

THE TIME-SUTURING TECHNOLOGIES OF NORTHERN SONG MUSICOLOGY

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Abstract

Scholars of ritual music in the Northern Song dynasty (960–1127) keenly sensed a temporal distance from the ancient sages that manifested as a divergence from canonical norms. To maintain a distinctive intellectual heritage and counterbalance outward-facing political and economic conditions, they located cultural identity in the idealized past. Given the overwhelming discursive importance of music, ministers and rulers alike sought to restore powerful practices and thereby transcend the boundedness of the dynastic cycle. Since their principal sources about antiquity, the textual classics, provided limited practical information about music, scholars had to supplement them with technologies grounded in linguistics, mathematics, and visualizations, which I explore in this dissertation. First, I observe how ritual music prescriptions were constituted in allusive or even paronomastic scholarly language. The Confucian principle of the rectification of names, stressing an enduring concord between words and reality, gave scholars rhetorical tools with which to critique at once society and music practices. Three case studies, treating the symbolism of the pentatonic scale, the discourse of harmony in the ritual bell-knife, and the implications of pitch metaphors, illustrate how reformers interrelated sociological commonplaces and concrete reform measures. Second, contrasting parallel mathematized and unmathematized music discourses, I trace the evolving relationship between mathematical and classical learning, showing how by Northern Song times mathematics could signify invariance. This discursive adoption afforded music reformers a precision that dovetailed elegantly with the royal prerogative of standardizing metrological systems. A case study explores the resilience of the

numerical measurement of the standard pitch pipe across time and the overlapping metonymy that made it resistant to metrical reorganization. Finally, I contextualize the turn toward visual epistemology in the Northern Song in terms of classical precedent, the explosion of woodblock printing, and nascent archaeology. I compare two kinds of musical images, cosmological diagrams and prescriptive illustrations of ancient instruments. Though quite distinct in assumptions, intellectual pedigree, and style, both image types demonstrate a technology surpassing the power of text to organize, preserve, and disseminate orthodox musical practice. These technologies allowed the scholars to suture time, bringing them into more direct contact with their own exalted history.

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Chapter 1: Introduction

An orientation toward the past

In literary Chinese, the ancient past is an unmarked temporal category; that is, it indicates the default period of time, and can therefore in a broader sense designate any age. Consider the question “how could the glory of one time remain abundant throughout the ages (*qian gu*)?” (何以光隆於一時垂裕於千古?).¹ *Gu* ordinarily means “ancient times,” but here, in the compound *qian gu* 千古 “the thousand *gu*,” *gu* takes the meaning of “time period” in general, and thus the phrase takes on the meaning of eternity or the whole of history.² With antiquity serving as the prototypical instance of an age, the ancient past was not just one moment among many, but served as a standard against which all other times implicitly would be measured.

Chinese people of many time periods have understood their relationship with the past using the term *fugu* 復古, which can be translated in various ways that reflect different understandings of how the present age related to (or should relate to) the past.³ *Fu* 復 can be translated as “return to” or “recover,” a distinction that depends on the manner in which the present and the past are to be linked. Meanwhile, *gu* 古 in its

¹ This question appears in the preface of the *Sanli tu* (962), a major impetus in Song Dynasty music reform, and a book that will be discussed prominently throughout this dissertation. Unless otherwise indicated, all translations in this dissertation are my own, with earlier translations I have consulted noted in footnotes.

² Luo Zhufeng 羅竹風, ed., *Hanyu da cidian* 漢語大詞典 (Shanghai: Cishu, 1986), I: 834. A related meaning offered in the dictionary is historical knowledge.

³ Wu Hung, “Introduction: Patterns of Returning to the Ancients in Chinese Art and Visual Culture,” in *Reinventing the Past: Archaism and Antiquarianism in Chinese Art and Visual Culture*, ed. Wu Hung (Chicago: Center for the Art of East Asia, University of Chicago, 2010), 16.

specific sense can similarly be translated in various ways, such as “the ancients,” “antiquity,” or “the archaic,” corresponding to its designation as the practices of a specific group of people or mythological figures, the specific time frame which allowed an ideal type of society, or particular customs or styles.

Fugu was of great importance at many points in Chinese history, documented as far back as the period of bronze inscriptions, which point to the past as a model for the present.⁴ However, *fugu* assumed an especially high importance in the course of the Northern Song 宋 dynasty (960–1127), due to specific political and socioeconomic circumstances that compelled officials to demonstrate their connection with the past. Most commonly noted are the peace treaties the Song negotiated in 1005 and 1042 with the Khitan Liao 遼 (907–1125) kingdom, and 1044 with the Tangut Xixia 西夏 (1038–1227) kingdom. As a stipulation of these treaties, the Song emperors were forced to recognize steppe kingdoms as political equals and pay an indemnity of silk and silver.⁵ In modern historical studies, this moment is often taken as a watershed moment, as the indemnity may actually have paradoxically strengthened the Chinese economy by stimulating rapid economic development and a lively international trade, both overland

⁴ Jessica Rawson, “Reviving Ancient Ornament and the Presence of the Past: Examples from Shang and Zhou Bronze Vessels,” in *Reinventing the Past: Archaism and Antiquarianism in Chinese Art and Visual Culture*, ed. Wu Hung (Chicago: University of Chicago Press, 2010), 47–76.

⁵ For an overview of the treaties and their political and economic effects, see Dieter Kuhn, *The Age of Confucian Rule: The Song Transformation of China* (Cambridge: Belknap Press, 2009), 45–48. Hsu Ya-hwei argues that the geopolitical situation was the main cause of the interest in *fugu*. Hsu Ya-hwei, “Reshaping Chinese Material Culture: The Revival of Antiquity in the Era of Print, 960-1279” (PhD diss, Yale University, 2010), 61–63.

and by sea.⁶ However, this beneficial effect was not very perceptible at the time, and strengthening the military remained a political objective throughout the dynasty, though they never were able to recover these lands and the indemnities actually increased. Since the previous long-lasting empires, the Han 漢 (206 BCE–220 CE) and Tang 唐 (618 – 907), had boasted nearly continuous military successes during their first centuries, there was continuing anxiety about what kind of a dynasty this would be, and whether it really could mark another such long-running political entity instead of falling victim to the short-term success that marked the chaotic Five Dynasties period (907–960) that preceded the Song.

Moreover, as steppe kingdoms annexed the far north and trade and industry boomed in the south, the demographic and political center of gravity shifted away from the cultural heartland of the Yellow River valley associated with the classical civilization and described in the texts they bequeathed. As learning since the Han dynasty had emphasized this textual inheritance, the specific cultural and ecological markers became important in discourse even as they decreased in practical importance due to this demographic change.

Given the inability to echo the military supremacy of the great empires of the past, the Han and Tang, the diminishing sense of geographic connection with the classics of many Chinese, and the increasing prominence of merchants, a class reckoned low in the traditional status-conscious hierarchy, many scholars felt anxious about their position

⁶ Yoshinobu Shiba, “Sung Foreign Trade: Its Scope and Organization,” in *China Among Equals: The Middle Kingdom and Its Neighbors, 10th-14th Centuries*, ed. Morris Rossabi (Berkeley: University of California Press, 1983), 110.

within Chinese history and, due to the extended period of negotiated peace, had time to contemplate it. Many saw forging links with the earliest Chinese ancestors as a way of confirming their own position in history. With this interest came an awareness of how much had been lost or changed in the intervening periods, and a new emphasis on recreating the past or the way of the ancient sages took hold. The classics described a material culture that was clearly different from that of the time. Even the language had changed considerably, as some passages were nearly incomprehensible without the centuries of glosses that grew up around them.

With regard to the Northern Song, Peter Bol observed that adherents of an “ancient style” (*guyi* 古意) “supposed that a change of style was also a change of heart and that the values that informed the mind, evident in what a man said and how he said it, would also inform his conduct.”⁷ This ancient style manifested itself in several ways that sought to reform current practice and reassert older norms. In writing, there was the Ancient Writing (*guwen* 古文) movement that turned away from the contemporary ornate prose style to the earlier more austere form used in the classics; this literary movement had important political ramifications when it became standard to the civil service examination in 1057.⁸ In painting, Gu Kaizhi 顧愷之 (c. 344–406), though less distant in

⁷ Peter K. Bol, “Government, Society, and State: On the Political Visions of Ssu-Ma Kuang and Wang An-Shih,” in *Ordering the World: Approaches to State and Society in Sung Dynasty China*, ed. Conrad Schirokauer and Robert Hymes (Berkeley: University of California Press, 1993), 139.

⁸ For a recent re-evaluation of the *guwen* movement, see Jeffrey Rice, “Northern Song Reflections on the Tang” (PhD diss, University of Pennsylvania, 2013), 61–126.

time, was taken as a classical model worthy of emulation in contrast to current practice.⁹ In music, too, scholars sought to recapture ancient forms as accurately as possible.

Recapturing ancient music

Music (*yue* 樂)¹⁰ was an obvious site for *fugu*, given its prominent place in classical discourse. The accounts of Confucius (Kongzi 孔子; 551–479 BCE) himself provides a justification for the revival of past forms of music. He is said to have admired Shao 韶 music, the court music of the legendary ancestor Shun 舜, who supposedly lived more than a millennium earlier. After hearing it, he exclaimed, “I did not believe music could reach such extreme perfection” (不圖為樂之至於斯也) and did not eat meat for three months.¹¹ Already by that point performances of such ancient music surely must have been conjectural recoveries.¹² Nonetheless, when Confucius enumerated the attributes of what he saw as the perfect state, he specified that music would follow the Shao.¹³ He even provided a precedent for reforming musical practice: “I returned from

⁹ Richard Barnhart, “Survivals, Revivals, and the Classical Tradition of Chinese Figure Painting,” in *Proceedings of the International Symposium on Chinese Painting* (Taipei: National Palace Museum, 1972).

¹⁰ Throughout this dissertation, I follow the majority of English-language writers and use the term “music” to translate Chinese word *yue*, though the terms do not completely align. For instance, *yue* explicitly included dance with props that some might consider extra-musical. For a justification of this convention, see Erica Fox Brindley, *Music, Cosmology and the Politics of Harmony in Early China* (Albany: SUNY Press, 2012), 5–6. In general, I limit my discussion almost entirely to the music of imperial ritual, the most esteemed and powerful variety among the educated elites of the Northern Song. There were, of course, many other forms of music practiced during the Song, but these are largely outside of my purview.

¹¹ Analects 7:14.

¹² C. H. Wang, *From Ritual to Allegory: Seven Essays in Early Chinese Poetry* (Hong Kong: Chinese University Press, 1988), 35.

¹³ Analects 15:11. In his translation, Arthur Waley calls *Shao* “the Succession Dance.” Arthur Waley, trans., *The Analects* (Changsha: Hunan People’s Publishing House, 1999), 201.

Wei to Lu [his home state], then the music was rectified, and the Elegantiae and the Eulogies [two sections of the *Classic of Poetry* (*Shijing* 詩經)] were each put in their place” (吾自衛反魯，然後樂正，雅頌各得其所).¹⁴

Confucius saw his own age as one of decline from the righteous ways of the ancients. Many scholars in the Northern Song dynasty held a similar view. They generally agreed that the correct music that Confucius had recognized had been lost in the intervening time, something they blamed especially on the foreign influence during the Tang dynasty (618–907) and the political chaos of the Five Dynasties (907–960) that separated the Tang from the Song.¹⁵ The most obvious disruption occurred in 947, when the Liao army invaded the court of the Later Jin 後晉 (936–947, the third of the Five Dynasties), extinguished the dynasty, and plundered the imperial musical instruments and notation.¹⁶ In accounts of Chinese tradition, such ritual instruments would have largely been passed down between dynasties as imperial regalia that demonstrated the right to rule.¹⁷ From a modern perspective, it seems rather doubtful that those instruments were

¹⁴ Analects 9:15.

¹⁵ Rulan Chao Pian, *Song Dynasty Musical Sources and Their Interpretation* (Cambridge: Cambridge: Harvard University Press, 1967), 1. Her work provides a brief general overview of the situation focusing on certain documents of use in musicological research.

¹⁶ Tuotuo 脫脫, ed., *Liao Shi 遼史 [Liao History]* (Beijing: Zhonghua shuju, 1974), 4.59-60. For a re-evaluation of the specific geopolitical context of this invasion, see Naomi Standen, “What Nomads Want: Raids, Invasions and the Liao Conquest of 947,” in *Mongols, Turks and Others: Eurasian Nomads and the Sedentary World*, ed. Michal Biran and Reuven Amitai (Leiden: Brill, 2005), 129–74. A translation of the relevant passage of the *Liao shi* appears on p. 155.

¹⁷ The two most famous examples of such an inherited marker of legitimacy are the Nine Tripods (*jiu ding* 九鼎) cast by Yu 禹, the founder of the Xia 夏 dynasty (trad. c. 2200–2101 BCE), which were passed on through the Shang and Zhou dynasties, until they were lost sometime before the Qin, and the Heirloom Seal of the Realm (*chuanguo xi* 傳國璽), carved from jade at the Qin conquest of 221 BCE, and subsequently passed down until the Tang dynasty.

really from antiquity; for instance, the bell designs had certainly completely lapsed.¹⁸ However, the moment of loss loomed large in the imagination of Northern Song musicians, and though the instruments were soon recreated, scholars remained suspicious of them throughout the dynasty.

Later in the dynasty, scholars became distrustful of an earlier moment of disruption during the Tang dynasty. Music at that time had taken on a cosmopolitan flavor, as the imperial court sought to demonstrate its power through performances that reflected the territories over which it had tributary control, such as concerts of the “Ten Types of Music” (*shibuji* 十部伎), where music connected with these geographic designations was performed as a suite.¹⁹ The scholarly class generally held a low opinion of the foreign (*hu* 胡) dancing and music that became popular at the time, which they associated with immoral behavior and alien culture.²⁰ Ritual musicians became suspicious that correct performances of music had fallen by the wayside due to influence from this vernacular music or disinterest in adequate patronage.

But, according to writers on ancient music in the Tang itself, decay had already long set in. In fact, Confucius’s own need to rectify musical forms shows he already felt distant from the past, usually seen as the break between the much-lauded Western Zhou

¹⁸ Consider the surprise that the exceptionally well-educated Ouyang Xiu had when discovering the true nature of ancient bells. Patricia Ebrey, “Replicating Zhou Bells at the Northern Song Court,” in *Reinventing the Past: Archaism and Antiquarianism in Chinese Art and Visual Culture*, ed. Wu Hung (Chicago: University of Chicago, 2010), 186–87.

¹⁹ For a detailed explanation of this practice, see Steven G. Nelson, “English Commentary,” in *Tōdai Ongaku No Rekishiteki Kenkyū* 唐代音楽の歴史的研究, by Shigeo Kishibe 岸边成雄 (Osaka: Izumi Shoin, 2005), 15–17.

²⁰ Marc Abramson, *Ethnic Identity in Tang China* (Philadelphia: University of Pennsylvania Press, 2008), 21 and 24.

周 (c. 1046–771 BCE) and its degraded successor the Eastern Zhou (770–256 BCE) in which Confucius lived. A more significant rupture occurred a few centuries later during the Qin 秦 dynasty (221–206 BCE), whose powerful First Emperor (Shihuangdi 始皇帝; r. 221–210 BCE) is notorious in later historiography for his opposition to Confucian tradition. When he allegedly “burned the books and buried the scholars” (*fenshu kangru* 焚書坑儒), the orthodox practices of music preserved in those pages and minds perished. Any remnants were further made suspicious because of the subsequent failures of transmission due to political turmoil at the end of the Han dynasty and during the period of disunion that lasted until 589. After each of these periods, scholars would lament the losses and try their best to resurrect the earlier forms, but suspicion would remain as to whether the earlier practice had been fully and accurately recovered.

Therefore, Northern Song music scholars sought to bring back earlier forms, untainted by the losses and corruptions of these centuries. However, because of incomplete or inconsistent historical records from the early period, exactly what constituted the ancient practices remained a matter of debate. The ancient sources spent far more space providing a philosophical and political explanation of music than the sort of concrete musical data that could be used to recreate the music. Reasonable people could be expected to understand specifics differently and fill in lacunae in wildly different ways. Moreover, as research techniques became more sophisticated and scholars were increasingly able to use philological, historical, or antiquarian resources, they only came to feel more alienated from what they sought. Therefore, the lengthy debates in court over how to rectify the music were never fully resolved.

“Song dynasty music, from the Jianlong Era [960–963] to the Chongning Era [1102–1106], in all was adjusted six times” (有宋之樂，自建隆訖崇寧，凡六改作).²¹ This is the first sentence of the “Treatise on Music” (*Yuezhi* 樂志) in the *Song History* (*Songshi* 宋史), the official dynastic history compiled centuries later during the Yuan 元 dynasty (1271–1368). The corresponding sections of other histories usually open with platitudes about the power or significance of music, but the bureaucrats in the Yuan court who compiled this history deemed the contentiousness so characteristic of Northern Song musical culture that it instead opens the discussion. Furthermore, in previous dynastic histories, the music section is typically dominated by records of what ritual pieces were played when, while matters of the cosmic effects of tuning appear elsewhere, most often in sections on tuning and/or calendrics. The *Song History* also has a “Treatise on Calendrics and Tuning” (*Lilizhi* 律曆志); however, it focuses far more on the former topic, and contains only transcribed excerpts from theoretical treatises on tuning, the context for which is established only in the *Treatise on Music*.²²

There were four principal contentious issues regarding the music-theoretic system: the frequency of the standard pitch *huangzhong* 黃鍾 (“yellow bell”²³), the use

²¹ *Songshi*, 126.2937. Modern scholars have sometimes deployed this fact prominently in their introductions as well; for instance, Pian, *Song Dynasty Musical Sources*, 1.

²² I explore why there are two such chapters in this and other dynastic histories in Chapter 4.

²³ This translation “yellow bell” has become a common metonym for Chinese music in general in English-language scholarship. This usage may stem from Mei-Pa Chao, *The Yellow Bell: A Brief Sketch of the History of Chinese Music* (Baldwin, MD: Barbary Hill, 1934), subsequently reprinted in 1974. Given the register of Chinese music discourse that could be said to relate to the yellow bell, either obscure theorization or elite instruments, this reflects the dominance of the elite both within Chinese music discourse (in a way similar to Ming dynasty art critic Dong Qichang 董其昌) and in English-language Sinology. Consider also the worldbeat fusion label Yellow Bell Records (www.yellowbellmusic.com),

of pentatonic or heptatonic scales (that is, the admissibility of “altered” *bian* 變 notes that would expand the scale from five to seven notes), the addition of four upper-octave tones (*si qingsheng* 四清聲) as part of the gamut, and the systematic progression of modes following a symbolic calendrical pattern.²⁴ In addition, there were major practical issues concerning the proper design of certain instruments and their use during ritual. For each of these issues, scholars produced arguments combining in various ways the transmitted sources of ancient practice and their own philosophical or aesthetic understandings. Given the paucity of information about ancient musical practice, how could they do this?

Epistemologies of ancient music

Naturally, the starting point for understanding ancient music was the textual legacies they left behind. The principal extant sources for ancient Chinese music philosophy are the corpus of texts that survive from the period. In the past few decades, some newly excavated texts have caused us to revise our understanding of this philosophy, but the majority of the texts now known have been known since they were written because they were transmitted as part of a body of knowledge known as the Chinese classics.²⁵ Because of its importance and the fact I will refer to these works

where it serves as a metonym for world music in general, quite removed from the shroud of cosmic orthodoxy it indicated in the Northern Song.

²⁴ This categorization is based on that of the eminent Chinese musicologist Yang Yinliu 楊蔭瀏, *Zhongguo gudai yinyue shigao* 中國古代音樂史稿 [Draft History of Ancient Chinese Music], vol. 2 (Taipei: Danqing tushu youxian gongsi, 1985), 196–206. In this dissertation, I discuss at length the first and third of these issues.

²⁵ An example of an excavated text that provides significant information about ancient Chinese musical ideas is the *Xing Zi Ming Chu* 性自命出 (“Human Nature is Brought Forth by Decree”), found on bamboo slips in the Guodian 郭店 tomb in 1993. While such texts are important for our efforts to understand

frequently throughout this dissertation, allow me to briefly survey their natures, contents, and relevance for Northern Song musicology.²⁶

The most prestigious classical work on music was the *Classic of Music* (*Yuejing* 樂經); like other classics it was often identified with a one-character name, *Music* (*Yue* 樂). Unfortunately for Northern Song scholars, the work no longer existed, though its supposed existence remained enshrined in the byname for classical texts, the Six Classics (*Liu jing* 六經). Whether the work ever had existed is a difficult question. In the Han, many scholars associated with the New Text (*jin wen* 今文) school, doubted it ever existed, believing that musical skill was part of the tradition associated with the *Classic of Poetry*; others associated with the Old Text (*gu wen* 古文) school, argued that it had been destroyed in the Qin Emperor's book-burning in 213 BCE.²⁷

Among Northern Song scholars, most treat the classic as though it had existed and often lamented that its destruction had made their task much more difficult, if not impossible. The work that Han scholars had compiled, supposedly to replace the lost classic, was the *Record of Music* (*Yueji* 樂記), which likely was compiled in the Han dynasty.²⁸ Although the early history of this text and its relationship with other classical

ancient musical ideas, they cannot be used as a basis to understand how people in the Northern Song understood them.

²⁶ For an informative history of each classic, their canonization, and enumeration, see Michael Nylan, *The Five "Confucian" Classics* (New Haven: Yale University Press, 2001).

²⁷ Stephen W. Durrant, *The Cloudy Mirror: Tension and Conflict in the Writings of Sima Qian* (Albany: SUNY Press, 1995), 48.

²⁸ For a brief overview of the *Record of Music*, see Scott Cook, "Yüeh Chi," in *The Indiana Companion to Traditional Chinese Literature*, ed. William H. Nienhauser, vol. 2 (Bloomington: Indiana University Press, 1998), 192–195. For a more detailed discussion and translation, see Scott Cook, "Yue Ji - Record of Music: Introduction, Translation, Notes, and Commentary," *Asian Music* 26, no. 2 (1995): 1–96, <https://doi.org/10.2307/834434>. For a sampling of the voluminous Chinese scholarship on the work, see

texts is controversial, the redaction included as the nineteenth chapter of the transmitted version of the *Record of Ritual* was one of the best-known and often-cited works on music during the later imperial period.

