emperor. Di Ku was a cousin of Zhuanxu 顓頊 who “invented” the calendar. His wife, Jiang Yuan 姜嫄 (姜 Jiang lineage), was mother of Hou Ji 后稷 (aka Qi 棄), First Ancestor of the Zhou line. Another consort, You Song shi 有娥氏, bore him Qi 契 (aka E Bo), First Ancestor of the Shang line.² A second consort, Juzi shi 妫氏, bore Zhi 摯 who succeeded Di Ku as ruler before abdicating in favor of Yao 堯 (Tao Tang shi 陶唐氏), who then abdicated in favor

¹ D.W. Pankenier, *Astrology and Cosmology in Early China: Conforming Earth to Heaven* (Cambridge: Cambridge U.P., 2013), pp. 44-57.

² For the 1562 BC date of the founding of Shang by Cheng Tang, see D.W. Pankenier, “A Multi-year Drought in Mid-sixteenth Century BCE China Caused by the Eruption of Thera (Santorini)” (forthcoming, *Asiatische Studien*).

- of Shun 帝舜, who in turn abdicated in favor of Yu 禹, founder of the hereditary Xia 夏 “dynasty” (ca. 1953–1562 BC). Shi Chen 實沈 was Di Ku’s son and E Bo’s younger brother. Both were brothers of Hou Ji, head of the Zhou lineage.
- Tang Shu Yu (Tai Shu): 唐叔虞 (姬/姜 Ji lineage). Younger son of Zhou King Wu 武王 (r. 1049–1043 BC) and Yi Jiang 邑姜. Enfeoffed in 1033 BC by king Cheng 成王 as lord of Jin 晉 (anciently *Tang guo* 唐國, ruled by Yao, a pre-Three Dynasties polity in the Jin-nan basin.)
 - Yi Jiang 邑姜 (*Jiang* 姜 lineage). Wife of Zhou king Wu, mother of king Cheng 成王 (r. 1042–ca. 1022 BC) and Tang Shu Yu. Yi Jiang was a daughter of Tai Gong Wang 大公望 (aka Lü Shang 呂尙). Tai Gong Lü Shang (姜 *Jiang* lineage) chief counselor of the Zhou, enfeoffed as lord by King Wu in Qi 齊 in Shandong.
 - King Cheng: Son and heir of Zhou king Wu.
 - Tao Tang shi 陶唐氏 legendary emperor Yao’s toponym/cognomen. Tao Tang lay in present-day Shanxi province and became the territory of the later state of Jin 晉.
 - Xiangtu 相土 was a revered pre-dynastic ancestor, third ruler of Shang, and grandson of E Bo, eleven generations before dynastic founder Cheng Tang 成湯.

Consider this passage, from *Zuo zhuan* 左傳, Lord Xiang 襄公, ninth year (631 BC):

In the ninth year, in spring, there was a conflagration in Song 宋... The Lord of Jin asked Shi Ruo, “I have heard that from Song’s visitation by this disaster one may conclude that it is the Way of Heaven: how so?” [Shi Ruo] answered, “In ancient times the Regulator of Fire *huo zheng* 火正 made offerings either to lodge Heart *xin* 心 (α Scorpius, Antares) or Beak *zhuo* 喙 (α Hydrae, Alphard) based on the rising and setting of Great Fire *Da Huo* 大火. Therefore, Beak is Quail Fire *chun huo* 鶉火 and Heart is Great Fire. Tao Tang shi’s (Yao’s) Regulator of Fire E Bo dwelt at Shangqiu 商丘 (in the Spring and Autumn period state of Song 宋) and sacrificed to Great Fire, so Great Fire marked the seasons there. (Ancestor) Xiangtu continued in like manner, so that the Shang had charge of (i.e., revered) Great Fire. The Shang people observed that their incipient calamities and defeats invariably began in Fire. Hence, because of the timing [of the disaster in Song] it was recognized as the Way of Heaven.” The Lord asked, “is it necessarily so?” Shi Ruo said, “it accords with the Way. If the state is disorderly but there is no sign, it is unknowable.”³

³ Du Yu 杜預 (W. Jin), comm., Kong Yingda 孔穎達 (Tang), subcomm., *CQZZ* 春秋左傳著述

Consider another passage from *Zuozhuan*, Lord Zhao 昭公, first year (560 BC):

The Lord of Jin fell ill. The Elder of Zheng 鄭伯 sent Gongsun Qiao 公孫僑 (aka Zi Chan 子產) to Jin on a state visit and to inquire about the Lord of Jin's health. Shu Xiang 叔向 asked him: "As to my Lord's illness, the diviners have said, 'Shi Chen 實沈 and Tai Tai 臺駘 are afflicting him.'⁴ No one among the scribe-astrologers knows about them. I venture to ask, who are these spirits?" Zi Chan replied: "Anciently, Gaoxin shi 高辛氏 (Di Ku 帝嚳) had two sons, the older one was called E Bo and the younger one was Shi Chen. They lived at Kuanglin 曠林. The two could not abide each other but daily took up arms and fought one another. (Emperor) Yao disapproved and so dispatched E Bo to Shangqiu 商丘 to take charge of (seasonal asterism) *chen* 辰 (Da huo 大火 Great Fire, or α Scorpius) which the Shang people came to rely on. Yao dispatched Shi Chen to Daxia 大夏 (the northwest and Jin-nan) to take charge of Shen 參 (Triaster/Orion's Belt), which the people of Tang relied on in their service to Xia (ca. 1953–1562 BC) and Shang.⁵ The last of their line was Tang Shu Yu. When King Wu's wife Yi Jiang had just conceived Tai Shu (Tang Shu Yu) she dreamt that the Supernal Lord said to her: 'I have named your son Yu 虞 and will bestow Tang on him, entrust asterism Shen to him, and cause his progeny to prosper.'⁶ When he was born, Tai Shu had a glyph on his hand—Yu. Accordingly, Yi Jiang named him Yu. When it came to (Zhou) King Cheng's reign, he extinguished Tang and enfeoffed Tai Shu there. So, Shen is the star of Jin, and, seen this way, Shi Chen is the spirit of Shen.⁶

(SKQS edn.; hereafter, *CQZZ*) 30, p. 33a. See Jao Tsung-yi 饒宗頤, "Yin buci suojian xingxiang yu shen shang, long hu, ershiba xiu zhu wenti" 殷卜辭所見星象、參商、龍虎、二十八宿諸問題, in Zhang Yongshan 張永山 and Hu Zhenyu 胡振宇, eds., *Hu Houxuan xiansheng jinian wenji* 胡厚宣先生紀念文集 (Beijing: Kexue chubanshe, 1998), p. 32. The same legend is alluded to in an equally famous passage in the "Discourses of Jin" 晉語 sect. of *Guoyu* 國語: "I have heard that when Jin was first enfeoffed, Jupiter was in Great Fire, which is the star of E Bo. In truth it marked the periods of the Shang people 吾聞晉之始封也, 歲在大火, 闕伯之星也, 實紀商人"; *Guoyu* (SKQS edn.) 10, p. 4b. All references to Western constellations are sidereal.

⁴ Tai Tai, a descendant of Shao Hao 少昊 (or 少皞), was a son of Huang di 黃帝 and progenitor of the Ji 姬 lineage. Tai Tai supposedly tamed the Yellow and Yangtze rivers long before Yu the Great 大禹 (founder of Xia).

⁵ Li Min, *Social Memory and State Formation in Early China* (Cambridge: Cambridge U.P., 2018), p. 341. For the diachronic changes in the connotations of the ethnonym Xia 夏 in early China, see Chen Zhi, "The Conceptualization of Chinese Identity in Early China," *JRAS* 14.2 (2004), pp. 185–205.

⁶ *CQZZ* 41, p. 29b. According to *Zuozhuan*, Tang Shu "was given his command in the Tang Proclamation and enfeoffed at the Mound of Xia. He led his people by means of Xia regulations and surveyed the land in accord with Rong 戎 models"; trans. Stephen Durrant, Li Waiyi,

The matter of Great Fire certainly dates from the Late Neolithic.⁷ Thirteenth-century BC Yin-Shang 殷商 divination records inscribed on oracle bones confirm the occurrence of sacrificial observances dedicated to Great Fire.⁸ The myth of the two feuding brothers signifies that the rising and setting of the diametrically opposed asterisms Great Fire and Shen-Triaster are inextricably linked, as indeed they are astronomically. As one prepared to rise in the east during the pre-dawn hours, the other would be leaving the sky at dusk in the west.

OVERVIEW OF THE ROLES OF QIANG
(JIANG) RONG & DI DURING CHINA'S FORMATIVE
PERIOD: HIGHLAND AND LOWLAND CULTURES

No written records produced by the Qiang, Rong, and Di ethnic minorities or any others in the earliest period have come down to us. Historical, cultural, and linguistic details relating to those groups are notably sparse in the mainstream literature despite very significant external cultural and technological influences on the kingdoms of the Central Plains. Consequently, students of the history of early China may be unfamiliar with those ethnic minorities and their movements during the formative period of Chinese civilization. Since much of the present study deals with those very cultures' impact on astral-calendrical matters, it will be helpful to discuss the nature and history of those interactions.

Long before the Three Dynasties (Xia, Shang, Zhou) became established in the Central Plains region in mid-second millennium BC, the Northern Zone was occupied by sedentary farmers and pastoralists

David Schaberg, *Zuo Tradition/ Zuo zhuan: Commentary on the Spring and Autumn Annals* (Seattle: U. Washington P., 2016), pp. 1748-49. Cf. Yan Sun, *Many Worlds Under One Heaven: Material Culture, Identity, and Power in the Northern Frontiers of the Western Zhou* (1045-771 BCE) (New York: Columbia U.P., 2021), p. 107. The passage is quoted in Li, *Social Memory*, p. 341. Li Min comments (p. 492, n. 16), "Xiazheng, meaning Xia regulations, could also mean the Xia calendar." Jin continued to use the Xia calendar long after the promulgation of the Zhou lunisolar calendar in early Western Zhou; see *ibid.* p. 352.

⁷ See Pang Pu's study of the archaic "Fire Calendar" (*huoli* 火曆) that left traces in folk memory and early texts. Pang Pu 龐樸, "Huoli san tan" 火曆三探, *Wen shi zhe* 文史哲 (1984) 1, pp. 23-31; *idem*, "Huoli gouchen: yige yishi yijiu de guli zhi faxian" 火曆鈎沈, 一個遺失已久的古曆之發現, *Zhongguo wenhua* 中國文化 (1989) 1, pp. 3-23. Also Chang Zhengguang 常正光, "Chen wei Shang xing jie" 辰爲商星解, in *Sichuan daxue xuebao bianji bu* and *Sichuan daxue guwenzi yanjiu shi* 四川大學學報編輯部, 四川大學古文字研究室, eds., *Gu wenzi yanjiu lunwen ji* 古文字研究論文集 (Chengdu: Sichuan renmin chubanshe, 1982) 10, pp. 141-46; and *idem*, "Da huo li: cong xinshiqi wanqi dao Xi Zhou shidai shiyong de lifa" 大火曆, 從新石器時代晚期到西周時代所使用的曆法, *Pingdingshan xueyuan xuebao* 平頂山學院報 (1995) 2, pp. 1-24.

⁸ Chang Yuzhi 常玉芝, "Guanyu buci zhong de 'xing'" 關於卜辭中的星, *Yinxu xuekan* 殷墟學刊 (1998) 1, p. 28.

who flourished in the transitional zone between the agricultural core of China and the Central Eurasian steppes (Gansu, Shaanxi, Southern Inner Mongolia, and northern Shanxi). A number of archeological cultures associated with these populations go back to the Neolithic and the Early Bronze Ages, centuries before any part came under the control of polities governed by lineages of the Ji 姬 clan, and before any urban civilization, aristocratic rank-order, or ancestral ritual ever became locally manifest.⁹

Indeed, according to Li Min, their

... highland Longshan society saw the emergence of a repertoire of high culture that later defined the Sandai tradition, i.e., bronze bells, chime stones, alligator skin drums, and ritual jade sets. The Longshan period (ca. 2900–ca. 2000 BC), therefore, represents the formative phase for *Sandai* civilization.¹⁰

During the period to which the E Bo–Shi Chen tale harks back, the stage on which the events played out was occupied by people later collectively referred to as the Qiang and Rong 羌戎 or any one of a number of variant ethnonyms such as Di 翟 (氐), Quan 犬, Gui 鬼, Yi 夷, and so on.¹¹ It should be noted that “Qiang” and “Jiang” 羌 (OCM *khaŋ and *khjaŋ ~ 姜 OCM *kaŋ or *kjaŋ) are cognates and refer to

⁹ See Lothar von Falkenhausen, *Chinese Society in the Age of Confucius (1000–250 BCE): The Archaeological Evidence* (Los Angeles: Cotsen Institute of Archaeology, U. California at Los Angeles, 2006), p. 212. Song Xinchao 宋新潮, *Yin Shang wenhua quyu yanjiu* 殷商文化區域研究 (Xi'an: Shaanxi renmin, 1991), p. 222. Nicola Di Cosmo, *Ancient China and Its Enemies: The Rise of Nomadic Power in East Asian History* (Cambridge: Cambridge U.P., 2002), pp. 44–90. For the origin of Yu the Great and the Xia from among the highland Qiang Rong, see Liu Qiyu 劉起鈞, “Ji Jiang yu Di Qiang de yuanyuan guanxi” 姬姜與氐羌的淵源關係, in idem, *Gu shi xu bian* 古史續辨 (Beijing: Zhongguo shehui kexue chubanshe, 1991), pp. 185–89; see also Li, *Social Memory*, p. 456.

¹⁰ See Li, *Social Memory*, p. 173. For the recent scientific confirmation of a colossal flood in the Yellow River basin in the mid- to late-20th c. BC, see D. R. Montgomery, “Emperor Yu’s Great Flood,” *Science* (2016) 353/6299, pp. 538–39: “This flood coincided with the social disruption of a major cultural transition and suggest that it breached the river’s natural levees.” According to the authors of another study, “The timing of the flood... coincides with an avulsion that redirected the Yellow River to carve a new course across the North China Plain about 2000 BCE. It would have taken considerable time for a large river to adjust to such a change, and the associated sustained flooding would fall in the right time and place to account for Yu’s story”; see Qinglong Wu et al., “Outburst Flood at 1920 BCE Supports Historicity of China’s Great Flood and the Xia Dynasty,” *Science* (2016) 353,6299, pp. 579–82. Yu the Great, as we know, was ethnically Qiang.

¹¹ The ode “*Yinwu*” 殷武 in the “Shang song” 商頌 sect. of *Odes* 詩 recounts how the Di-Qiang 氐羌 did not dare to resist Shang founder Cheng Tang’s overlordship; see Song, *Yin Shang wenhua*, p. 222. Song summarizes (pp. 225–36) the evidence from the late-Shang oracle-bones that locates groups such as the Gui fang 鬼方 in proximity to the Qiang (others include Gong fang 工方 (alt. *Gu* 古 fang, or *Hu* 胡 fang). The *Bamboo Annals* (*Zhushu jinian* 竹書紀年) record how a deputation bearing tribute from the Di and Qiang were hosted in Cheng Tang’s second year as king of the new dynasty: “十九年大旱。氐羌來賓。” Other fang were located either in Shaanxi of the Jin-nan basin. In one cited instance (Song, p. 235) an inscription re-

clans among the same ethno-linguistic group.¹² As E. G. Pulleyblank has shown, “Ji and Jiang are clearly clan names, not ethnic names as such.” The “two surnames, which I believe to be etymologically related ... were intermarrying moiety, a ruling clan and its collateral, wife-supplying counterpart, that together constituted the elite of the ‘tribe’ or ‘people’ out of which the Zhou dynasty emerged.” Later befuddlement notwithstanding, Mencius was correct in calling king Wen “... a man of the Western Barbarians.”¹³

Zhou surrogates fought dispersed Rong tribes in the north. The principal reason for the institution of lord-protector (“hegemon” 霸) of the feudatories of the Zhou kingdom was to confront the militant tribes on their peripheries. The Qiang–Rong played a historically vital role as powerful adversaries and sometime allies of the Central Plains polities from the Shang dynasty through the Warring States period.

There was a tacit recognition of the cultural, political, and military challenges posed by the non-Hua–Xia ethno-linguistic groups during the Zhou dynasty.¹⁴ According to *Hou Han shu* 後漢書 (*History of Later Han Dynasty*; 445 AD), the Western Qiang were thought to stem from the prehistoric San Miao 三苗 and were an offshoot of the Jiang people.¹⁵ There, the “Account of the Western Qiang” (“Xi Qiang zhuan” 西羌傳)

cords that in their role as Shang collaborators, the Guifang captured Qiang people. Concerning various lineages in the Zhou “backyard” – Jing and western Wei River valleys (*jiubang* 舊邦) – such as the Ze 夬, Lü 呂, Bin 邠, Guai 乖, Feng 豐, etc., whose rulers styled themselves “king” *wang* 王, see Yan, *Many Worlds*, pp. 38, 61, 64 ff.

¹² Axel Schuessler, *Minimal Old Chinese and Later Han Chinese* (Honolulu: U. Hawaii P., 2009), p. 76. Cf. Edwin G. Pulleyblank, who held that in early texts, “the distinction between the ethnic name Qiang and the clan name Jiang is fully maintained,” and that “they are different words.” See Pulleyblank, “Ji 姬 and Jiang 姜: The Role of Exogamic Clans in the Organization of the Zhou Polity,” *EC* (2000) 25, pp. 16–17. Pulleyblank also found that: “The two most prestigious clan names of the Chou, Chi 姬 and Chiang 姜 were found also among the Jung... Chi was the surname of the royal house of Chou. Chiang was the surname of a number of important feudal houses including Ch’i, Lü, Shen and Hsü, but, more important, it was the clan from which the principal wives of the Chou kings were regularly chosen.” See idem, “The Chinese and Their Neighbors in Prehistoric and Early Historic Times,” in David N. Keightley, ed., *The Origins of Chinese Civilization* (Berkeley: U. California P., 1983), p. 421.

¹³ “King Wen was born in Zhou by Mt. Qi and died in Biying, a man of the Western Barbarians 文王生於岐周，卒於畢郢，西夷之人也,” *Mengzi*, 4B/1. See Pulleyblank, “Chinese and Their Neighbors,” p. 421. Revealingly, Legge renders the last clause: “a man *near* the wild tribes on the west” (italics mine).

¹⁴ Yuri Pines, “Beasts or Humans: Pre-imperial Origins of the Sino-Barbarian Dichotomy,” in R. Amitai, ed., *Mongols, Turks, and Others: Eurasian Nomads and the Sedentary World* (Leiden: Brill, 2005), pp. 64, 69, 84, 88. As Pulleyblank points out (“Chinese and Their Neighbors,” p. 427), the transformation of Chu in the south is an obvious parallel: “Ch’u dropped its Man identity and began to treat the unsinicized Man around it as ‘barbarians’—the same process that separated the Chou people from the Jung.”

¹⁵ *Hou Han shu* 後漢書 87, p. 2879. (All references to the standard histories are to the modern Zhonghua shuju editions.) *Cizhi* 賜支 is thought to be the Qiang name for the headwaters

says that originally their vast territory stretched from the Ordos and Shaanxi to Cizhi 賜支 and the headwaters of the Yellow River in Qinghai. In the far northwest they were neighbors with the Shanshan 鄯善 and Jushi 車師 “countries” in the area from Dunhuang to Turpan, until displaced by the Xiongnu 匈奴 a millennium later.¹⁶ Representative cultural sites of the area are Qijia 齊家 (c. 2200–1600 BC), Zhukaigou 朱開溝 (c. 2000–1250 BC) and the great Longshan ritual complex of Shimao 石峁 (c. 2300 BC).¹⁷

Maria Khayutina has stated:

Zhukaigou was a large residential center occupied since ca. 2000 BC and abandoned about 1250 BC. Its inhabitants led sedentary lives, combined agriculture and animal husbandry, and learned bronze-casting technology in the eighteenth-century BC, probably from Qijia. About the mid-second millennium BC, the Zhukaigou 朱開溝 culture dominated the Ordos Plateau, southern Inner Mongolia outside the bend of the Yellow River, and the northern parts of Shaanxi and Shanxi provinces. At the same time the Qijia established contacts with the early Shang culture.¹⁸ Migrants from Shang could conceivably have resided in the Zhukaigou or Qijia settlements... The Dongxiafeng 東下馮 (or the Dongxiafeng variant of the Erlitou 二裡頭 culture) [was] centered on the Yuncheng Plain in the middle course of Sushui River and spreading along the lower course of the Fen River circa 1800–1500 B.C. ... Some

of the Yellow River, first mentioned in the “Yu gong” 禹貢 chapter of the *Venerable Writings* (*Shangshu* 尚書) as *Xizhi* 析支. The same text also states that the Qiang are a “separate branch of the Jiang surname”; *Hou Han shu* 87, p. 2969. For the archeological markers attesting to the wide distribution of the Qiang and the fraught relations between them and the lowland states, see Li, *Social Memory*, pp. 124, 267 and Yan, *Many Worlds*, pp. 52, 208 (for connection among Yu the Great, the Xia, and highland Qiang groups, pp. 456, 459). Also see “The Highland Claim to the Xia Legacy,” in *ibid.*, pp. 463–66. For more on Xia founder Yu the Great’s origin among the Qiang–Xi Rong, see especially Liu Qiyu, “Xia yu Si Yue you jiu Zhou zhi Qiang Rong chu” 夏與四岳由九州之羌戎出, in Liu, *Gu shi xu bian*, pp. 183–85.

¹⁶ Liu, “Ji Jiang yu Di Qiang,” p. 183.

¹⁷ Sun Zhouyong 孫周勇, Shao Jing 邵晶, Di Nan 邸楠, “Shimao yizhi de kaogu faxian yu yanjiu zongshu” 石峁遺址的考古發現與研究綜述, *Zhongyuan wenwu* 中原文物 (2020) 1, pp. 39–62.

¹⁸ Li Jaang writes, “The earliest bronze mirrors found in what is today’s China belong to the Qijia 齊家 culture (ca. 2200–1700 BCE) ... The Qijia culture is particularly significant because of its location – on the pathway between China and the Eurasian Steppe – and because of its pivotal role in the development of metallurgy in early China ... It significantly predates metallurgy in the Erlitou culture (ca. 1750–1550 BC) on the Central Plains, the heart of Chinese civilization”; Jaang, “Long-Distance Interactions as Reflected in the Earliest Chinese Bronze Mirrors,” in Lothar von Falkenhausen, ed., *The Lloyd Cotsen Study Collection of Chinese Bronze Mirrors Volume II: Studies* (Los Angeles: UCLA Cotsen Institute of Archaeology Press, 2011), pp. 34–35.

scholars associate the Erlitou culture and its Dongxiafeng variant with the Xia dynasty.¹⁹

In the mid-second millennium, the Qiang-Rong tribal groups were scattered across the northwest, from Qinghai eastward through the Ordos to the Fen River valley and southwestward down through the valley of the Min River to western Sichuan.²⁰ The archeological record shows that technologies including bronze metallurgy were introduced by the highland people to the North China lowland polities. Transfer of such complex technology must have involved the intervention of specialists from among the Qiang-Rong who were proficient in metallurgy, chariot building, and horse breeding and domestication. Such rapid technological proficiency as exhibited by the Shang could hardly have been acquired simply by slow imitation and adaptation.²¹ The Qiang were also perennial antagonists of the Shang. Oracle-bone inscriptions record that Qiang captives enjoyed the unfortunate distinction of serving in substantial numbers as sacrificial victims in the Shang royal cult. For example, the *Bamboo Annals* (*Zhushu jinian* 竹書紀年) records that, “in the thirty-fifth year of (Shang) king Wu Yi 武乙 (mid-11th c.), the Zhou king Ji 季 (歷) attacked the Western Rong and Gui Rong 鬼戎, capturing twelve Di kings.”²² Wang Guowei 王國維

¹⁹ Khayutina “The Rulers of Peng: Relationships between Zhou and Northern Non-Zhou Lineages (Until the Early Ninth Century BCE),” in E. L. Shaughnessy, ed., *Imprints of Kinship: Studies of Recently Discovered Bronze Inscriptions from Ancient China* (Hong Kong: Chinese U. Hong Kong P., 2017), pp. 15–16. For the connection between the major Longshan 龍山 highland centers of Shimao 石卯 in the Ordos and Taosi 陶寺 in Jin-nan with Sichuan in the late third millennium BC, see Li, *Social Memory*, pp. 138–52, and Sun et al., “Shimao yizhi de kaogu faxian.” For an example of Longshan astronomical experimentation in the form of a purpose-built solar observation platform at Taosi 陶斯 (ca. 2100 BC), see Pankenier, *Astrology and Cosmology*, pp. 17–29; also Di Cosmo, *Ancient China*, pp. 46, 48.

²⁰ Li, *Social Memory*, p. 306. For a map of tribute routes via Sichuan, see *ibid.* fig. 8.8, p. 433, and for a map of prehistoric sites along the trans-Minshan corridors linking Sichuan with the north, see p. 150, fig. 4.22. According to Jao Tsung-yi, “Consider also the two-handled urn exhumed from a stone coffin of the Ch’iang tribe in Mao-wen, Szechwan... In the site report [from Maowen Qiang Minority Autonomous County] there is a table of 27 carved symbols... as at Lo-tu, Chinghai. Some are also similar to characters from Erh-li-t’ou, which indicates that the inhabitants of Mao-wen, Szechwan were indivisibly connected to the ancient Western Ch’iang people”; Jao, “Questions on the Origins of Writing Raised by the Silk Road,” *Sino-Platonic Papers* 26 (1991), p. 8. For turquoise-inlaid bronze plaques as markers for cultural connections between Tianshanbeilu, Qijia, Erlitou, and Sanxingdui, see Sun Mao, “Turquoise-Inlaid Bronze Plaques from the Erlitou Culture: Origin and Transmission,” Ph.D. diss. (U. of Kansas, 2017), p. 4.

²¹ Rod Campbell, “Erligang: A Tale of Two Civilizations,” in Kyle Steinke and Dora C. Y. Ching, eds., *Art and Archaeology of the Erligang Civilization* (Princeton: Princeton U.P., 2014), p. 127. Edward L. Shaughnessy, “Historical Perspectives on the Introduction of the Chariot into China,” *HJAS* (1988) 48.1, pp. 189–237.

²² *Zhushu jinian* (SBCK edn.), j. 2, p. 167. Interactions between the various Rong groups and the Shang, including the latter’s hosting of Rong delegations, are mentioned fourteen times. See Jao, “Yin buci suo jian,” p. 35, where he cites the oracle-bone inscription *Jiaguwen*

identified these Gui Rong with the Gui Fang 鬼方 named in the early oracle-bone divinations against whom the Shang king Wu Ding 武丁 (r. late-13th–early-12th c. BC) campaigned repeatedly during the early years of the late-Shang period (13th c. BC).²³ Subsequently, the Qiang-Rong posed a challenge to predynastic Zhou in the second half of the second millennium BC. In the predynastic period it was pressure from the Qiang that forced Zhou ancestor Gu Gong Tan Fu 古公亶父 to lead his people from their Bin 豳 homeland to the Plain of Zhou (Zhouyuan 周原) in the western Wei valley. From then on, the Western Zhou rulers had an intimate on-again, off-again relationship with the Qiang-Rong, with whom they contended for *Lebensraum*, but with whose Jiang lineage they also exchanged aspects of their respective cultural traditions and from which they chose elite spouses. Others among the neighboring Rong polities northwest of Zhou even took part in the decisive campaign against Shang in 1047–46 BC. Tradition has it that legendary ancestor Jiang Yuan 姜嫄 was the mother of the primal Zhou ancestor Hou Ji 后稷. Zhou king Wu's wife Yi Jiang was the daughter of Tai Gong Wang (Tai Gong Lü Shang) and mother of Zhou king Cheng. Tai Gong Wang (Jiang lineage) was enfeoffed far away, in Qi (modern-day Shandong) by king Wu. As we saw, it is well-established that Zhou rulers had a long tradition of marrying Jiang lineage women.²⁴

heji 甲骨文合集 32112: “divining on day *jiayin*: we ought to *di*-sacrifice to Fang 方 (房) one Qiang, one cow, and nine dogs.” During the Zhou through the Spring and Autumn period we have a further thirty-four mentions of such interaction.

²³ *Ibid.* p. 26. See Xu Mingbo 徐明波, “Shang wang Wuding zhengfa kao: yi YH127 keng binzu buci wei li” 商王武丁征伐考, 以殷墟YH127坑賓組卜辭爲例, *Qiusuo* 求索 (2006) 11, pp. 208–11. Cf. the Bin group 賓組 inscription: ... [day] X-*mao* there was [displayed a] ... sign, on day *gengshen* there was also displayed a sign, there was a calling bird... would seize Qiang-Rong 卯有...象, 庚申亦有設, 有鳴鳥...將執羌戎 “甲” 2415. Nevertheless, the Shang forged marital alliances by taking highland elite women as spouses, one of whom may have been king Wu Ding's consort Fu Hao 婦好, famed for her martial prowess; Li, *Social Memory*, p. 296. For the history of Ji-Jiang alliances see especially, Liu, “Ji Jiang yu Di Qiang,” and idem, ed., “Ji Jiang zai zi Di Qiang chu, ‘Zhou’ you ‘Di’ yin zhuan er cheng” 姬姜再自氐羌出, 周由氐音轉而成, in Liu, *Gu shi xu bian*, pp. 167–69, 185–91. Distinctive highland bronzes deriving from marital alliances, including examples inscribed “*Qiang*” 羌, have been discovered in burials from Shang to Jin; Di Cosmo, *Ancient China*, p. 51. Li Min argues (*Social Memory*, p. 300) that these marriage alliances between the Sandai states and their highland peers were “an important means for the transmission of social memory and political knowledge,” and that the Zhou later deliberately adopted this as an effective state-building strategy. See also Pulleyblank, “Ji and Jiang,” pp. 3–4, and Armin Selbitschka, “Early Chinese Diplomacy: ‘Realpolitik’ versus the So-called Tributary System,” *AM* 3d ser. 28.1 (2015), p. 75, n. 54.

²⁴ “Most striking is that Jiang-surnamed women seem to be married exclusively to Ji-surnamed men”; Maria Khayutina, “Marital Alliances and Affinal Relatives (*sheng* 甥 and *hun-gou* 婚媾) in the Society and Politics of Zhou China in the Light of Bronze Inscriptions,” *EC* (2014) 37, p. 5. Khayutina has pointed out that exogamic inter-lineage marital relations served to help keep the peace and that a bilateral exchange of women meant that lineages or principalities viewed each other as equals; “Rulers of Peng,” pp. 15, 30, 31, 30. See Khayutina,

During the early-Western Zhou reigns of king Kang 康 (ca. 1024–996 BC) and king Mu 穆 (ca. 976–929 BC) confrontations with various Rong groups prompted extended campaigns. The famous Da Yu ding 大盂鼎 bronze from early-Western Zhou records the successful outcome of such a Zhou campaign.²⁵ The spoils, from just the one campaign, as itemized on the Xiao Yu ding 小盂鼎, amounted to “several thousand prisoners, more than one hundred *war chariots*, several hundred oxen, dozens of sheep and many horses” (emphasis added).²⁶ It is evident that these people were not nomadic pastoralists as has sometimes been asserted.

There was a clear recognition among the Hua–Xia states of the mixed quality of political and cultural heritages in the various highland and lowland traditions. Glossing the expression “*si er bu xiu* 死而不朽” (“gone but not deteriorated”), a memorable passage from *Zuozhuan* traces the lineage of a high official of the Jin state all the way back through Zhou, Shang, and Xia to Yao (Tao Tang shi), naming illustrious members from each dynasty. Of these, at least two, Yu Long shi 御龍氏 of Xia and Shi Wei shi 豕韋氏 of Shang, distinguished themselves as transmitters of traditional astral learning concerning the seasons and the stars, including the Fire Star, also called the “heart” of the dragon.²⁷

“Reflections and Uses of the Past in Chinese Bronze Inscriptions from the Eleventh to Fifth Centuries BCE: The Memory of the Conquest of Shang and the First Kings of Zhou,” in John Baines, Henriette van der Blom, Y. S. Chen, and Tim Rood, eds., *Historical Consciousness and the Use of the Past in the Ancient World* (Sheffield, U.K.: Equinox Publishing, 2019), p. 168. Song Xinchao discusses the evidence that the *Jiang* tribe among the *Qiang* lived in close proximity to the Zhou on the west, who had established themselves in the area of Qishan 岐山 and Fufeng 扶風 in the Wei River valley; *Yin Shang wenhua*, pp. 223–24.

²⁵ For the dating and historical context of the two *Yu ding* cauldrons, see *ibid.* p. 166.

²⁶ Khayutina, “Rulers of Peng,” p. 28. Also see Khayutina: “During the Western Zhou period, the Zhou faced a variety of lineages that retained their autonomy and stayed outside of the Zhou political hierarchy. Some of them reached the same level of complexity as Zhou units conventionally defined as ‘principalities,’” “Marital Alliances,” p. 8. For the crucial influence of the Rong in the state of Jin and the important role played by half-Rong offspring of the Lord, see Di Cosmo, *Ancient China*, p. 110. In one telling example, “The highland vessel shape (double handled beaker) represented in bronze in the tomb of a Jin elite woman (M113) at the Qucun cemetery ... serves as a touchstone for the transmission of Longshan social memory in the Jin state” (see Li, *Social Memory*, p. 435, also Yan, *Many Worlds*, pp. 118–19, 122). For the unmistakable “cultural hybridity” among the Central Plains states and their regional neighbors persisting into the immediate pre-imperial period see Wu Xiaolong, “Cultural Hybridity and Social Status: Elite Tombs on China’s Northern Frontier during the Third Century BCE,” *Antiquity* (2013) 87:335, pp. 121–36. Wu remarks (p. 135): “among the social elite in the Chinese states there was also a group of individuals who secured high social status through successfully maintaining trade and diplomatic relations with the non-Chinese groups.”

²⁷ Note that in fact the Shi Wei lineage was immortalized by having the location in the sky containing the winter solstice named for them. See Lord Xiang 襄公 24th year; Ruan Yuan 阮元, *Shisanjing zhushu* 十三經注疏 (Taipei: Wenhua tushu gongsi, 1970), p. 1978. On the demographic diversity of Jin, see Yan, *Many Worlds*, pp. 196 ff.

Archeological studies have established clear connections between the highland groups west of Zhouyuan and the Shu 蜀 groups in the Sichuan basin (Sanxingdui–Jinsha 三星堆, 金沙 sites).²⁸ As Li Min remarks, “The Qiang–Rong and others from as far away as Sichuan had earlier joined the coalition supporting Zhou King Wu in the 1046 BC conquest of Shang and were later repeatedly involved in Central States affairs. As we read in the *Book of Odes*, the minor ode ‘Chu ju’ 出車 says ‘Grand, grand was Nan Zhong 南仲 (fl. ca. 800), (he) chastised and attacked the Western Rong.’”²⁹

During the Spring and Autumn period, Qiang–Rong groups continued to play important roles in the diplomatic one-upmanship, alliances of convenience, and conflict among the contentious central kingdoms. They were also seen as an essential source of manpower.³⁰ In 771 BC, the Qiang–Rong had moved in force from the west into the eastern Wei River Valley, displacing the Western Zhou and forcing their relocation to the secondary capital of Chengzhou 成周 (modern Luoyang area) some 300 kilometers to the east. Nicola Di Cosmo concluded that from the early Spring and Autumn period, “the Chou states seem to have had little choice but to admit their powerful foreign neighbors to the highest levels of diplomatic intercourse.”³¹ In the late-seventh century, the western Rong were eventually subdued by the expansionist non-Hua–Xia state of Qin under lord Mu 穆 (r. 659–621).³²

Another famous passage from *Zuo zhuan* is illustrative. A Rong leader was excluded from a meeting of allies of Jin (mid-fourth century BC) on suspicion of double-dealing. The Rong chieftain Juzhi 駒支

²⁸ For a sketch map of the geographic distribution of the Di–Qiang, see Chen Jiujiu 陳久金, Lu Yang 盧央, Liu Yaohan 劉堯漢, *Yizu tianwenxue shi* 彝族天文學史 (Kunming: Yunnan renmin, 1984; hereafter, *Chen et al.* both in the notes and main text), fig. 1.2 (“Chuan, Dian Qian Di–Qiang qu yu tu” 川滇黔古氏羌區域圖); also Li, *Social Memory*, p. 433. According to Li Min (ibid. p. 420), “the major concentrations [of Longshan jade scepters] at Shimao on the loess highlands and later at Sanxingdui–Jinsha on the Chengdu Plain indicate a strong association with highland Longshan traditions.” Recently, sacrificial pits containing early W. Zhou bronzes or near imitations have been discovered at Sanxingdui; see Hui, X., Zhong, Q., and Tong, F., “New Discoveries at Sanxingdui Ruins Shed Light on Chinese Civilization,” *Xinhua Net* (March 20, 2021) <http://www.xinhuanet.com/english/2021-03/20/c_139823786.htm>

²⁹ Bernhard Karlgren, *The Book of Odes* (Stockholm: BMFEA, 1950), Mao no. 168, p. 112; *Shangshu*, “Oath at Muye” *Mu shi* 牧誓 (SKQS edn.); *CQZZ* 10, pp. 5a, 22b. The Nan Zhong were the ruling clan of Zeng 曾, in the buffer zone between Zhou and the south-southwest.

³⁰ Di Cosmo, *Ancient China*, pp. 106, 122. It is noteworthy that, “the Zhou state did not present itself as the direct heir of the Xia and Shang regimes . . . instead, it identified itself as a highland-based political power at the western fringe of the Central Plains society”; Li, *Social Memory*, p. 316.

³¹ Ibid. p. 117. The “Rong” appear over 150 times in different contexts in *Zuo zhuan*, predominantly in the early period.

³² Yan, *Many Worlds*, pp. 214, 218.

protests such treatment of a longtime Jin ally, and alludes to the Rong role in the defeat of Qin 秦 three centuries earlier:

Of old, the men of Qin relying on their greater numbers and being covetous of our territory, drove out us Rong. [The former Jin ruler] Lord Hui 惠 (r. 650–637 BC), displaying his great virtue, and saying that, as we were descendants of the Four Peaks and should not be thus cut off, bestowed on us lands on his southern border where foxes dwelt and wolves howled. We Rong cut down thorn and bramble, drove out fox and wolf, and became peaceable and loyal subjects of your former ruler, and until the present day we have remained faithful. Of old, Lord Wen 文 (r. 636–628) and Qin attacked Jing (Chu 楚, in 632). The men of Qin secretly covenanted with Jing 荆 (Chu), and left guards behind, whence came the encounter at (the Battle of) Yao 嶠 (in 627). Jin engaged them from above, the Rong beset them from below, and that the Qin host did not return was in truth due to us Rong ... Why then have we not escaped [these accusations]?³³ From that time on, the doings of Jin, one after another through the ages, have always been in concert with us Rong; we have followed its leaders, as in the time of [the Battle of] Yao; how should we have dared to keep apart? Now, the hosts under the leadership of your officers have made mistakes and antagonized the Lords and yet you blame us Rong... We Rong differ in our food and clothing from the Hua people, our fabrics and other products are not exchangeable, and our languages are not mutually intelligible—what evil, then, could we have committed? If we do not take part in this meeting, it will be no disgrace to us.³⁴

Rod Campbell has provided another thesis: “Rather than see the Central Plain Bronze Age horizon in terms of a homogeneous, militaristic expansion into an empty or impotent periphery, it would be better to see ... Central Plain Bronze Age centers as nodes in far-reaching and constantly changing networks of warfare, alliance, ritual, trade, tribute, marriage, and other things, involving a variety of actors of different ethnicity.”³⁵ By the late-Warring States period, as the regional

³³ Interestingly, this same watershed moment in Qin history is cited in a 242 BC memorial to king Yingzheng 嬴政 of Qin (Qin Shi Huangdi 秦始皇帝) by counselor Li Si 李斯, who argues among other things that non-native advisors (like himself) are not untrustworthy. E. B. Brooks and A. T. Brooks, *The Emergence of China: From Confucius to the Empire* (Amherst: U. of Massachusetts, 2015), p. 211.