A few of the other chapters of the *Record of Ritual* mention music as well, especially in a ritual context, and get cited by Song scholars. The chapters of the *Record of Ritual* themselves are quite diverse in style and content, reflecting the different situations in which each was created; Kenneth Brashier proposed the useful analogy that instead of a unified text, we imagine the work more like a loose-leaf binder that was revised numerous times in antiquity.²⁹ By the Song, of course, this was no longer the case as the contents had long been set, but the distinct viewpoints that it represents must have been obvious to scholars then as well, which is perhaps why it is often cited by the chapter titles only.

Renmin yinyue chubanshe bianji bu 人民音樂出版社編輯部, 'Yueji' Lunbian 《樂記》論辨 (Beijing: Renmin yinyue chubanshe, 1983). The origins, date, original contents of the record, as well as its relationship with similar chapters on music in the Xunzi and the *Historical Records*, remain a matter of debate. See Jeffrey K. Riegel, "Li chi," in *Early Chinese Texts: A Bibliographical Guide*, ed. Michael Loewe (Berkeley: Society for the Study of Early China, 1993), 296.

There are three published English translations of the *Record of Music*. The first was by the Scottish Sinologist James Legge (1815–1897), as part of his complete translation of the *Record of Ritual* and the full Chinese classics, published as James Legge, trans., *Lî Kî (Book of Rites)*, vol. 28, Sacred Books of the East (Oxford: Clarendon Press, 1885). Second, the German-American musicologist Walter Kaufmann (1907–1984) translated it as part of his *Musical References in the Chinese Classics* (Detroit: Information Coordinators, 1976). Most recently is Cook's article cited above, which has full translation of the text and Zheng Xuan's commentary for the first three *pian* 篇 (textual divisions), translation without commentary of three *pian*, and detailed summaries of the remaining five *pian*.

The difference in how the text has been divided can make references confusing. In this dissertation, references to the text will give the location of the section on the Chinese Text Project (CTP; <http://ctext.org/>), which includes the original text and James Legge's translation, where it is divided into 50 sections. The references to Chinese Text Project will consist of the part of the URL after the domain (consisting of the book and its divisions, and thus meaningful even without accessing the site) and the number corresponding to the divisions on that page. I have generally consulted the other translations, but only cite them if I quoted them directly or wish to make a point about how the passage had been translated.

²⁹ K.[enneth] E. Brashier, *Ancestral Memory in Ancient China* (Cambridge: Harvard University Asia Center, 2011), 48.

A second key source, very different from the preceding, is the *Rites of Zhou* (*Zhouli* 周禮). Supposedly, this is a listing of all the official positions in the early Western Zhou government, which could serve as a blueprint for ideal government. The details and commentary often provide specific measurements and details, something largely missing from the *Record of Ritual* chapters. If the *Record of Ritual* describes the why of ritual observation, the *Rites of Zhou* can be said to reflect the how, though it does not really explain the processes of the rituals themselves, but rather how the state was organized ritually. The *Rites of Zhou* was an extremely important work for Northern Song political reformers, most famously Wang Anshi 王安石 (1021–1086).³⁰

Most of the musical content in the *Rites of Zhou* appears in the sixth of six sections, titled the *Artificer's Record* (考工記 *Kaogongji*), which supposedly reflected information about the workings of the craftspeople who made ritual and other objects for the government. This chapter is in fact a late addition to the classic, replacing an apparently lost section that, in logical sequence from the previous three seasonal chapters, should cover the winter offices (*dongguan situ* 冬官司徒), those ministers responsible for arts, crafts, and procurement.³¹ For this reason, at times it was treated suspiciously, though since it was the only source that gave much information about the actual construction of instruments, it was unavoidable for scholars of the Northern Song. Information within this chapter heavily reflects the Han preoccupation with numerology

³⁰ Peter K. Bol, "Wang Anshi and the Zhouli," in *Statecraft and Classical Learning: The Rituals of Zhou in East Asian History*, ed. Benjamin A. Elman and Martin Kern (Leiden: Brill, 2010), 229–51.

³¹ Benjamin A. Elman, "The Story of a Chapter: Changing Views of the 'Artificer's Record' ('Kaogong Ji' 考工記) and the Zhouli," in *Statecraft and Classical Learning: The Rituals of Zhou in East Asian History*, ed. Benjamin A. Elman and Martin Kern (Leiden: Brill, 2010), 330–355.

and correlative cosmology, and is often at odds with reason and known of archaeological finds.³² However, for the music-oriented scholars of the Northern Song, that its information harmonized so well with cosmological concerns may instead have been seen as evidence of its authenticity.

A third ancient classic dealing with ritual, the *Ceremonies and Rituals* (*Yili* 儀禮), was the most concrete guide to ritual practice, as it was a compilation of ritual scripts for various circumstances. However, this work is seldom cited in connection with imperial ritual music for two reasons: it had very little musical content and was principally targeted at life events within the noble ranks rather than the grandiose state ceremony with which the music scholars were concerned. These three quite different works were generally grouped together as the Three Ritual Classics (*Sanli* 三禮), which were often printed and commented on as a unit. When authors referred to a “classic of ritual,” it was sometimes unclear which of these works was being referred to, although most frequently the *Record of Ritual* played this role in the canon.

Other references to music are scattered among the remaining four of the Six Classics.³³ The *Classic of Poetry* (*Shijing* 詩經), purported to be the texts of songs sung in various contexts, frequently alludes to musical instruments that may or may not have been used in accompaniment in their early performances. The *Classic of Documents* (*Shangshu* 尚書) also refers frequently to musical practices, particularly as applied in

³² Anthony J. Barbieri-Low, *Artisans in Early Imperial China* (Seattle: University of Washington Press, 2007), 49.

³³ For a compilation and translation of the references to music in the major Chinese classics, see Kaufmann, *Musical References in the Chinese Classics*. The accompanying essays can be of varying quality.

governance. The *Classic of Changes* (*Yijing* 易經) contains very few references to music, although as will be shown in Chapter 4, its cosmic vision was of considerable importance to some music scholars. Finally, the historical work the *Spring and Autumn Annals* (*Chunqiu* 春秋), an incredibly laconic text always read in conjunction with one of its three orthodox commentaries, named after their supposed authors as the Zuo 左, the Gongyang 公羊, and the Guliang 穀梁 Commentaries, also contains several references to music or instruments. Each of these works was cited by Northern Song scholars, whether as evidence of ancient musical practice or merely to argue a classical justification for less direct reconstructions.

All classical learning relied on commentaries that were produced to explain the difficult words and concepts that one frequently encountered in archaic writing.³⁴ There were many such commentaries scholars produced over the ages, which sometimes differed enormously in their interpretations, but certain ones were officially canonized and became indispensable guides for understanding the classic. While there inevitably remained disagreements about the accuracy of even the canonized commentaries, the likelihood of argument from authority was strong. The classics were inevitably read alongside these commentaries and they became a default against which one needed to argue new interpretations.

Probably the most important of these commentators for the music scholars of the Northern Song was the late Han dynasty scholar Zheng Xuan 鄭玄 (127–200), whose

³⁴ For a description of Chinese commentarial practice and comparison with similar practices across Eurasia, see John B. Henderson, *Scripture, Canon, and Commentary* (Princeton: Princeton University Press, 1991).

commentaries on the Three Ritual Classics were designated as official in the Tang and maintained this status through the Song dynasty. In contrast to other commentators, he placed authority in the time period of the Western Zhou, and used commentary to develop that sense as clearly as possible.³⁵ Zheng's commentaries assumed that the early Zhou rituals that the classics described were unified, and his approach was to juxtapose them and explain away differences as problems of transmission or limited understanding.³⁶ In general, such a hermeneutic was adopted by Northern Song scholars as well, who seldom addressed the possibility of synchronic or diachronic complexity in the ritual music they wished to revive.

Building on these canonized commentaries were also later subcommentaries that further explained and collated classical references. The best known of these subcommentaries was that by the Tang dynasty scholar Kong Yingda 孔穎達 (574–648), said to have been a 32nd-generation descendent of Confucius. Kong was imperially commissioned in the early Tang to write commentaries called *Zhengyi* 正義 (“correct meaning”) that became official to the Five Classics and several other works as well. Though they were generally only explicitly cited when the meaning of the original was difficult, they guided the interpretation of the classics and it is likely they were consulted each time a reference was adduced.

³⁵ Michael Puett, “Manifesting Sagely Knowledge: Commentarial Practice in Chinese Late Antiquity,” in *The Rhetoric of Hiddenness in Traditional Chinese Culture*, ed. Paula M. Varsano (Albany: State University of New York Press, 2016), 310.

³⁶ Michael Puett, “Combining the Ghosts and Spirits, Centering the Realm: Mortuary Ritual and Political Organization in the Ritual Compendia of Early China,” in *Early Chinese Religion: Shang Through Han (1250 BC-220 AD)*, ed. John Lagerwey and Marc Kalinowski, vol. 1 (Leiden: Brill, 2009), 718.

In addition to these classical sources, the other main source of textual information on ancient music were official histories (*zhengshi* 正史). Beginning in the Han dynasty, emperors began canonizing specific compendia of historical materials; it was not until considerably later that they came to be regularly commissioned by new dynasties after terminating the previous one. The first history to be canonized, the *Historical Records* (*Shiji* 史記) of Sima Qian 司馬遷 (c. 145–86 BCE), was the only one of these histories that did not claim to be a dynastic history. However, it set the standard format for all later dynastic histories. In addition to annals of events and biographies of notable figures, the histories included treatises on specific topics, which usually included music and tuning as separate topics.³⁷ In Sima Qian’s history, the same text as the *Record of Music* was included as the *Book of Music* (*Yueshu* 樂書);³⁸ it was followed by a more technical *Book of Tuning* (*Lüshi* 律書). Notably, neither of these chapters is historicized; both treat the phenomena as timeless standards. In many later dynastic histories, these sections were combined with others, most often as a *Treatise of Ritual and Music* (*Liyuezhi* 禮樂志) and a *Treatise on Tuning and Calendrics* (*Lülizhi* 律曆志). For Northern Song music reformers, the relevant sections from the *Book of Han* (*Han shu* 漢書) and the *Book of Later Han* (*Hou Han shu* 後漢書), the second and third of the official histories, provided important information thought to apply in more distant antiquity. They also sometimes

³⁷ For a discussion of why these were separated, see the introduction to Chapter 4.

³⁸ The “Book of Music” included is textually very similar to the *Record of Music*, and thus some have argued that it is later addition to Sima’s work. See Martin Kern, “A Note on the Authenticity and Ideology of Shih-Chi 24, The Book on Music,” *Journal of the American Oriental Society* 119, no. 4 (1999): 673–77.

consulted later histories as well to reverse engineer music from the known changes to the musical practice that had been adopted since then.

But in the end, these limited textual sources could only take the Northern Song musicologists so far. To fully recapture ancient musical practice, they needed to draw on non-textual evidence to complement the partial information or uncertain interpretation afforded by textual transmission. In this dissertation, I explore evidence of three other kinds that these scholars implicitly drew on in their arguments: linguistic, mathematical, and visual. I contend that Song musicologists saw these epistemic technologies as less timebound and well-suited to the ideal of timelessness that underlay the proper ritual music practiced by the sages.³⁹ For this reason, scholars used them as a means to transcend temporal distance and interface more directly with the past. First, however, I need to explain more about the nature of the Northern Song music reform, its historical sources, its ritual function and musical instruments, and how this project relates to past investigations of Chinese musicology.

A brief history of Northern Song music reform and surviving sources

There were a large number of works related to ritual music written in the Northern Song dynasty. The bibliography of the official dynastic history *Song History* lists 111 titles.⁴⁰ Some of these date to earlier periods, but as far as can be told from their titles, not

³⁹ In this concept of timelessness, I am thinking of a concept similar to Chun-chieh Huang's "Supertime." Chun-chieh Huang, "'Time' and 'Supertime' in Chinese Historical Thinking," in *Notions of Time in Chinese Historical Thinking*, ed. Chun-chieh Huang and John B. Henderson (Hong Kong: Chinese University Press, 2006), 19–41.

⁴⁰ Tuotuo 脱脱, ed., *Songshi 宋史 [Song History]* (Shanghai: Xinhua shudian, 1977), 8.5053-5057.

that many. Most of them are now lost, though even some of the lost ones survive in part as quotations in other works. There are six free-standing treatises which have significant content relating to ritual music that survive completely; indeed, they survive in multiple independent versions, a testament to their perceived importance at the time and in later periods. One remarkable characteristic of all of them is that, they use copious amounts of illustrations, and many even include the term illustration (*tu* 圖) as the last or penultimate character in the title; this aspect of the treatises will be explored in Chapter 5. This dissertation does not provide a comprehensive analysis of these works, but as they provide the primary sources on which this dissertation is based, it is worth pausing to introduce them and their bibliographic situation before turning to a more general discussion of Northern Song musical attitudes and ideologies. I will present them within a basic narrative of the history of music reform in the Northern Song, which explains the changing context in which they were written.

The earliest Northern Song source is the *Xinding sanli tu* 新定三禮圖 (“Newly Established Illustrations from the Three Ritual Classics,” hereafter *Sanli tu*), by Nie Chongyi 聶崇義 (fl. 950–962), presented in 961 to the founding Song Emperor Taizu

太祖 (r. 960–976).⁴¹ This text in twenty *juan*⁴² describes and illustrates all of the paraphernalia involved in various courtly rituals, including both sacrificial and entertainment rituals. There are musical instruments depicted and discussed in the fifth and seventh *juan*. Nie Chongyi had worked previously for the Later Han (947–950) and Later Zhou (951–960) Dynasties in administrative positions in education and ritual, and naturally saw this work to its natural conclusion after the founding of the Song.⁴³

The *Sanli tu* was the last of a series of works called *Sanli tu* that dated back nearly a millennium. However, works in that tradition were apparently little-known outside of the imperial clan before the Northern Song.⁴⁴ Two of the earliest works of this type, that of Zheng Xuan and Ruan Chen 阮謹 (fl. 3rd c.) of the Eastern Han (27–220 CE), survive

⁴¹ The best English discussion of this work is Francois Louis, *Design by the Book: Chinese Ritual Objects and the Sanli Tu* (Chicago: University of Chicago Press, 2017). This date is often given as 962, but it should be 961 according to Jin Zhongshu 金中樞, “Songdai de Jingxue Dangdai Hua Chutan: Nie Chongyi de Sanli Tu Xue 宋代的經学當代化初探: 聶崇義的三禮圖學 [A Preliminary Investigation of the Contemporaneization of Song Dynasty Classical Learning: Studying Nie Chongyi’s Sanli Tu],” *Guoli Chenggong Daxue Lishi Xuebao 國立成功大學歷史學報* 10 (1983): 79–80. See also the explanation in Jeffrey Moser, “Recasting Antiquity: Ancient Bronzes and Ritual Hermeneutics in the Song Dynasty” (PhD diss, Harvard, 2010), 12n1.

The Northern Song editions were lost in the chaos of 1127, but a copy from Sichuan remained, and formed the basis of the 1175 edition, the earliest extant edition and the one that Feng Jiren argues is the best available today. Feng Jiren, *Chinese Architecture and Metaphor: Song Culture in the Yingzao Fashi Building Manual* (Honolulu: University of Hawai’i Press, 2012), 252 n. 45. The first modern edition was included in the *Sibu congkan* 四部叢刊 series. A photo-offset copy of the 1175 version was made in 1984 in Shanghai. Feng Jiren further states that the images in the subsequent Yuan edition (1238 or 1239), second-earliest extant edition, are inferior to the 1175 edition (253n52).

⁴² In this dissertation, I leave *juan* 卷 untranslated. Its literal meaning is “scroll,” though by this time it simply refers to a textual division, generally longer than a chapter but shorter than a volume. Perhaps the best English translation is “fascicle,” but that becomes cumbersome when frequently repeated. Confusingly, both “volume” and “chapter” sometimes are used as translations as well.

⁴³ See his biography in the *Songshi*, 431, 12793–12797 and Rulan Chao Pian, “Nieh Ch’ung-I,” in *Sung Biographies*, ed. Herbert Franke, vol. 2 (Wiesbaden: Franz Steiner Verlag, 1976), 801–802.

⁴⁴ Hsu Ya-hwei, “Reshaping,” 32.

as texts, although they were originally illustrated.⁴⁵ In the preface, Nie Chongyi claims to have had access to six collections of diagrams with which to compile the work: those of Zheng Xuan and Ruan Chen, Liang Zheng 梁正 and an unnamed official from the Sui 隋 dynasty (581–618), and Xiahou Fulang 夏侯伏郎 and Zhang Yi 張益 from the Tang (618–907). In the preface Nie Chongyi claims that these were largely similar, though with fine differences that he was committed to emending using a textual basis.

Representing this continuously transmitted knowledge from early times, the *Sanli tu* was considered to serve as an authoritative basis for understanding the classics visually.⁴⁶ The text, meanwhile, was mainly a concatenation of the classical references to the objects.

The *Sanli tu* and its images became widely known and cited, particularly after Taizu ordered it issued to the provinces as a reference and painted on the walls of the Directorate of Education (*Guozijian* 國子監).⁴⁷ Although the emperor approved of the work, Nie was challenged by several literati as to the authenticity of his sources and accuracy of his citation and his recommendations were not fully put into effect. The illustrations of the *Sanli tu* came increasingly into question during the first half of the eleventh century, especially as they were found at variance with archaeological finds. Earlier, the discovery of ancient artifacts had been interpreted as auspicious omens

⁴⁵ Hsu Ya-hwei, 26.

⁴⁶ For this transmission and how *Sanli tu* illustrations seem related to objects found from the Eastern Han to the early Northern Song (though not necessarily the antiquity they claim to relate to), see Hsu Ya-hwei, 28–34.

⁴⁷ *Songshi*, 431.12797; Hsu Ya-hwei, “Reshaping,” 28. For examples of the influence in the Yuan and Ming Dynasties and in Japan, see Hsu Ya-hwei, 28n34 and 35.

(*xiangrui* 祥瑞) or they had been used as magical objects.⁴⁸ Now, however, scholars such as Ouyang Xiu 歐陽修 (1007–1072) and Shen Gua 沈括 (1031–1095) increasingly became interested in ancient artifacts as a possible source of knowledge, and were critical of how divergent they were from the *Sanli tu* models.⁴⁹

By the 1030s, the underlying factors that caused music to be contentious in the dynasty had come into focus. Taizu, who had accepted the *Sanli tu*, also commissioned the first music reform of the dynasty, completed in 966 by He Xie 和峴 (940–995). However, the fourth Song emperor Renzong 仁宗 (r. 1022–1063) called anew for ideas for reform during the Jingyou 景祐 period (1034–38).⁵⁰ There was little consensus achieved in the long run, but the other five treatises from the Northern Song I examine all come after this period and reflect the growing diversity of opinions on how to rectify music.

Renzong announced the undertaking of a second music reform during the Huangyou 皇祐 period (1049–1054), again seeking opinions from a wide variety of scholars.⁵¹ The result of these efforts was the second treatise, the *Huangyou xinyue tuji* 皇祐新樂圖記 (“Illustrated Record of the New Music of the Huangyou Period,”

⁴⁸ Hsu Ya-hwei, “Reshaping,” 25–26. Some examples of this interpretation from the Han dynasty can be found in Rong Geng 容庚, *Shang Zhou Yi Qi Tong Kao* 商周彝器通考 [Comprehensive Study of the Sacrificial Vessels of Shang and Zhou] (Cambridge: Harvard-Yenching Institute, 1941), 6.

⁴⁹ Hsu Ya-hwei, “Reshaping,” 34–35.

⁵⁰ The contentious period of music reform is detailed in Christian Meyer, *Ritendiskussionen am Hof der nördlichen Song-Dynastie (1034-1093): Zwischen Ritengelehrsamkeit, Machtkampf und intellektuellen Bewegungen* (Sankt Augustin: Institut Monumenta Serica, 2008), 177–209.

⁵¹ The history of this period is detailed in Meyer, 209–30. Chapter 2 includes a close reading of Renzong’s edict ordering the music reform.

hereafter *Huangyou ji*), was presented in 1053 to Emperor Renzong.⁵² The authors of the treatise, Ruan Yi 阮逸 (fl. 1023–1053) and Hu Yuan 胡瑗 (993–1059), were major musical thinkers and scholars of the time. Both had been involved also in the Jingyou reform. Less is known about Ruan, since he lacks a biography in the *Song History*, but he passed the highest civil service examination (*jinshi* 进士) in 1027. He wrote or co-wrote several other works on music, though none survive. Hu Yuan was the more famous of the two, however. He never passed the *jinshi*, but became so famous for his teaching that he was nonetheless later invited to teach at the Imperial Academy. His other works are probably more famous, including commentaries on the *Classic of Changes* and the “Great Plan” (*Hong fan* 洪範) chapter of the *Classic of Documents*.⁵³ His teaching emphasized the practical application of Confucian learning, insisting on training in practical skills, including such fields as public policy, national defense, and irrigation. Even some contemporary historians saw his partnership with political reformers as a turning point in the early Northern Song intellectual climate, as they were committed to applying Confucian learning to order the world, and part of the movement of the educated elite to actively participate in government.⁵⁴

⁵² The original version of the *Huangyou ji* treatise is now lost. A manuscript copy was made in 1239, which formed the basis of all modern editions. A printed edition was made from the 1239 manuscript by Zhang Haipeng 張海鵬 (1755-1816) for inclusion in his *Xuejin taoyuan* 學津討原, completed in 1806, which is now widely available in lithograph as part of the major series *Congshu jicheng* 叢書集成 in 1936. A different version forms part of *Siku quanshu*. Both of these editions are frequently cited in this dissertation.

⁵³ For an analysis of his *Classic of Changes* commentary, see Tze-ki Hon, “Eremitism, Sagehood, and Public Service: The Zhouyi Kouyi of Hu Yuan,” *Monumenta Serica* 48, no. 1 (January 1, 2000): 67–92, <https://doi.org/10.1080/02549948.2000.11731343>.

⁵⁴ See his biography in *Songshi*, 432.12837-12839; Rulan Chao Pian, “Hu Yüan,” in *Sung Biographies*, ed. Herbert Franke, vol. 1 (Wiesbaden: Franz Steiner Verlag, 1976), 444–445.

This *Huangyou ji* was relatively short, three *juan*, the shortest of the treatises considered here and shorter than many of the lost treatises. Each *juan* is subdivided into several sections labeled in their titles as though they were primarily explanations of the illustrations they contain. Thus, like the *Sanli tu*, there are extensive classical citations and it centers around illustrations, though the text itself has a more clearly argumentative tone. The first *juan* explains the authors' view on the proper use of grains of millet to measure length, volume, and weight to establish accurate pitches, as well as mathematical calculations of the correct pitches and an explanation using historical measurement standards. The second *juan* details how to create bell and lithophone and the corresponding chime sets. Patricia Ebrey has shown that, while unmentioned, archaeological discoveries of bells seem to have been important in this understanding.⁵⁵ The third *juan* is about ritual equipment, with individual sections for three tools used in rituals. Despite its brevity, it has an important status as the earliest work dedicated to music theory that survives in full.

The next two sources form a pair. Neither were associated with the official music reforms under Shenzong 神宗 (r. 1067–1085) or Zhezong 哲宗 (r. 1085–1100), which both produced their own literature that has been lost. Instead, they represent the work of a pair of brothers from Fujian, Chen Xiangdao 陳祥道 (c. 1042–1093) and Chen Yang 陳暘 (1064–1128), who wished to draw together complete repositories of ritual and musical knowledge, under the titles *Lishu* 禮書 (“Book of Ritual”) and *Yueshu* 樂書 (“Book of Music”).

⁵⁵ Ebrey, “Replicating Zhou Bells.”

Chen Xiangdao compiled the *Lishu* (preface dated 1092) over the course of twenty years.⁵⁶ Its 150 *juan* essentially continue the *Sanli tu* tradition,⁵⁷ though on a much larger scale. *Juan* 117–130 deal with music and dance; divided into sections on music theory (117–118), bells and lithophones (119–120), other musical instruments (121–126), ensemble layouts (127), and dance (128–130). Chen was a follower of the reformer Wang Anshi, so his revival of ritual forms again was envisioned as part of a broad reorganization of government that sought imprimatur from the structures of the *Rites of Zhou*.⁵⁸ However, Chen often disagreed with Zheng Xuan’s interpretations, and argued against them using his broad knowledge of the classics.

The *Yueshu* 樂書 (“Book of Music,” completed in 1101), written by Chen Yang, is the largest of the books I examine, comprising 200 *juan*, a million Chinese characters and over 540 illustrations of instruments and performance.⁵⁹ According to his preface, he originally envisioned it as the musical companion to his brother’s work, although it ended up being more comprehensive in treatment and differently organized. Like the *Lishu*, it reflected decades of diligent work, and for this reason became a standard reference long

⁵⁶ Two Song printings of the work survive as well as a Yuan printing of 1347. See Chu-yu Wu, “Ch’en Hsiang-Tao,” in *Sung Biographies*, ed. Herbert Franke, vol. 1 (Wiesbaden: Franz Steiner Verlag, 1976), 108–108.

⁵⁷ Hsu Ya-hwei, “Reshaping,” 35.

⁵⁸ Bol, “Wang Anshi and the Zhouli.”

⁵⁹ On the extant editions and textual history of this work, see Yu Filipiak, *Chen Yangs Darstellung der “barbarischen” Musikinstrumente im Buch der Musik (Yueshu): ein Beitrag zur Erforschung des Musiklebens am Kaiserhof der Song-Dynastie (960-1279)*, 1. Aufl, Deutsche Ostasienstudien 19 (Gossenberg: Ostasien-Verl, 2015), 19–24. Several copies of Song editions survive in libraries in China and abroad. A helpful punctuated version with Korean translation is *Yeokju akseo* 역주악서, trans. Yi Huyeong 이 후영 and Kim Jongso 김종수, 6 vols. (Seoul: Somyong Publishing 소명출판, 2012). This title should not be confused with the treatise on music in Sima Qian’s history, which is textually similar to the *Record of Music*.

into the future, and today is probably the most detailed and comprehensive work on music anywhere in the world before the modern era. For this reason, it has received more scholarly attention than the musical aspects of the other works here, though more often because of the unconventional inclusion of discussions of foreign and vernacular music.⁶⁰

Musical instruments used in ritual are illustrated and discussed in both the *Lishu* and the *Yueshu*, though in far more detail in the latter. The first half of the work, *juan* 1–95, titled “Instruction in the Righteous Ideas” (*Xunyi* 訓義) is philosophical, gathering the classical references to the power and function of music along with thorough annotation and explanation. The second half, “Illustrations and Discourses on Music” (*Yuetulun* 樂圖論), occupies the remaining 105 *juan*. It covers issues of music theory, musical forms (*yuezhang* 樂章), dance, drama (*baixi* 百戲), and music practice. The section on musical instruments, occupying *juan* 109–150, includes descriptions of 462 instruments, most with illustrations. Despite Chen’s obvious ideological bias, he divides this section into three parts, “elegant music” (*yabu* 雅部), “barbarian music” (*hubu* 胡部), and “popular music” (*subu* 俗部), including the latter two categories in the interest of completeness. Today this serves as a crucial resource for the early history of these kinds of music, which were ignored in nearly all other extant Chinese works. With regard to the former, like other Northern Song music specialists, he had his pet solutions to controversial issues, including insistence upon the use of only pentatonic scales in

⁶⁰ For an overview of the contents, see Fang Baozhang 方宝璋 and Zheng Linghun 郑俊晖, *Zhongguo Yinyue Wenxianxue* 中国音乐文献学 (Fuzhou: Fujian jiaoyu chubanshe, 2006), 253–62. For a detailed analysis of the work, see Zheng Changling 郑长玲, *Chen Yang Jiqi “Yueshu” Yanjiu* 陈旸及其《乐书》研究 (Beijing: Wenhua yishu, 2005).

contravention of modal practice since the Tang Dynasty, and reducing the bell-sets to twelve notes by eliminating the four upper-octave notes.⁶¹ However, its inclusiveness makes the work invaluable for research on a wide variety of musical topics, orthodox or otherwise.

Despite the scholarly value of the work for posterity, it was rejected when presented to Emperor Huizong 徽宗 (r. 1101–1125) in 1103, since by then he was already intrigued by the unconventional music proposals of the eccentric Wei Hanjin 魏漢津, who had been summoned to the court in 1102. Though Huizong was skeptical of Chen’s ideas, he followed court protocol and did order a discussion of the matter. However, by January 1104 he had publicly accepted Wei’s proposals, setting the stage for the significant reconfiguration of imperial music practice that would create the *Dashengyue* 大盛樂 (“Music of Great Efflorescence”) that lasted until the end of the Northern Song.⁶² Chen’s book, meanwhile went unpublished and his ideas unrealized until their value was recognized in the Southern Song, when it received its first printing in 1199. Around that time, Lou Yue 樓鑰 (1137–1213) wrote a critical commentary entitled “The Correct and Erroneous in the *Book of Music*” (*Yueshu zhengwu* 樂書正誤).

⁶¹ He argues for these in *Yueshu* 101.11r–13r and 107.6r–v.

⁶² The best English-language discussion of the musical and institutional aspects of this movement is in Joseph S.C. Lam, “Huizong’s *Dashengyue*,” in *Emperor Huizong and Late Northern Song China: The Politics of Culture and the Culture of Politics*, ed. Patricia Buckley Ebrey and Maggie Bickford (Cambridge: Harvard University Asia Center, 2006), 395–452. For more information on the theoretical innovations of Wei Hanjin and how they relate to court politics, see Kojima Tsuyoshi, “Tuning and Numerology in the New Learning School,” in *Emperor Huizong and Late Northern Song China: The Politics of Culture and the Culture of Politics* (Cambridge: Harvard University Asia Center, 2006), 206–226.

Meanwhile, Wei Hanjin and the more conventional music official Liu Bing 劉昺 dominated imperial music practice. A series of books were written related to the *Dashengfu* 大晟府 (“Office of Great Efflorescence”), the organization Huizong created to propagate the new music. Though these books survived long enough to be recorded in the bibliography of the *Song History* and other works, they are all now lost. This loss is no doubt due to the conjunction of the destruction of the capital in 1127 as the Jin invaded and extinguished the Northern Song as well as the terrible reputation of Huizong and the *Dashengyue* in posterity, which were held responsible for the downfall. However, some of the works survive in part in quotation in the *Song History*, such as Liu Bing’s *Yue Shu Ba Lun* 樂書八論 (“Eight Discourses on the *Book of Music*”), written in 1111.

This completes the survey of theoretical works relating to ritual music. However, two other works from the late Northern Song provide important information about prevailing musical attitudes, coming from the nascent field of archaeology. The discovery of ancient musical artifacts provided a new way of thinking about evidence from the past, reinterpreting textual sources in light of physical remains. Both of these works are archaeological catalogs that present a variety of ancient artifacts, including bells and lithophones. These were groundbreaking in approach since they were first books compiled anywhere in the world that reproduced actual archaeological artifacts.

The *Kaogutu* 考古圖 (“Illustrated Investigations of Antiquities,” preface dated 1092) was compiled by Lü Dalin 呂大臨 (1044–1093).⁶³ It is of modest length (ten *juan*).

⁶³ For an overview of the *Kaogutu*, see Yun-Chiahn C. Sena, “Cataloguing Antiquity: A Comparative Study of the *Kaogu tu* and *Bogu tu*,” in *Reinventing the Past: Archaism and Antiquarianism in Chinese Art and Visual Culture*, ed. Wu Hung (Chicago: University of Chicago, 2010), 202–7. The earliest surviving edition

Hsu Ya-hwei noted that the way it “juxtaposed the image of the object with that of the inscription...not only establish[ed] a new format for cataloging bronzes but also provid[ed] a new visual experience for the Song viewer.”⁶⁴ It includes 210 bronze and 13 jade artifacts, including eight bells and one lithophone in the seventh *juan*. Lü found these ancient objects in the imperial collection and the private collections of thirty officials. The text is remarkably objective and thorough, providing data on the provenience, size, description, and other technical information, and indicating when these are unknown. The eight bells and one lithophone are illustrated and discussed in the seventh *juan*.

The *Chongxiu xuanhe bogu tulu* 重修宣和博古圖錄 (“Revised Illustrated Catalogue of the Great Antiquities of the Xuanhe Period,” c. 1125, hereafter *Bogutu*) was compiled by Wang Fu 王黼 (1079–1126), though the nature of his authorship has been contested, based on an earlier work (*Xuanhe bogu tulu* 宣和博古圖錄, 1113) that is no longer extant.⁶⁵ It was commissioned by Emperor Huizong. It is much bigger than the *Kaogutu*, amounting to 30 *juan* and including 839 pieces in total. Though many are new discoveries, it also documents the works included in the *Kaogutu*. Musical instruments are found in *juan* 22–26; 118 bells, representing 55 distinct sets, are included in *juan* 22–25 and four lithophones (from three distinct sets) and a variety of other types of bells are included in *juan* 26.

is a fourteenth-century reprint of a 1299 edition. However, Hsu Ya-hwei argues that the version in the *Siku quanshu* edition provides superior illustrations. Hsu Ya-hwei, “Reshaping,” 42n51.

⁶⁴ Hsu Ya-hwei, “Reshaping,” 43.

⁶⁵ For an overview and discussion of authorship, see Sena, “Cataloguing Antiquity,” 212–17; Hsu Ya-hwei, “Reshaping,” 74–87.

Because of these two works' emphasis on artifacts that distinguishes them from the other treatises considered here, I will sometimes refer to these two works together as the artifact-based treatises. However, while the *Bogutu* is similar in structure and style to the *Kaogutu*, Y. C. Sena has argued for a major difference between the works in that the *Kaogutu* is especially concerned with accurate description, for whatever historicist purpose, while the *Bogutu* is aimed towards imperial ritual reconstruction, a major concern of Huizong's.⁶⁶ Some of the bells in the *Bogutu* seem to have been used as direct models for the *Dashengyue* bells cast in Huizong's court.⁶⁷ Curiously, the *Bogutu* never cites the *Kaogutu*, even though it is its obvious predecessor and it generally recognizes its sources; Hsu explained this as due to the political sensitivity of citing the conservative Lü Dalin in the Huizong's reformist (and heavily ideological) court.⁶⁸

In addition to these treatises that are extant in full, many other materials have been preserved, at least in part, as part of larger compilation works. The most notable of these is the *Song History*. The longest of the 24 canonized histories, Rulan Chao Pian noted that it was one of the more hastily done and poorly compiled.⁶⁹ However, this is in some ways a benefit, as it means that the texts included have not been as digested, and may be taken to be more accurately represent of the contemporary documents from which they were copied. Because, for the Song, we lack the imperial diaries (*qijuzhu* 起居注)

⁶⁶ Sena, "Cataloguing Antiquity," 224.

⁶⁷ James C. Y. Watt, "Cultural Efflorescence During the Sung Dynasty: Antiquarianism and Naturalism," in *Possessing the Past: Treasures from the National Palace Museum, Taipei*, ed. Wen C. Fong and James C. Y. Watt (New York: Metropolitan Museum of Art, 1996), 225–27. In particular, compare Plate 98 (p. 223) and Figure 86 (p. 224).

⁶⁸ Hsu Ya-hwei, "Reshaping," 47–61.

⁶⁹ Pian, *Song Dynasty Musical Sources*, 15.

and the veritable records (*shilu* 實錄) that survive for some of the other dynasties, this remains an important point. Though this official dynastic history was compiled significantly later, it was created nearly entirely by copying contemporaneous documents, particularly memorials to the emperor and edicts from the emperor. Therefore, it is likely the specific wording here represents the discourse used to express the concerns at the time. Another important compilation is the *Song huiyao jigao* 宋會要輯稿 (“Draft to an institutional history of the Song dynasty”), a reconstruction of a Song institutional history from substantial fragments in the Ming dynasty 明 (1368–1644) encyclopedia *Yongle dadian* 永樂大典. The work is divided into institutional categories, and three *juan* treat music.

How music works

Modern scholars encountering pre-modern musical writings, whether from the Chinese, Greek, or other traditions, are often struck by the agency they give to music, and find this hard to reconcile with currently dominant ontologies that understand music as an autonomous aesthetic or cultural phenomenon. Because the nature of this agency was seldom a concern of the ancients, writers are rarely explicit about precisely how music achieves the remarkable effects accorded to it. Moreover, asking such questions is looking at the problem backwards: for many writers, the agency of music was a given, and the mechanism through which it functions might need only an ad hoc explanation or none at all. As with provisional scientific explanations for an observed phenomenon in general, many mutually contradictory theories may simultaneously exist. Moreover, the

existence of overlapping explanations also has the effect of ensuring that the power of music was not an easily falsifiable notion, and indeed music became an important concern of virtually every Chinese dynasty, regardless of their philosophical predilections.

The situation with music maps closely on to the situation of music's sister discipline, ritual (*li* 禮).⁷⁰ In Chinese writings, these two terms frequently appear together as a compound word (*liyue* 禮樂) or in parallel clauses. Music and ritual are not just linked in ancient Chinese treatises, but are deeply connected in many anthropological investigations of music, as ethnomusicologists have discovered. This connection can be a fruitful analytic even in cases where members of the culture themselves do not recognize it as ritual, as Christopher Small observed in his ritualistic reading of Western concert practice.⁷¹ Other kinds of scholars have also made the same leap; for instance, the scholar of religion Aaron Stalnaker, in arguing for taking ritual propriety seriously regardless of present ontological norms, has compared its techniques and effects to that of music and dance.⁷² Both ritual and music involve performance of a more or less predetermined set

⁷⁰ As with *yue*/music, this word can be understood and translated differently. Sometimes it refers to specific quasi-scripted behaviors, a usage which lines up well with “ritual” in an anthropological sense, or the more religiously circumscribed “rite.” However, it can refer to appropriately deferential behavior in general, in which case it is often translated “propriety.”

⁷¹ Christopher Small, “Performance as Ritual: Sketch for an Enquiry into the True Nature of a Symphony Concert,” *The Sociological Review* 34, no. S1 (May 1986): 6–32.

⁷² Aaron Stalnaker, “In Defense of Ritual Propriety,” *European Journal for Philosophy of Religion* 8, no. 1 (2016): 125–26, <https://doi.org/10.24204/ejpr.v8i1.72>. He also notes that such ideas are hardly his own, but have developed in response to several other contemporary philosophers (125n12).

of physically enacted internal or external movements, and moreover one that takes long periods of training and practice to develop fluency and expressivity.⁷³

Broadly speaking, the underlying explanations for the efficacy of music and ritual can be grouped into three categories, which I will call the propitiative, the sociological, and the cosmological. These are not mutually exclusive, as will be shown below, but such a typology demonstrates the complexity of the issue and the diversity of understandings that gave a music ideology the flexibility for ritual music to flourish as a discursive concern throughout imperial China. Below, I discuss each of these theories in roughly chronological order of when they first appeared.

The first kind of explanation views music as effective because it can propitiate ghosts and spirits. The ancient Chinese believed in a variety of supernatural entities, who could have varying degrees of influence on the living. In the widespread practice of ancestral veneration, it was believed that the ancestral spirits were to blame for many of the fortunes and misfortunes in life. Maintaining proper ritual and music toward these spirits served as an important means of receiving their blessings and avoiding their wrath. Because the spirits were once alive, performing rituals and music for their own ancestors, they would be most accustomed to the forms of ritual and music that were current in their

⁷³ I take the concept of ritual fluency from Michael David Kaulana Ing, *The Dysfunction of Ritual in Early Confucianism* (Oxford: Oxford University Press, 2012). He means it as the flexibility with which practitioners can adapt ritual procedures to meet real-world circumstances and needs without losing the sense of ritual propriety or connection with past instantiations of the ritual. Extending this idea to musical practice seems quite reasonable, as musicians similarly are always adapting to the external constraints of the performance situation without losing the connection to the work, genre, or style they are performing. Specific forms of musical fluency include improvisational technique and the creativity and expressiveness that Lam emphasized in ritual music. Joseph Lam, *State Sacrifices and Music in Ming China: Orthodoxy, Creativity, and Expressiveness* (Albany: State University of New York Press, 1998).

lifetime, and thus might recognize those forms best as spirits themselves. This reason is one explanation for the general conservatism in musical and ritual practices.

The propitiative function of music appears in some very early texts such as the *Classic of Poetry*. Mao 毛 poem No. 274, *Zhi Jing* 執競, supposedly a song used during sacrifice in the early Zhou dynasty, includes the line: “The bells and drums sound in harmony; The sounding stones and flutes blend their notes; Abundant blessing is sent down; Blessing is sent down in large measure” (鐘鼓喤喤、磬筦將將、降福穰穰、降福簡簡).⁷⁴ As is often the case, the specific agents who are sending down fortune are left unspecified, but the proximity of the sonic instruments and the blessing strongly implies a kind of transaction with supernatural figures. A later passage, from the “Conveyance of the Rites” (*Liyun* 禮運) from the *Record of Ritual* (*Liji* 禮記), after enumerating the various processes involved in preparing for the ceremony, explores their function somewhat more explicitly:

列其琴瑟管磬鐘鼓...，以降上神與其先祖，以正君臣，以篤父子，以睦兄弟，以齊上下，夫婦有所。是謂承天之祜。

The *qin* and *se* zithers, pipes, lithophones, bells and drums are set out...in order to bring down the spirits from above and their ancestors, to rectify [the relationship between] ruler and ministers; to deepen [the feeling between] father and son; to bring harmony between elder and younger brother; to adjust [the relationship between] those in high and low

⁷⁴ Translation by James Legge, from CTP book-of-poetry/zhi-jing. I have not revised the translation as I find the reduplicated adjectives at the end of each group of four characters difficult to interpret; but the basic idea of these four musical instruments causing fortune to be sent down is clear. For other translations, see Joseph Needham and Kenneth Robinson, “Sound (Acoustics),” in *Science and Civilisation in China*, by Joseph Needham, vol. 1 (Cambridge: Cambridge University Press, 1962), 133; Bernhard Karlgren, *The Book of Odes* (Stockholm: Museum of Far Eastern Antiquities, 1950), 243; Arthur Waley, trans., *The Book of Songs: The Ancient Chinese Classic of Poetry* (New York: Grove Press, 1987), 230.

positions and husband and wife. This is to receive the blessing of Heaven.⁷⁵

One difficulty with this explanation in the context here is that ritual specialists (*ru* 儒), the sort of person who would write treatises about ritual music, generally avoided explicit interaction with supernatural entities. Confucius famously did not discuss supernatural spirits, as indicated in the famous *Analects* passage “The master did not talk about extraordinary things, feats of strength, disorder, or spirits” (子不語怪、力、亂、神),⁷⁶ and other ritual specialists generally followed suit. Lothar von Falkenhausen has suggested that at the time there was a strict division of labor between ritual specialists and *wu* 巫 officials, who served as spirit mediums.⁷⁷ However, Northern Song music specialists do not seem to have shared this view, as demonstrated in the explanations of how different instruments invoke different kinds of supernatural entities, as in this passage from the *Huangyou ji* that distinguishes four kinds of drums functionally by their intended recipient:

教為鼓而辨其聲用。以雷鼓鼓神祀；以靈鼓鼓社祭；以路鼓鼓鬼享；以晉鼓鼓金奏。

The teaching is that drums are distinguished by their sound and use. By means of the thunder drum, one drums sacrifices to the heavenly spirits; by means of the numinous drums one drums sacrifices to the god of Earth; by means of the street drums one drums sacrifices to ghosts; by means of the *jingu* one drums metal music.⁷⁸

⁷⁵ CTP *liji/li-yun* 7.

⁷⁶ *Analects* 7:21.

⁷⁷ Lothar von Falkenhausen, “Reflections on the Political Role of Spirit Mediums in Early China: The Wu Officials in the Zhou Li,” *Early China* 20 (1995): 279–300.

⁷⁸ *Huangyou ji*, *SKQS* ed., 3.1r–v. I have omitted the small-print commentary, which provides glosses of the words *shen* 神, *she* 社, and *gui* 鬼, but followed its interpretations in the translation.

In the passage from the “Conveyance of the Rites” above, one can observe that at the same time that the ritual brings down the spirits and their blessings, these effects are manifested in improving relationships among the living. Here it appears the effects of music are not limited to the spirits, but apply to animals and humans as well. This phenomenon can be seen in an observation that the ancient Music Master Kui 夔 observed in a discussion from “Yi and Ji” (*Yi Ji* 益稷) in the *Classic of Documents* (*Shangshu* 尚書):

夔曰：「夏擊鳴球、搏拊、琴、瑟、以詠。」祖考來格，虞賓在位，群后德讓。…夔曰：「於！予擊石拊石，百獸率舞，庶尹允諧。」
Kui said, “Sounding jade is tapped or struck, the *qin* and *se* are brushed or plucked, to accompany singing. The ancestors come, the guest of Yu [the place of his master, the ruler Shun] is in his place, and all the princes virtuously submit” ... Kui said, “Oh! when I strike or strike the stone, the hundred beasts lead one another to dance, and all the ministers become truly harmonious.”⁷⁹

What brings about this submission and harmony? The sources are usually silent on this issue, but one possibility that later theorists explored brings us to the second kind of explanation for music, the sociological. This vein of thought is grounded in the idea of music as an important tool of personal cultivation, which then can regulate interpersonal contact. In the early Zhou dynasty, supposedly music was one of the Six Arts (*liu yi* 六藝) that formed the basis of aristocratic education.⁸⁰ Confucius especially emphasized music as the fulfillment of the process of education, noting that “poetry stimulates, rituals

⁷⁹ CTP shang-shu/yi-and-ji 5.