³⁴ Trans. Brooks and Brooks, *Emergence of China*, p. 159 (with modifications). Cf. Li, *Social Memory*, p. 385; also Pines, “Beasts or Humans,” p. 70.

³⁵ Campbell, “Erligang,” p. 128.

Qiang-Rong politics interspersed among the Central Kingdoms were assimilated or acculturated, the perception of those not part of the Hua-Xia oikumene began to change. For example, in the *Stratagems of the Warring States* (*Zhanguo ce* 戰國策), the peripheral homelands that the western Qiang-Rong occupied were ultimately dismissed as being of only marginal interest and not worth the effort to annex.³⁶

Throughout the Qin and Han dynasties, however, the Western and Southern Qiang posed perennial problems. Despite sustained intercourse with the Han settlers along the frontier, the Qiang raided settlements, often in reaction to rapacious behavior by Han government agents and lackeys who stole livestock and provisions and kidnapped women. This went on for generations.³⁷ Han (206 BC–220 AD) emperors repeatedly strove either to recruit the Western Qiang as a buffer against the aggressive nomadic Xiongnu 匈奴, or to campaign against them for control of the frontier areas on which Han settlers increasingly encroached. Occasionally, for self-protection Qiang groups allied themselves with the Xiongnu in raiding the frontiers. It is important to note here that among the descendants of the Qiang in the present day are the Yizu, Naxi, and other groups in the southwestern provinces who share a Tibeto-Burman ethno-linguistic background.³⁸ After the Han, “the Qiang people were centered around Wenchuan, south of Songfan in the hilly area along the upper Min River in present-day Sichuan” (namely, Ngawa Tibetan and Qiang Autonomous Prefecture).³⁹ The evidence shows that they had been there for over two millennia. Moreover,

³⁶ In *Zhanguo ce*, sect. one of “Stratagems of Qin” (“Qin ce” 秦策), in a disputation before king Hui 秦惠文王 (r. 356–311 BC) it is argued that: “Now, at present Shu 蜀 [Sichuan] is a peripheral western state controlled by the Rong-Di. To decimate their army and belabor the masses would not suffice to make one’s reputation, nor would gaining their land confer sufficient advantage 今夫蜀，西辟之國，而戎狄之長也；弊兵勞眾不足以成名，得其地不足以爲利。” Liu Xiang 劉向, *Zhanguo ce* 戰國策 (SBCK edn.) 1, p. 115.

³⁷ See *Han shu* 漢書, chap. “Xiongnu zhuan xia” 匈奴傳下 94A–B, p. 59. The long history of fraught border relations is thoroughly documented in the *Hou Han shu* monographs on the Western Regions and their denizens: “Xi yu zhuan” 西域傳, “Xi Qiang zhuan” 西羌傳, “Xinan Yi lie zhuan” 西南夷列傳.

³⁸ According to Pulleyblank: “It makes good sense on a number of grounds to identify Jung as the general name for non-Chinese Tibeto-Burmans, including the Ch’iang and Ti of Chou times”; see Pulleyblank, “Chinese and Their Neighbors,” pp. 418–19 also Axel Schuessler, *ABCE Etymological Dictionary of Old Chinese* (Honolulu: U. of Hawaii Press, 2007), p. 3. As Chen *et al.* point out, Yi 彝 and Yi 夷 are homonyms 彝 (MC *ji, 夷 MC *ji); Chen *et al.*, p. 78. The name Yizu 彝族 appears rather late and may have been substituted for *yizu* 夷族 once that term began to refer to the severest form of capital punishment—the extermination of an entire clan lineage. See also Marc Kalinowski, “L’Astronomie des populations Yi du Sud-Ouest de la Chine,” *CEA* 2 (1986), pp. 253–63.

³⁹ Liu, “Ji Jiang yu Di Qiang,” p. 183.

... on the north-south axis, the highland groups from Ordos to Sichuan were never fully incorporated into the Central Plains-based political framework during the second millennium BC. The archaeological study ... firmly established that these highland groups were memory communities of the highland Longshan tradition.⁴⁰

These kingdoms were the successors of the Ba-Shu 巴蜀 kingdoms Yelang 夜郎 and Dian 滇 (277 BC–115 AD) in the time of late Warring States through Former Han. At that time Ba, Shu, and Yunnan were mainly populated by people variously referred to as Southern Yi 南夷, Western Qiang 西羌, Southern Qiang 南羌, Southwestern Yi 西南夷, and so forth, some of whom, despite their loose organization, were capable in concert of fielding armies in the thousands.⁴¹

CULTURAL LEGACIES OF EXEMPLARY QIANG-RONG FIGURES

In their seminal work, *Yizu tianwenxue shi* 彝族天文學史, Chen Jiujin 陳久金 and coauthors trace the history of cultural practices of the peripheral ethno-linguistic minorities of western China from the Three Dynasties period on. Their research has revealed the heretofore overlooked influence of the Qiang and Rong on the development of mainstream Hua-Xia civilization, especially in connection with astral-calendrical matters. An extensive research program that included the study of old texts in the Yizu script, oral interviews with traditional practitioners, and extensive field study, led to the realization that a unique ten-month solar calendar has been in continuous use among groups such as the Yizu since ancient times. This discovery, in turn, led to the recognition that certain Western Zhou and Spring and Autumn texts (10th–5th c. BC) such as the poem “Seventh Month” (“Qi yue” 七月) contained in *Odes*, the “Lesser Annuary of Xia” (“Xia xiao zheng” 夏小正; in *Da Dai Liji* 大戴禮記), and the “You Guan” 幼官 chapter of *Guan zi* 管子 all bear importantly on the history of such calendrical matters

⁴⁰ Li, *Social Memory*, pp. 319–20.

⁴¹ *Hou Han shu* 31, p. 1105, records that during the reign of emperor An 安 (r. 106–125 AD) the Western Qiang “plundered Ba commandery, harming the people, [so that] an imperial edict ordered General Yin Jiu to go punish them, but for several years he could not overcome them.” Remarkably, third to fourth century silk brocade remnants from fabric woven in Sichuan were discovered in a burial at Niya 尼雅 on the edge of the Taklamakan Desert. Pieced together, the remnants display the legend: “When the five planets emerge in the east it is advantageous for China to punish the Southern Qiang, for the Four Yi 夷 to submit, and for the Shanyu (Xiongnu) to capitulate, so that together with Heaven (China will endure) without limit”; see Zhang Cunliang 張存良, “Yi shi caijian xi Shu lai: Dunhuang xieben S.3753 he P.4642 de shufa ji lai yuan di kaocha” 疑是彩箋西蜀來, 敦煌寫本 S.3753 和 P.4642 的書法及來源地考察, *Xi Hua shifan daxue xuebao (zhexue shehui ban)* 西華師範大學學報(哲學社會科學版) 3 (2019), pp. 25–34; cf. Pankenier, *Astrology and Cosmology*, pp. 306–14.

and have previously been misunderstood. Some of Chen Jiujin's and his coauthors' evidence is taken up below, but first it will be of interest to mention three Qiang-Rong figures to whom they point and who made important contributions in astronomy, the calendar, and politics in the central states.

Hu Yan 狐偃 (ca. 715–629 BC)

A good example of Rong influence in the powerful state of Jin is the renowned diplomat Hu Yan (Zi Fan 子犯), already mentioned. He was prince Chong Er's 重耳 maternal uncle. Chief counselor and architect of the exiled prince's restoration to power in Jin as lord Wen (r. 636–628), Zi Fan was also chief strategist in the struggle against Chu that culminated in the Battle of Chengpu (632 BC), bringing about an end to Chu's expansion northward.⁴² Chong Er's mother Hu Ji 狐姬 (Ji lineage) and uncle Zi Fan were both Rong, so that during part of his nineteen years in exile under Zi Fan's tutelage Chong Er sought refuge among the Rong where he was safe from his Jin enemies.⁴³ Zi Fan later played a pivotal role in negotiating Rong assistance in Jin's defeat of Qin at Yao in 627 BC.⁴⁴

Chang Hong 襄弘 (d. 492 BC)

Chang Hong was a famous statesman and polymath who served three Zhou kings in the sixth century BC as scribe-astrologer and diviner-king Ling 靈 (r. 571–545 BC), king Jing 景 (r. 544–521 BC), and king Jing 敬 (r. 519–476 BC). Renowned for his knowledge of the calendar,

⁴² For Zi Fan's role as astrologer-strategist, the connection between Jupiter stations Shi Chen and Da Huo (E Bo), and the timing of Chong Er's return to Jin, see *Guoyu* "Jin yu" 晉語 (SBBY) (Taipei: Taiwan Zhonghua shuju, 1974) 10, pp. 11a–b, and Pankenier, *Astrology and Cosmology*, pp. 261 ff.

⁴³ During a campaign against the Rong, Chong Er's father lord Xian of Jin 獻公 (r. 676–651) captured a certain lady Li Ji 麗姬 (Ji lineage) who became his principal wife and later wielded considerable power in Jin. In his preference for Rong consorts, Lord Xian was clearly emulating the Zhou rulers. See Pulleyblank, "Ji and Jiang," p. 19, and "Chinese and Their Neighbors," p. 420.

⁴⁴ Yuri Pines, *Zhou History Unearthed: The Bamboo Manuscript Xinian and Early Chinese Historiography* (NYC: Columbia U.P., 2020), pp. 82–84, 180, n. 8; Pines, "Beast or Human," p. 84, n.78; Li, *Social Memory*, p. 351. A rare and impressive matched set of chime bells, *Zi Fan bian zhong* 子犯編鐘, with lengthy serial inscriptions, commemorates Zi Fan's exploits that culminated in duke Wen's being confirmed as hegemon *ba* 霸 by the Zhou king; see Constance A. Cook and Paul R. Goldin, eds., *A Sourcebook of Ancient Chinese Bronze Inscriptions*, Early China Special Monographs Series 8 (Berkeley: Society for the Study of Early China), pp. 265–73. The Rong participated in epoch-making military confrontations, not least on the side of Jin in the battle at Chengpu (632 BC) that put an end to the northward expansion of Chu; Olivia Milburn, "The *Xinian*: An Ancient Historical Text from the Qinghua University Collection of Bamboo Books," *EC* 39 (2016), p. 80.

music, and astronomy in particular,⁴⁵ as the Zhou dynasty weakened, Chang was put in charge of the government to restore its prestige and power. According to the *Book of Rites* (*Liji* 禮記), in 496–95 BC Confucius sought out Chang Hong for his knowledge of music and other matters.⁴⁶ Chang was a native of Shu in Sichuan at a time when its population was non-Hua-Xia.⁴⁷

He Guan zi 鶡冠子

The Pheasant Cap Master was a Warring States thinker whose eponymous text (especially *Tian ze pian* 天則篇) deals with astral-calendrical matters. It is one of only two pre-Qin texts to mention how the handle of the Dipper serves as a seasonal timepiece, the other being the Lesser Annuary of Xia (hereafter often shortened to “Lesser Annuary”). In particular, although the “Monthly Ordinances” (“Yueling” 月令) chapter in *Springs and Autumns of Master Lü* (*Lü shi Chunqiu* 呂氏春秋; mid-3d c. BC) shares other features in common with *He Guan zi*, it makes no mention of the Dipper’s seasonal role. In contrast, this function of the Dipper remains a central feature of Yizu calendrical practice to this day. According to *He Guan zi*,

When the handle of the Dipper points to the east [at dawn], it is spring to all the world. When the handle of the Dipper points to the south it is summer to all the world. When the handle of the Dipper points to the west, it is autumn to all the world. When the handle of the Dipper points to the north, it is winter to all the world. As the handle of the Dipper rotates above, so affairs are set below. 斗柄東指，天下皆春；斗柄南指，天下皆夏；斗柄西指，天下皆秋；斗柄北指，天下皆冬。斗柄運於上，事立於下。⁴⁸

In this connection, Sima Qian’s “Treatise on the Celestial Offices” (“Tianguan shu” 天官書) and Ban Gu’s “Monograph on the Heavenly Patterns” (“Tian wen zhi” 天文志) both elaborate in parallel:

⁴⁵ *Huainanzi* 淮南子 (Xinbian zhuzi jicheng 新編諸子集成 edn.; Taipei: Shijie shuju, 1974), j. 13, pp. 16b–17b.

⁴⁶ *Liji*, sect. “Yueji” 樂記, in Ruan Yuan 阮元, *Shisanjing zhushu* 十三經注疏 (Taipei: Wenhua tushu gongsi, 1970), j. 39, p. 11a. For an instance of Chang Hong’s prognosticating based on Jupiter’s movements in response to an inquiry by king Jing 景, see *Zuozhuan*, Zhao 11 (650 BC), CQZZ (SKQS) 45, p. 25a. See Pankenier, *Astrology and Cosmology*, pp. 261 ff, where Guan Zhong, Chang Hong and Zi Fan are all associated with Jupiter prognostication.

⁴⁷ *Chen et al.*, , pp. 66–68.

⁴⁸ *He Guan zi*, 5, 21, pp. 1–4 (The *He Guan zi* is photographically reproduced in Defoort); Carine Defoort, *The Pheasant Cap Master (He guan zi): A Rhetorical Reading* (Albany: SUNY Press, 1996), pp. 189, 320; Angus Graham “A Neglected Pre-Han Philosophical Text: *Hokuan-tzu*,” *BSOAS* (1989) 52.3, p. 517; also *Chen et al.*, pp. 71, 211–15.

Great Horn (Arcturus) is the imperial court of the Heavenly King. On each of its sides there are three stars, (as if) the legs of cauldrons bracket it, and so it is called *sheti*. Now this *sheti* is what the handle of the dipper points to when vertical, whereby the season is established. 大角者，天王帝廷。其兩旁各有三星，鼎足句之，曰攝提。攝提者，直斗杓所指，以建時節。⁴⁹

Now, *Shetige* 攝提格 is the name of the first of the twelve so-called chronograms *richen* 日辰, or Jupiter Stations (*suici* 歲次) into which the band of the sky near the equator is divided and near which the sun, moon, and planets travel. All twelve transcribed names for the chronograms make complete gibberish in Chinese and are generally recognized as transcriptions of a different language.⁵⁰ Since He Guan zi came from far southwestern Ba 巴, which like Shu 蜀 was then principally a Qiang dominated region, and since the Lesser Annuary of Xia and its unique application of the Dipper handle as seasonal indicator has strong Qiang–Rong connections, it may well be that the twelve unintelligible terms are Tibeto-Burman and derive from the Qiang language. Since the reclusive He Guan zi and Liu An 劉安 (ca. 179–122 BC), who commissioned the well-known *Huainanzi*, are both closely linked to Chu and/or the southwest it seems likely that this *sheti* scheme had a non-Sinitic origin. Around the time of the Qin unification, it was adopted by mainstream practitioners and became conventional.

Chen et al. have remarked: “The ancient Chinese method of using the direction pointed to by the Dipper handle to determine the seasons began with the ancient Di and Qiang people. No trace of this practice has been found in Yin (Shang) or Zhou astronomy.” We might have expected so, based on the famous “conferring the seasons 授時) astral-calendrical passage in the “Canon of Yao” (“Yaodian” 堯典) section of the *Venerable Writings* (*Shangshu*). The “Canon of Yao” preserves archaic Shang terminology and enjoys the place of honor as the very first document in the *Writings*.⁵¹ It is noteworthy that the seasonal indications

⁴⁹ *Shiji* (Beijing: Zhonghua shuju, 1972) 27, p. 1297; *Han shu* 26, p. 1276.

⁵⁰ The transcribed names of the twelve stations are 攝提格, 單闕, 執除, 大荒落, 敦牂, 協洽, 涒灘, 作鄂, 闍茂, 大淵獻, 困敦, 赤奮若. Only Sima Qian’s forced gloss for the first term *shetige* suggests that it might be Chinese. When elaborated in the *Huainanzi* chapter “Tianwen xun” 天文訓 (ca. 139 BC), the twelve terms are explicitly linked to the annual movements of the planet Jupiter and its fictitious hemerological corollary Great Yin *Taiyin* 太陰, which supposedly moved through the stations in the opposite direction from the planet. See Marc Kalinowski, *Maitre de Huainan: Traité des Figures Célestes* 淮南子《天文訓》 (Paris: Les Belles Lettres, 2022); John S. Major, *Heaven and Earth in Early Han Thought: Chapters Three, Four, and Five of the Huainanzi* (Albany: SUNY Press, 1993); Erya 爾雅, “Shi tian” 釋天.

⁵¹ *Chen et al.*, p. 71. It is worth noting here that because of its usefulness in calculating planetary ephemerides the ten-month scheme resurfaces in Qin and Han time in the manuscript

among lodges and for Shen (Triaster) given in the “Tianze” 天則 chapter of *He Guan zi* establish that *He Guan zi* drew on early sources.⁵² Early commentators identify *He Guan zi*'s author as a native of far-western Chu or Ba 巴, and make him a member of non-Hua–Xia people, who were often collectively referred to at the time as “tributary peoples, *congren* 賔人.”⁵³

LUOXIA HONG 落下閔 OF BA 巴 (FL. CA. 150–CA. 90 BC)

Luoxia Hong 落下閔 was renowned as principal astronomer and calendar expert at the court of emperor Wu of Han 漢武帝 (r. 157–87). He worked intensively with Sima Qian (c. 145–c. 86 BC) on the major reform of the astral-calendrical system, to be known as the Grand Inception calendar, or “*Taichu li* 太初曆,” of 104 BC. It had become necessary to replace the traditional “Zhuanyu 顓頊” calendar named for Zhuanyu, the predynastic “inventor” of the calendar (also recognized as such by the Yizu) that had been adopted by the Qin dynasty but which was no longer serviceable. Summoned to the court at Chang’an, Luoxia Hong was responsible for the astrometry used in the project: “(He) recursively calculated the revolutions of the calendrical scheme, after which the degrees of the chronograms agreed with the Xia regulation 運算轉歷然後日辰之度與夏正同,” which involved recalibration of the positions of the principal stars and lodges and the cardinal points of the tropical year.⁵⁴

“Prognostications of the Five Planets” *Wuxing zhan* 五星占, also a Chu region artifact. Daniel P. Morgan remarks: “the debate surrounding the ‘*Xia xiao zheng*’ 夏小正 10-*yue* calendar preserved in *Da Dai Liji* 大戴禮記 raises the very real possibility that, at around the time of the *Wu xing zhan*, the term *yue* could indeed refer to solar periods.” This point surfaces repeatedly in Morgan’s, “The Planetary Visibility Tables in the Second-Century BC Manuscript *Wu xing zhan*,” *East Asian Science, Technology, and Medicine*, (2016) 43, pp. 23–25, 30.

⁵² Chen *et al.*, p. 69. Li Xueqin 李學勤 dates the *He guan zi* to ca. 310–260 BC and says the author was a reclusive Daoist scholar to whom is attributed an eclectic strain of Huang-Lao 黃老 thought; Li, “Mawangdui boshu yu *He Guan zi*” 馬王堆帛書與鶡冠子, *Jiang Han kaogu* 江漢考古 (1983) 2, pp. 55–56. Based on further detailed study, Xu Wenwu 徐文武 dates *He Guan zi* to 300–240 BC and his eponymous work to shortly thereafter; see Xu, “*He Guan zi jiguan yu shengping shishu kaolue*” 鶡冠子籍貫與生平事迹考略, *Nantong daxue xuebao (shehui kexue ban)* 南通大學學報 (社會科學版) (2005) 21.2, pp. 90–94.