⁸⁰ The others were ritual, archery (*she* 射), charioteering (*yu* 御), calligraphy (*shu* 書), and mathematics (*shu* 數). See the discussion of the Six Arts in Chapter 4.

establish, and music completes” (興於詩，立於禮，成於樂).⁸¹ Ancient writers in general believed music provided powerful access to their emotional or psychological states.⁸² This is similar in principle to the doctrine of imitation and music in education in ancient Greek works such as Aristotle’s *Politics*.⁸³

But this individual character formation was seldom separated from how it would benefit the larger society, hence my designation of this category as not merely psychological but sociological. The four tools of government came to be enumerated as “rituals, music, punishments, and laws” (禮樂刑政), each of which is, in the *Record of Music*, associated with a distinct governing purpose: “Rituals regulate the people’s hearts, music harmonizes the people’s voices, laws are to administrate, punishments are to defend” (禮節民心，樂和民聲，政以行之，刑以防之).⁸⁴ The stated purpose of music here is of course works in a musical sense, but sets up harmony also as a goal in statecraft. Confucian philosophers were to make much of this political sense of harmony,⁸⁵ a fact surely not unrelated to their appreciation for music.

⁸¹ Analects 8:8. This passage could certainly be referring to the corresponding classics as texts to be memorized; certainly, poetry at least refers to such an established corpus. The same ordering of three appears in Confucius’s mouth in the “Confucius in Leisure” (*Kongzi xianju* 孔子閒居) chapter to the *Record of Ritual*, but with additional steps added on that link them to emotions. CTP liji/kongzi-xian-ju 2.

⁸² Brindley, *Music, Cosmology, and the Politics of Harmony*, 110.

⁸³ A productive comparison between the Greek (largely Aristotelian) and Chinese (largely Xunzian) ideas can be found in James Harold, “On the Ancient Idea That Music Shapes Character,” *Dao* 15, no. 3 (2016): 341–354.

⁸⁴ CTP liji/yue-ji 9.

⁸⁵ See, for example, Li Chenyang, *The Confucian Philosophy of Harmony* (London and New York: Routledge, 2014). Erica Fox Brindley noted that this sense of harmony is hardly to be found exclusively in the past, given recent rhetoric from the government of the People’s Republic of China. Brindley, *Music, Cosmology, and the Politics of Harmony*, ix–x.

This kind of connection between music and politics can also be found in writing from ancient Europe. For example, Cicero observed that “What the musicians call harmony with respect to song is concord in the state, the tightest and best bond of safety in every republic; and that concord can never exist without justice.”⁸⁶ But while Cicero may just be offering a useful analogy, Confucian philosophers took such rhetoric quite seriously, and collapsed discourses of music and politics to the extent that they believed one could achieve political harmony by means of the proper application of musical harmony. The precise mechanism involved here is often not explicitly described, but a starting point may be the theorization of ritual provided by the philosopher Xunzi 荀子 (c. 310–220 BCE).

In the chapter “Discourse on Ritual” (*Lilun* 禮論), Xunzi argued against the propitiative function of ritual by maintaining a skeptical view toward the supernatural. Nonetheless, he advocated for the continued use of ritual as a device for maintaining social order.⁸⁷ By performing ritual (including music), agents would be enacting the very relationships that need to be cultivated to achieve a harmonious society. These ideas are presented more clearly in this chapter than in the subsequent “Discourse on Music”

⁸⁶ “. . . quae harmonia a musicis dicitur in cantu, ea est in civitate concordia, artissimum atque optimum omni in re publica vinculum incolumitatis, eaque sine iustitia nullo pacto esse potest.” Cicero, *Librorum de Re Publica Sex*, ed. C. F. W. Mueller (Leipzig: Teubner, 1889), reproduced on Perseus Digital Library, <http://www.perseus.tufts.edu>. English translation by Melissa Lane, “Ancient Political Philosophy,” *The Stanford Encyclopedia of Philosophy* (Winter 2014 Edition), edited by Edward N. Zalta, <https://plato.stanford.edu/archives/win2014/entries/ancient-political/>.

⁸⁷ John Knoblock, trans., *Xunzi: A Translation and Study of the Complete Works*, vol. 3 (Stanford: Stanford University Press, 1988), 51. Xunzi was likely anticipated by Mozi 墨子 (c. 400s–300s BCE) in this view, though Mozi did not explicitly doubt the supernatural beings. Philip J. Ivanhoe and and Bryan W. Van Norden, *Readings in Classical Chinese Philosophy*, 2nd ed (Indianapolis: Hackett Publishing, 2001), 104n77. Mozi was, however, famously critical of music, and his surviving writings do not concur with the musical aspects of this argument.

(*Yuelun* 樂論), but the parallel structures of the two chapters makes their functional unity clear. As Scott Cook argued, “it is clear that Xun Zi conceived ritual and music as a pair of complementary institutions arising from similar social needs, as the respective remedies to two different types of societal chaos.”⁸⁸ Xunzi is the most explicit theorist here, but even he is not clear about the details.⁸⁹ However, one can see in his discussion on music some sort of influence music exerts on the wills of the listeners, which helps strengthen society:

夫聲樂之入人也深，其化人也速，故先王謹為之文。樂中平則民和而不流，樂肅莊則民齊而不亂。民和齊則兵勁城固，敵國不敢嬰也。Now, sounds and music enter people deeply and transform them rapidly. Therefore, the Former Kings carefully made them fit a pattern. When music is centered and balanced, the people are harmonized and not [consumed by] dissipation. When music is sober and dignified, the people are even and not chaotic. When people are harmonious and even, then armies are strong and the cities secure, and enemy states do not dare bother them.⁹⁰

Perhaps because it can be more easily assimilated with modern disenchanting conceptions of music and the universe, this explanation is the one most likely to find favor among researchers today. Though ethnomusicologists searching for the reasons humans make music have come up with rather disparate answers, most continue to theorize some sort of Durkheimian functionalism, wherein the act of musicking reinforces some cultural value or releases some otherwise dangerous tension that helps

⁸⁸ Scott Cook, “Xun Zi on Ritual and Music,” *Monumenta Serica* 45, no. 1 (1997): 4, <https://doi.org/10.1080/02549948.1997.11731299>.

⁸⁹ Paul Goldin, *Rituals of the Way: The Philosophy of Xunzi* (Chicago: Open Court, 1999), 80.

⁹⁰ CTP xunzi/yue-lun 5; translation adapted from Goldin, 79–80.

bind society together. In that way, they are building on Xunzi's claims, even though they may reject the simplicity of his model of causation.

While sociological explanations are appealing for these reasons, they are seldom explicitly invoked in the Northern Song dynasty sources. Since Xunzi's work became a template for much of the *Record of Music*,⁹¹ perhaps the most important text on ancient music ideology that survived to the Northern Song, these ideas are latent, but the arguments employed by music reformers lack the philosophical agility characteristic of Xunzi. Most likely, this absence is because such argumentation was not part of the goals of the music reformers, who were more practically oriented in attaining results.

The third kind of explanation applies cosmological theories about music. In about the third century BCE, Chinese texts begin to demonstrate a mode of thinking that posited hidden relationships between humans and the cosmos in specific and systematic ways.⁹² In English, this mode of thinking is usually called "correlative cosmology."⁹³ This practice seems to have been heavily indebted to a musical phenomenon; one of the principal explanations for such relationships was the acoustic principle of resonance,

⁹¹ Cook, "Xun Zi on Ritual and Music," 2.

⁹² John B. Henderson, *The Development and Decline of Chinese Cosmology* (New York: Columbia University Press, 1984), 2. Because these relationships appear in texts attributed to earlier sages or have been interpolated into earlier transmitted texts, much earlier dates are sometimes given, but verifiably dated texts do not support such an early development.

⁹³ There does not seem to have been a corresponding indigenous name. Erica Fox Brindley has objected to the static and fully systematized nature of this terminology, in line with her overall interest in the diachronic development of such ways of thinking. She prefers instead the term "cosmologies of resonance," in order to emphasize the underlying logic which could be realized in a variety of conflicting manners in particular situations. The main distinction I see in this terminology is the use of the plural, to emphasize that such cosmologies did not always cohere into a single system, which is true. While I sympathize with her concerns, I believe that if one thinks of the term "cosmology" as indicating a process rather than a product (a double-meaning possible with many scientific nouns in English), there is no problem with the standard term. Brindley, *Music, Cosmology, and the Politics of Harmony*, 3–4.

where the vibration of one string may cause another close by to spontaneously resound. A typical description of how this phenomenon works and its importance appears in the Han dynasty work *The Luxuriant Dew of the Spring and Autumn Annals* (*Chunqiu fanlu* 春秋繁露), attributed to Dong Zhongshu 董仲舒 (179–104 BCE), the Western Han scholar often considered the most important figure in the development and canonization of this mode of thinking. This excerpt is from the passage “Things of the same category move one another” (*Tonglei xiangdong* 同類相動):

故氣同則會，聲比則應，其驗然也。試調琴瑟而錯之，鼓其宮則他宮應之，鼓其商而他商應之，五音比而自鳴，非有神，其數然也。 Thus, if *qi* are similar, they will merge; if sounds correspond [*bi* 比], they resonate [*ying* 應]. The test of this is thus. Try to tune a *qin* and a *se* [string instruments] and be off. If you pluck the *gong* [certain note] on one, then the *gong* on the other will respond to it; if you pluck the *shang* [another note] on one then the *shang* on the other will respond to it. The Five Notes, if they correspond, they will sound by themselves. This is nothing mysterious, but their numbers are that way.⁹⁴

This phenomenon was extrapolated to other domains and, it was supposed, other interactions could be explained by similar, non-audible kinds of resonance. The passage above continues with descriptions of other, non-musical examples of such response, such as animal communication and heavenly portents. Practitioners of correlative cosmology often built up large synoptic schemes, which linked numerous attributes into categories (*lei* 類). Musical phenomena could be linked up with forces, colors, tastes, virtues,

⁹⁴ Chinese text from CTP *chun-qiu-fan-lu/tong-lei-xiang-dong* 1. For other translations, see Needham and Robinson, “Sound,” 281–82; Kenneth J. DeWoskin, *A Song for One or Two: Music and the Concept of Art in Early China* (Ann Arbor: Center for Chinese Studies, University of Michigan, 1982), 72; *Luxuriant Gems of the Spring and Autumn*, trans. Sarah A. Queen and John S. Major (New York: Columbia University Press, 2016), 438.

emperors, directions, and many other things. Groupings of five were especially favored, given the doctrine of the Five Phases (or Elements; *wuxing* 五行), which made the notes of the pentatonic scale fit neatly into such patterns.⁹⁵

Writers on Chinese science have tended to emphasize the fiveness of correlative cosmology. Ho Peng Yoke called it a “heavenly number” that manifested itself in these various pentads.⁹⁶ If he was thinking of a Chinese phrase (he put the term in quotes), presumably he meant *tianshu* 天数. This term that does appear in the *Book of Changes*, but in reference to odd (yang) numbers in general. The *First Commentary on Attached Phrases* (*Xici shang* 繫辭上) of the *Book of Changes* does say “There are five heavenly numbers, there are five earthly numbers” (天数五，地数五),⁹⁷ but this is simply a count of the five odd single-digit numbers. Otherwise, no other classical source gives an indication that it is five. However, and more fundamentally, such a designation is a confusion of a flexible correlational scheme with an *a priori* numerological categorization. There were also correlative schemes of other numbers, including two (generally based on *yin-yang* 陰陽 theory), eight (which included the Eight Timbres *ba*

⁹⁵ William Theodore de Bary and Irene Bloom present a chart, based on passages from the *Record of Ritual* and the *Huainanzi* 淮南子, that links the Five Phases with pentads of seasons, divine rulers, attendant spirits, sacrifices, animals, grains, organs, numbers, earthly stems, colors, tones, tastes, smells, directions, creatures, beasts of the directions, virtues, planets, and officers. William Theodore De Bary and Irene Bloom, eds., *Sources of Chinese Tradition, Vol. 1: From the Earliest Times to 1600*, 2nd ed. (New York: Columbia University Press, 1999), 348–49.

⁹⁶ Ho Peng Yoke, “Chinese Science: The Traditional Chinese View,” *Bulletin of the School of Oriental and African Studies, University of London* 54, no. 3 (1991): 507. In another context, Ho used the term “heavenly numbers” as those used in divination or a metonym for fate. I believe these usages better reflect the Chinese sources and the flexibility of correlative cosmology. Ho Peng Yoke, *Li, Qi and Shu: An Introduction to Science and Civilization in China* (Hong Kong: Hong Kong University Press, 1985), 115 and 146.

⁹⁷ CTP book-of-changes/xi-ci-shang 7.

yin 八音, discussed below), and twelve (which included the Twelve Pitches *shi'er liu* 十二律), and also others that attempted to correlate these cardinally distinct groups.

From these premises, one could deduce that correctly executed music could cause *qi* 氣 to resonate with the music and stimulate its proper flow through the cosmos.

However, such practice would be complex, as this flow varied according to natural cycles, and had to take into account other related categories. If achieved, however, such flow could produce a natural state of prosperity. However, this only works if the music is performed correctly, and therefore such concerns best explain the motivation for the precision to which theorists took their tuning concerns, which went beyond what was audible and thus needed an explanation that went beyond the concerns of human and spiritual agents. It also explains why such concerns as calendrical performances of modes became important.

A procedure that epitomizes cosmological explanations is “waiting for the *qi*” (*houqi* 候氣), which linked calendrical, geomantic, and tuning concerns.⁹⁸ Investigators would arrange pipes sounding the twelve notes of the fixed scale, one in each of the twelve directions corresponding to the Earthly Branches (*dizhi* 地支), and place a small quantity of ash in each, then seal off the room in an airtight manner. Upon re-entering the room later, any ash that was blown must have been pushed by the *qi* that would resonate with the pipe. Because the tubes were tuned precisely and in the arrangement corresponding to the directions, one would expect the appropriate *qi* to disperse the ash at

⁹⁸ Derk Bodde, “The Chinese Cosmic Magic Known as ‘Watching for the Ethers,’” in *Studia Serica Bernhard Karlgren Dedicata*, ed. Søren Egerod (Copenhagen: E. Munksgaard, 1959), 351–72.

the appropriate moments of the calendar, and one could be certain that the flow of *qi* was in balance with the cosmos. Though it is unclear the extent to which this procedure was ever more than a thought experiment, it remained discursively important for centuries. By the Song period, music scholars had noted the practical application that such an experiment could test the cosmic accuracy of a set of pitchpipes, thus verifying by cosmological means the tuning standards.⁹⁹

These categories of explanations were often not kept clearly distinct. For instance, a cosmological explanation might be grafted onto a propitiative explanation. Both correlative cosmology and propitiation are based on the concept of response. That the latter involves a response from a sentient being is not a major difference, as Dong Zhongshu, later in the passage cited above, proceeded to discuss horses and oxen responding to one another. Writers on music sometimes imagined the response of supernatural beings the sort of *qi* flow associated with cosmological explanations. For instance, in an edict, the Northern Song emperor Renzong (r. 1022–1063) described the end result of a newly proposed music reform that it will “make the ancestors spread forth their merit without limit, the deities will be moved to respond with favorable *qi*” (使祖宗功德發揚無窮，神祇感格善氣來應).¹⁰⁰ To a certain extent the avoidance of clearly demarcating how music worked was likely often a strategic omission, to appeal more broadly to those who held different understandings of the phenomenon or none at all.

⁹⁹ Bodde, 367. He cites the Southern Song scholar Cai Yuanding 蔡元定 (1135–1198). Though I have not found an earlier citation that uses this idea explicitly, it certainly fits within the cosmic worldview of the Northern Song and may have been attempted.

¹⁰⁰ *Huangyou ji*, SKQS ed., 1.4r. Renzong’s edict will be analyzed in detail in Chapter 2.

Such a strategy was certainly pursued by Xunzi, whose skepticism did not exclude maintaining the appearance of supernatural intervention for the less educated.¹⁰¹

Finally, it should also be noted that, in the political context in which they occurred, none of these explanations need be taken as true for music reform to be pursued vigorously. Once a discourse of the efficacy of music had developed and became expected, any regime that ignored it would lose a powerful means of demonstrating their legitimacy for those who did adhere to these theories, or worse, risk demonstrating their own illegitimacy by departing from timeworn norms.¹⁰² Moreover, in adroitly handling such matters, one could demonstrate political skills that signaled other sorts of legitimacy. For instance, Joseph Lam, who has often considered imperial ritual music in this way, saw the performance of Emperor Huizong and his music ministers in meta-musical terms as a “perfect ensemble, manipulating music as an orthodox expression of emperorship and officialdom.”¹⁰³ It is seldom possible to determine whether these agents are responding to sincere convictions or predictions of political gains, but either position strengthens the discourse of the power of ritual music.

¹⁰¹ Xunzi commented of the sacrifice that “among Superior Men it is considered to be a human practice; among the common people it is considered to be a serving of the spirits” (其在君子以為人道也，其在百姓以為鬼事也; CTP xunzi/li-lun 32). C. K. Yang noted that this “dualistic” character of sacrifice, where it was interpreted alternately as supernatural and as rational by different classes, remained characteristic of imperial Chinese religious practice. C. K. Yang, *Religion in Chinese Society; a Study of Contemporary Social Functions of Religion and Some of Their Historical Factors*. (Berkeley: University of California Press, 1961), 254.

¹⁰² For a wonderful discussion of how ritual concerns could bind even the most uninterested monarchs, see Howard J. Wechsler, *Offerings of Jade and Silk: Ritual and Symbol in the Legitimation of the T'ang Dynasty*, 1st Edition edition (New Haven: Yale University Press, 1985).

¹⁰³ Lam, “Huizong’s Dashengyue,” 439.

Musical instruments

Chinese music theorists have traditionally divided musical instruments into eight categories called the Eight Sounds (*ba yin* 八音). The name is associated with the legendary emperor Shun,¹⁰⁴ but most textual appearances use the phrase simply as a metonym encompassing music in general, with eight denoting completeness rather than a specific categorization. However, some classical sources specify that the eightfold categorization is based on the material of the instruments. In the ordering in the classic *Rites of Zhou*, these categories are: metal (*jin* 金), stone (*shi* 石), clay (*tu* 土), leather (*ge* 革), silk (*si* 絲), wood (*mu* 木), gourd (*hu* 匏), and bamboo (*zhu* 竹).¹⁰⁵

Because of the classical precedent of the division, musical ensembles tended to include members of each of these classes. However, imperial music discourse tended to emphasize the principal representatives of the first two of these categories, bells (*zhong* 鐘) and lithophones (*qing* 磬). Because they are both ordinarily hung in chimed sets to be played, they were also grouped together as “suspended music” (*yuexuan* 樂懸), a term that originates in the *Rites of Zhou*.¹⁰⁶ Since they are central to all discussions of music reform, let me pause to briefly define these two in particular.

¹⁰⁴ This attribution appears in the *Historical Records (Annals of the Five Emperors* 五帝本紀 24) and the *Classic of Documents (Yi and Ji* 益稷 3).

¹⁰⁵ Other lists contain the same elements (with the exception that “leather” is replaced by the nearly synonymous “skin” *pi* 皮), but may be in a different order (for instance, in the *Book of Han* 漢書 “Treatise on Calendrics and Tuning” 律曆志上 4). I have used this order here because of the importance of the *Rites of Zhou* for many of these scholars and is the order used when the Eight Sounds are used to organize listings of instruments in the *Lishu* and the *Yueshu*.

¹⁰⁶ *Rites of Zhou Chunguan* 春官 (“Spring Offices”) 107, discussing the role of the *Xiaoxu* 小胥 (“Minor Music Officer”).

There were many types of bells in China, not all of which are intended when I use the word “bell.”¹⁰⁷ The English general term “bell” does not have an equivalent in the Chinese writings I examine; different types of bells had different names, and the only overarching category sometimes used, *jin* 金 “metal,” also included objects that are not bells. In Lothar von Falkenhausen’s detailed study of ancient Chinese bells, he distinguishes nine classes of bells in current use among archaeologists, which are based on a mixture of classical terminology and neologisms.¹⁰⁸ The complexities of this classification, however, was not well understood in Song times, when few examples of most of these types were known. In this dissertation, when I use the word “bell,” I mean only the group that Falkenhausen collectively refers to as the *zhong* 鐘 family. These are distinguished from other bell types by appearing in musical performances (in contrast to other bell types used primarily for signaling), having definite pitches, being often arranged in chimed sets, and being suspended.¹⁰⁹ In particular, Falkenhausen divides them into *yongzhong* 甬鍾 and *bo* 罇¹¹⁰ bells, distinguished by the manner of suspension;

¹⁰⁷ The organologist Curt Sachs defined a bell as “ein Schlaggefäß mit klingendem Rand und stummen Scheitel,” translated by Lothar von Falkenhausen as “a vessel-like percussion instrument with a sound-producing rim and a mute apex.” The definition mainly distinguishes them as a category from gongs, where the center produces sound and the rims are mute. One feature Sachs does not specify, but that applies to all bells examined here and most (but not all) bells worldwide, is that they are made out of metal. Curt Sachs, *Geist Und Werden Der Musikinstrumente* (Hilversum: Frits A. M. Knuf, 1965), 101; Lothar von Falkenhausen, *Suspended Music: Chime-Bells in the Culture of Bronze Age China* (Berkeley: University of California Press, 1993), 67.

¹⁰⁸ Falkenhausen, *Suspended Music*, 67–72.

¹⁰⁹ The exception to the suspension is the *nao* 鐃 bell, which was mounted face upward. However, this type was unfamiliar to the Song, who considered *nao* to be a small, signaling bell, one of the four bells (*chun* 鐃, *zhuo* 鐃, *nao*, and *duo* 鐃) used alongside the six drums for signaling purposes during ritual performances, according to the *Rites of Zhou Diguan* 地官 (“Earthly Offices”) 101, in the section on the “Royal Drummer” (*guren* 鼓人).

¹¹⁰ Falkenhausen uses the variant character 罇, which does not appear in Song treatises to my knowledge. Falkenhausen, *Suspended Music*, 68.

the former use a shank while the latter use a loop. Song writers seldom understood this contrast, and often took the terms as equivalent, using the term *bozhong* 罇鍾 as a synonym compound.

In contrast to bells, lithophones (also translated as “stone-chimes” or “sounding stones”) form a homogenous category in what we understand of ancient Chinese musical practice. Moreover, because they are uncommon in Western music, they are less likely to suffer from formal misunderstandings. There may, however, remain misunderstandings due to the cultural estimation of stones, which was considerably higher in China. By the Northern Song, connoisseurs of stones had developed their own discourses, and sonic properties were generally held to be an important characteristic of stones among connoisseurs. For instance, in Du Wan’s 杜綰 “Stone Catalog of Cloudy Forest” (*Yunlin shipu* 雲林石譜, c. 1126), he pays careful consideration to the resonance of the stones he includes.¹¹¹

Bells and lithophones are the two principal instruments of concern in Song Dynasty writings on music reform, always discussed before other instruments, because of the confluence of antiquity, prestige, and durability that these instruments obtain.¹¹² Both bells and lithophones developed autochthonously in China at an early stage, and thus appear as artifacts and in textual records from early times. Because of the considerable expense of making them and sumptuary laws that restricted their use to certain members

¹¹¹ Edward H. Schafer, *Tu Wan’s Stone Catalogue of Cloudy Forest* (Berkeley: University of California Press, 1961), 33.

¹¹² Jeffrey Moser makes a similar point about the priority of tripods (*ding* 鼎) in the antiquities catalogs I analyze. Jeffrey Moser, “Why Cauldrons Come First: Taxonomic Transparency in the Earliest Chinese Antiquarian Catalogues,” *Journal of Art Historiography*, 2014, 1–23.

of the aristocracy, patrons of these instruments were especially interested in documenting their construction and use in inscriptions and transmitted texts, which would signal their social status and wealth. Being more apt to be preserved than instruments made from organic materials (such as wood, leather, or silk), musical instruments of these types are more likely to have survived as tangible artifacts that could be studied directly. For these reasons, more information was available to Song scholars (and remains available today) on these instruments than other kinds of ancient instruments.

Moreover, precisely because they were the most prestigious instruments in classical descriptions, they were of special concern to the classically-minded scholars of the Song Dynasty. As the prestige of the instruments was connected to ritual use, as opposed to faddish entertainment, knowledge about these instruments would be practical for those who wished to rectify imperial music practice. They were central to the musical ensemble used in the most important rituals, particularly the suburban sacrifice to heaven and earth (*jiaosi* 郊祀) at the circular mound altar (*yuanqiu tan* 圓丘壇), and the ancestral offering (*jisi* 祭祀) in the ancestral temple (*zongmiao* 宗廟). These two rituals reflected the emperor's role as the nexus between heaven and earth, and recognized him as part of a lineage that connected him with emperors of the past. Unlike performers of popular entertainment, scholars interested in details of ritual inevitably had a high degree of literacy and documentary sense, thus their descriptions tend to dominate the surviving evidence.

As noted above, musical ensembles usually included many other types of instruments, although they were much less often discussed in official music reform

treatises. However, many of these instruments were becoming important during the Northern Song, even among the scholarly classes. For instance, the string instrument *qin* 琴 had long been an important symbol of refinement. The Northern Song scholar Zhu Changwen 朱長文 (1041–1100) wrote the *History of the Qin* (*Qin shi* 琴史), a compilation of historical anecdotes that clearly demonstrated a classical precedent and a long history of orthodox performers, including many of the venerated sage-kings.¹¹³ However, as it was intended as an expressive solo instrument and was ill-suited to large ensemble performances, the set of writings on the *qin* intersects only rarely with the music reform treatises under consideration. Other instruments, which did form part of ritual music ensembles, are sometimes discussed in the treatises, but generally in much less detail than bells and lithophones.

As a final point, music reform treatises were not necessarily limited to what we might recognize as “musical” instruments. For instance, the concluding section of the *Huangyou ji* treatise, which has the ostensible function of describing a “new music,” has a section on the design of the *shengding* 牲鼎 ritual tripod, which is used to offer food to the spirits. While under ordinary circumstances tripods were not used to produce sound, the vessels for the imperial sacrifice were considered closely related to the ritual function of music and relevant to the metrological and reconstructive interest of the treatise. On the other hand, though songs were used in ritual and their lyrics are frequently preserved

¹¹³ For an overview of this work, see Fang Baozhang 方宝璋 and Zheng Linghun 郑俊晖, *Zhongguo Yinyue Wenxianxue* 中国音乐文献学, 250–52.

in dynastic histories, there is remarkably little discussion of singing in music reform treatises.

One thousand years of scholarship

As has already been noted, Chinese study of historical music has been an ongoing endeavor since the Song times. The works that survive do so because they were preserved, copied, or published, activities which only happen if the works were deemed of interest to their preservers, copiers, or publishers. Throughout the imperial period, much of this inquiry took place largely within the discourse of official ritual music practice, which continued to ask questions about ancient ritual in order to resolve questions about practice and legitimacy. Though ritual music continued to develop and the Northern Song scholarship was no longer on the cutting edge, it apparently continued to provide useful information for the theorization of later scholars. There was also similar interest in other states in East Asia, which had their own local reasons sought to replicate Chinese court culture in their own local conditions.¹¹⁴ By the Qing dynasty, curious scholars, particularly those who aligned themselves with the *Kaozheng* 考證 (“Evidentiary scholarship”) movement, reframed such investigations to be more empirical and sought to investigate the past on its own terms. Scholars such as Dai Zhen 戴震 (1724–1777), Cheng Yaotian 程瑤田 (1725–1814), and Wang Yinzhi 王引之

¹¹⁴ The use of Song resources in music rectification in Joseon Korea is discussed in Robert Provine, *Essays on Sino-Korean Musicology: Early Sources for Korean Ritual Music* (Seoul: Iljisa Publishing Company, 1988), 75f.

(1766–1834) did excellent philological work that greatly enhanced the understanding of classical passages regarding bells, for instance.¹¹⁵

It was around this time that Western scholars got their first reliable information on Chinese music, from the French Jesuit scholar Jean Joseph Marie Amiot (1718–1793), whose interest in music tended toward the historical, but who also provides a window from the outside on late imperial musical practice that would be unavailable using only Chinese sources.¹¹⁶ Later scholars worked firmly within the context of Sinology, the branch of philology that concerned itself with China. Their interest in music was more peripheral, but due to the prominent role music plays in Chinese discourse, they invariably encountered musical references that they attempted to explain. Occasionally the results were quite impressive. Among these the most notable is Maurice Courant (1865–1935), whose contribution on Chinese music to the *Encyclopédie de la musique et dictionnaire du conservatoire* (1913) is a remarkably detailed compilation of the historical information about music from the works that were available to him within the Chinese imperial library.¹¹⁷

At this time, both Chinese and Western scholars were mostly interested in recovering the oldest strata of the musical tradition, although for different reasons.

Chinese scholars continued to stress ideologically the orthodoxy of these early

¹¹⁵ Falkenhausen, *Suspended Music*, 87.

¹¹⁶ Jean Joseph-Marie Amiot, *Mémoire sur la musique des Chinois, tant anciens que modernes* (Paris: Nyon l'aîné, 1779), reprinted as Joseph Marie Amiot, *Mémoire sur la musique des Chinois* (Geneva: Minkoff Reprint, 1973).

¹¹⁷ Maurice Courant, “Chine et Corée: Essai historique sur la musique classique de la chinois avec un appendice relatif a la musique coréenne,” in *Encyclopédie de la Musique et Dictionnaire du Conservatoire, Première Partie: Histoire de la Musique Antiquité - Moyen Age*, ed. Albert Lavignac (Paris: Libraire Delagrave, 1913).

practitioners and see recovering their approach with the same practical importance it had in the Song. Western scholars, on the other hand, tended to see in the oldest materials the most authentic representation of a Chinese spirit, one that could serve as a foil to the European spirit (positively or negatively, depending on the ideology of the scholar). Chinese and Western scholars agreed in their view that later periods were generally corrupted versions of earlier periods and provided useful information only in filling in the lacunae of earlier periods. For this reason, the research of both parties focused on explication of works and bibliography essentially in the manner of traditional commentators. Neither one had much interest in historicizing music discourse or analyzing how it was transformed in the postclassical era.

In China, these interests only developed after substantial contact with musical and academic traditions from abroad, which had in the nineteenth century grown more sophisticated. By the turn of the twentieth century, many musicians in the younger generation in China sought to revitalize Chinese music along Western grounds as part of their own nationalist project.¹¹⁸ While most of the interest was practically focused on developing performers and audiences that matched European models, a few, such as Wang Guangqi 王光祈 (1892–1936), who studied with Erich von Hornbostel in Germany, came to be interested in the theoretical questions posed by comparative musicology posed and begin to reinvestigate the case of China.¹¹⁹ By the 1930s, a few

¹¹⁸ For a comprehensive view of this period, see Liu Ching-chih 刘靖之, *A Critical History of New Music in China*, trans. Caroline Mason (Hong Kong: Chinese University Press, 2010).

¹¹⁹ His major historical work, first published in 1934, was Wang Guangqi 王光祈, *Zhongguo yinyue shi* 中國音樂史 [*A History of Chinese Music*] (Taipei: Taiwan Zhonghua shu ju, 1956).

East Asian scholars became interested in constructing comprehensive narratives of the imperial Chinese music for their own historicist reasons. Yang Yinliu 楊蔭瀏 (1899–1984) was the first Chinese of the new generation to systematically engage with imperial Chinese music history. His work usefully collates a variety of imperial sources, tracing the development of musical ideas across Chinese history, though guided by a Marxist materialist metanarrative. He came to be considered the doyen of Chinese music studies and his approach formed the basis of Chinese music history as studied in the People’s Republic, which was hampered by ideological constraints and unstable political support until the 1980s.

Since then it has rapidly developed, both along the lines of ethnographic and historical work. However, the latter has often continued to be dominated by interest in the earliest period, especially given the remarkable archaeological discoveries that have allowed that period to be thoroughly re-interpreted, particularly the 1978 discovery of the bell-chime of the Marquis Yi of Zeng (*Zenghou Yi* 曾侯乙). The most important scholar after Yang Yinliu, Huang Xiangpeng 黃翔鵬 (1927–1997), mostly specialized in this early period, but tried to maintain its continuity with the present, living folk traditions using the analogy of a flowing river.¹²⁰ This ideology, which clearly promotes ethno-nationalist ends, minimizes the contingency of the musical practices of specific eras, which is necessary for an accurate understanding of how they functioned.

¹²⁰ For instance, Huang Xiangpeng 黃翔鵬, *Suliu Tanyuan: Zhongguo Chuantong Yinyue Yanjiu 溯流探源: 中国传统音乐研究 [Tracing the Stream to Its Source: Studies of Traditional Chinese Music]* (Beijing: Renmin yinyue chubanshe, 1993).

The first works to focus on the music of a particular era came from Japan and Germany, which opened up the discursive space to considerations of institutional structure and the nature of performance. In Japan, which had adopted Western historiographical practices somewhat earlier than China, Shigeo Kishibe 岸辺成雄 (1912–2005) provided the first systematic exploration of a specific Chinese music infrastructure, the musical institutions of the Tang dynasty; today it remains a comprehensive achievement.¹²¹ Meanwhile, Martin Gimm’s heavily annotated translation of the treatise *Yuefu zalu* 樂府雜錄 (“Miscellaneous notes on the Music Bureau”; c. 890) provided a look into the memories of performing musicians in the late Tang.¹²²

It is probably no coincidence that both of these works focused on the Tang, which was seen as a high point in Asian culture. While focus remained on the earlier period, the Tang developed into a secondary focus as the most noteworthy musical culture since the Han. In a way analogous to the emphasis on ancient music, post-Tang developments took on the narrative function of decline and were therefore seen as less worthy of study. This devaluation neglects intriguing questions about what kind of transformation in musical thought and practice might have accompanied the rise of commerce, the decline in aristocratic privilege, the expansion of the imperial examination, the neo-classicism of the Ancient Writing movement, or any of the other factors that have tended to make

¹²¹ Shigeo Kishibe 岸辺成雄, *Tōdai Ongaku No Rekishiteki Kenkyū* 唐代音楽の歴史的研究 [Research into the History of Tang Dynasty Music] (Tokyo: Tokyo University Press, 1961).

¹²² Martin Gimm, *Das Yueh-Fu Tsa-Lu des Tuan An-Chieh: Studien zur Geschichte von Musik, Schauspiel und Tanz in der T'ang-Dynastie* (Wiesbaden: Otto Harrassowitz, 1966).

historians see the Song dynasty unusual or some kind of turning point to the “early modern.”¹²³

Meanwhile, as musicology developed in the West, Western scholarship on Chinese music came to occupy a peculiar niche. On the one hand, as a music outside of the European common practice, it has largely been in the domain of ethnomusicology, which, due to its anthropological approach, is largely confined to investigating extant musical cultures. This field has certainly provided many quality studies of contemporary musical practice within China, but it has not generally been able to avail itself of the rich historical information that the Chinese sources provide, among the richest of any musical discourses in the world, and provide an account of the historical workings of the music culture. On the other hand, historical musicology, which should be better-suited to such historicism, has largely been dominated by studies of European music, which was long thought exceptional due to the sophistication of harmonic practice, and therefore more worthy of historical study.¹²⁴ Both of these biases have diminished in recent years, as historical ethnomusicologists have argued for greater interdependence between the past and the present and historical musicologists have gradually moved toward contextualizing European music within a global context, but the division of labor in institutions and scholarly societies still works against imperial Chinese music from

¹²³ The periodization of the Song dynasty as “early modern” was the interpretation of the influential Japanese historian Naitō Konan 内藤湖南 (1866–1934). This discourse survives in the emphasis on the Tang-Song transition, for example in Peter K. Bol, *“This Culture of Ours”: Intellectual Transitions in T’ang and Sung China* (Stanford: Stanford University Press, 1992).

¹²⁴ This discourse of exceptionalism is quite similar to the one in the history of science, which long considered the Scientific Revolution a unique event, similar to the development of functional harmony, which demanded historical explanation. Even apologists for Chinese science, like Joseph Needham, tended to adhere to such a view, and see their job as explaining difference.

becoming a major area of research. There have been, however, a few exceptional researchers who have shaped the field as it exists now.

Detailed Western scholarship on imperial Chinese music got going in the 1960s with the foundational work of two scholars, each of whom assembled schools of scholars around them: Rulan Chao Pian 卞趙如蘭 (1922–2013) at Harvard and Laurence Picken (1909–2007) at Cambridge. Pian worked within the paradigms of historical musicology as it was practiced in the 1950s and 1960s. Her main work, *Song Dynasty Musical Sources and their Interpretation* (1967) was awarded the American Musicological Society's Otto Kinkeldy Prize, perhaps a signal of that society's desire in that era to move in a more global direction.¹²⁵ However, because it dealt with a language and repertoire so far from the ken of most American musicologists, in the words of her student Bell Yung, "the book itself caused hardly a ripple in Historical Musicology."¹²⁶ Most of Pian's later research dealt with more contemporary music performance, based on oral performing literatures that she analyzed from recordings she made.

Laurence Picken had a long and varied career. He actually began as an academic zoologist, but from an early age developed an interest in music of Turkey and China, and in 1966 formally changed to the music faculty. After an interest in organology, he came to specialize in the interpretation of historical sources. He founded a research group at Cambridge known as the Tang Music Group, who collectively produced seven volumes

¹²⁵ This title is not misspelled. Throughout her work, she uses her father Yuen Ren Chao's 趙元任 transliteration scheme Gwoyeu Romatzyh 國語羅馬字, unlike the dominant Wade-Giles and pinyin usage of nearly all other scholars. Given the prominence of her work, adding a third competing transliteration scheme has surely not helped welcome non-specialists to take an interest in Chinese music.

¹²⁶ Bell Yung, "Remembering Mrs. Pian, My Mentor and Friend," *CHINOPERL* 33, no. 2 (December 2014): 138, <https://doi.org/10.1179/0193777414Z.00000000024>.

of *Music of the Tang Court* (1981–2006), that offer reconstructions of the entertainment music of the Tang based on a few lost sources and a reinterpretation of Japanese sources.¹²⁷

The legacies of Pian and Picken have mostly come to fruition in recent Chinese scholarship.¹²⁸ Moreover, interest in the Song dynasty (as opposed to the Tang) has grown there in the last decade, boosting the organization of panels and sessions in academic conferences related to this time, and most recently the International Academic Seminar on Song Dynasty Music Research 宋代音乐研究国际学术研讨会, which convened in 2009 and 2013. The participants have diverse interests and approaches to studying Song music culture. Prominent recent scholars include Li Youping 李幼平, who has performed a thorough study of the surviving *Dashengyue* bells around the world, Kang Ruijun 康瑞军, who has analyzed the role of musical institutions in the Song court, Huang Yi'ou 黄艺鸥, who has compiled the careful chronology of Northern Song music history, Zheng Changling 鄭長玲, who has examined the contents of the largest Song dynasty music treatise, the *Book of Music*, and Yang Yuanzheng 楊元錚, who has analyzed the lyric songs of the Southern Song composer Jiang Kui 姜夔 (c. 1155-c.

¹²⁷ Laurence Picken, *Music from the Tang Court* (London: Oxford University Press, 1981); Laurence Picken, R.F. Wolpert, and Noël J. Nickson, *Music from the Tang Court 2* (Cambridge: Cambridge University Press, 1985); Laurence Picken, *Music from the Tang Court 3* (Cambridge: Cambridge University Press, 1985); Laurence Picken, *Music from the Tang Court 4* (Cambridge: Cambridge University Press, 1987); Laurence Picken, ed., *Music from the Tang Court 5* (Cambridge: Cambridge University Press, 1990); Laurence Picken and Noël J. Nickson, eds., *Music from the Tang Court 6* (Cambridge: Cambridge University Press, 1997); Laurence Picken and Noël J. Nickson, *Music from the Tang Court 7: Some Ancient Connections Explored* (Cambridge: Cambridge University Press, 2006).

¹²⁸ David W. Hughes, "The Picken School and East Asia: China, Japan and Korea," *Ethnomusicology Forum* 19, no. 2 (November 2010): 231–39, <https://doi.org/10.1080/17411912.2010.508236>.

1221).¹²⁹ Another strain of scholarship has been more practically oriented toward reconstruction and performance of Song music, beginning with the positive reception Shanghai Conservatory professors such as Zhao Weiping 赵维平 and Chen Yingshi 陳應時 gave to Picken’s research.¹³⁰ Most recently, Zhao is coordinating the construction of a database of historical notation at his institution, known as the Research Centre on China and East Asian Notation 中国与东亚古谱数据库管理平台.¹³¹ Thanks to the continuing efforts of such scholars, musical works recorded in the Southern Song sources are now being performed in performances no more speculative than European early music—which is to say, of course, still quite speculative, but still the endeavors are far more sophisticated and rigorous than earlier attempts. In all, the recent research by Chinese scholars on Song music is building a much more solid understanding of the nature and practice of music-making during the Song dynasty.

Nearly all of the research so far discussed was undertaken with a positivist orientation. Again, the local causes in Chinese and Western research for this focus are

¹²⁹ Li Youping 李幼平, *Dashengzhong yu Songdai huangzhong biao zhun yingao yanjiu* 大晟鍾與宋代黃種標準音高研究 (Shanghai: Shanghai yinyue xueyuan chubanshe, 2004); Kang Ruijun 康瑞军, “Hegu Zhidu Ji Qi Zai Songdai Gongting Yinyue Zhong de Zuoyong 和雇制度及其在宋代宫廷音乐中的作用 [‘Hegu System’ and Its Function in the Court Music of the Song Dynasty],” *Yinyue Yishu (Shanghai Yinyuexueyuan Xuebao)* 音乐艺术(上海音乐学院学报) 2007, no. 2 (2007): 79–89; Huang Yi’ou 黄艺鸥, “Zhongguo Yinyue Biannianshi de Lilun Sikao—Beisong Yinyue Bian Nianshi Yanjiu de Gean 中国音乐编年史的理论思考——北宋音乐编年史研究的个案,” *Zhongguo Yinyuexue* 中国音乐学, no. 4 (2013): 41–46; Zheng Changling 鄭長玲, *Chen Yang Jiqi “Yueshu” Yanjiu* 陈旸及其《乐书》研究; Yang Yuanzheng 楊元錚, “Jindou: A Musical Form Found in Southern Song Lyric Songs,” *T’oung Pao* 101, no. 1–3 (August 28, 2015): 98–129, <https://doi.org/10.1163/15685322-10113P03>; Yang Yuanzheng 楊元錚, *Plum-Blossom on the Far Side of the Stream: Renaissance of Jiang Kui’s Lyric Oeuvre* (Hong Kong: Hong Kong University Press, 2018).

¹³⁰ Hughes, “The Picken School and East Asia,” 235–36.

¹³¹ “The Research Centre of China & East Asian Notation 中国与东亚古谱研究中心,” 2018, <https://ceanotation.www.shcmusic.edu.cn/strongly/index.jsp>.

different, but the results are largely the same. Chinese research, while no longer dominated by Marxist historicism, continues the scientism on which it was based. The major project of Chinese music scholars continues to be the accurate description of the musical developments, *wie es eigentlich gewesen*, in ever greater precision. The valuable contributions of more recent scholars, including those who have focused on the Song dynasty, are hampered by this limitation. Meanwhile, both Pian and Picken saw as their most important result of their research the production of critical editions of works of music from the Tang and Song eras. The project was inspired by their colleagues who practiced Early Music research in European musicology, and who treated music theory and historiography as stepping stones toward the transcription and authentic performance of long-lost musical works. However, there is an irony for these researchers of both China and Europe, in that the objects of their study tended to only sporadically provide the type of practical information they seek, since those who wrote them generally deemed it less significant than the underlying music ideology.

However, the positivist critique of musicology and the rise of various schools that have been collectively labeled New Musicology in the 1990s led to a new kind of musicological scholarship, one that sought to interrogate how musical practices functioned as part of complex cultural or social phenomena. The usual touchstone here is Joseph Kerman, who stressed the limitations of positivist scholarship, in the interest of reclaiming a scholarly role for music criticism.¹³² The scientific approaches of Pian and Picken fit cozily into his critique of positivism, though he does not mention them or other

¹³² Joseph Kerman, *Contemplating Music: Challenges to Musicology* (Cambridge: Harvard University Press, 1986).

scholars of historical music from Asia. Kerman and the vast majority of his colleagues were primarily interested in the living traditions of Western art music, and his ideas have not been particularly influential among scholars of other cultivated music traditions in the world.