⁵³ Chen *et al.*, pp. 68–74. The plumed headgear of the Pheasant Cap Master may have had to do with the penchant of military figures for wearing long pheasant plumes. Cf. *Yi Zhou shu*, *Wang hui jie* 王會解 (SKQS edn.) 7, p. 9a. Xu Wenwu thinks *He Guan zi* was initially a military strategist disillusioned by the decline of Chu who then became a reclusive scholar. Chen *et al.*'s informants explain that the pheasant plume headgear was also characteristic of Di-Qiang and Yizu occult practitioners. The Zhao 趙 general Long Yuan 龐援 had studied with *He Guan zi* in Chu in about 241 BC. *He guan zi* has parallels in the Guodian 郭店 texts, as seen in the Chu prose-poem “Tianwen” 天問.

⁵⁴ Prior to his collaboration with Sima Qian, Luoxia Hong played a similar role at the court of Liu An 劉安 (179–122 BC), king of Huainan; see Y. Maeyama, “The Oldest Star Catalog of

Luoxia may very well have used an early type of armillary to perform such positional observations.⁵⁵ Since he also advocated the emergent *huntian* 渾天 cosmology that envisioned the cosmos as spherical, one wonders how the astrometry could have been accomplished without an armillary-like instrument, however basic. He is said to have been a native of Langzhong 閬中 in Ba commandery 巴郡 (Sichuan) and a member of the Qiang community at a time when Han settlers in Shu were few. In *Shiji* 史記, Sima Qian refers to him as Luoxia Hong of Ba, taking pains to mention his ethnic minority background. Sima Qian probably encountered both Luoxia Hong and Tang Du 唐都 (fl. ca. 130 BC) in Changsha where they were employed when the historian accompanied his father during Emperor Wu's imperial progress to Chu in 126 BC. In his "Treatise on the Celestial Offices," Sima Qian recounts how his father learned astronomy from Tang Du. One gains the strong impression that non-Hua-Xia Chu was a center of astronomical learning at the time. Luoxia Hong's and Tang Du's expertise in astronomy, astrology, astrometry and instrumentation must have greatly impressed Sima Tan at the time so that this is why Luoxia Hong and Tang Du were later recruited for the ambitious Grand Inception Tai Chu 太初 astral-calendrical revision project.⁵⁶ Noteworthy too is that earlier stars and asterisms figured prominently in the "Songs of the South," or *Chuci* 楚辭.

Even though we have only cited four noteworthy figures who appear in the sources, their careers could be representative of others less famous who also served in central kingdoms. From the above brief biographical sketches, it seems that far from being the uncivilized backwaters they were sometimes portrayed as, during the latter half of the first millennium BC the minority regions of the southwest may have been a source of astronomical and calendrical expertise just as had been those in the northwest when it came to metallurgy.⁵⁷

China: Shih Shen's Hsing-ching," in Maeyama, ed., *Astronomy in Orient and Occident: Selected Papers on Its Cultural and Scientific History* (Hildesheim: Georg Olms Verlag, 2003), p. 9.

⁵⁵ *Chen et al.*, pp. 77–79. On Luoxia Hong and a precursor to the armillary, see Liu Changdong 劉長東, "Luoxia Hong de zushu zhi yuan ji huntian shuo, huntianyi suo qiyuan de zushu" 落下閩的族屬之源暨渾天說, 渾天儀所起源的族屬, *Sichuan daxue xuebao* 四川大學學報 (zhexue shehui kexue ban 哲學社會科學版) (2012) 5, pp. 30–45. On regionalism in the sciences and mathematics, albeit a few centuries later, see Daniel Patrick Morgan, "Regional Networks in Chinese Mathematics and Astronomy, 311–618 CE," *East Asian Science, Technology, and Medicine* 53.1–2, pp. 3–55.

⁵⁶ See Marc Kalinowski, "Diviners and Astrologers under the Eastern Zhou," in J. Lagerwey and M. Kalinowski, eds., *Early Chinese Religion, Part One: Shang through Han* (1250 BC–220 AD) (Leiden: Brill, 2009) 1, pp. 341–96. Also Kalinowski, *Maitre de Huainan*, p. 123, 170–174 ff.

⁵⁷ According to *Chen et al.*, p. 78, at the time Sichuan boasted an "observatory" (*lingtai* 靈台).

QIANG-RONG ASTRAL-CALENDRICS IN PRE-QIN SOURCES

After the conquest of Shang in 1046 BC, king Cheng, the son of Zhou king Wu and Yi Jiang, was enfeoffed in Jin, ancestral homeland of the Xia, so that the melding of Ji 姬 and Jiang 姜 lineages was perpetuated in Jin from the outset.⁵⁸ Similarly, Tai Gong Wang (he too of Jiang descent) was set up in Qi 齊 in the east, assuring the transmission of Jiang-Rong heritage to Qi. It is hardly surprising then that Jin persisted in using the old “Xia calendar” (“Xia zheng”) even though the lunisolar calendar inherited from the Shang and promulgated by the Zhou royal court began the year with the eleventh, solstitial, month (*zi* 子) rather than the third month (*yin* 寅). In addition, traces of a ten-month solar calendar identical to the Yizu traditional calendar are clearly discernible in the “Youguan” 幼官, or “Dark Palace” 玄宮,⁵⁹ chapter of *Guan zi* 管子, attributed to Guan Zhong 管仲 (Ji 姬 lineage; 725–645 BC), a statesman, strategist, and counselor to hegemon lord Huan of Qi (685–643, Jiang 姜 lineage).⁶⁰ Their study confirms the transmission of Qiang-Rong astral lore and practices into the central kingdoms.⁶¹ In *Yi Zhou shu* 逸周書 there is the following statement:

And, indeed, when it came to our Zhou kings, (they) were brought to attack the Shang, and to change the First Month of the year and the royal regalia, to make manifest the Three Traditions. But as for “respectfully bestowing the seasons on the people,” royal progresses and sacrifices, (they) still followed the Xia. 亦越我周王，致伐于商，改正異械，以垂三統，至於敬授民時，巡守祭享，猶自夏焉，是謂周月，以紀于政。⁶²

⁵⁸ For the demographic heterogeneity of the Jin population, see Sun, *Many Worlds*, pp. 106–10.

⁵⁹ The title of this chapter is thought to be a misreading of the original *xuan gong* 玄宮 “Dark Palace” that denoted the winter quadrant of the heavens as associated with the Xia and the “Lesser Annuary of Xia” in the same way that autumn (metal/white) was associated with Shang, and summer (fire/red) with Zhou. The “Dark Palace” is also where, according to Mozi 墨子 (“Against Aggressive Warfare,” *Fei gong xia* 非攻, part B) and others, Heaven bestowed on Yu the Great the “Dark Jade Scepter 玄珪” inscribed with the Supernal Lord’s command to Yu to assume the kingship; Pankenier, “Astrology and Cosmology,” pp. 36, 178 ff, and idem, “A Chinese Mythos of Mantic Turtles, Yu the Great, Number, and Divination,” *BMFEO* 79–80 (2018), pp. 335–60.

⁶⁰ *Chen et al.*, pp. 77–79. It was the discovery of such links that led *Chen et al.* to solve the riddle of the parallels between the calendrical data preserved in the *Xia xiao zheng*, the *Bin feng* 豳風 ode “Seventh Month” 七月, and the “*You guan*” chapter in *Guan zi*.

⁶¹ *Ibid.* pp. 63–81. Guan Zhong was no stranger to planetary astrology. In one of the earliest mentions of his role in tactical prognostication, among the essential decision-making considerations that he reputedly emphasized to lord Huan of Qi was the need to consult with knowledgeable advisers about Mars’ location; *Guan zi*, sect. “Jiu shou” 九守 (Xinbian zhuzi jicheng edn.) j. 5, p. 301. Seven centuries later, Sima Qian echoed Guan Zhong’s recommendation concerning Mars; *Shiji*, chap. “Tianguan shu” 天官書 27, p. 1347.

⁶² *Yi Zhou shu*, 6, p. 87. Pankenier, *Astrology and Cosmology*, p. 257. “Respectfully bestow

Thus, there was a time-honored distinction between the ritual-bureaucratic calendar, with its political symbolism, and a more traditional calendar of seasonal festivals, market-days, and the like based on something like the Lesser Annuary, which the common folk continued to follow. This distinction is also apparent in the “Great Plan” 洪範 chapter of *Shangshu*, where the habits of the common people are distinguished from those of the elite: “What the common people (scrutinize) are the stars. There are stars which favor wind, there are stars which favor rain.”⁶³ The passage succinctly expresses how essential it was to keep the count of the months (i.e., the tropical calendar) synchronized with the stars.

THE TEN-MONTH CALENDAR AND COMPETING ASTRAL TRADITIONS

Early studies of the calendrical data, the seasonal phenology (*shihou* 時候), and the astronomical observations in the above three texts approached those seasonal indications from the perspective of the lunisolar “Monthly Ordinances” (“Yueling” 月令), found in *Lüshi chunqiu* 呂氏春秋 (ca. 242 BC) and elsewhere. The scheme in it pertains to a twelve-month lunisolar calendar. But indications in both the Lesser Annuary and the ode “Seventh month” refer to a ten-month solar calendar. The two schemes are fundamentally incompatible.

Extensive evidence is put forward in *Chen et al.* for the ten-month solar calendar, whose origins the authors demonstrate are traceable to the ancient Qiang–Rong people. As we saw, the transmission of these traditions to Zhou, Jin, and Qi are attributable to such influential mediators as Tai Gong Wang in Qi, Chang Hong in Zhou, Guan Zhong in Qi, Zi Fan in Jin, He Guan zi, and Luoxia Hong in the Han, and no doubt others. The few mentioned are the standouts who were so distinguished as to have merited mention in the histories. As Confucius reportedly said:

I wished to observe the way of the Xia, and so went to Qi 杞 (a state with a legacy Xia population), but there was insufficient evidence, although I did acquire the “Seasons of the Xia” (“Xia shi” 夏時) there (i.e., the calendar). I wished to observe the ways of Yin 殷 (商), and so went to Song 宋 (state with a legacy Shang popula-

the seasons on the people” is a quotation from the *Yao dian* 堯典 chap. of *Shangshu*.

⁶³ Trans. Bernhard Karlgren, *The Book of Documents* (Stockholm: BMFEA, 1950), p. 29 (trans. modified); Pankenier, *Astronomy and Cosmology*, p. 243.

tion), but there was insufficient evidence, although I did acquire the [written work named] “Kun Qian” 坤乾 there. In this way, I got to see the meaning of “Kun Qian,” and the different periods in the seasons of the Xia.

我欲觀夏道，是故之杞，而不足徵，吾得“夏時”焉；我欲觀殷道，是故之宋，而不足徵也，吾得“乾坤”焉。“乾坤”之義，“夏時”之等，吾以此觀之。⁶⁴

And in another place, “Yan Yuan asked how the government of a state should be conducted. The Master counseled, “Practice the seasons of Xia.’ 顏淵問爲邦。子曰：行夏之時。”⁶⁵

We do not know the name or ethnicity of the expert sought out by Confucius in Qi or any other, except Chang Hong. In this admonition Confucius was clearly following an ancient precedent recorded in the “Shao gao” 召誥 chapter of *Shangshu*, which reads

Those above and below being zealous and careful, let them say, “As we receive Heaven’s Mandate, we should follow the calendar of the Xia, but not supplant that of the Yin’— in order that (as one would wish) the king, through the little people, may receive Heaven’s eternal Mandate.” ... 我受天命，譬若有夏歷年，式勿替殷歷年，欲王以小民受天永命。⁶⁶

In other words, the two separate traditions should be maintained, one attributed to Shang and the east, and the other to Xia (Jin–Tang) and the northwest.

THE ASTRONOMICAL EVIDENCE

For Confucius, Guan Zhong was a pivotal figure, both as cultural intermediary and paragon. Confucius was interested in the legacy of Xia (not to mention Shang and Zhou). By all accounts his interests extended to the calendar and the seasons of the stars. One episode is related in the much later *Kongzi jiayu* 孔子家語 (comp. W. Han era; recomp. 3d c. AD):

⁶⁴ *Kongzi jiayu*, sect. “Wenli” 問禮 (SBCK), j. 1, p. 21a.

⁶⁵ *Lunyu*, “Wey Ling Gong” 衛靈公 (Xinbian zhuzi jicheng edn.), vol. 1, p. 337. *Liji* 禮記, sect. “Liyun” 禮運 (SKQS) 21, p. 10b; 21, p. 11a. According to Sima Qian, “Kongzi deemed the seasons of Xia to be definitive, and those who learned from him all transmitted the Lesser Annuary of Xia 孔子正夏時，學者多傳夏正云”; *Shiji*, sect. “Xia benji” 夏本紀 2, p. 89. “Kun Qian” refers to the first two hexagrams of the *Zhou yi* 周易 (*Changes of Zhou*). Here the Sage seems to be specifically alluding to the astral-calendrical content of *Qian* and *Kun*, for which see Pankenier, *Astrology and Cosmology*, pp. 44–57. The attribution of the *Kun Qian* (replete with dragon lore) to the Shang is noteworthy, given the close association of the *Changes* with Zhou.

⁶⁶ Trans. Chen Zhi, “From Exclusive Xia to Inclusive Zhu–Xia: The Conceptualisation of Chinese Identity in Early China,” *JRAS* 14.3 (2004), p. 188 (reading *li* 歷 for *li* 曆).

Ji Kangzi asked Confucius, “This is the Zhou twelfth month, the Xia tenth month, and still there are catyrids; why is that?” Confucius answered, “I have heard that ‘after the Fire Star has set, the hibernators have all gone.’ But now the Fire Star is still declining in the west. The officials in charge of the calendar are wrong.” Ji Kangzi said, “By how many months are they off?” Confucius said, “By the tenth month of the Xia calendar the Fire Star has already set, but now the Fire Star is still visible; [they have] missed intercalating twice.”

季康子問於孔子曰：“今周十二月，夏之十月，而猶有蟊，何也？”孔子對曰：“丘聞之，火伏而後蟊者畢，今火猶西流，司歷過也。”季康子曰：“所失者幾月也？”孔子曰：“於夏十月，火既沒矣，今火見，再失閏也。”⁶⁷

The question arises, what might Confucius have meant when he connected the work “Kun Qian” (see above) with the seasons of Xia in the same breath? The archeological discovery of the Taosi 陶寺 observational platform from the late-third millennium BC and the opposition between Shi Chen and E Bo provide important clues. As we saw, the key to understanding the mythic rivalry between the two siblings lies in their association with Shen-Triaster and the Fire Star, respectively. Figure 4 (all figures are collected at the back of this article) is a computer simulation of the appearance of the sky from east to west just after the vernal equinox in 2100 BC, at the very same time the Taosi platform was being used to observe sunrise over the mountain ridge to the east. Naturally, such a “numinous terrace” (*lingtai* 靈台) could also have served to observe the rising of stars. This is not to suggest that there is a direct connection between the Lesser Annuary of Xia and Taosi, but simply to highlight solar observational practices known to have been used there up through the late-Longshan period. There is every reason to suspect that the Taosi “numinous terrace” had to do with refining the calendar.

The star chart in the figure shows the lunar lodges arrayed across the sky from east to west after sunset, with the sun well below the western horizon and the sky pitch dark. At left in the east the orange-red Fire Star in lodge Heart has risen well above the horizon at azimuth $107^{\circ}51'$ (SE), altitude $8^{\circ}48'$.⁶⁸ Exactly opposite on the horizon in the

⁶⁷ *Kongzi jia yu*, sect. “Bian wu” 辯物 (SBCK edn.) 4, p. 15b. The implication is that Confucius kept track of both the twelve-month lunisolar calendar used in Lu 魯 as well as the Xia ten-month solar calendar; see Pankenier, *Astrology and Cosmology*, p. 257.

⁶⁸ The two observing apertures E₄ and E₅ on the Taosi platform may be implicated in such observations. The mid-line azimuth of aperture E₅, e.g., is 106° (E of N) and the altitude of the horizon opposite is 7.2° so that the Fire Star’s oblique rising across the field of view as it cleared the mountain ridge in that direction would have been hard to miss if an observer had been

west, Shen-Triaster has already sunk below the horizon out of sight. The computer simulation graphically illustrates the usefulness of the pair of asterisms as markers of spring and autumn, a role they played in the cultural astronomy of other early societies as well. The opposition also applies to the emblematic constellations of the eastern and western palaces of the sky, the Dragon (*Alligator sinensis*) and the Tiger, denizens of the well-watered coastal east and the highland inland west, respectively.⁶⁹

Elsewhere, the lines of hexagram Qian in the *Zhou Changes* 周易 have been shown to describe the behavior of the dragon constellation through the seasons: first it peeks above the horizon at dusk in early spring, then leaps into the sky, and then soars across the heavens on summer evenings, finally to dive abruptly below the horizon in the west in the autumn.⁷⁰ In view of the very strong astral associations, the opposition obtaining between E Bo and Shi Chen, Dragon and Tiger, East and West, lowland and highland, Qian and Kun (*yang* and *yin*) can hardly be coincidental.⁷¹ Thus, in some now obscure tradition, perhaps also a legacy of the Xia, the origin of Qian and Kun as icons analogous to E Bo and Shi Chen may have figured in a traditional almanac that also transmitted astral lore. This may be what Confucius was alluding to by lumping the two together: “I got to see the meaning of ‘Kun Qian’ and the different stages in the seasons of the Xia.”

TEXTUAL EVIDENCE FOR THE “LESSER ANNUARY OF XIA”

The Lesser Annuary of Xia and the ode “Seventh month” concern the “seasons of Xia,” so it will be to them that we now turn.⁷² Here is an informative stanza from the ode “Seventh month”:⁷³

watching for the sun to rise in that aperture. The case for Shen-Triaster is even stronger. The mid-line azimuth of slot E₄ is 112.68° and the horizon altitude is 6.13°. Shen would certainly have come into view before sunrise at 112°45'. Pankenier, *Astrology and Cosmology*, p. 25.

⁶⁹ For details as to how the Chinese alligator and its seasonal habits likely inspired the dragon, see *ibid.*, p. 62.

⁷⁰ *Ibid.*, p. 46. The original version of Qian hexagram no doubt derived from a traditional farmers' almanac of sorts, such as the ode “Seventh Month,” the kind of oral astral lore we know to have been transmitted between generations for centuries. The oracular pronouncements attached to the original passages came later when the *Changes* was transformed into a divination tool.

⁷¹ The lines of hexagram Kun also point to seasonal associations, albeit less obviously. Apart from the dueling dragons, the dark associated with the winter palace (*xuan* 玄) and the treading on frost, other detailed astral associations of hexagram Kun are lacking; Pankenier, *Astrology and Cosmology*, p. 48.

⁷² For discussion of the ten-month solar calendar in the Lesser Annuary, see *Chen et al.*, pp. 63–64, 199, 223–26, 338–39.

⁷³ Trans. Karlgren, *Book of Odes*, p. 97. Recall Confucius's remark about the catydid (grasshoppers) in *Kongzi jiyu*; see n. 67, above

In the fifth month the locust moves its legs;
 in the sixth month the grasshopper shakes its wings;
 in the seventh month it is out in the open country;
 in the eighth month it is under the roof;
 in the ninth month it is in the doorway;
 in the tenth month the cricket is under our bed.
 The holes being stopped up, we smoke out the rats;
 we block the northern window and plaster the door;
 oh, you wife and children!
 It is all for the (changing of the year) passing into the new year;
 let us enter the house and dwell there.

“Seventh month” is an excellent example of how a rhyming phonological (*shi hou* 時候) calendar devoted to seasonal changes in nature, essentially a farmers’ almanac, can be transmitted in song or verse for centuries.⁷⁴ It describes the seasonal activities followed by the common folk month to month (blocking up windows and smoking out rats are unlikely to apply to princes). Significantly, no verse mentions either an eleventh or a twelfth month, although the other months are all represented. In “Seventh Month” there is also the strong implication that the tenth month ends the year.

Below is the essential text of the Lesser Annuary. The fact that here as well only the seasonal and astral indications for ten months are adequately represented should have given pause, but it remained for *Chen et al.* to probe more deeply and verify that the text’s astral indications are fundamentally incompatible with a twelve-month lunisolar calendar, and to explain why. The indications do fit perfectly with the ancient ten-month calendar with its thirty-six-day “months,” whose thirty twelve-day “weeks” are described in *Guan zi*.⁷⁵ These periods fulfilled the same role as the later twenty-four monthly *qi*-nodes 節氣 in the lunisolar calendar scheme. Those were also tied to the seasons of the tropical year and served as a corrective indicating when the slip-

⁷⁴ A parallel example can be found in Hesiod’s didactic poem, *Works and Days* (ca. 700 BC): “When Zeus has finished sixty wintry days after the solstice, then the star Arcturus leaves the holy stream of Ocean and first rises brilliant at dusk. After him the shrilly wailing daughter of Pandion, the swallow, appears to men when spring is just beginning. Before she comes, prune the vines, for it is best so” (pp. 564–70). “Set your slaves to winnow Demeter’s holy grain when strong Orion (28) first appears, on a smooth threshing-floor in an airy place. Then measure it and store it in jars” (pp. 597–608). See Thomas D. Worthen, *The Myth of Replacement: Stars, Gods, and Order in the Universe* (Tucson: U. Arizona P., 1991), p 210.

⁷⁵ *Chen et al.*, pp. 227–31. As Marc Kalinowski notes (personal communication), the thirty-by-twelve-day hemerological cycle in *Guan zi* and in the Yinqueshan 銀雀山 *yin-yang* texts is of particular interest because of the numerological relations: “since $5 \times 72 = 10 \times 36 = 30 \times 12$ ”.

page of the lunisolar calendar meant that intercalation was needed to resynchronize with the tropical seasons.

Here we will only be concerned with a matter of particular significance in the present context, the seasonal stars and the orientation of the Dipper's handle. The text of the "Lesser Annuary of Xia" (minus commentary and glosses) follows:

- 正月: 初昏參中, 斗柄懸在下。"First month ... Shen-Triaster transits at dusk, Dipper handle hangs down." [W; winter in *He Guan zi*]
 三月: 參則伏。Third month ... "Shen-Triaster sets"
 四月: 昴則見, 初昏南門見 "Fourth month ... Pleiades pre-dawn rise, α Cen straight up at dusk."
 五月: 參則見 ... 初昏大火中 "Fifth month ... Shen-Triaster's pre-dawn rise, Fire Star α Sco (transits) at dusk."
 六月: 初昏斗柄正在上 "Sixth month ... Dipper handle straight up at dusk." (S; summer in *He guan zi*)
 七月: 初婚織女正在東鄉 ... 斗柄懸在下則旦 "Seventh month ... Weaving Maid eastward (?) at dusk, Dipper handle hangs down pre-dawn"⁷⁶
 八月: 辰則伏 ... 參中則旦 "Eighth month ... Chen (lodge Heart) sets; Shen-Triaster's pre-dawn transit."
 九月: 辰系于日 "Ninth month ... Chen is tied to the sun (in conjunction)."
 十月: 初昏南門見 ... 織女正北鄉則旦 "Tenth month ... South Gate (α Cen) rises at dusk (pre-dawn?)." Weaving Maid is due N (E?) at dawn"

As has been demonstrated by *Chen et al.* (the latter two being Yizu), the variously pre-dawn and dusk observations of Triaster-Shen and the seasonal orientations of the Dipper preserved in the Lesser Annuary are incommensurate with the twelve-month lunisolar calendar found in the *Yueling* 月令 "Monthly Ordinances." The failure to recognize this led early commentators and modern scholars alike to mistaken conclusions about the underlying calendar.⁷⁷

⁷⁶ In contrast to the *He Guan zi*, the Lesser Annuary only references the orientation of the Dipper in summer and winter while adding Vega and Alpha Centauri in spring and autumn. *He Guan zi* makes use of the Dipper in all four seasons, while *Yaodian* ignores the Dipper's orientation.

⁷⁷ E.g., Nōda Chūryō 能田忠亮, who dated the astronomy to the second millennium BC; see his "'Kashōsei' seishōron" 夏小正星象論, *THGH* (1941) 12, p. 209. Joseph Needham and Wang Ling briefly discuss the "Lesser Annuary" in *Science and Civilisation in China*, Vol. 3: *Mathematics and the Sciences of the Heavens and the Earth* (Cambridge: Cambridge U.P., 1959), p. 194. For the full text of *Xia xiao zheng*, see *Da Dai Liji hui jiao ji zhu* 大戴禮記匯校集注 (Xi'an: Sanqin chubanshe, 2004).

Because the dates of the solstices and equinoxes changed significantly between 2000 BC (Vernal Equinox: April 8) and, for example, Guan Zhong's day (d. 7th c. BC) (Vernal Equinox: March 26, 700 BC) the dates of the astral correlations with the seasons (and months) changed commensurately. Without knowing the precise timing of the observations ("dawn 旦" and "start of dusk 初昏" are too vague), dating the astral indications precisely is notoriously difficult, no less so than those in the famous "conferring the seasons" passage in the "Yaodian" chapter of *Shangshu*. For convenience, astronomical twilight, that is, one hour after sunset or before sunrise when the brightest naked-eye stars are visible can serve here. The orientation of the Dipper's handle and the risings and settings of stars are more precise, but the latter also depend on the altitude of the local horizon which cannot now be known, hence the dates given are approximations. *Chen et al.* suggest that the ten-month solar calendar may still have been in use among highland groups interspersed among the Central States in Guan Zhong's time and only fell out of use in the Central Plains area sometime thereafter as the interspersed Qiang-Rong peoples became culturally assimilated. Ban Gu 班固 (32-92 AD) is of the same opinion in the quotation from his *Han shu*.⁷⁸

Eventually, the gradual disconnects between the astral indications and the cardinal points of the tropical calendar due to precession of the equinoxes would have necessitated a "recalibration" of seasonal indications once sufficient time had passed for the discrepancy to become problematical. After four to five centuries had elapsed it must have occasioned the Three Traditions "San tong 三統" recalibrations occasioned by the dynastic transitions from Xia to Shang to Zhou. If mountain contours on the horizon were used to mark sunrise on the solstice a noticeable deviation might become detectable fairly soon. That technique was evidently in use at Taosi by about 2100 BC.⁷⁹

Table 1, below, shows the astral indications given in the Lesser Annuary. It indicates at least that 1. the ten-month calendar is certainly functional, and 2. the astral indications are internally consistent.

⁷⁸ *Chen et al.*, pp. 71, 237.

⁷⁹ The consensus among astronomers is that the elevated terrace with twelve observing apertures facing the mountain ridge to the east was clearly designed for astronomical observation, particularly sunrise. Ten of the twelve apertures capture the range of movement of the sun along the horizon from SE to NE and back, during a year. The superfluous apertures at the extremes suggest that this may indicate that this was an early experimental effort. They also do not capture the lunar standstills. (See other data given in fn. 66, above.) Chen Jiujin, "Yao du tianxiang yizhi tianwen lifa gongneng shixi" 堯都天象遺址天文曆法功能試析, *Zhonghua keji shi xuehui huikan* 中華科技史學會會刊 (2007) 11, pp. 11-18.

For example, it is noteworthy that the two astral observations in the Lesser Annuary that are prescribed to occur in the solar First Month. Shen–Triaster’s meridian transit and the vertical downward pointing of the Dipper’s handle, being both sidereal, occurred at the same date in 2100 as in mid-first millennium BC; that is, on February 9. The difference is that in 2100 BC, February 9 was just over a month after the solstice on January 6, but it was forty-six days after the solstice around the time of unification (25 December BC). This illustrates the difficulty at that late date of reconciling the old ten-month astral calendar with the twelve-month lunisolar calendar.

Table 1. Lesser Annuary of Xia Calendar in Guan Zhong’s Time

MONTH	CALENDAR DATE CA. 700 BC	ASTRAL INDICATION
I	01/17 + 36d = 02/22	Dipper points down, Triaster dusk transit. Crosses local merid. due So. (culminates)
II	[02/22 + 36d = 03/30]	---
III	03/30 + 36d = 05/05	Triaster sets at dusk
IV	05/05 + 36d = 06/10	S. Gate straight up at dusk
V	06/10 + 36d = 07/16	Triaster rises at dawn
VI	07/16 + 36d = 08/21	Dipper points up at dusk
VII	08/21 + 36d = 09/26	Dipper points down at dawn
VIII	09/26 + 36d = 11/01	Triaster dawn transit
IX	11/01 + 36d = 12/07	Lodge Heart (Fire Star); sun in conjunction
X	12/07 + 36d = 01/12 + 5d = 01/17	S. Gate rises at dawn (Winter solstice 12/25)

Figure 5 shows the locations of the Twenty-eight Lodges with the present-day solstices and equinoxes and their locations in 2400 BC, thus making apparent the consequences of precession of the cardinal points. It is evident from the figure that the dawn rising of lodges Shen–Triaster and Heart (Antares) would have marked the vernal and autumnal equinoxes for some centuries around that time as in some traditions elsewhere.

Of interest is the discovery that the pointing of the Dipper’s handle may have been interpreted differently between the early Spring and Autumn and late Warring States periods. Figure 6 reproduces a drawing of a pair of round “heaven plates” based on early-Han mantic-astrolabes.

Note that the seasonal astral “stays, or meridians 紀” (the intersecting lines) are superimposed on renderings of the Dipper.⁸⁰ The Dippers on the Heaven Plates are often crudely realized, but the inscribed quadrantal meridians intersecting at the nominal pivot star *Yuheng* 玉衡 (Jade Transverse, ϵ UMa Alioth) show how the orientation of the Dipper was adapted as a seasonal and hemerological timepiece in the Han.⁸¹ The focus on the star Alioth in the Dipper handle illustrates how the “Northern Asterism 北辰” became a stand-in for the pole some distance away that still lacked a bright star. The heaven plate was designed to rotate on a square “earth plate” beneath, successively correlating with temporal graduations around the periphery. The purpose was mainly heuristic and hemerological. Figure 7 shows how *Chen et al.* interpret the orientation of the Dipper when vertical, as originally employed. This interpretation emerged when the astral indications of the “Lesser Annuary” were mapped onto the seasonal sky of the period.

According to *Chen et al.*, by the late-Warring States period or the beginning of the Former Han an attempt was made to adapt the indications of the Lesser Annuary to agree with the solstices by reimagining how the Dipper handle pointed. Calendar specialists at the time would have been unaware of the actual cause of the Dipper’s increasing “inaccuracy.” To rectify the discrepancy, the target of the Dipper handle may simply have been reinterpreted to conform to the contemporary situation by shifting the target two lodges from the Fire Star Antares α Scorpius in lodge *Xin* to lodge *Kang* (κ Virginis) (or later even farther to lodge Horn, as *Shiji* has it).⁸² Precession had caused the solstices and equinoxes to drift westward by one week as each millennium passed. On the assumption that this is what occurred, we can estimate when the Lesser Annuary’s Dipper indications would have been accurate. Since a documented recalibration was undertaken by Sima Qian’s time at the latest, and that was done to account for the fact that Arcturus could no

⁸⁰ Zhongguo shehui kexueyuan kaogu yanjiusuo 中國社會科學院考古研究所, ed., *Zhongguo gudai tianwen wenwu tuji* 中國古代天文文物圖集 (Beijing: Wenwu, 1980), p. 115. See Needham and Wang, *Science and Civilisation in China* 3, pp. 232–33.

⁸¹ Pankenier, *Astrology and Cosmology*, p. 460. The “Tianwen xun” 天聞訊 essay in *Huainanzi* contains a detailed description. In *Shiji* and elsewhere the Dipper is called the “Dipper Top-cord 斗綱” from which the cardinal and inter-cardinal meridians (*wei* 維) or pendants (*ji* 紀) are suspended. The first sentence in *Hou Han shu*, “Monograph on Harmonics and Calendars” 律曆志下, lumps together all the significant observations: “Anciently, when the sages created the calendrical system, they observed the rotation of the Jade Device *xuanji* 璇璣, the travels of the Three Luminaries, the movements of the Dao, the length of the [gnomon’s] shadow, what the Dipper Top-cord indicates, and the path the Cerulean Dragon treads”; *Hou Han shu* 11, p. 3055.

⁸² *Shiji* 27, p. 1291.

longer serve its original function, then the angular difference between the two stars could be a rough index of the passage of time since the Dipper's pointing was initially established.

Figure 7 is a graphic illustration of how the pointing of the Dipper functioned in the Lesser Annuary scheme. This appears to be alluded to in the "Shundian" sect. of *Shangshu* (compiled in mid-Zhou dynasty, though parts date from early-Western Zhou), where the stars of the Dipper are referred to: "Examine (the Northern Dipper stars) *Xuan* 璿 (Phecda, γ UMa), *Ji* 璣 (Merak, β UMa) and *Yuheng* 玉衡 (Alioth, ϵ UMa) to equilibrate the Seven Regulators (namely, sun, moon and five planets) 在璿璣玉衡以齊七政."⁸³ A more complete passage appears in Sima Qian's "Treatise on the Celestial Offices" ("Tianguan shu" 天官書) in *Shiji*. There Sima Qian expands on the meaning of the *Shundian* characterization of the Dipper's function:

The seven stars of the Northern Dipper, the so-called Jade Rotator, (Celestial) Device, and (Jade) Transverse, are what equilibrate the Seven Regulators (sun, moon, and five planets). *Biao* "Ladle Handle" (*yaoguang* 搖光) is attached to Horn (*jiao*; lodge no. 1, Spica; or alternatively Great Horn, Arcturus). *Heng* "Transverse" hits the Southern Dipper (*Nandou*, lodge no. 8) in the middle; *kui* "Scoop" rests on the head of Shen-Triaster (lodge no. 21). The dusk indicator (timing dusk transits) is Handle... The midnight indicator (transiting at midnight) is Transverse... The dawn indicator (timing dawn transits) is Scoop. 北斗七星, 所謂旋、璣、玉衡以齊七政. 杓攜龍角, 衡殷南斗, 魁枕參首. 用昏建者杓... 夜半建者衡... 平旦建者魁.⁸⁴

According to the Lesser Annuary, "in the First Month ... Shen-Triaster culminates and the handle of the Dipper hangs down 正月 ... 參則中, 斗柄懸在下."⁸⁵ At this time the Dipper is vertical and extending the "topcord" *dougang* through the stars *Xuan*-Rotator, *Ji*-Device and *Biao*-Handle points straight toward lunar lodge Heart (figure 7), the prime target being the Fire Star (orange-red Antares, α Scorpius). At this moment *Shen*-Triaster would be on the meridian due south.

⁸³ *Shangshu zhengyi* 尚書正義 (SBBY edn.) 2, p. 5a, clarifies that these stars revolve and hence are "the device by whose means the king regulates the celestial patterns 王者正天文之器."

⁸⁴ *Shiji* 27, p. 1291. See also Pankenier, *Astrology and Cosmology*, pp. 271, 460.

⁸⁵ *He Guan zi*, chap. "Celestial Rules" ("Tian ze pian 天則篇") elaborates: "This is what Heaven grasps in overseeing the Dipper. When culminating, Shen takes its place and the four (directional) *materia vitalis* are in order; ahead is the lodge Spread (Hydra; heart of the Vermilion Bird) and behind is (Heavenly) Device (γ UMa), to the left is Horn (Arcturus or Spica) and to the right is Battle Axe (κ , 1, θ Bootes). 此天之所柄以臨斗者也. 中參成位, 四氣爲政, 前張後極, 左角右鉞." *He Guan zi* (*Hua zhai cang* 花齋藏 edn.) A, p. 5b. This is a depiction of the scene at the winter solstice when the Dipper points straight down and Shen-Triaster is due south on the meridian.

Here, it is worth quoting at length Needham and Wang Ling's informative discussion of the subject:

Now the *Hsing Ching* (Star Manual) mentions as an old tradition that the Great Bear originally consisted of nine stars, not seven, but that two of them had been lost sight of. And in effect, if we prolong the handle of the Great Bear, we come to a number of stars in Bootes which could well have been considered as belonging to it. In the *Huai Nan Tzu* (c. 120 BC) there is a whole chapter which gives social-ceremonial directions for the months, enumerating them according to the point indicated by the star Chao yao (Twinkling indicator). It is said that when Chao yao points to Yin (N 60° E), it is the first month of spring, when it points to Mao (due E), it is the second month, etc. As Chao yao is probably to be identified with γ Bootis, a star which must have left the area of perpetual visibility about -1500, it can be seen that this text seems to report a very ancient tradition. Here is another piece of evidence which should induce caution in accepting too late a dating for the origins of Chinese astronomy. Moreover, with the advance of time, precession can bring about changes in the right ascensions of stars ... The keying of the *hsiu* to the circumpolars will also be affected. Thus it is thought that ... *Ta chio* (Arcturus; α Bootis), which may once have been one of the "prolongation" stars of the Great Bear's handle, was superseded by *Chio* (Spica) ... The position of *Ta chio* (Arcturus) in Bootes needs a further remark. It has on each side, east and west, two small groups of three stars each, the left and right *She-thi* or "Assistant conductors" ... But the effect of precession was to spoil the seasonal significance of the phenomenon as the ecliptic moved away from the neighbourhood of Arcturus, and hence we find Sima Chhien saying, "the *She-thi* could no longer serve as indicators."⁸⁶

As Needham and Wang point out, there is probably a very long history of using the Great Horn Arcturus as an extension of the handle of the Dipper. Now, precession results in a displacement between sidereal indications and tropical seasons of one degree every seventy-two years. A rough estimate of the time that elapsed between the original

⁸⁶ Needham and Wang, *Science and Civilisation* 3, pp. 251-52 (modified). "The first month was ruined, the ruler of *sheti* failed to serve as indicator, and the calendar got out of order 孟陬殄滅, 攝提無紀, 歷數失序." See also Léopold de Saussure, *Les Origines de l'Astronomie Chinoise* (Paris: Maisonneuve, 1934), p. 106. Zhu Kezhen 竺可楨, "Ershiba xiu qiyuan zhi didian yu shijian" 二十八宿起源之地點與時間, *Qixiang xuebao* 氣象學報 (1944) 18, p. 1; Zhu Wenxin 朱文鑫, *Tianwen kaogu lu* 天文考古錄 (Shanghai: Commercial Press, 1933), p. 122.

observation practice called for by the Lesser Annuary will be given by the size of the angle between the two lines emanating from the Northern Dipper (or Arcturus and Antares) in figure 7. That angle is roughly thirty-five degrees so that even a rough approximation suggests an elapsed time of more than two millennia, which takes us into the late third-millennium BC.

THE “LESSER ANNUARY” AND THE ZENG HOU YI “CALENDAR” HAMPER

In 1978 a fascinating artifact was excavated from the richly furnished Chu-area tomb of the Marquis Yi of the state of Zeng 曾侯乙 dated to 433 BC. This earliest representation of the lodges is exceptionally important because instead of the typical ball-and-bar depictions of asterisms such as in figures 1 and 2 the actual names of the lodges are written in archaic script. The names form a crude oval surrounding an eccentric, oversized “dipper 斗” representing the Northern Dipper (figure 8).⁸⁷ Much study has been devoted to the multiple astral motifs on the hamper and to the crudely written inscriptions.⁸⁸ Depicted on the east face is the graph “Fire 火,” which is taken to refer to the second of the Three Great Astral Indicators, the *San da chen* (Northern Dipper, Fire Star, and Shen-Triaster), which figured so importantly for millennia as seasonal astral markers. Note that the image on the lid of this artifact from this buffer state between Zhou and Chu shows two exaggerated elongated strokes connecting the Dipper with lodges Heart in the east and Shen-Triaster in the west, recalling the emblematic role of the pair.