One possible exception is Gary Tomlinson. His early work is based in the traditional musicological domain of the European Renaissance, though he later became interested in musics outside of this realm, the pre-Columbian and most recently, the music of other species.¹³³ For my purposes, though, what is important about him is the role he gives interpretive context in his research. In describing his research program, he cites the interpretive anthropology of Clifford Geertz, claiming that what is important is reconstructing the cognitive worlds of what meanings musical actions had for their agents. It is these lost cognitive worlds that give the historical musical sources their meaning, and it is these, not musical notes, that should be the ultimate goal of reconstruction.¹³⁴ Unfortunately, Tomlinson tends to get bogged down in the distinctions of continental philosophy he uses for his analysis, though it is certainly reasonable that one must make reference to extrinsic philosophical frames when dealing with areas with little indigenous literature. However, scholars who wish to follow his model to study societies for which substantial literary resources are available can draw on more appropriate philosophical categories and approaches.

¹³³ Gary Tomlinson, *The Singing of the New World: Indigenous Voice in the Era of European Contact* (Cambridge: Cambridge University Press, 2007); Gary Tomlinson, "Sound, Affect, and Musicking before the Human," *Boundary 2* 43, no. 1 (2016): 143–72.

¹³⁴ Gary Tomlinson, "The Web of Culture: A Context for Musicology," *19th Century Music* 7, no. 3 (1984): 350–62.

Few have yet applied this method to Chinese music, but there are promising trends in other fields of Chinese study. Paul Goldin has called for adopting a “thick description of Chinese philosophy,” by paying more attention to what details in the original text would have been read to contemporaries, and less to how it fits into contemporary debates. In a revealing passage, he laments how “much ink has been spilled...over the Procrustean question of whether Mohist ethics is deontological or consequentialist. The answer will matter only to a philosopher who is prepared to deracinate Mohism by disregarding what the ancient Chinese themselves thought was significant about Mohist philosophy.”¹³⁵ In a similar way, I react against those who would read traditional Chinese musical thought only for evidence about how it addresses other concerns, such as reconstructing lost musical scores. In a Western intellectual context, philosophy and music are similar in that they are often seen as autonomous endeavors which can be practiced independently of cultural context, and thus perhaps lend themselves to such “deracination.”¹³⁶

While Western musicologists have largely avoided earlier periods of Chinese history, music appears prominently in the writing of intellectual historians such as Kenneth J. DeWoskin, Howard L. Goodman, and Erica Fox Brindley and art historians such as Lothar von Falkenhausen, Jenny So, or Ingrid Furniss.¹³⁷ These scholars’ insights

¹³⁵ Paul Goldin, *After Confucius: Studies in Early Chinese Philosophy* (Honolulu: University of Hawaii Press, 2005), 3.

¹³⁶ In music, perhaps the clearest example of such deracination has been in the field of temperament. Western scholarship on Chinese musical thought has long emphasized its mathematical aspect, which it has tended to assimilate to the generative systems of Pythagoras in ways that obscure specifically Chinese discourses of numerical significance. I explore this issue in more detail in Chapter 4.

¹³⁷ DeWoskin, *A Song for One or Two*; Howard L. Goodman, *Xun Xu and the Politics of Precision in Third-Century AD China* (Leiden: Brill, 2010); Brindley, *Music, Cosmology, and the Politics of Harmony*; Falkenhausen, *Suspended Music*; Jenny F. So, ed., *Music in the Age of Confucius* (Washington, D.C: Freer

into musical thought and practice are invaluable, but in general they have mostly been concentrated on the pre-imperial or early imperial period. On the other hand, scholars of art or literature of the Song dynasty have produced fascinating studies on the interdependence of aesthetics and the sociopolitical context, such as the studies of Amy McNair, Alfreda Murck, and Patricia Ebrey in art and Ronald Egan and Ari Levine in literature.¹³⁸ The philosophical and political concerns that underlay the music reform proposals reveal similar and engaging dynamics but are generally yet to be seriously considered by scholars.

The two major exceptions to this are Joseph Lam 林萃青 and Christian Meyer, who have studied the concerns that underlie Song musical-ritual practice.¹³⁹ Joseph Lam, who began as a student of Pian but identifies as an ethnomusicologist, is one of the major exponents of a historical ethnomusicology that conceives of an ethnographic encounter through historical records, as he himself wrote:

As a historical ethnomusicologist, I wish I could do fieldwork in the Ming court, observing the court citizens and asking them why state sacrifices and music played such a central role in their public and private lives. The

Gallery of Art, Smithsonian Institution, 2000); Ingrid Furniss, *Music in Ancient China: An Archaeological and Art Historical Study of Strings, Winds, and Drums During the Eastern Zhou and Han Periods (770 BCE-220 CE)* (Amherst: Cambria Press, 2008).

¹³⁸ Amy McNair, *The Upright Brush: Yan Zhenqing's Calligraphy and Song Literati Politics* (Honolulu: University of Hawai'i Press, 1998); Alfreda Murck, *Poetry and Painting in Song China: The Subtle Art of Dissent* (Cambridge: Harvard-Yenching Institute, 2000); Patricia Ebrey, *Accumulating Culture: The Collections of Emperor Huizong* (Seattle: University of Washington, 2008); Ronald Egan, *The Problem of Beauty: Aesthetic Thought and Pursuits in Northern Song Dynasty China* (Cambridge: Harvard University Press, 2006); Ari Levine, *Divided by a Common Language: Factional Conflict in Late Northern Song China* (Honolulu: University of Hawaii Press, 2008).

¹³⁹ Another exception is Beverly Bossler, but since her work relates to courtesan music-making instead of the ritual music I am concerned with, I do not treat her here. Beverly Bossler, "Shifting Identities: Courtesans and Literati in Song China," *Harvard Journal of Asiatic Studies* 62, no. 1 (2002): 5–37, <https://doi.org/10.2307/4126583>; Beverly Jo Bossler, *Courtesans, Concubines, and the Cult of Female Fidelity* (Harvard University Asia Center, 2016).

emperors and scholar-officials cannot be reached now, but they have left a wealth of evidence that they found their state sacrifices and music expressive.¹⁴⁰

Lam began his research in the Ming context, but has since done similar work during the Song, though most of it is related to the Southern Song.¹⁴¹ Recently, he has also weighed in on the reconstructive efforts, similar to the debates about early music authenticity in the West, conceiving the philosophy of “music of reminiscence” (*huaigu yinyue* 怀古音乐) which has been influential in the most recent efforts, which approach success in integrating scholarship and artistry. However, Lam’s research into the ritual music decisions of the Song and Ming emperors and specialists reveal an intense engagement with interpreting the interactions of the agents.

Christian Meyer is a scholar of religion, who began historical work in modern China, but later produced a remarkably thorough analysis of the ritual debates in the Northern Song, which of course carries a substantial amount of music information.¹⁴² He has worked to interpret the nature of the literati discourse and it compares with Habermas’s notion of a “public sphere,” which of course evolved in a very different context. His work goes far beyond the nature of who said what to provide an interpretation of the societal context in which the arguments took place.

¹⁴⁰ Lam, *State Sacrifices and Music*, xi.

¹⁴¹ Most of this work was published in English, but the best compilation is the Chinese translation Joseph S. C. 林萃青 Lam, *Songdai Yinyue Shilun Wenji: Lilun yu Miaoshu 宋代音乐史论文集：理论与描述* (Shanghai: Shanghai Yinyue Xueyuan Chubanshe, 2011).

¹⁴² Meyer, *Ritendiskussionen*. For a much shorter English summary of this work, see Christian Meyer, “Negotiating Rites in Imperial China: The Case of Northern Song Court Ritual Debates from 1034 to 1093,” in *Negotiating Rites*, ed. Ute Husken and Frank Neubert (Oxford: Oxford University Press, 2012), 99–115.

However, while both Lam and Meyer focus on the interaction of participants, neither interrogates the discursive frame in which these debates operated. Though the idealized prescriptions that the Song debaters proposed has received positivist attention, no one has yet asked questions about the nature of the non-canonical sources of these prescriptions and the interpretive strategies that scholars took to evaluate them. In this dissertation, I move in this direction, performing close readings of selected texts to open windows on the conceptual worlds in which these scholars worked. I do not claim to be comprehensive in such matters, which no doubt will take further efforts to uncover the full extent. However, I aim to point a new direction in coming to terms with the conceptual world that underlay Song music scholars' attempts to reform music.

Organization of dissertation

Following this introduction, I begin the dissertation with a chapter about temporality. As music, like so many other practices, was grounded in ideologies of *fugu* and recreation of a Golden Age, I first need to investigate what conceptualization of time allow for such recreation. I attend in particular to two structuring temporalities widespread in Chinese thought, lineage and cyclicity, and explore how they intersect one another in Northern Song music reform discourse. I base this chapter on a case study of the edict that Emperor Renzong issued to initiate his second music reform in 1050. This document makes concrete these competing temporal claims and addresses what is at stake for the Song imperial family and the Chinese heritage that they lay claim to. In essence, this temporal construction is the “why” of the music reform movements in the Northern Song.

The remainder of the dissertation focuses on the “how” of the reform movements. Beyond the simple and obvious answer that they consulted ancient texts to understand ancient musical practices lies the interesting question of on what grounds they could go past fragmentary or unclear transmitted texts and still believe they were recreating orthodox practices. In the following three chapters, I examine in sequence three technologies found in the musical reconstruction documentation that function both to move beyond the limitations of text and to suture the past and the present.

In Chapter 3, I examine how the effectiveness of ritual music was constituted in the allusive or even paronomastic language used by scholars. The logic of the Confucian principle of the rectification of names (*zhengming* 正名), stressing concord between words and reality, gave music scholars powerful and subtle rhetorical tools with which to critique society by critiquing ritual music practices. In this chapter I look at three case studies that illustrate how this logic could be at once used to transfer sociological discourse into concrete reform music measures. My first case study relates to a commonplace in which the notes of the musical scale are said to correspond with parts of the state, which necessitates musical instruments to be designed a certain way. My second case study examines the bell-knife (*luandao* 鸞刀), an archaic sacrificial tool that was no longer in use, and the ways in which the scholars’ understanding of the word “harmony” (*he* 和) served as a resource in deciding how to recreate it. Finally, I examine a case of what I believe to be an implicit metaphor that guided the repeated need to lower the pitch of the tuning system over the course of the Northern Song dynasty.

In Chapter 4, I observe the mathematical inclinations of many of the music reform measures, and contrast it with a parallel music discourse that was not concerned with number and measurement. I explore the uneasy relationship between mathematics and classical learning, and trace how the valence of mathematics shifted over the centuries so that by Northern Song times, classical scholars could employ it as a technology that remained invariant over time. This adoption of mathematical discourse afforded music reformers a metric precision that dovetailed elegantly within traditions of royal and imperial duty and privilege regarding systems of measurement. I investigate why one means of rectifying measures in accordance with ancient standards, that of basing them on grains of millet, became more common than other methods that seem like they should be equivalent. I close this chapter with a longer exploration of the curious resilience of the measurement of the standard pitch pipe, which always measured nine units, even when the size of the unit was a subject of debate.

In Chapter 5, I turn to images, noting that, beginning in the Northern Song, diagrams (*tu* 圖) often supplemented texts, so much so that, as I noted above, most of the surviving sources have illustrations. I contextualize this turn toward visual epistemology in terms of classical precedent and the expanding use of woodblock printing. I compare two kinds of musical images, that have contrasting logical assumptions and intellectual pedigrees. The first, cosmological diagrams, show how musical elements correspond with other aspects of the cosmos, presented as an atemporal scheme that allows for no musical distinction between past and present. The second, carefully rendered illustrations of instruments from the past, realizes the potential of visualizing instrument measurement, construction, and arrangement as a means of transcending the textual limitations of the

classics and achieving a glimpse of the music of the ancient sages. Though quite distinct in appearance, basis, and style, both kinds of images demonstrate a technology that surpasses the power of text to preserve and disseminate information about ancient and orthodox musical practice.

Chapter 2: Escaping the Musical-dynastic Cycle

Cycles in the Chinese historical imagination

It is a familiar claim that Chinese think about time cyclically. The earliest indications of such ideas come from the use of a cycle of sixty formed by combining Heavenly Stems (*tiangan* 天干) with Earthly Branches (*dizhi* 地支), attested in the earliest Chinese writings on oracle bones (*jiaguwen* 甲骨文, from c. 1200 BCE). This system was originally used to count days, later it was adapted to count years. The precise origins of this system are obscure, but it is believed that the Earthly Branches, which number twelve, derive from Jupiter's twelve-year orbit.¹ This cycle, then, is simply an extension of the obvious cycles of day, month, and year shared by virtually every culture.

Later, as historical time became more obvious due to the persistence of records, another kind of temporal cycle emerged. The first indications were from the writings that try to legitimate the conquest of the Shang by the Zhou as a transfer of the Mandate of Heaven (*tianming* 天命) in c. 1046 BCE. These writings argue that the final king of the Shang had become so tyrannical that he had lost his support from that Heaven and would be replaced by a worthier ruler who would bring the realm to greater prosperity. They further justified this transfer of power with accounts that the Shang themselves were founded by a similarly more virtuous king who had replaced the final tyrant of the preceding Xia dynasty about five centuries earlier. No authentic contemporaneous

¹ John S. Major et al., trans., *The Huainanzi: A Guide to the Theory and Practice of Government in Early Han China* (New York: Columbia University Press, 2010), 922.

documents support this claim, but the accounts in the *Classic of Documents* and Sima Qian's *Historical Records* were accepted as historical by later scholars.

From this point on, this perspective colored the historical accounts of the dynasties that were to follow, causing the discourse of the dynastic temporality and its historical referent to co-evolve. The original justifications for the transfer of the Mandate of Heaven emphasized the tyranny of the deposed king. Later, Mencius emphasized more the sagehood of the new king, postulating that these sage-kings appear in a cyclic pattern lasting about 500 years. But to make the timing correspond to historical data, he had to take it a step away from ordinary political power by interpolating Confucius as the “uncrowned king” (*suwang* 素王) of his age:²

孟子曰：「由堯舜至於湯，五百有餘歲，若禹、皋陶，則見而知之；若湯，則聞而知之。由湯至於文王，五百有餘歲，若伊尹、萊朱則見而知之；若文王，則聞而知之。由文王至於孔子，五百有餘歲，若太公望、散宜生，則見而知之；若孔子，則聞而知之。由孔子而來至於今，百有餘歲，去聖人之世，若此其未遠也；近聖人之居，若此其甚也，然而無有乎爾，則亦無有乎爾。」

Mencius said, “From Yao and Shun to Tang was just over 500 years. Yu and Gao Yao saw them and so knew it [their doctrines], while Tang heard them and so knew them. From Tang to King Wen was just over 500 years. Yi Yin and Lai Zhu saw Tang and knew his doctrines, while king Wen heard them and so knew them. From King Wen to Confucius was just over 500 years. Tai Gong Wang and San Yi Sheng saw Wen, and so knew his doctrines, while Confucius heard them and so knew them. From Confucius until now, there has been just over 100 years. From the era of the sage it is so short; the place near the sage is so close. However, is there no one who has it [his doctrines]? Again, is there no one who has it?”³

² On-cho Ng and Q. Edward Wang, *Mirroring the Past: The Writing and Use of History in Imperial China* (Honolulu: University of Hawai'i Press, 2005), 47.

³ Mencius, *Jin xin* II 盡心下. CTP mengzi/jin-xin-ii 84.

In this passage, the ministers of each sage ruler meet with the sage (“see” *jian* 見) to learn how to effectively govern, but once the sage departs from living memory, there is a decline that is reversed only with the coming of the next sage five centuries hence. However, those later sages can learn about the teachings of their predecessors (“hear” *wen* 聞) and recreate their predecessor’s virtue. The cause of the cycle and the regularity of the timing remains unexplained. Rather, he treats it as an empirical observation of history on a large scale, though he himself is doubtful of its continuing predictive power given the present state. Others have speculated on larger ideas underlying Mencius’s cycle; for instance, David Pankenier sees in it a memory of a grand astronomical cycle of the conjunction of the five known planets.⁴ Such a view, which attributes to cosmic forces the repetition of the cycle, seems plausible given the approximately contemporary development of correlative cosmology.

By the Han dynasty, writers characterized such phenomena as “cycles” (*xunhuan* 循環), although it remained more common merely to suggest implicit cyclic features. These cycles did not necessarily correspond to dynasties; in addition to the case of Mencius above, where Confucius did not found a new dynasty, Sima Qian predicted a cycle of three dynasties, based on a cycling dominant virtue of each dynasty he saw manifested in the characters of the Xia, Shang, and Zhou dynasties.⁵ Nathan Sivin has argued that because the early historians were hired as court astronomers, they saw a

⁴ David W. Pankenier, *Astrology and Cosmology in Early China: Conforming Earth to Heaven* (Cambridge: Cambridge University Press, 2013), 420.

⁵ In the eulogy to Han Gaozu 漢高祖, the founder of the Han dynasty, Sima Qian wrote: “The way of three dynasties is like a cycle, at the end it begins again” (三王之道若循環，終而復始). CTP shiji/gao-zu-ben-ji 91.

cyclic understanding of time as a natural consequence of the motions of heavenly bodies, even as it proved far less predictable.⁶ Other historical theorists, following cosmological theories associated with the Five Phases (*wuxing* 五行), developed more elaborate schemes of time in which dynasties succeed one another as water extinguishes fire or earth dams water; situating a dynasty within such a quasi-natural frame then became a major concern in dynastic legitimation, even at the time of the Song dynasty.⁷ The net result of centuries of such theorization was the orderly progression of dynasties that one finds in most accounts of Chinese history.

Traditions of historical practice in China also contributed to the expectation of dynastic cycles. When the Ban 班 family of historians sought to bring up to date Sima Qian's history, they found in the Western Han dynasty (202 BCE – 9 CE) an obvious temporal demarcation. Later historians emulated this example, and empires began to commission histories of the preceding dynasties, again as a way of signaling their own legitimacy within the larger historical pattern. The main source of the past became the set of official histories (*zhengshi* 正史) which carved up historical time among themselves. Later historical theorists occupied themselves with the unintended complexities of this temporality, such as the issue of “setting the limits” (*duanxian* 段限), exploring how such

⁶ Nathan Sivin, “Chinese Conceptions of Time,” in *Science in Ancient China: Researches and Reflections* (Aldershot, Hampshire: Variorum, 1995), 90.

⁷ Yuan Chen, “Legitimation Discourse and the Theory of the Five Elements in Imperial China,” *Journal of Song-Yuan Studies* 44, no. 1 (2014): 325–64, <https://doi.org/10.1353/sys.2014.0000>.

rigid confines could accommodate the real individuals whose lives crossed such demarcation points.⁸

This way of conceptualizing Chinese history has become so widespread that the progression of dynasties seems to shape historical time itself, becoming the scaffold for non-political aspects of Chinese history as well. Instead of using a totalizing numerical system for reckoning dates like *ab urbe condita* or *anno Domini*, years in Chinese history were until recent times designated by reign periods (*nianhao* 年號) associated with specific emperors and dynasties. Though there were comprehensive listings of these periods and one could certainly add up all the numbers to establish an absolute chronology, in practice traditional historians seldom did this. Instead, it became common to identify historical agents with specific dynasties, and even today it is far more common to identify a person, even one who did not participate in politics, as having lived in the Northern Song than in the eleventh century. This manner of reckoning history produced the sense of Chinese history as a progression of discrete eras, which contained people and events.

I should pause to remind the reader that the very concept of a dynasty is already a convenient, if ubiquitous, fiction.⁹ There are numerous examples of irregularities that

⁸ Chi-yen Chen, "Immanent Human Beings in Transcendent Time: Epistemological Basis of Pristine Chinese Historical Consciousness," in *Notions of Time in Chinese Historical Thinking*, ed. Chun-chieh Huang and John B. Henderson (Hong Kong: Chinese University Press, 2006), 48.

⁹ Perhaps there is no better demonstration of this than an anecdote told by Valerie Hansen. She describes a student, late in a history survey course, who asked the professor, "What is a dynasty?" The other students laughed at his apparent ignorance of such a basic concept, but the professor went on to give examples that make the point that dynasties are not givens but "convenient fictions" constructed by powerbrokers to garner legitimacy and used by historians as organizing concepts. Valerie Hansen, *The Open Empire: A History of China Through 1600* (New York: W. W. Norton & Co., 2000), 5–6.

large-scale chronological charts must gloss over. Well-known examples include Empress Lü 呂后 (241–180 BCE), the wife of the first Han emperor, whose domination of the court following her husband's death broke up the effective authority of the dynastic family; Wang Mang 王莽 (r. 9–23 CE), who interrupted the Western and Eastern Han dynasties with his self-proclaimed Xin 新 dynasty; and Wu Zetian 武則天 (r. 690–705), who first ruled for a few years as part of the Tang dynasty before proclaiming her own dynasty, the Zhou 周, which ended upon her death. Much of the details of such periods suffer from *damnatio memoriae* and the names of short-lived dynasties that confuse the orderly patterns of time are as likely to appear in footnotes as in a separate section heading in dynastic tables. There were always power struggles in succession, and emphasizing their connection to a single family, and downplaying the significant influence of those outside the family, such as dowager empresses and eunuchs, was more a legitimating move than a straightforward statement about political succession. Historians were inclined to adopt the dynastic claims of successors who claimed continuity, and minimize those who disrupted the cycle, for the sake of adhering as close to possible to the expected patterns of history.

Cartographies of time and music

The conception of the dynastic shape of time is analogous to the way political maps neatly divide territory; likewise, their influence sometimes extends far beyond any reasonable political claim. Even such utterly anachronistic statements as “Peking Man lived in China” seem reasonable because China is a more expedient spatial designator

than, say, a precise latitude and longitude; the discrete territorial boundaries of modern nations are simply easier to use for many purposes. In this logic, the short-lived reigns of usurpers are akin to breakaway provinces that have achieved de facto independence; they may deserve some sort of footnote but not a distinct color on the map.

One reason this analogy between chronology and geography is productive is that Chinese tradition had long used geographical determinism as an explanation of difference. For instance, a common idiom in Chinese literature uses the example of citrus fruit: “When the orange tree goes north of the Huai River, it turns into the thorny lime bush” (淮橘為枳).¹⁰ In other words, the geographical position, relative to the fixed boundary of a river, determined how the fruits would mature, not unlike how the terroir influences the flavor of wine which is then denominated into discrete varieties. This maxim was used to explain why the landscapes and cultures of different places in the world are different. Following my parallel, it might explain why historical events take on the shade of the dynasty in which they transpired.