It is particularly noteworthy that the graph for “dipper 斗” in the center of the array of lodges on the lid is distorted by the striking elongation of four of its strokes to make them point to a specific lodge in each of the four seasons. It has been speculated that this somehow con-

⁸⁷ Compare the graph *dou* marking the location of the lodge Southern Dipper at the three o'clock position.

⁸⁸ Hubeisheng bowuguan bian 湖北省博物館編, *Zeng Hou Yi mu* 曾侯乙墓 (Beijing: Wenwu chubanshe, 1989). Feng Shi 馮時, “Zhongguo zaoqi xingxiang tu yanjiu” 中國早期星象圖研究, *Ziran kexueshi yanjiu* 自然科學史研究 (1990) 9.2, pp. 108-18; Wu Jiabi 武家璧, “Zeng Hou Yi mu qixiang tianwen tu zhengjie” 曾侯乙墓漆箱天文圖証解, *Kaoguxue yanjiu* 考古學研究 5 (Kexue chubanshe, 2003) 1, pp. 738-48; Liu Xinfang 劉信芳 and Su Li 蘇莉, “Zeng Hou Yi mu yixiang shang de yuzhou moshi” 曾侯乙墓衣箱上的宇宙模式, *Kaogu yu wenwu* 考古與文物 (2011) 2, pp. 49-54; Huang Xiquan 黃錫全, *Hubei chutu Shang Zhou wenzi jizheng* 湖北出土商周文字輯證 (Wuhan: Wuhan daxue chubanshe), pp. 110-16. See especially Li Ling 李零, “Zeng Hou Yi mu qi xiang wenzi bu zheng” 曾侯乙墓漆箱文字補正, *Jiang Han kaogu* 江漢考古 5.164 (2019), pp. 131-33. Li’s updated interpretations of the inscriptions improve on the early studies.

nects with a four-character inscription just beneath the position of the first lodge *Jiao* Horn that reads: “the third day *jiayin* 甲寅三日.” This clear reference to the calendar has been interpreted as indicating an important date, possibly a date of death or burial. It turns out that the orientation of the central Dipper graph and its abnormally elongated strokes do have a significance that have a bearing on the discussion of the Lesser Annuary of Xia. Table 1 takes the 433 BC date of the calendar hamper as the baseline for the analysis of the seasonal astral indications. The four lodges in the circumference of the oval pointed to by the strokes of the Dipper are, 1. *Wei* “Roof” in Capricorn, the location of the sun in mid-winter at the start of the year; 2. *Shen*–Triaster; 3. *Zhang* “Spread” in Jupiter station “Quail Fire,” the location of summer solstice; and finally 4. *Xin* “Heart,” the Fire Star’s lodge (next door to *Fang*, the “Farmer’s Auspice”). These four locations comprise high points of the year, “months” one, four (or five), six, and eight in the ten-month sequence of the Lesser Annuary shown in table 2. Spread and Heart may also relate to the iconography on the opposite ends of the hamper. By mid-fifth century, the state of Zeng, located in Suizhou in Hubei, had already endured for half a millennium. For much of that time Zeng (*ji* 姬 lineage) had been a bulwark against Chu’s 楚 northward expansion. The rich furnishings of the tomb give evidence of the “exotic” influences of Chu and Ba-Shu cultures to the southwest.⁸⁹

In a recent article concerning the chronology of Western Zhou and the use of the lunar phase terms *yuexiang* 月相 in the bronzes to date the earliest inscriptions, Chen Jiuji (in another piece) has demonstrated that the only viable interpretation of the scheme is as a binary division of the lunar month with the enumeration of the days of the second half recommencing at the full moon 望.⁹⁰ This is precisely the practice among the Yizu, Daizu 傣(泰)族 and other minority peoples of

⁸⁹ For the numerous locations in China’s southwest where the ten-month calendar was found to still be in use, see *Chen et al.*, fig. 6.1.

⁹⁰ Chen Jiuji, “Guanyu Xia Shang Zhou duandai gongcheng Xi Zhou wang wangnian de xiuzheng yijian” 關於夏商周斷代工程西周王年年的修正意見, *Guangxi minzu daxuexuebao, ziran kexue ban* 廣西民族大學學報 自然科學版 (2014) 20.3, p. 14. As Chen states, “the notion that *chuji* 初吉 ‘first auspicious’ stands for the first quarter of a lunation has been disproven (p. 15), and with it the ‘four-quarters’ interpretation of the dating terms.” See especially Huang Shengzhang 黃盛璋, “Shi chuji” 釋初吉, *Lishi yanjiu* 歷史研究 (1958) 4, pp. 71–86, and Li Changhao 黎昌顥, *Zhongguo tianwenxue shi* 中國天文學史 (Beijing: Kexue chubanshe, 1981), pp. 20–21. For an authoritative analysis of the meaning of the W. Zhou *yuexiang* 月相 commissioned by Li Xueqin 李學勤, see Xu Fengxian, “Using Sequential Relations of Day-Dates to Determine the Temporal Scope of Western Zhou Lunar Phase Terms,” *EC* (2010–11), pp. 33–34, 171–98. See also Xia Shang Zhou duandai gongcheng zhuanjia zu 夏商周斷代工程專家組, *Xia Shang Zhou duandai gongcheng 1996–2000 jieduan chengguo baogao (jian ben)* 夏商周斷代工程 1996–2000 年階段成果報告(簡本) (Beijing: Shijie tushu chubanshe, 2000), pp. 35–36.

China's southwest. Chen argues that the division of the lunar month such as that of the Yizu into bright 明 (namely, 生) and dark 暗 halves punctuated by the full moon, has a very long history. The scheme is analogous to early Western Zhou lunar terminology (on king Wen's sacrifice to the full moon in March 1065). The Western Zhou scheme may well be a legacy of the early intimate cultural contacts between the Zhou and their Qiang-Rong neighbors and others during the pre-dynastic period at the far western end of the Wei River Valley and in neighboring Gansu.⁹¹

THE SEASONAL STARS ACCORDING
TO *YAO DIAN* AND *XIA XIAO ZHENG*

The Xia xiao zheng (Lesser Annuary of Xia) solar calendar featured ten months of thirty-six days (for a year of 360 days). The five days left over at the end of the year were (and still are among the Yizu) devoted to New Year's celebrations, possibly referenced by "day number one, day number two 一之日, 二之日" in the ode "Seventh month," according to *Chen et al.*⁹² Besides its simplicity, the solar calendar enjoyed another advantage over the lunisolar calendar by eliminating the need for periodic intercalation.

Tables 1 and 2 show the results of the analysis and simulation of the Lesser Annuary astral indications in 433 BC (proleptic Julian dates), the date assigned to the Zeng Hou Yi "calendar" hamper with its oval arrangement of lodge names. Lodges pointed to by the outsized dipper graph on the hamper lid identify the sun's location in months I, IV, VI, VIII. Observations in months one and six refer to the straight up

⁹¹ Hints of a moon cult are found in the lunar phase terms appearing in early Western Zhou bronze inscriptions. In particular, *Yi Zhou shu* 逸周書 accurately records a verifiable total lunar eclipse on March 12-13, 1065 BC during Zhou king Wen's reign that interrupted a rite devoted to the full moon. It was interpreted as an ill omen for the king; see Pankenier, *Astrology and Cosmology*, p. 196. For possible early connections between Western and pre-dynastic Zhou and contemporaneous Indo-European cultures on the periphery such as, say, the Tocharians (Yuezhi) in Xinjiang, and the possibility that the early Western Zhou term for the lighted portion of the moon (or "moon soul") *ba/po* 霸/魄 (OC *p'āk) together with the early Zhou binary division of the month may be related to Sanskrit *pakṣa* as elaborated in the *Taittirya-brāhmaṇa*, see D.W. Pankenier, "Reflections of the Lunar Aspect on Western Chou Chronology," *TP*, 2d ser. (1992) 78.1-3, pp. 56-57. Indeed, an anonymous reader of this paper suggested the same: "I wonder if there is a genetic relationship to the Indic model (which might be Indo-European): the waning (*kṛṣṇa-pakṣa*) and waxing (*śukla-pakṣa*), periods, each 15 days." In this connection, see especially Pulleyblank, "Chinese and Indo-Europeans," *JRAS* (1966) 98.1-2, pp. 9-39.

⁹² *Chen et al.*, p. 200.

and straight down orientation of the Dipper at dusk. (In the following, entries under the third column heading, “Xia xiao zheng,” are in order: original text > translation > astronomical verification.) The Julian dates assigned to the observations should be accurate to within a few days. The approach here defines dusk and dawn as astronomical twilight; that is, one hour after sunset and one hour before sunrise when a majority of naked-eye stars become visible, and alternatively, begin to disappear. Although Vega makes an early appearance among the named stars in the ode *Da Dong* 大東, the indications for the Weaving Maid star in *Lesser Annuary of Xia* raise important questions.

The ten-month Xia xiao zheng (Lesser Annuary of Xia) calendar that emerges from the most precise among the astronomical observations in table 2 looks like the following:

Table 2. Monthly Astral Indications in Xia xiao zheng

月	YAODIAN 堯典	XIA XIAO ZHENG 夏小正	433 BC Julian	COMMENTS
1		正月初昏參則中, 斗柄懸在下 XXZ: "First month Shen-Triaster transiting at dusk; Dipper handle is hanging down." □ Triaster dusk transit; Dipper handle points down	Feb 9	Winter (per He guan zi) Sun in 危 Wei α Aqr
2	日中星鳥以殷 仲春 [春分] VE Niao α Hya	XXZ: (no data) [Vega due North pre-dawn; Dipper points up]	VE Mar 26	鳥 Niao 七星 α Hya
3		四月參則伏 XXZ: "Shen-Triaster sets at dusk." □ Triaster is setting at dusk	Apr 17	Sun in 昴 Mao 17 Tau
4		四月昴則見, 初昏南門正 XXZ: "Mao is rising; South Gate is upright at dusk." □ Pleiades=<u>Mao</u> dawn rising; S. Gate culminates at dusk	May 19 June 5	S. Gate α Cen Sun in 觜 Zuizi φ ¹ Ori
5	日永星火以正 仲夏 [夏至] SS Fire Star α Sco, Jun 27	五月參則見, 初昏大火中 XXZ: "Shen-Triaster is rising at dawn." □ Triaster rises pre-dawn; [Great Fire transits at dusk]	SS Jul 6-9	火星 α Sco Sun in 井 Jing μ Gem
6		六月初昏斗柄正在上 XXZ: "Dipper handle is straight up at dusk." □ Dipper handle is straight up at dusk	Jul 26	Summer (per He Guan zi) Sun in 張 Zhang Hya
7		七月初昏織女正東鄉, 斗柄懸在下則旦 XXZ: "Dipper handle is hanging down at dawn; □ Weaving Maid due east (?) at dusk. " □ Dipper handle is hanging down pre-dawn. Vega is due west at dusk	Sep 10	Vega α Lyr Sun in 角 Jiao α Vir
8	星虛以殷 仲秋 [秋分] AE Ruins β Aqr	八月辰則伏, 參中則旦 XXZ: "Chen (Xin) is setting; Shen-Triaster is transiting pre-dawn" □ Chen is setting at dusk; Triaster transits pre-dawn	AE Sep 16- 20	Sun in 亢 Kang κ Vir Xu 虛 β Aqr
9		九月辰系于日 XXZ: "Chen is attached to the sun." □ Chen (Xin) in conjunction and invisible	Nov 1 (±27 d)	心 Xin α Sco conjunction
10	星昴以正仲冬 昴 Mao 17 Tau WS	十月初昏南門見, 織女正北鄉則旦 XXZ: □ "at dusk (?) S. Gate appears; □ Weaving Maid is due north (?) " S. Gate rises pre-dawn; Vega rising NE 3 hrs pre-dawn	WS Dec 25 (±4 d)	W. Solstice Sun in 牛 Niu β Cap

What is particularly noteworthy about the Lesser Annuary of Xia is the prominent role played by Triaster-Shen and the Dipper, among the several dusk and pre-dawn astral indications. Shen, rarely a focus elsewhere, is featured four times, once in each season (months one, three, five, eight), along with three seasonal indications of the Dipper's orientation (months one, six, seven). There are two indications concerning the Weaving Maid star (*Zhinü* 織女, Vega); uniquely, two of South Gate *Nanmen* 南門 (α Centauri); one of the Pleiades (*mao* 昴), and only one of Great Fire in the fifth month (albeit as *chen* in the eighth month).⁹³ *Chen* also figures in the ninth month in conjunction with the sun at which time, of course, the Fire Star is invisible. As *Chen et al.* points out, the rising and setting behavior of Shen-Triaster alone match the ten-month solar calendar closely and clearly show that its indications are incompatible with the twelve-month lunisolar calendar.⁹⁴

A snippet of commentary in the version of the Lesser Annuary preserved in *Da Dai Liji* even assigns a supporting role to the Dipper, underscoring that Shen-Triaster is primary: “in ‘when the handle of the Dipper hangs down,’ the Dipper’s handle is mentioned it is (because it) shows that Shen is culminating (on the meridian).”⁹⁵ The prominent roles played by the orientation of the Dipper and Shen are distinctive and unique to the Lesser Annuary of Xia and the Zeng Hou Yi lacquer hamper motif. Clearly, the Dipper’s orientation is central to the meaning. As *Chen et al.* show, the Dipper’s pointing function does not otherwise appear in the (albeit scarce) Shang and Zhou astral-calendrical material. The Dipper-pointer’s obvious importance as the central motif links the Dipper’s calendrical role there with the Lesser Annuary and the ode “Seventh Month.”

THE ENIGMA OF THE WEAVING MAID AND THE OXHERD

The indications for the Weaving Maid in Lesser Annuary are vague and problematical. The Weaving Maid star is nearly circumpolar, so that it visibly rotates around the pole throughout the night in some seasons. Only in the third month (not the seventh) could Vega be described as “east” at dusk. In contrast, only in the pre-dawn hours in the tenth

⁹³ Recall how in the ode “Seventh Month” (“Airs of *Bin* 鬲,” a place that was predynastic Zhou’s homeland) the Fire Star is “declining” westward *liu huo* 流火 before setting *fu* 伏 in the eighth month in *Xia xiao zheng*. The two texts neatly complement each other. *Chen et al.*, pp. 223–26. The asterism *Nanmen* apparently also appears in the Shang oracle-bones; see Jao, “Yin buci,” pp. 32–33, 38–39.

⁹⁴ *Chen et al.*, pp. 209–11; Pang, “*Huoli san tan*,” p. 18.

⁹⁵ *Da Dai Liji* 2, p. 4a.

month could Vega be described as “due east” (and not “due north” as in Lesser Annuary). Being purely sidereal and not tropical these correlations only changed minimally over millennia. Indeed, in 11,800 BC Vega had been a serviceable Pole Star. The earliest mention of the Weaving Maid star Vega and the Ox(-herd) Altair (α Aquilae) occurs in the ode Great East *Dadong* 大東 in the *Book of Odes* dating from early Western Zhou. No reference to Vega or Altair has been identified in the Shang oracle-bone inscriptions.

What is of particular interest, however, is the role that this pair of bright stars may have played for quite some time prior to the Shang and Zhou dynasties. There was no bright pole star such as our Polaris for some millennia during the formative period of Chinese civilization. As we saw, the reason for this is the precession of the Earth’s axis about the true celestial pole with a period of about 26,000 years. The nearest bright star to the pole during the late-Longshan through Zhou era, β Ursa Minoris in the Little Dipper was around 6° from the pole, which is roughly about the width of six fingers held at arm’s length against the sky. This has been suggested as a possible explanation for why the N-S axes of the deliberately cardinally oriented structures at Erlitou and during the Shang variously point roughly 7° – 10° west or east of true north, respectively. This might be an expected result if the same observation of β Ursa Minoris was made after dark as opposed to before dawn.

In contrast, more than a millennium earlier the Egyptians were already capable of cardinally orienting the Giza pyramids with an error of less than 0.5° . A careless “misorientation” on the part of the Xia and Shang architects in such a significant context during the second millennium BC seems unlikely, particularly in view of the fact that much earlier much more humble structures at Dahecu 大河村 can be shown to have been built to achieve exact or near exact right angles with an error of less than 1° , likely using Pythagorean-triads.⁹⁶ Moreover, it has been demonstrated that the stars of the Great Square of Pegasus were being used to accurately orient high-value structures on true north by the early first millennium BC, so that unique technique which is portrayed as ritually significant was certainly known and used by the ancient Chinese. The real reason for the earlier axial deviation from true north remains a mystery.

⁹⁶ Marcello Ranieri, “Triads of Integers: How Space Was Squared in Ancient Times,” *Rivista di Topografia Antica* (1997) 7, p. 232.

Now, it is a fact that through much of the late fourth and third millennia BC there was a quite serviceable pole star—Thuban, or α Hydrae. This pole star and a gnomon may both have been exploited by the ancient Egyptians. There is another possibly, however, and this involves the Weaving Maid and Oxherd stars. If one dials back the epoch using astronomical software to the year 2775 BC a fascinating circumstance reveals itself. Precisely when the star Thuban served as the pole star during the late-Longshan period the two stars Vega and Altair straddling the Milky Way pointed exactly at the north celestial pole.

Figure 9 clearly shows that after astronomical twilight in the evening on the summer solstice in 2775 BC, Vega and Altair both lay at 16h right ascension on the grid and aligned precisely on the north celestial pole of that epoch. This means that on these all-important solstitial occasions as the sun reached its southern-most and northern-most rising and setting points on the horizon at mid-winter and mid-summer, the alignment of Vega and Altair in the eastern sky precisely identified the date. Thus, for centuries, from the early third millennium BC on, this pair of stars was ideally suited to indicate the shortest day of the year, the most important precisely identifiable date of the tropical year. This would have been an extraordinarily useful coincidence of astral and tropical indicators.

If one now follows the meridian marking 16h right-ascension figure 9 in the opposite direction toward the horizon it passes between lodges Ox-leader (*qian niu* 牽牛 #9) and Serving Maid 女 #10 as they were known in the standard scheme of the Twenty-eight Lodges. This scheme assumed final shape in the late-Warring States to Western Han periods, by which time the sun's location at the winter solstice had precessed from farther east in Pegasus to this location. Here, arguably, we have the explanation why the two astral figures, originally named Weaving Maid and Oxherd, were relocated to become side-by-side lodges in the sun's path—their creation served to memorialize the pair's ancient astral-calendrical function. Here, too, we have suggestive evidence for the antiquity of the Lesser Annuary of Xia solar calendar and the reason why Vega still figures in it, even if in garbled fashion.

Why cardinally-oriented Erlitou and Shang sites exhibit significant deviations west or east of true north has long been a puzzle. The very ancient polar pointing function of the Weaving Maid and Ox-leader may provide an answer. Over the following centuries as the Earth's axis described a circle around the pole and left the vicinity of Thuban, the pointing function of Vega and Altair would also have been disrupted. By mid-second millennium, for example, the pair would have pointed to a spot some 8° or so from the true pole. This could explain

the surprising errors in axial alignment. Venerable celestial indications by their very nature are notoriously resistant to change, so it is quite possible that by the first half of the second millennium BC the stellar pair were still being used to locate the pole. As cardinal alignment became more sophisticated and the misorientation impossible to ignore, new methods had to be devised, for example using the Great Square of Pegasus, or *Ding* 定~顛.⁹⁷

CONCLUSION: TWO DISTINCT CULTURAL LEGACIES

The appendix sets out the traditional genealogy of China. In it are featured the lines of descent of E Bo and Shi Chen and other principal figures. The descent lines illustrate how the two cultural traditions would have been thought to pass from generation to generation. This study began with the premise that the tale of E Bo and Shi Chen was essentially an etiological myth encoding the astronomical opposition and seasonal roles of the Fire Star and Shen-Triaster by means of a familial analogy--sibling rivalry. It is that, certainly, but it seems there is more to the rivalry than first meets the eye. Mounting evidence suggests that the myth also encodes the tension between two ancient cultural traditions, highland and lowland, for which the astral calendar is a proxy.