This logic applied to both natural and artisanal production. Chinese tradition held that the *qi* in different areas caused their products to differ, and indeed they did, though moderns would attribute this more to climatic factors like temperature and humidity.¹¹ Those in political power in the center, though, should use products from all over the realm to reinforce their dominion. This is the implicit point of the “Tribute of Yu”

¹⁰ See the discussion in Joseph Needham and Francesca Bray, *Science and Civilisation in China: Volume 6, Biology and Biological Technology, Part 2, Agriculture* (Cambridge: Cambridge University Press, 1984), 424–25. The origin of this maxim is a dialogue in the *Spring and Autumn Annals of Master Yan* (*Yanzi chunqiu* 晏子春秋, CTP *yanzi-chun-qiu/chu-wang-yu-ru-yan-zi* 5). The reason the text gives for the difference is that the “water and soil are different” (水土异也).

¹¹ Barbieri-Low, *Artisans*, 49.

(*Yugong* 禹貢) chapter of the *Classic of Documents*, which is mostly a description of each of the nine provinces (*jiuzhou* 九州) that Yu 禹, the founder of the Xia dynasty, established, as well as the river regulation he ordered in each and the tribute products of each. The tribute products, which differ considerably from province to province, represent mainly exotics, local items with unusual characteristics that contribute to cultural value, and not simply products of useful economic value.

To demonstrate that this discourse is especially important in writings on music, I here offer three examples of the specific products of one area that are distinctive in musically important ways. First, in theoretical writings, the correct measurements for musical instruments are said to be based on the dimensions of grains of millet. The “Treatise on Tuning and Calendrics” in the *Book of Han* provides the earliest source of this, stating that the *huangzhong* bell that would sound at the standard pitch should have a length of 90 grains of millet (*zigu jushu* 子穀秬黍) and a capacity of 1,200 grains.¹² However, different varieties and growing conditions yield different size grains. The millet from Yangtoushan 羊頭山 in Shangdang County 上黨縣 in Lu’an prefecture 潞安 (now Changzhi City 長治 of Shanxi province) came to be recognized as the standard. In 1034, Li Zhao 李照 sought to reform the music by using millet as a measure, but encountered a geographical snag:

照遂建議請改制大樂，取京縣秬黍累尺成律，鑄鍾審之，其聲猶高。更用太府布帛尺為法，乃下太常制四律。別詔潞州取羊頭山秬黍上送於官。

¹² CTP han-shu/lv-li-zhi-shang 11–12. See the discussion of this kind of measurement in Chapter 4.

[Li] Zhao then developed ideas and requested to reform the system and make music grand. He took the millet from the capital region and lined them up to make the law, cast bells and judged them, found that the pitch was still high. He substituted the Superintendent of the Court's cloth and textile ruler as a rule, then lowered the Court of Imperial Sacrifices system four pitches. Otherwise, it was ordered in Luzhou to take Yangtze Mountain millet and send it to a minister.¹³

Li Zhao began with the assumption that millet was millet and ignoring geography, but when he cast bells using the convenient millet as a measure, he was unable to resolve the tuning problem.

Second, among the regional products mentioned in the "Tribute of Yu" are the "floating lithophones on the banks of the Si River" (泗濱浮磬)¹⁴ in the county Xuzhou 徐州, apparently in modern southeastern Shandong and northern Jiangsu. These are not the only geographically located lithophones mentioned in the text (they were also listed without comment as tribute items from Yuzhou 豫州¹⁵), but the unusual description of them floating in the river captured later writers' imaginations. Various later writers ventured opinions on the identity of this stone, which Edward Schafer noted "continued to occupy an important if hazy dignity in educated opinion."¹⁶ For instance, these lithophones are mentioned in the very first entry of Du Wan's 杜綰 *Stone Catalogue of Cloudy Forest* (*Yunlin shi pu* 雲林石譜, c. 1126), the earliest catalogue describing famous varieties of stones across the empire. There he describes several varieties of the

¹³ *Songshi* 126.2949.

¹⁴ CTP shang-shu/tribute-of-yu 5. Legge found this description unbelievable and hedged it as "the sounding-stones that (seemed to) float on the (banks of the) Si."

¹⁵ CTP shang-shu/tribute-of-yu 9.

¹⁶ Schafer, *Tu Wan's Stone Catalogue of Cloudy Forest*, 50.

Stone of Lingbi (*Lingbi shi* 靈璧石), describing in particular sonic properties, and concluding that “these must be the ‘floating lithophones on the banks of the Si’ from the Classic of Documents.” (《書》所謂「泗濱浮磬」是也).¹⁷

In post-classical times, the use of these lithophones seems to have been abandoned. The middle Tang poet Yuan Zhen 元稹 (779–831) lamented the abandonment of the traditional stones in favor of newer, more exotic alternatives. Emperor Xuanzong 玄宗 (r. 712–756), the most cosmopolitan emperor of the Tang, is said to have made a set of marble lithophones for his consort Yang Guifei 楊貴妃 (719–756), who was skilled at playing them.¹⁸

Aware of the discarded tradition, several times in the musical history of the Northern Song, officials proposed or attempted to find functional Si River stone in order to reconstruct the proper lithophones. In 966, following the advice of the Supervisor of the Court of Imperial Sacrifices He Xian 和峴, local magistrates were ordered to Xuzhou to search for the stones.¹⁹ Again in 1034, following Li Zhao’s plan, someone was sent to gather more than a thousand pieces of floating stones to use as hanging lithophones.²⁰ The search was suggested again in 1110, under the advice of Wei Hanjin, but rejected.²¹

¹⁷ Du Wan 杜綰, “Yunlin Shipu 雲林石譜 [Stone Catalogue of Cloudy Forest],” in *Zhibuzu Zhai Congshu 知不足齋叢書*, ed. Bao Tingbo 鮑廷博, vol. 28 (Hangzhou: Zhibuzu zhai, 1814), 1.2r, <https://ctext.org/library.pl?if=en&file=86901>.

¹⁸ Edward H. Schafer, *The Golden Peaches of Samarkand: A Study of T’ang Exotics* (Berkeley: University of California Press, 1963), 33.

¹⁹ *Songshi* 126:2940. Also cited in Schafer, 51.

²⁰ *Songshi* 126:2950.

²¹ *Songshi* 129:3009, also cited in Schafer 51.

Third, perhaps most obviously, is the ancient and widespread practice of grouping songs geographically. This is indeed an old tradition; it forms the structure of the “Airs of the States” (*Guo feng* 國風), the largest section of the *Classic of Poetry*, compiled by the middle of the first millennium BCE. Later, in the Han dynasty, the Music Bureau (*Yuefu* 樂府) was an organ of the imperial government that was charged with collecting songs from various parts of the realm. These institutions in effect constructed a musical map, where the songs, just like the fruit, reflect the influence of the local geographic conditions in a systematic way.

This mapping also links with the tradition that the quality of a state’s governance is discernible in its music. The *locus classicus* of this tradition is the concert of the “Airs of the States” in 543 BCE, as recorded in the *Zuo Commentary* to the *Spring and Autumn Annals*.²² After each air, Ji Zha 季札 of Wu 吳 commented on the music of each state and what it indicated about its politics. Ji Zha was noted as a great traveler, and the passage describing this emissary’s musical visit went on to be one of the most famous passages in classical literature by late imperial times.²³

David Schaberg has argued that, since song is a “privileged point of entry to the past,”²⁴ the account of Ji Zha further suggests a cartography of time:

The sounds of place as Ji Zha hears them always signify a historical period, namely, the moment when the region figured most prominently in

²² Xiang of Lu 魯襄公 29. For a translation and discussion of the musical issues, see DeWoskin, *A Song for One or Two*, 21–27.

²³ Olivia Milburn, *Cherishing Antiquity: The Cultural Construction of an Ancient Chinese Kingdom* (Cambridge: Harvard University Asia Center, 2013), 30 and 35–36.

²⁴ David Schaberg, “Song and Musical Imagination in Early China,” *Harvard Journal of Asiatic Studies* 59, no. 2 (1999): 357.

the fortunes of the Zhou house. In other words, Ji Zha's commentary represents the 'Airs' as something other than an anthology of songs from the several regions of the realm; for him, it is an anthology of the music of Zhou's history in these regions...In one sense Ji Zha historicizes the 'Airs' by reading the individual sections against particular places and times that belong to a history of the Zhou. But at the same time he imposes on history and place the order of the text. The words and music assembled in the *Shi* are true not for the single moment of composition, but for all time, and nothing prevents Ji Zha from reading the central states of his own day through texts inherited from an earlier period. As in citation of the *Shi*, as in *wen* activity of any sort, the inherited artifact is both linked to a time of origin and true for any moment of reading.²⁵

In other words, although the states making up the Airs are contemporaneous, their presentation reveals a single historical narrative.

Perhaps Ji Zha's most famous judgment was his criticism the music of the state of Zheng 鄭 by saying, "In intricacy they have gone too far. The people will not be able to endure, so Zheng will be the first state to vanish" (其細已甚，民弗堪也，是其先亡乎).²⁶ This prediction either came true after a fashion, or the anecdote was invented *ex post facto*, but in any case, the audibility of the political situation in music remained a trope in writings about music. The music of Zheng went on to become a symbol for the licentious music of a moribund state and is alluded to in the writings of Confucius and many others.²⁷

²⁵ David Schaberg, *A Patterned Past: Form and Thought in Early Chinese Historiography* (Cambridge: Harvard University Asia Center, 2001), 88–89.

²⁶ CTP chun-qiū-zuō-zhuān/xiāng-gōng-er-shí-jiǔ-nián 2. Translation from DeWoskin, *A Song for One or Two*, 22.

²⁷ DeWoskin, 92–94.

The appearance of dynastic music

Because of the orderliness of the dynastic periodization in the Chinese historical imagination and the ability of music to index distinct geopolitical situations, we might expect that dynasties, just like states, come to have their own distinctive music. Indeed, there is a classical precedent for this claim, in a description of the most ancient stratum of music from the *Record of Music*:

五帝殊時，不相沿樂；三王異世，不相襲禮。

The Five Emperors [pre-dynastic sage rulers] belonged to different times, so they did not each adopt the music of his predecessor. The Three Kings [or dynasties; meaning either Xia, Shang, and Zhou or their founders] belonged to different ages, so they did not each follow the ceremonies of his predecessor.²⁸

The rulers and dynastic founders described here are those Mencius noted as the virtuous sage-kings appearing every five centuries or so. While he noted that they modeled their virtue on their predecessors, the same was apparently not true of the music and ritual itself, which instead responded to the distinct times in which they lived.²⁹ If we assume that the grain of time is uniform over the course of a dynasty, as discrete periodization implies, then the result is a sequence of mutually distinctive dynastic musics spanning history.

²⁸ CTP liji/yue-ji 16.

²⁹ Based on the discourse of several chapters of the *Record of Ritual*, Michael Ing argued that responsiveness to the times was considered an important aspect of ritual fluency. This was a means by which to preserve the meaning of the ritual in changing circumstances. Ing, *The Dysfunction of Ritual in Early Confucianism*, 49–52, 209–11. A historicization of music, a prerequisite for a periodization, logically follows from this premise.

However, the orderliness of music within a dynastic frame could have another explanation.³⁰ Music was an effective tool of governance that should, if correctly performed, bring peace and prosperity to the realm.³¹ Something must have been wrong in the music of a fallen dynasty, or they would not have lost the Mandate of Heaven. Its music must have fallen into one of these categories described in this passage from the *Record of Music*:

亂世之音怨以怒，其政乖。亡國之音哀以思，其民困。

The tones of an age of disorder indicate resentment and anger; its government is perverse. The tones of a state facing extinction express sorrowful thoughts, its people are face hardship.³²

In fact, as Ji Zha's musical diplomacy suggests, a musically competent ruler or minister should have been able to discern the cause of that dynasty's extinction in its music. That the music was not fixed and disaster averted reflects poorly on the ruler's virtue and his ability to select music ministers, and their model should not be followed. Therefore, a new dynasty should discover what had been corrupted and rectify it, lest they suffer from the same fate.

This logic applies until the music has been appropriately rectified, but thereafter, it becomes more problematic to change. Emperors, like everyone else, were expected to honor their parents and ancestors and defer to their elder brothers. Since the throne generally succeeded from father to son or elder brother to younger brother, this duty

³⁰ This explanation of relative creation by founders and filial extension by successors is indebted to Joseph S.C. Lam, "Imperial Agency in Ming Music Culture," in *Culture, Courtiers and Competition: The Ming Court (1368-1644)*, ed. David M. Robinson (Cambridge: Harvard University Asia Center, 2008), 283–85.

³¹ The means by which music worked this way was much more ambiguous than the ideology itself. See the explanations of the efficacy of music in Chapter 1.

³² CTP liji/yue-ji 3.

included following the precedents of earlier emperors within the dynasty. Filial piety (*xiao* 孝) and fraternal respect (*ti* 悌) were even more important for the ruler than everyone else. In Confucian ideology, the emperor functions as a moral center for society, so his exemplary behavior would be imitated by his subjects. Moreover, his actions were thought to bring about the harmony between the human and spiritual realms that was the central aim of governance. As the *Classic of Filial Piety* (*Xiaojing* 孝經) elaborates,

故雖天子，必有尊也，言有父也；必有先也，言有兄也。宗廟致敬，不忘親也；修身慎行，恐辱先也。宗廟致敬，鬼神著矣。孝悌之至，通於神明，光於四海，無所不通。

Thus, even the Son of Heaven [i.e. emperor] must have respect for his father's words and must defer to his elder brother's words. If he showed respect to the lineage shrine, the ghosts and spirits became defined, and when his filial and fraternal piety peaked, it penetrated into the spiritual, becoming radiant everywhere within the four seas without exception.³³

Even more skeptical emperors would wish to avoid the appearance of a lack of filial piety, so they generally heeded these words. In practice, mid-dynasty musical changes did happen, but they had to be carefully explained away without blaming the previous emperors, such as identifying mistakes one blamed on low-ranking court musicians (blaming higher-ranking ministers could be problematic, as it would imply the emperor's lack of judgment in appointing them) or making radical new discoveries that their predecessors could not have known about.³⁴ The further one goes in a dynasty, the more ancestors have set precedents, so significantly changing the ritual music late within

³³ CTP xiao-jing/influence-of-filial-piety-and-the 1. For another translation, see Brashier, *Ancestral Memory*, 68.

³⁴ An example of such a find is the discovery of ancient bells during the Song dynasty; see Chapter 5.

a dynasty becomes more difficult without the appearance of impropriety. The natural result is a conservatism of ritual music within a dynasty and the appearance of a relatively homogenous dynastic music. Thus, music follows the same orderly sequence as the dynasties; each dynasty begins with a musical rupture corresponding to the temporal rupture.

Another time

But the dynastic cycle is not the only paradigm of time in Chinese culture. Western scholarship has for at least a century recognized its importance alongside cycles; Weber argued that kinship based on lineage (“sibs”) was the basic model for all social relationships and the basic unit of power.³⁵ Since as early as archaeological records exist, ancestral veneration has been a central part of Chinese religious practice. Filial piety became a core moral virtue in part because it served as a mode of performing this lineage, but formalized rituals could enact respect for more distant segments of lineage. Chinese ancestral shrines were usually set up with the ancestral tablets of the most recent few generations, those who continued to reside in living memory, on individualized altars at the front, before that, at the back of the shrine, of the more distant lineage founder. As the generations passed, a formalized process that K. E. Brashier termed “structured amnesia” takes place, wherein the tablets of more recent ancestors receded beyond having distinct altars while the lineage founder was never similarly demoted.³⁶ In this way, the collateral

³⁵ Max Weber, *The Religion of China: Confucianism and Taoism* (New York: Macmillan, 1964), 86–88. Cited in Brashier, *Ancestral Memory*, 70.

³⁶ Brashier, *Ancestral Memory*, 64–65.

branches of that founding ancestor continued to be ritually unified, while an ambiguous gap separated him from his more recent descendants for whom ritual practices could be understood in more personal terms.

However, lineage was not only a genealogical concern. Similar discourses were found in learning as well, where a disciple's deference to his teacher is modeled on that of a filial son to his father. Within these lineages, a greater value was placed on transmission than on innovation; clarifying and emending a master's ideas was permissible, but it was better to impute one's insights to the past than to claim to be an innovator oneself. Confucius himself famously declared "I transmit rather than create" (述而不作).³⁷ In ancient China, teachers often had personal disciples who would pass on their learning without the use of writing. In fact, most books that preserve the wisdom of the particularly well-known teachers of the time, such as Confucius and Mozi, were in fact compiled by the disciples who recorded quotations attributed to the masters. Learning in those times was largely a personal, embodied experience, even if the tenets or even the words themselves often had a much longer heritage.

However, scholars also looked to their more distant forebears for inspiration, most often by consulting written texts but at times by some other kind of inspiration. For instance, Confucius claims to have been visited frequently by the Duke of Zhou (*Zhougong* 周公) in dreams.³⁸ Such an admission is analogous to the direct veneration of quite distant ancestors, without regard for the intervening generations.

³⁷ Analects 7:1.

³⁸ Analects 7:5.

A similar idea is expressed in the idea of “Dao” 道,³⁹ which is frequently translated as “Way,” but, as Peter Boodberg noted, it has “great semantic complexity” that “may have predetermined the rich system of associations surrounding [it] in its metaphysical and literary career.”⁴⁰ In the Tang dynasty, Han Yu 韓愈 (768–824) developed a remarkable theory, now generally called the “Transmission of the Dao” (*Daotong* 道統), though that name was first used centuries later by Zhu Xi 朱熹 (1130–1200).⁴¹ This theory derives from this passage from Han Yu’s “The Origin of the Dao” (*Yuandao* 原道):

曰：「斯道也，何道也？」曰：「斯吾所謂道也，非向所謂老與佛之道也。堯以是傳之舜，舜以是傳之禹，禹以是傳之湯，湯以是傳之文武周公，文武周公傳之孔子，孔子傳之孟軻。軻之死，不得其傳焉。苟與揚也，擇焉而不精，語焉而不詳。由周公而上，上而為君，故其事行；由周公而下，下而為臣，故其說長。」

Someone may ask: “This way, what way is it?” I reply: “This Way of which I speak is not what the Daoists and Buddhists refer to as the Way. Instead, this Way was transmitted by Yao to Shun; I was transmitted by Shun to Yu; it was transmitted by Yu to Tang; it was transmitted by Tang to Wen, Wu and the Duke of Zhou. Wen, Wu, and the Duke of Zhou transmitted it to Kongzi [Confucius]. It was transmitted by Kongzi to Mengzi [Mencius]. When Mengzi died, it did not succeed in being transmitted. Xunzi and Yang Xiong grasped parts of it but not its essence; they spoke of it but not in detail. Up to the Duke of Zhou, [these sages] were rulers. Hence, their actions were put into effect. After the Duke of Zhou, they were ministers. Hence, they offered more developed explanations.”⁴²

³⁹ This word is found frequently in Chinese philosophical writings of all schools, by no means only those now called Daoism (or Taoism), in whose name it appears.

⁴⁰ Peter A. Boodberg, “Philological Notes on Chapter One of the Lao Tzu,” *Harvard Journal of Asiatic Studies* 20 (1957): 601.

⁴¹ Bol, *This Culture of Ours*, 28.

⁴² Han Yu 韓愈, “Yuan Dao 原道 [The Origin of the Dao],” in *Shi Shi Baijia Zamiao 經史百家雜鈔* (Beijing: Shangwu Yinshuguan, 1906), 2.9v. Translation by Bryan W. van Norden, “On the Way,” in

Han Yu clearly builds on Mencius's ideas presented above, giving the name Dao to what Mencius called "it" (*zhi* 之). But instead of presenting it as a cycle, he presents it as a lineage, emphasizing instead its transmission.⁴³ He presents its transmission as an unproblematic succession, without being explicit about how it was passed on and without repeating Mencius's distinction between those who saw and those who heard the sages.

Is this a lineage of people or a lineage of ideas? In the case of transmission from Confucius to Mencius (who was born about a century after Confucius's death), tradition holds that Mencius was taught by Zisi 子思, Confucius's grandson, and thus there was a chain of direct, personal relationships.⁴⁴ Moreover, the sages who open the chain, Yao, Shun, and Yu, all began as ministers of the former sovereign, so they could learn about proper governance on the job. Han Yu was explicit about the lack of direct transmission of the Way from the time of Mencius up until his own day, but some of the earlier gaps, which he does not explicitly problematize, were not that much smaller, 500 years in Mencius's reckoning. There were texts of speeches and edicts that these sages supposedly passed down for posterity, now collected in the *Classic of Documents* as well as other less canonical works, but these could hardly have served as full explanations of the Way, or else its transmission would not have been as fragile as Han Yu depicted. Even

Readings in Later Chinese Philosophy: Han Dynasty to the 20th Century, ed. Justin Tiwald and Bryan W. van Norden, trans. Bryan W. van Norden (Indianapolis: Hackett, 2014), 130.

⁴³ John Jorgenson noted that, ironically given Han Yu's vitriol toward Buddhism, he was probably influenced by the emphasis on lineages in Chan Buddhism and the use of textual transmission to cover lineage gaps in Tiantai Buddhism. John Jorgensen, "The 'Imperial' Lineage of Ch'an Buddhism: The Role of Confucian Ritual and Ancestor Worship in Ch'an's Search for Legitimation in the Mid-T'ang Dynasty," *Papers on Far Eastern History* 35 (March 1987): 123–24.

⁴⁴ This tradition is at odds with their received dates, but the point here is the tradition of personal lineage, whether or not it was historical fact.

following Confucius and Mencius, if textual records were sufficient for transmitting the Way, those coming from Confucius and Mencius offer, as Han Yu himself says, “more developed explanations,” so why would it take so long for someone to inherit the orthodoxy?

Han Yu seems to be implying that there is instead some sort of mystical connection that goes beyond mere study of written records by means of which later transmitters can resume a tradition that has been lost. As a precedent, one could cite perhaps the inspiration Confucius received from the Duke of Zhou in his dreams. The invocation of this logic opens the possibility for later ages to transcend inherited traditions and even textual records to instead bind themselves directly to earlier ages. This is the essence of *fugu* and provides an imprimatur for the sort of recreations that music reformers of the Song dynasty sought.

Han Yu felt ignored by most of his contemporaries, but several Northern Song scholars saw him as a major intellectual forebear. According to them, Han Yu himself had succeeded in inheriting the Dao, just as had Mencius who made the similar humble claim.⁴⁵ His writings went on to stimulate the revival of Confucian thought during the Song dynasty, leading to the Neo-Confucian synthesis in the twelfth century.⁴⁶

As noted in Chapter 1, writers on music history often imagined an interruption in proper music (*yayue* 雅樂) akin to Han Yu’s thesis of the decline of the Dao after Mencius, and imagined that it could be repaired by the concerted efforts of ministers and

⁴⁵ Bol, *This Culture of Ours*, 124–36.