E Bo and Shi Chen were siblings, both sons of Di Ku, who was considered as a progenitor by both the Shang and Zhou dynasties. E Bo, ancestral to the Shang line, represented the Fire Star tradition that Pang Pu has shown is a likely descendant of the prehistoric Fire Calendar that registered the passing seasons by means of the Fire Star Antares' risings, settings, and culminations.⁹⁸ This knowledge was perpetuated by the Shang who revered the Fire Star, sacrificed to it and passed the tradition down to their descendants in the Warring States state of Song. Accordingly, the astral correlate of Song in that era's "field-allocation" (*fenyé* 分野) astrological scheme is the space occupied by Great Fire in Scorpius, the heart of the dragon constellation of the east. By late-Shang time the practical role of Great Fire had already become a venerable tradition, vitally important among the common folk and seasonally observed in ceremonies but playing a subordinate role given the maturing lunisolar calendar. That calendar with its thirteenth-month intercalation scheme provided the frame of reference for the all-important schedule of sacrifices to the royal ancestors.

⁹⁷ See Pankenier, *Astrology and Cosmology*, pp. 118, 137, 317.

⁹⁸ Pang, "Huoli san tan."

The second tradition, represented by Shi Chen, depended on age-old observations of the risings, settings, and culminations of Shen-Triaster, and uniquely on the orientation of the Dipper.⁹⁹ This was an aspect of the calendrical scheme of Tang 唐 and Xia (late-3d to mid-2d millennium BC) and perhaps Erlitou, a legacy that was part of the cultural heritage of the Longshan Qiang-Rong and their later descendants, including in our own time certain minority groups of Sichuan, Yunnan, and Guizhou. The same cultural tradition passed into the states of Jin and Qi through the medium of marital alliances between the Ji and Jiang lineages with their accompanying retinues, and continued to be practiced as an aspect of what was taken to be a legacy Xia calendar through the Spring and Autumn period. This was evidently what Confucius (purportedly the descendant of a Shang aristocratic lineage) meant by “wishing to observe the way of the Xia,” with which he was evidently unfamiliar.¹⁰⁰

Zuozhuan (Lord Zhao, 7th year; 535 BC) and *Guoyu* both report an episode that underscores the continuity of the Xia legacy in Jin. The Lord of Jin, having been sick for months, dreamed that a brown bear entered his bedroom. Taking it to be an unappeased spirit, renowned counselor Zi Chan was summoned to identify the revenant and advise. Zi Chan determined that it was the spirit of Gun 鯀 (father of Yu the Great), who had been put to death by Yao. Sacrifices to Gun were supposedly a royal prerogative from Xia through Zhou. Accordingly, a sacrifice to Gun was carried out and the Lord of Jin’s illness abated. The account makes clear that in requiring sacrifices from their descendants, the spirits could only make demands on individuals of comparably high status, which is part of the reason why, the Zhou royal house being now in decline, it fell to Jin to carry out the sacrifices.¹⁰¹

⁹⁹ In *Shuowen jiezi* 說文解字 Xu Shen 許慎 (fl. ca. 50 AD) alone defines *Shen* as “star of Shang” 參商星也. Elsewhere, “the star of Shang” is the Fire Star. Both asterisms appear in the oracle-bone inscriptions; Jao Tsung-yi, “*Yin buci*,” pp. 32–5, 37. Be that as it may, what seems clear is a consciousness of the distinction between lowland Shang (Dragon/East/Fire Star) and highland Xia-Zhou (Tiger/West-Northwest/Triaster).

¹⁰⁰ Lothar von Falkenhausen has said that the preservation of distinctive aspects of non-Zhou material culture “was symbolic rather than utilitarian and served to signify their possessors’ ethnic origin”; von Falkenhausen, *Chinese Society in the Age of Confucius*, p. 212; also Khayutina, “Rulers of Peng,” pp. 12, 24, 39. More symbolic and utilitarian than tomb furnishings would have been the distinctive non-material legacy comprising the astral-calendar, the “Seventh Month” almanac, and folk traditions. The centuries-old Qiang-Rong calendar would have been crucial for the perpetuation of aspects of cultural life such as seasonal festivals and commemorative rituals.

¹⁰¹ *Guoyu*, 14, p. 11a. For a blatant example of Jin’s hubris in this regard, see Khayutina, “Uses of the Past,” p. 170.

According to Li Min, “The Zhou leaders referenced a Xia legacy associated with the Jin-nan basin when they granted Shu Yu the Ruins of Xia. The Lord of Tang was instructed to colonize the highland groups with the Xia political tradition and to use the Rong regulations for land survey. The Zhou rulers embraced this Xia legacy as a means of settling the highland groups associated with it.”¹⁰² As Li Min shows, “the tensions within the dual legacy of the Xia ran throughout Zhou political history, unfolding between the Zhou political power claiming the Luoyang-centered tradition and the highland groups on the loess highlands.”¹⁰³ It is no accident that E Bo and Great Fire in the Eastern Palace of the heavens represented Shang-Song and the east, while Shen-Triaster or Shi Chen, represented Xia-Qiang/Rong-Jin and the west.

Han ideology having appropriated the prestigious Xia legacy, Sima Qian’s explication of the new principles of astral prognostication suitable for the universal empire is a binary *yin-yang* layout that mirrors the “us and them” division of Hua-Xia and non-Hua-Xia astral-terrestrial regions. In his innovative scheme, which departs from the long-established Warring States field-allocation multi-polar system, the new binary division of the Chinese world is defined by a nominal SW to NE “meridian 維” as the central feature, rather than the roughly similar course of the Yellow River. In doing so he nevertheless preserves the basic orientation of the Milky Way as primary.¹⁰⁴ This new scheme was devised to reflect the post-Qin political reality. And yet, Sima Qian clearly draws inspiration from the millennia-long relationship between the “Hua-Xia” and culturally distinct others.¹⁰⁵

¹⁰² Li, *Social Memory*, pp. 462–63. Mencius expressly recognized the non-Hua-Xia origins of both Di Shun and King Wen. “Shun was born at Zhufeng, moved to Fuxia, died at Mingtiao—he was a man of the Eastern Yi. King Wen was born at Qizhou, died at Bicheng—he was a man of the Western Yi”; see Pines, “Beast or Human,” p. 73. Mencius appears to mean that King Wen was half-Qiang-Rong. According to Chen Zhi, “The Xia tradition emerged from the Zhou rulers’ assertion of their legitimacy in early Zhou times to enhance their control of conquered people ideologically and politically” (Chen, “Exclusive Xia to Inclusive Zhu-Xia,” p. 195).

¹⁰³ Li, *Social Memory*, p. 463. However, “over time the notion of Xia was increasingly used to represent a generic notion of civilization to the exclusion of highlanders as cultural others”; *ibid.*, pp. 350–52.

¹⁰⁴ As an early apocryphal text “Xiao jing yuan shen qi” 孝經援神契 put it: “The Yellow River is the Lord of Water corresponding to the Heavenly Han [Milky Way] above. 河者, 水之伯, 上應天漢”; quoted in *Shui jing zhu* 水經注 (6th c.), chap. 1, s.v. “Rivers” 河水. Qin Shihuang’s short-lived revision of the scheme made the Wei River the dominant feature, with the Qin capital Xianyang as the cosmic center. Subsequently, Han-era Chang’an assumed the mantle of “cosmic capital.”

¹⁰⁵ See *Shiji*, sect. “Tianguan shu” 天官書 27, p. 1346; Pankenier, *Astrology and Cosmology*, p. 451. For “Hu, Mo, Yuezhi” in Sima Qian’s account, one could as easily read “Qiang, Rong, Di” without doing violence to the sense of the passage. For the increasingly exclusionary view of non-Hua-Xia people by the Han period, exacerbated by conflict with the Xiong-nu, see

As *Chen et al.* have argued, the ten-month solar calendar was originally the prevailing tradition of the ancient Longshan territory in Tang 唐 (Taosi/Jin-nan),¹⁰⁶ and elsewhere, before eventually becoming hybridized with the lunisolar calendar centuries after the founding of the state of Jin.¹⁰⁷ Alongside the Dipper it was Shen–Triaster that played the dominant role in the seasonal scheme laid out in the “Lesser Annuary of Xia.” Shi Chen became the name of the Jupiter Station 歲次 that contains Shen–Triaster in the Warring States field-allocation scheme and, thus, the astral correlate of Jin.¹⁰⁸ It was this distinctive tradition, mediated by the Qiang–Rong, that survived long enough to leave the revealing traces documented in the Lesser Annuary of Xia, in *Guan zi*, and the ode “Seventh Month.”¹⁰⁹

In the absence of a Qiang–Rong written record, and despite the Han chauvinistic portrayals of non-Sinitic people in the later texts, it has become increasingly clear that the contribution of the highland cultures to mainstream Hua–Xia culture in the preimperial period—the “Xia”

Pines, “Beast or Human,” p. 79. Cf. Achim Mittag and Fritz-Heiner Mutschler, “Empire and Humankind: Historical Universalism in Ancient China and Rome,” *Journal of Chinese Philosophy* (2010) 37.4, p. 547; see also p. 545: “The prevalent perception of the barbarians in the newly established empire is highlighted by a metaphor used by Jia Yi 賈誼 (201–169 BC), statesman and an architect of early Han statecraft thinking. Likening the empire to the human body, Jia Yi viewed the emperor as the ‘head’ (*shou* 首) and the barbarians as the ‘feet’ (*zu* 足) of All-under-Heaven. To clarify this somewhat odd metaphor, Jia Yi adds that the Son of Heaven occupies the place ‘at the top (*shang* 上),’ while the barbarians occupy the place ‘at the bottom (*xia* 下).’ From this it follows that the barbarians were looked upon as occupying the lowest rung of the ladder of society—still an organic part of the empire, even though their main function perhaps was to point morals.”

¹⁰⁶ Tao Tang shi 陶唐氏 is the toponym of Di Yao 帝堯 and Tao is the “Tao” of Taosi 陶寺, referring to Linnan, Shanxi.

¹⁰⁷ *Chen et al.*, p. 171. Li Min comments: “The systematic discrepancies between the chronicles of the Jin and other Zhou states incorporated in the *Zuozhuan*, for example, suggest multiple systems of time-keeping were adopted in the Zhou realm. Lu and other states used the Zhou calendar, which started the annual cycle at the month of the winter equinox [sic. “solstice”] while the Jin state used the Xia calendar, which started the year two months later”; *Social Memory*, p. 352.

¹⁰⁸ Jupiter played the central role in *fenye* astrology by energizing the station/state it occupied, so it hardly comes as a surprise that Jupiter was in fact in Shi Chen in 632 at the time of the decisive Battle of Chengpu 城濮之戰 which led to the elevation of lord Wen of Jin 晉文公 to the status of hegemon; see Pankenier, *Astrology and Cosmology*, pp. 281–84. It was Zi Fan, lord Wen’s Rong uncle, who was responsible for timing the battle to coincide with Jupiter’s movements. When Chong Er hesitated to cross the Yellow River Zi Fan persuaded him with a historical synopsis of Jin’s connection to Shen–Triaster, Jupiter’s requisite location within “Jupiter bivouac” 歲次 Great Span Daliang 大梁, together with the crucial tactical value of timing actions in accordance with Shen–Triaster and Great Fire (see *Guoyu* “Jinyu” 4, p. 11a–b).

¹⁰⁹ Even a cursory comparison of the canonical *Yaodian* scheme of seasonal stars with that preserved in *Xia xiao zheng* shows that the two derive from different astral-calendar traditions, which perhaps explains why the *Yaodian* “conferring the seasons” passage makes no reference to the Dipper.

component of the binome – has been seriously underestimated.¹¹⁰ Confucius once had an interview with Yanzi 鄰子, the enlightened ruler of the quasi-Hua–Xia state of Yan 鄰國, about lost techniques of good governance, including the calendar. After a recitation of the numerous non-Hua officials (including the *lizheng* 曆正, or regulator of the calendar) who had served under a sequence of illustrious sovereigns, Confucius was moved to voice his conclusion about the current state of affairs. According to *Zuozhuan*:

Confucius heard about Yanzi and went to learn from him. Afterward, he [Confucius] told others, “I have heard that after the Sons of Heaven lost their [competent] officials, the knowledge persisted among the Four Yi [i.e., non-Sinitic people]; this is still true.”¹¹¹ 仲尼聞之, 見於鄰子而學之, 既而告人曰, 吾聞之, 天子失官, 學在四夷, 猶信。

According to *Han shu*:

After the Three Dynasties (Xia, Yin-Shang, and Zhou) were eclipsed, and at the end of the Five Hegemons (the Spring & Autumn period, 722–481 BC), the standards of the office of scribe-astrologer were lost, and practitioners of the disciplines and their disciples dispersed, some to the *Yi* and *Di* peoples. So it is that among what they (the non-Hua–Xia) record are the Yellow Emperor’s, Zhuangxi’s, and the Xia, Yin, Zhou, and Lu calendrical systems.” 三代既沒, 五伯之末, 史官喪紀, 疇人子弟分散, 或在夷狄, 故其所記, 有黃帝、顓頊、夏、殷、周及魯曆。¹¹²

The implication seems to be that there had been a regular practice throughout predynastic history of recruiting officials from among the highland groups that had declined over time. Given the historical trend toward Hua–Xia “exceptionalism” a perspective such as Confucius’ on such historical dependency can hardly have been an invention.

Gu Jiegang 顧頡剛 and Liu Qiyu have shown that the process of euhemerization and/or deification of gods and progenitors reached its

¹¹⁰ Yan Sun incisively critiques the “core-periphery” analytical model in archaeology, anthropology, and historical studies: “The core-periphery model contrasts the dominant core to the subject periphery and the powerful newcomers to the less advanced natives. . . . As a result, stories drawn from the center, the powerful side, have been told and retold, while the ‘invisible’ locals or ‘barbarians’ have remained invisible”; Sun, *Many Worlds*, pp. 1–11.

¹¹¹ *Zuozhuan*, Zhao 17. This statement of Confucius is cited by Ban Gu as: “Confucius said, ‘When the rites are lost, seek them on the periphery’ 子曰:禮失而求諸野”; “Monograph on the Literary Arts,” *Han shu* 30, p. 1746.

¹¹² *Han shu* 21A, p. 973. Daniel P. Morgan, “Mercury and the Case for Plural Planetary Traditions in Early Imperial China,” in John M. Steele, ed., *The Circulation of Astronomical Knowledge in the Ancient World* (Leiden: Brill, 2016), p. 2 (trans. modified).

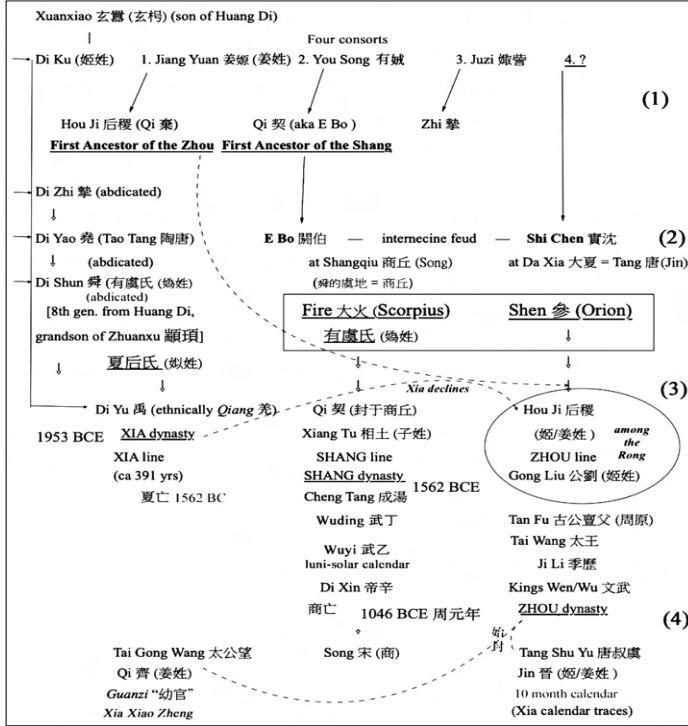
final stages by the late-Warring States period. An integral part of this process was the elaboration of lineage histories and genealogies. Some figures, such as Shi Chen in the account from *Zuo zhuan*, continued to straddle both worlds and persist as tutelary spirits capable of haunting the living. With reference to the Hua–Xia and northern peoples specifically, Nicola Di Cosmo concluded:

Sima Qian rationalized the history of relations between the north and China into a broad pattern resting on two elements. One was the creation of a ‘genealogy’ of northern peoples that could match the historical ‘genealogy’ of Chinese dynasties and hegemonic states from the mythical beginning of history to the historian’s time. The other was the insertion of the north and its inhabitants within the system of correspondences between the celestial and the human spheres that was believed ... to constitute the cosmic order ... foreign peoples and their lands became equal partners in the construction of Chinese history.¹¹³

It is not surprising, therefore, that the pre-dynastic “sibling rivalry” between the personified seasonal asterisms E Bo and Shi Chen and their divergent astral-calendrical schemes should also resonate as a proxy for the age-old on-again, off-again political and cultural competition and collaboration that endured for centuries between highland and Central Plains polities.

¹¹³ For detailed study of the historical processes involved and the political and cultural roles played by genealogy, see Khayutina, “Uses of the Past,” p. 172; Liu, “Ji Jiang yu Di Qiang,” pp. 5–32; Di Cosmo, *Ancient China*, p. 10; Li, *Social Memory*, p. 463.

Appendix. Traditional Genealogy of Ancient China



Notes to Appendix

This appendix is a basic tabulation of the traditional genealogy of early China designed to show the relationships among the major mythical and quasi-legendary figures celebrated in numerous Zhou, Warring States, and Han texts (*Zuo-zhuan*, *Guoyu*, *Mozi* 墨子, *Guan zi* 管子, *Meng zi* 孟子, *Shan hai jing* 山海經, *Lüshi Chunqiu* 呂思春秋, down to *Shiben* 世本, *Shiji* 史記, *Han shu* 漢書, etc.). In general, the sources agree on most details after a centuries-long process of rationalization. Of course, much of the genealogical data from the pre-historic period is based on centuries-old traditions as well as Warring States period reconstructions, some of which may be of questionable historicity.¹¹⁴ What is important, though, is not whether the genealogies are factually correct in every detail, but rather that they were believed to be true long before the late Warring States period, when appeals to pseudo-historical genealogy became a matter of vital concern.¹¹⁵ As Chen Zhi mentions:

¹¹⁴ On this point, see Li Liu and Hong Xu, "Rethinking Erlitou: Legend, History and Chinese Archaeology," *Antiquity* 81.314 (2007), pp. 897, 899: "It is possible that some names of prehistoric kings mentioned in oracle-bone inscriptions and later texts refer to actual individuals in oral traditions passed through generations."

¹¹⁵ As Chen Zhi ("Exclusive Xia to Inclusive Zhu-Xia," p. 188) also explains, "The exam-

K. C. Chang has examined the relationship between the Xia, Shang and Zhou peoples and posited the provocative theory that the three peoples existed synchronically. They were thus contending sedentary groups in a process which saw first Xia, then Shang, and finally Zhou dominate politically. During the period in which the Zhou people were subordinate to the Shang, their sacrifices to the Shang kings Di Yi 帝乙, Taijia 太甲 and Cheng Tang 成湯 prove that the Zhou once shared the same ancestral beliefs as and subjected themselves to the cultural integrity of the Shang.¹¹⁶

1. Di Ku had one son by each of four consorts. E Bo and Shi Chen were the feuding brothers. Interestingly, Di Ku's father Xuan Xiao and consort Juzi were immortalized by later having Jupiter stations *suici* 歲次 named after them, pointing to astronomical associations reinforced by those of E Bo and Shi Chen. To Zhuanyu is attributed the invention of the calendar, as still recognized today among the Yizu.
2. E Bo and Shi Chen became tutelary ancestors of Shang and Zhou lineages, reflected in their astral associations with Great Fire in Scorpius (E) and Orion's Belt (W) both geographically and astrally.
3. Hou Ji, founder of the Zhou lineage (conferred *Ji shi* 姬氏 by Di Yu) is a son of Di Ku by Jiang Yuan from the ancient Jiang (Qiang) line, apparently establishing the precedent for Zhou kings to preferentially marry Jiang women. With the end of Xia and loss of his official position Hou Ji went to live with his maternal Jiang relatives among the Rong, thus establishing a precedent for Chong Er (Jin Wen Gong) centuries later. Gong Liu and Gu Gong Tan Fu (Tai Wang 太王) remained among the Rong for generations until Tan Fu was obliged to lead his people out of the Great Bend of the Yellow River southward to Mount Qi 岐山 in the Plain of Zhou in the Wei River Valley.
4. After Zhou was founded (1046 BC), King Wu set up Tang Shu Yu as lord of Jin (in Tang, a Xia homeland) and set up Tai Gong Wang as Lord of Qi in the east. In both states, connections to a pre-Shang Xia calendar (Xia Xiao Zheng) were preserved as a result of the strong influence of their Jiang heritage in the maternal line as well as from contemporary Jiang-Rong figures (e.g., Zi Fan and Lady Li Ji, Tai Gong Wang).¹¹⁷ Jin persisted in using a Xia calendar starting the year in month *yin* 寅, two months later than the eleventh month *zi* 子 of the Zhou royal calendar *wang nian* 王年.

A summary in *Guoyu* of the sacrificial rites dedicated to high ancestors codifies some of the most important genealogical relationships:

ple of the rise and fall of the Xia dynasty was thus used by the Zhou rulers as a caveat in their reminder to "look at our ancients in antiquity, the Xia." See also Yuri Pines, Gideon Shelach, Lothar von Falkenhausen, and Robin Yates, *Birth of an Empire: The State of Qin Revisited* (Berkeley: U. of California, 2014), p. 13. For the genealogies reproduced in *Da Dai Liji* and *Shiben* 世本, see Liu, "Ji Jiang yu Di Qiang," p. 33.

¹¹⁶ Chen, "Exclusive Xia to Inclusive Zhu-Xia," p. 186.

¹¹⁷ For noteworthy Jin Jiang 晉姜 spouses of Jin lords, see Yan, *Many Worlds*, pp. 130 and 248, n. 6.

Therefore, the You Yu Shi [tribe] *Di* sacrificed to Huang Di and dedicated the *Zu* ancestral sacrifice to Zhuanxu, offered the *Jiao* suburban sacrifice to Yao, and *Zong* lineage sacrifice to Shun. The Xia Hou Shi [tribe] *Di*-sacrificed to Huang Di and dedicated the *Zu* ancestral sacrifice to Zhuan Xu, offered the *Jiao* suburban sacrifice to Gun [father of Yu the Great], and dedicated *Zong* lineage rites to Yu. The Shang people *Di*-sacrificed to Shun and conducted the *Zu* ancestral sacrifice for Qi (E Bo), dedicated the *Jiao* suburban sacrifice to Ming and offered *Zong* lineage rites to Tang [as dynastic founder]. The Zhou people *Di*-sacrificed to Di Ku, dedicated the *Zu* ancestral sacrifice to King Wen, and conducted *Zong* lineage-rites for King Wu [as dynastic founder] ...¹¹⁸ Mu was able to emulate Zhuanxu so You Yu Shi *bao*-sacrificed to him; Zhu was able to emulate Yu [the Great] so Xia Hou shi *Bao*-sacrificed to him; Shangjia Wei was able to emulate Qi (E Bo), so the Shang *Bao*-sacrificed to him; Gao Yu and Tai Wang were able to emulate Ji, so the Zhou *Bao*-sacrificed to them. In all, *Di*, *Jiao*, *Zu*, *Zong*, *Bao*, these five are the canonical rites of the state.

故有虞氏禘黃帝而祖顓頊，郊堯而宗舜；夏后氏禘黃帝而祖顓頊，郊鯀而宗禹；商人禘舜而祖契，郊冥而宗湯；周人禘嚳而郊稷，祖文王而宗武王；幕，能帥顓頊者也，有虞氏報焉；杼，能帥禹者也，夏后氏報焉；上甲微，能帥契者也，商人報焉；高圉、大王，能帥稷者也，周人報焉。凡禘、郊、祖宗、報，此五者國之典祀也。

LIST OF ABBREVIATIONS

- Chen et al.* Chen Jiujin 陳久金, Lu Yang 盧央, Liu Yaohan 劉堯漢, *Zhongguo Yizu tianwenxue shi* 中國彝族天文學史 (this abbreviation used also in main text)
- CQZZ* Du Yu 杜預, comm., Kong Yingda 孔穎達, subcomm., *Chunqiu Zuozhuan zhushu* 春秋左傳著述

¹¹⁸ *Guoyu*, “*Luyu*” 魯語 4, pp. 6b-7a. According to Wei Zhao 韋昭 (201-273 AD), *Ming* 冥 was an ancestor of the Shang who was eight generations before dynastic founder Tang; [Yu 虞] Mu 幕 was Zhuanxu’s ancestor; Zhu 杼 was Yu’s seventh generation descendant; Shangjia Wei 上甲微 was eighth generation descendant of Qi 契 (E Bo) and first ancestor in the Shang sacrificial cycle; Gao Yu 高圉 was Zhou progenitor Hou Ji’s tenth generation descendant Gong Fei’s 公非 son; Tai Wang 大王 (Gu Gong Tan Fu) was great-grandson of Gao Xin and grandfather of King Wen of Zhou. In the same passage the *Guoyu* also attributes to Di Ku the initiation of observations of the all-important Three Great Seasonal Asterisms *san da chen* 三大辰: Dipper, Fire Star, Triaster.

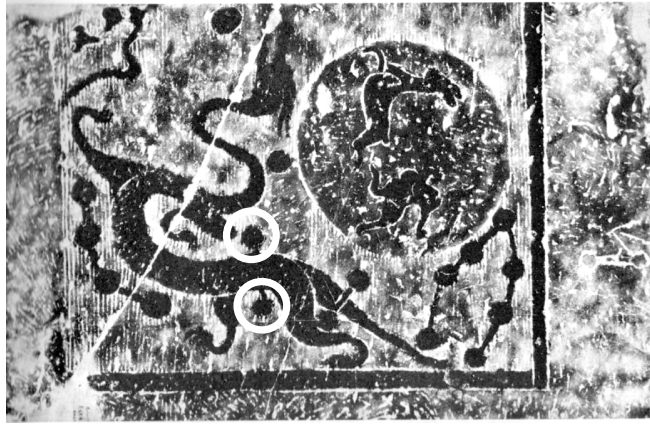


Figure 1. Three Stars of the Lodge “Heart 心”

Two (see white circle-labels) straddle the Dragon constellation’s midsection, and between them (not distinguishable here) is the third—the orange-red central star Great Fire 大火, or Antares (α Sco). The three form the lodge “Heart.” Ink rubbing of Eastern Han-era stone engraving. After Zhongguo gudai tianwen wenwu tuji (cit. in full, n. 80), p. 49.

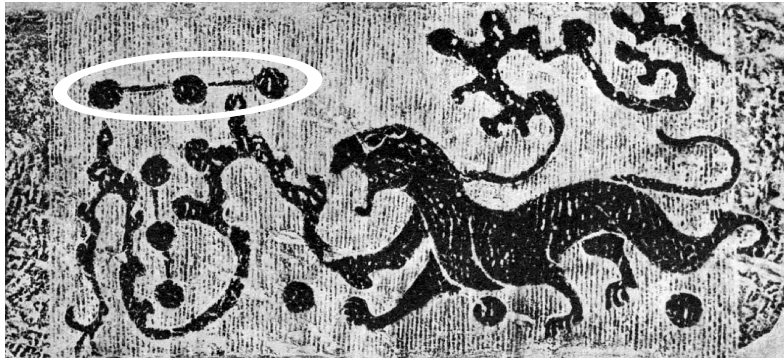


Figure 2. Lodge “Shen-Triaster”

Three stars (enclosed here by an ellipse-label) form the lodge Shen-Triaster (being the belt of Orion—the forepart of the White Tiger of the West). Ink rubbing of Eastern Han stone engraving. After Zhongguo gudai tianwen wenwu tuji, p. 49.

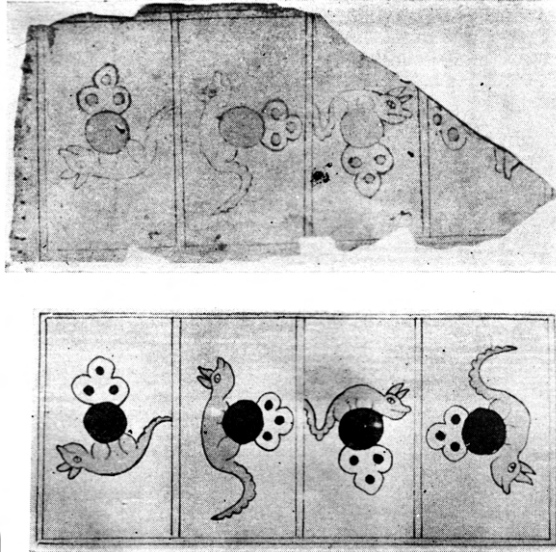
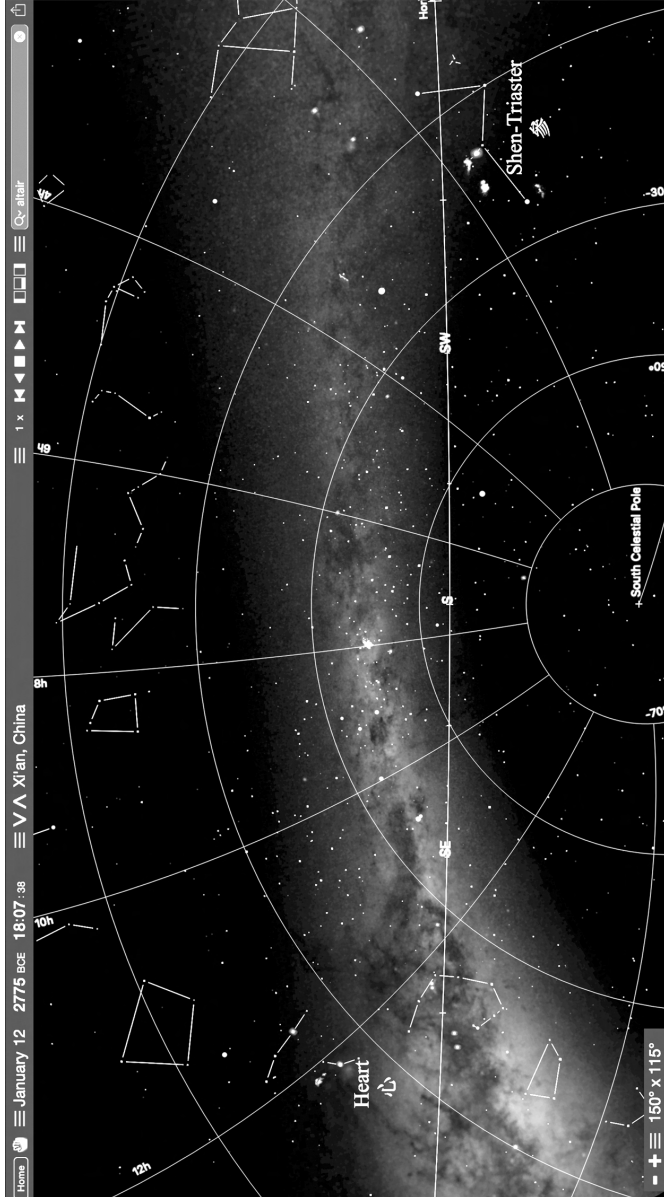


图 10 : 2
耳苏人「母虎历书」封底四幅虎踩天球图。此图采自四川甘洛县
察平公社腊摩歹(母虎村)西番耳苏人巫师杨光银珍藏的「母虎
历书」。上图为原件照片。下图为复制件。天球上所附三星表示
众星。

Figure 3. *Yizu Depiction of Seasonal Direction-Pointer*

Here, a tiger substitutes for the Dipper, from an old “*Mu Hu li*” 母虎曆 (Mother Tiger Calendar”) from Ganluo county, Sichuan. “Mother Tiger” is a tutelary spirit among the Yizu. *Di* 禘 sacrifices were already being directed to the astral spirits Tiger and Dragon in the Shang oracle-bone divinations. Re. their ritualized roles among Yizu minority, Sichuan, the Tiger calendar and direct associations with progenitors of the Fuxi 伏羲 and Nüwa 女娃 peoples, see Jao, “*Yin buci*” (cited at n. 3), pp. 33, 44. Li Min remarks, “The highland memory communities in Sichuan had apparently kept their prehistoric religious traditions alive for nearly a thousand years”; *Social Memory* (cited n. 5), p. 457. After Chen et al. (see *Abbrvns.*), pl. 10.2.



*Figure 4. Computer Simulation Showing E Bo and Shi Chen
Here they are at opposite ends of the sky in 2100 BC, the former rising as the other sets. Based on Starry
Night Pro 8.1.1.*

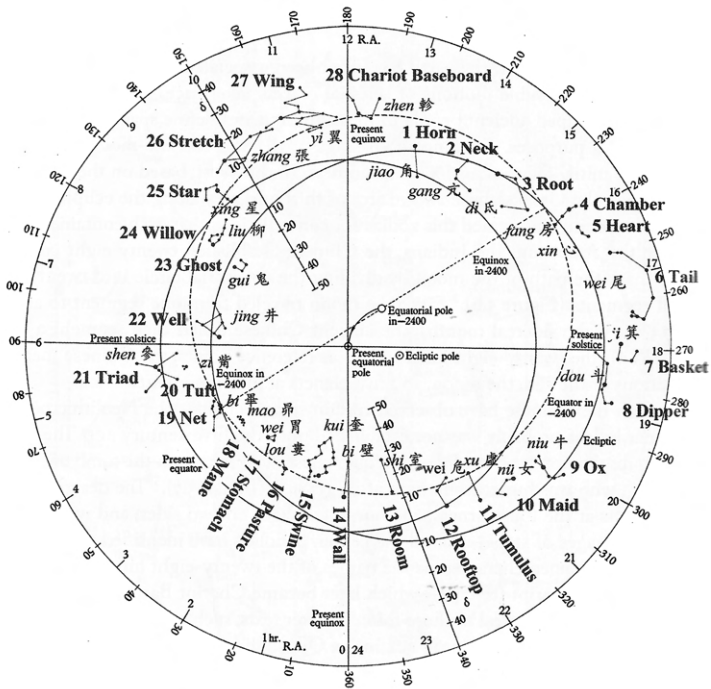


Figure 5. Locations of the Twenty-Eight Lunar Lodges

After Lilian L. Tseng, Picturing Heaven in Early China (Cambridge, Mass.: Harvard E, Asian Monographs, 2011) p. 306.

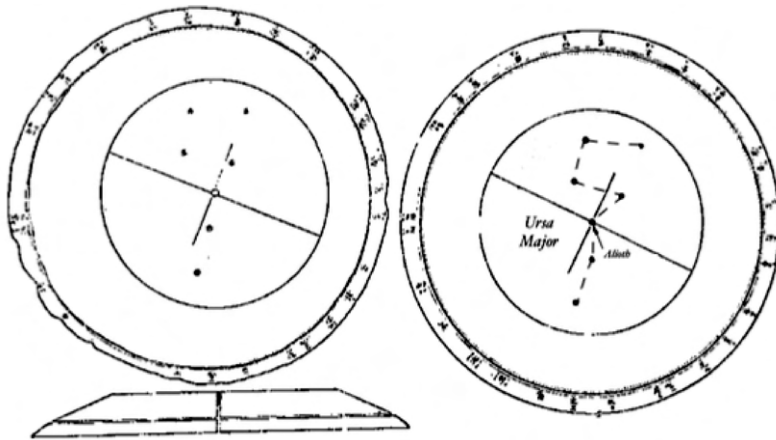


Figure 6: Han-Period Mantic Astrolabes 式盤

These were heuristic devices used to represent the Dipper's orientation and seasonal correspondences and to divine auspicious times for activities. After Zhongguo gudai tianwen wenwu tuji , p. 115.

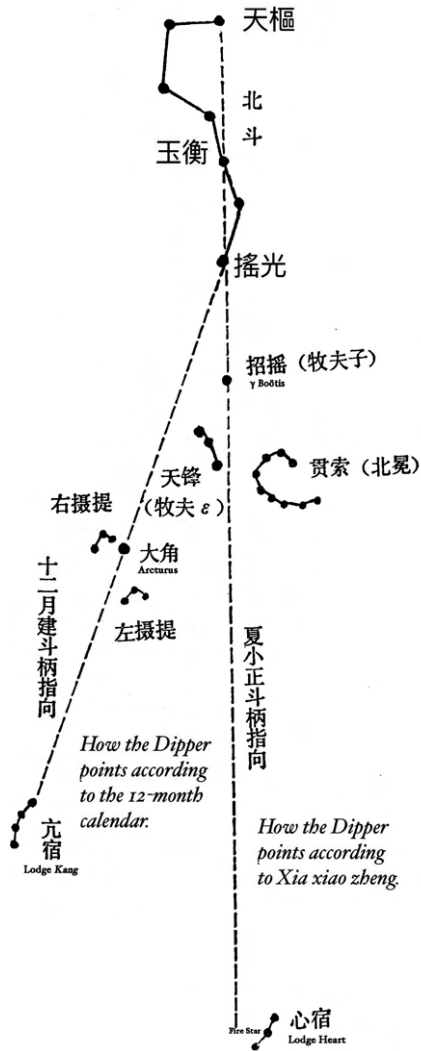
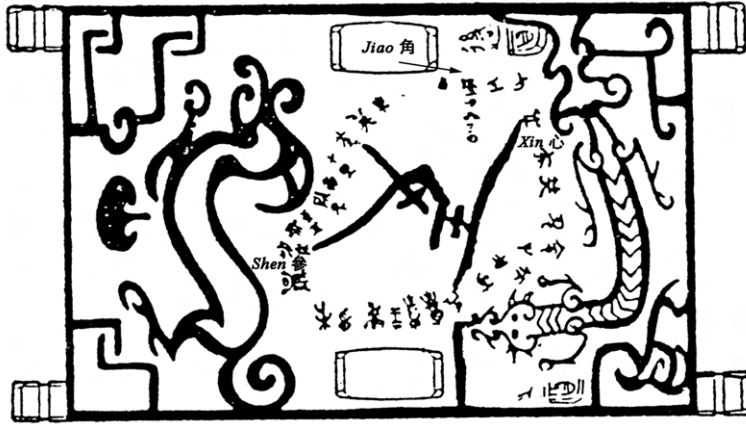


Figure 7: How the Dipper Points
After Chen et al. (see Abbrevs.), p. 213.



*Figure 8: Lid of "Calendar Hamper"; Tomb of Marquis Yi of Zeng (Hunan)
After Li Ling 李靈, "Zeng Hou Yi mu" (cit. in full, n. 88), pp. 5, 132, 164.*



Figure 9: Alignment of Vega (Weaving Maid) and Altair (Oxherd)

Relative to Thuban at the N. Celestial Pole in 2775 BC while in the east at winter solstice. This seasonal indicator would have been accurate for centuries during the Longshan culture's highpoint. When the 28-lodges system took shape over a millennium later, these figures became lodges "Serving Girl" and "Ox-leader," marking position of the winter sun during that epoch. In 483 BC the winter-solstice sun was in lodge "Ox-Leader."