⁴⁶ Bol, 158–85.

rulers. Some blamed this failure on the Tang dynasty (618–907) and Five Dynasties (907–960), which they considered less concerned with ritual propriety and more influenced by “barbarian” traditions. These two excerpts from the final *juan* of the music reform treatise *Huangyou ji*, pleading for the restoration of the rising drum (*jingu* 晉鼓) and the cooked food offering in the imperial sacrifice, clearly illustrate this attitude:

今太常寺歆神之後，唯用散鼓以鼓金奏。殊不合古制，是必唐室之季禮殘樂缺，工師解散，汨而弗倫。五代因之，不克釐正。皇上馴致太平，精心報祀，隆禮備樂，無文或舉。非聰明神聖決于師古，則孰能與于此哉！

Now in the Court of Imperial Sacrifice, after appeasing the spirits they only use the dispersed drum to drum the metal music. This is especially not in accordance with the ancient system, this must be [due to] the late Tang House when the rituals declined and the music became flawed, the music craftspeople dispersed and scattered, [these] became submerged and lost the principles. The Five Dynasties after this did not succeed in rectifying [it]. Your Majesty training the great peace, sincerely performing the sacrifices, elevate the rites and make the music complete, illiterates and literates will all raise. If the intelligent and sage decide not to take the ancients as masters, then who could grant this?⁴⁷

凡祭有四，謂血腥燂熟也。血腥太古之用，燂中古之用，此三者示不忘古，所以達誠謹而已。惟薦熟切于孝子孝孫之情。故禮經謂之正祭。自唐末五代，禮文殘缺，郊廟之祭皆無薦熟之儀。雖有孝子孝孫之情，不可得而見矣。皇上秩其墜典達其孝心以先于天下，使天下之人聳然知事親，追遠之道。

In all the sacrifices are four, namely the blood, flesh, half-cooked and cooked. The blood and flesh were used in High Antiquity; the half-cooked in Middle Antiquity. These three show we have not forgotten the ancients, the only way by which we can reach sincerity and caution. Only the cooked food offering comes fully from the feelings of the filial son and grandson. Therefore, the classics on ritual call it an orthodox sacrifice. From late Tang and Five Dynasties, ritual and cultural patterns were barbarically degraded, the suburban and ancestral temple sacrifices all without the propriety of the cooked food offering. Although one may have the feeling of filial sons and filial grandsons, it cannot be made manifest [because of an error in ritual]. Your majesty, re-establish the lapsed

⁴⁷ *Huangyou ji*, *Jicheng congwu* ed., 3.50.

canons and extend your filial heart to the first progenitors under heaven, make the people under heaven reverently know how to serve their families, and follow the distant path (*Dao* 道).⁴⁸

Given these laments over the changes that have taken place over time, we might ask whether music and ritual admit of change at all. Earlier, in a passage from the *Record of Music*, we saw that the sage rulers all used different music reflecting their own age, emphasizing the distinctness of each age. However, later in that treatise, it says:

樂也者，情之不可變者也。禮也者，理之不可易者也。
Music is something whose nature cannot be altered; ritual is something whose principles cannot be changed.⁴⁹

Scott Cook emphasized the distinction here, missed by many commentators, that while the ideas behind the music do not change, its outward manifestation changes to correspond to the times.⁵⁰ In the terms of the discussion here, the outward manifestation of music can be expected to reflect the nature of the dynasty in which it was created, while the inward nature preserves a lineage that traces back to the ancient sages. What constitutes the “inside” and “outside” here, though, is a difficult issue to resolve. Apparently, the authors of the laments recorded above considered the ritual aspects they defended so essential to the ritual that they reflected its immutable nature.

⁴⁸ *Huangyou ji*, *Jicheng congwu* ed., 3.59.

⁴⁹ CTP *liji/yue-ji* 38.

⁵⁰ Cook, “Yue Ji,” 50.

Intersecting temporalities in an emperor's view of music

How do these competing temporalities of music history coexist? To explore this issue, for the remainder of the chapter I will present a close reading of an edict issued by Emperor Renzong 仁宗 (r. 1022–1062) at about the midpoint of the Northern Song dynasty. In this edict, Renzong sets up a contrast between the dynastic time of history and a timelessness he equates with returning to the ways of the ancients, the principal goal of Northern Song music reformers. The edict ordered a new reform of the ritual music used in the imperial court, leading to the third change in the standard pitch and the compilation of the treatise *Huangyou ji* in 1053.

Renzong issued this edict on the fifth day of the intercalary eleventh month of the second year of the Huangyou period (皇祐二年閏十一月五日), corresponding to the winter solstice (*dongzhi* 冬至) of 1050.⁵¹ This timing is surely not coincidental, and reflects the annual cycle, thought to underlie both music and calendrics. In correlative thought, the Winter Solstice is the point of time where *yin* has reached its annual peak and *yang* would begin to rise again. According to the “Monthly Ordinances” (*Yueling* 月令) in the *Record of Ritual* as well as the more detailed *Huainanzi* 淮南子, this part of the year is associated with the standard tuning pitch *huangzhong*; since one of the main tasks of the music reform was to determine the correct pitch for this note, such a date was appropriate for the edict.

⁵¹ The date is as given in the *Huangyou ji*, which converts to the Gregorian calendar as Friday, December 21, 1050 (using Academia Sinica's converter at <http://sinocal.sinica.edu.tw/>). Though Europe still used the Julian calendar at this time, the timing of the solstice is easier to see using the Gregorian system.

The edict can be divided into three parts: a historical sketch of music history before the Song dynasty, an explanation of the inadequate music reforms that had been undertaken so far during the Song dynasty, and Renzong's plan for the next music reform. In what follows, I fill in the historical allusions made in the edict and explore how they relates to the models of temporality discussed so far in this chapter. I have divided the text of the edict into nine parts that I will discuss in turn; they are identified by bold Roman numerals at their start to distinguish them from quoted passages from other sources that I cite. The text is preserved somewhat differently in two sources, the introduction to the *Huangyou ji* and the *Song History*. The differences are not of great importance for the argument here; the text here follows the former except where noted.⁵²

Lessons from music history

Pre-dynastic period

I: 朕聞古者作樂，本以薦上帝、配祖考，三、五之盛，不相沿襲，然必太平，始克明備。

I, the emperor, hear that the ancients making music was based on the offering to the Supernal Lord and sacrificing to the ancestors. The glory of the Three [Sovereigns] and Five [Emperors] was not passed down. Thus, one must have peace, only then can one achieve bright perfection.

The edict begins by invoking the ancients, stating that their music based on two key ritual practices, offerings to the Supernal Lord (*Shangdi* 上帝) and sacrifices to the ancestors. The opening formula “I have heard” was often used to humbly refer to familiar

⁵² The base text is the *Huangyou ji*, *Jicheng congshu* ed., 1.5–7.

quotations from well-established texts. In this case Renzong seems to have been referring to the greater image commentary to *Classic of Changes* Hexagram No. 16, *Yu* 豫 (“Enthusiasm”), which reads:

雷出地奮，豫。先王以作樂崇德，殷薦之上帝，以配祖考。
The thunder comes out and the Earth takes off [referring to the two trigrams which make up the hexagram]; this is *Yu*. The Former Kings, in accordance with this, made music and honored virtue, presenting this grand music to the Supernal Lord,⁵³ in order to sacrifice to the ancestors.⁵⁴

Since the *Classic of Changes* was widely believed to be among the oldest and most authentically preserved of the classics, a statement in it that describes an even earlier past served as evidence of very ancient music practice, indeed.

The Former Kings (*xianwang* 先王) is no more specific than “the ancients,” but the edict (and not the *Changes* passage) continues on to specify the legendary period ruled by the culture heroes collectively known as the Three Sovereigns and Five Emperors (*san huang wu di* 三皇五帝; in Renzong’s text simply called *san-wu* 三五 “the Three and the Five”; in traditional dating, they ruled in the third millennium BCE, prior to the Xia dynasty). In those days, the succession of rulers did not follow dynastic progression, but each ruler is said to have abdicated to a chosen worthy successor who would ascend to the throne peacefully, a practice now known by the non-classical term *shanrang zhi* 禪讓制. In fact, many of these rulers are said to have had familial relationships, but the successors were generally cousins of different surnames and did not

⁵³ Following Wang Bi’s gloss for *yin* 殷 as “using this fully flourishing music to present sacrifices to the Supernal Lord” 用此殷盛之乐荐祭上帝也). *Zhou Yi zheng yi* 周易正義 [The True Meaning of the Zhou Changes] (Taipei: Wunan tushu chuban gufen yousi gongsi, 2001), 2.101.

⁵⁴ CTP book-of-changes/yu 1.

call themselves or think of themselves as a dynasty, and they were never viewed as such in traditional historiography.

There are many references to the peace and prosperity of this distant time found in the classics, which also include musical accomplishments. In various and sometimes contradictory accounts, several of the sovereigns employed music ministers were noted for their feats of hearing or musical judgment. Among these ministers are Ling Lun 伶倫, the minister of the Yellow Emperor (Huangdi 黃帝, the last of the Three Sovereigns or the first of the Five Emperors, depending on the enumeration) who established the standard set of pitches in imitation of the order and harmony of nature,⁵⁵ and Kui 夔, the minister of Shun 舜 (the last of the Five Emperors) who rectified the music practices during ancestral sacrifice and was particularly noted for his harmony that would cause the ancestral spirits to descend.⁵⁶

Renzong then states that the flourishing (*sheng* 盛) of this early period was not passed down. It is unclear by this statement whether Renzong meant music or the government in general, as neither the details of their musical practice nor the peaceful transitions of power between sagacious rulers had continued to his day. Instead, the details of this early music were confined to anecdotes that praise its effect but give few

⁵⁵ The traditional account of Ling Lun appears in the *Spring and Autumn Annals of Master Lü*, (CTP v-shi-chun-qiu/gu-yue 5). See my discussion in Chapter 4 as well as those by DeWoskin, *A Song for One or Two*, 59–61; Needham and Robinson, “Sound,” 178–79.

⁵⁶ Kui’s appointment and abilities appear in the *Classic of Documents* in the “Canon of Shun” (*Shundian* 舜典) and “Yi and Ji” (*Yiji* 益稷).

practical details and rulers had long formed dynasties and succession was no longer determined primarily by the worthiness of the successor.

Perhaps Renzong is thinking of the “Great Union” (*datong* 大同), the ancient utopia Confucius described in the “Conveyance of the Rites” (*Liyun* 禮運) chapter of the *Record of Ritual*. In those times, society flourished in universal harmony without ceremony, righteousness, or preference for one’s family. As the Great Way (*da dao* 大道) fell into obscurity, it was succeeded by an era called “Small Tranquility” (*xiaokang* 小康), governed by ritual. Confucius is not clear about when the “Great Union” was, but in the orthodox commentary Zheng Xuan assumes he meant in the days of Yao 堯 and Shun, the last two of the Five Emperors. This makes sense, given the meritocratic succession of the pre-dynastic era, in contrast to the preference for one’s own family inherent in dynastic structures.

Renzong’s next sentence, “Therefore, one must have peace, only then can one begin to achieve clear perfection” (然必太平，始克明備), at first seems a non sequitur. In fact, as becomes clear later, he is describing the situation now, after the musical or political norms of the ancients were not passed down. This statement serves to introduce a theory of music history that he elucidates by providing empirical support in brief summaries of the musical history of the Zhou, Han, and Tang dynasties. Under the new dynastic temporality, the early rulers of each dynasty first had to seek peace and consolidate their reign before they could turn their attention to music.

Zhou dynasty (c. 1046–256 BCE)

II: 周武受命，至成王周公始大合樂以和邦國。

Wu of Zhou gained the Mandate of Heaven. At the time of King Cheng and the Duke of Zhou began the Great Uniting of Music in order to harmonize the country.

The Zhou dynasty was founded when King Wu defeated the last king of the Shang dynasty at the Battle of Muye 牧野 (trad. c. 1046 BCE), thereby receiving the Mandate of Heaven. However, the Great Uniting of Music (*Da he yue* 大合樂) is credited to his successor Cheng and his regent, Wu’s brother the Duke of Zhou.⁵⁷ The term “Great Uniting of Music” appears in three independent loci in the classical corpus, in two chapters of the *Record of Rites*, the “Monthly Ordinances” (*Yue ling* 月令) and the “King Wen as Son and Heir” (*Wenwang shizi* 文王世子), and in the *Rites of Zhou*. In none of these places is it clear that it was meant as a proper noun or to designate a specific musical performance or event; it could also simply mean playing music together on a grand scale.⁵⁸ However, such a nominalized usage of the term appears in Zheng Xuan’s 鄭玄 standard commentary, and was followed in later usages, such as a Southern Liang dynasty debate on the term.⁵⁹ Since this specialized usage is implied by the wording of

⁵⁷ The version of the edict in the *Songshi* omits mention of the Duke of Zhou.

⁵⁸ This is reflected in the diversity of approaches translators have given to this phrase in the translations of the classics. In Legge’s translation of the *Record of Ritual* loci, he uses “a grand concert of music” and “the accompaniment of music on a great scale” (see the two citations below). Walter Kaufmann translates the “Yue ling” references as “a grand musical performance” and the *Rites of Zhou* locus is “the great harmony of the various melodies” (Kaufmann, *Musical References in the Chinese Classics*, 179).

⁵⁹ Arguing about the meaning of the passage in the *Rites of Zhou* below, Emperor Wu of Liang 梁武帝 (r. 502–549) used the phrase in this sense in a response to a memorial by Ren Fang 任昉 (460–508). The response is recorded as “Jiri bu yi li wu liu dai yue yi” 祭日不宜籥舞六代樂議 and was included in the encyclopedia *Tongdian* 通典 (c. 770) compiled by Du You 杜佑 (735 – 812). CTP tongdian/147.

Renzong's edict, I have used this phrasing to translate the earlier sources, which is likely how those in Renzong's time would have understood them.

The *Record of Ritual* appearances are used in conjunction with semi-regular musical events at the court, and provide no specific information about them. In the “Monthly Ordinances,” a month-by-month account of the ritual and government activities to be undertaken over the course of each year, one of the instructions for the third month of spring reads:

是月之末，擇吉日，大合樂，天子乃率三公、九卿、諸侯、大夫親往視之。

At the end of this month [the third month of spring], an auspicious day is chosen for the Great Uniting of Music. The Son of Heaven leads three ducal ministers, the nine high ministers, the Feudal Lords, and his great officers, to go see it in person.⁶⁰

This performance is apparently of a pair with the Great Uniting of Wind (*Dahechui* 大合吹), also presided by the Music Master (*yueshi* 樂師), which occurs in the third month of winter and closes the year's musical activities.⁶¹ Here, the fact that the Zhou ruler is to attend alongside ministers and feudatories suggests that the “uniting” may have been meant in a political sense, bringing together those with various domains and duties to represent the government as a whole.

The other *Record of Ritual* appearance is in “King Wen as Son and Heir,” which describes the educational program used by the sons of hereditary feudatories and other boys chosen for their aptitude, and in particular Kings Wen, Wu, and Cheng, as is

⁶⁰ CTP *liji/yue-ling* 28. See also the translation (reference 53) in Kaufmann, *Musical References in the Chinese Classics*, 51.

⁶¹ CTP *liji/yue-ling* 107. Legge translates this as “a grand concert of wind instruments.”

explained in the opening few sections. Prominent in this program were musical methods, which are mentioned repeatedly in the chapter.

凡釋奠者，必有合也，有國故則否。凡大合樂，必遂養老。
Each time the offerings are set forth, it was required to have [musical] accompaniment, except when there was a disaster. Each time there was a Great Uniting of Music, it was required to immediately to feast the elderly.⁶²

The *Rites of Zhou*, the classic that purports to document the structure and duties of the early Zhou bureaucracy, uses the term in its explanation of the duty of the Grand Director of Music (*Dasiyue* 大司樂).⁶³ This official was to oversee the musical instruction and performance at court and the connection between this musical instruction and moral instruction, before turning to the specific dances to be taught and explaining function of the music:

以樂舞教國子舞《雲門》、《大卷》、《大咸》、《大韶》、《大夏》、《大濩》、《大武》。以六律、六同、五聲、八音、六舞大合樂，以致鬼神示，以和邦國，以諧萬民，以安賓客，以說遠人，以作動物。

[The Grand Director of Music] uses music and dance to teach the sons of the state to dance “The Gate of Clouds,” “The Great Meeting,” “The Great Completeness,” “The Great Inheritance,” “The Great Augmentation,” “The Great Salvation,” and “The Great Military Force.”⁶⁴ Using the six

⁶² CTP liji/wen-wang-shi-zi 7. That a musical accompaniment is intended is suggested by Liu Chang’s 劉敞 commentary.

⁶³ I follow Kaufmann’s translation of the term (*Musical References*, 178), since it is quite literal. Charles Hucker calls this “Musician-in-chief” (no. 6056) and explains its significance in the Zhou as: “two ranked as Ordinary Grand Masters (*zhong dafu*) members of the Ministry of Rites (*chunguan*) who were in charge of all musical education and performances at court, supervising a corps of Music Masters (*yueshi*).” Biot translates it as “grand directeur de la musique.” Charles O Hucker, *A Dictionary of Official Titles in Imperial China* (Stanford, Calif.: Stanford Univ. Press, 1998), 472.

⁶⁴ The interpretation of these titles is difficult. The titles given here reflect Zheng Xuan’s commentary in the *Rites of Zhou* and Huang Zhencheng’s 黃鎮成 (1288–1362) commentary to the *Classic of Documents*, and are based on the translations by Mei Ah Tan, “A Study of Yuan Zhen’s Life and Verse 809-810: Two Years That Shaped His Politics and Prosody” (PhD diss, University of Wisconsin-Madison, 2008), 108.

yang tones and the six *yin* tones, the Five Notes, the Eight Sounds, and the Six Dances, the Great Uniting of Music is used to offer to the spirits, harmonize (*he* 和) the fiefdoms and the state, harmonize (*xie* 諧) the common people, bring peace to visitors, bring joy to the far-off people, and make things move.⁶⁵

The beginning of this passage identifies the Grand Director of Music's duties to include a set of dances, apparently associated with the designation of the Six Dances (*liuwu* 六舞) that appears later in the passage.⁶⁶ The subsequent description of the effects of the music gives a clear sense of its alleged centripetal power, particularly the one Renzong cited, "to harmonize the fiefdoms and the state" (以和邦國). The application of the music to an effective central government is clear and is typical of the centralizing ethos that pervades the *Rites of Zhou*.⁶⁷ Such a purpose remained of great importance during the Northern Song, with respect to the challenge of the Liao and Xixia realms to the north and the chronological closeness of the disunity of the tenth century.⁶⁸

The text that follows describes the principal notes and sacrificial purposes of each dance. According to Zheng Xuan's commentary, which formed the basis of the understanding of this passage during the Song, these dances recapitulate political history:

⁶⁵ CTP rites-of-zhou/chun-guan-zong-bo 100. Another English translation is Kaufmann, *Musical References*, 178–179.

⁶⁶ There is a numerical discrepancy of the seven dances listed being identified as six. Apparently, the first two are both associated with the Yellow Emperor in the historicization noted below, and thus represent a single entry. It is possible that the full name of the first dance is "The Great Meeting of the Gates of Clouds" (*Yunmen dajuan* 云門大卷); however, in most sources I have seen them punctuated separately, so I have listed them separately here. Perhaps the two titles refer to two halves of a suite.

⁶⁷ For more on this centralizing ideology and its historical uses, particularly by Wang Mang and Wang Anshi, see Michael Puett, "Centering the Realm: Wang Mang, the Zhouli, and Early Chinese Statecraft," in *Statecraft and Classical Learning: The Rituals of Zhou in East Asian History*, ed. Benjamin A. Elman and Martin Kern (Leiden: Brill, 2010), 129–54.

⁶⁸ See Chapter 1 on the geopolitical context of the Northern Song and its effects.

each dance is associated with the achievements of historical political figures, namely Huangdi, Yao, Shun, Yu (the founder of the Xia dynasty), Tang (the founder of the Shang dynasty), and Wu (the founder of the Zhou dynasty).⁶⁹ Zheng Xuan's commentary to the following passage calls these the Six Eras of Music (*liu dai zhi yue* 六代之樂), and links it directly to the Great Uniting of Music, here clearly nominalized:

大合樂者，謂徧作六代之樂也，以冬日至作之，致天神、人鬼，以夏日至作之，致地祇、物彪、動物、羽羸之屬。

The Great Uniting of Music is the complete performance of the Six Eras of Music. On the Winter Solstice, it is presented to the spirit of Heaven and the ghosts of Man; on the Summer Solstice it is presented to the spirit of the Earth, ghosts, animals, and the feathered and naked classes.⁷⁰

This way of performing the music of previous dynasties is likely the basis of the observations in the *Record of Music* cited above, that each sage had their own music that reflected their time, even as the functional nature of music never changed. The description of this suite, apparently performed together under the name “Great Uniting of Music,” is a clear precursor to the historicism of Renzong's vision of music history.

⁶⁹ Edouard Biot, ed., *Le Tcheou-Li: Ou, Rites Des Tcheou* (Peking: Wen Tien Ko, 1939), II: 29, <https://catalog.hathitrust.org/Record/102052995>. Biot's understanding follows Zheng Xuan's commentary, Zheng Xuan 鄭玄, *Zhouli Zheng shi zhu* 周禮鄭氏注 [Mr. Zheng's Commentary on the Rites of Zhou] (Shanghai: Shangwu yingshuguan, 1937), 145. This explanation does not fully account for the complexity of the names and attributions, but was apparently widely accepted in the Song. Liao Baoyi 廖抱一 argued that this state does not reflect ancient dance practice, but rather the political ideology of late Han dynasty Confucians bent on emphasizing abdication to the virtuous. See Liao Baoyi 廖抱一, “‘Liu Dai Wu’ Kao [六代舞] 考 [The Investigation of ‘Dance of the Six Dynasties’],” *Yishu Pinglun* 藝術評論 24 (2013): 111–25.

⁷⁰ Zheng Xuan 鄭玄, *Zhouli Zheng shi zhu*, 146.

Han dynasty (206 BCE–220 CE)

III: 漢初亦沿舊制，武帝時始定太一、后土樂詩；光武中興，至明帝始改「大予⁷¹」之名；益前後，以制樂節。

The early Han also carried on the old system. In the time of Wudi, they began to set the music and poetry to Taiyi and Houtu. In Guangwu's reign the state resurged, by Mingdi they began to change the name of the office of the Great Director of Music; [they used] lengthening and shortening [by a third to generate the pitches] in order to systematize music and rhythm.

At the beginning of the Han dynasty, the preceding music was apparently used until a new standardization was ordered by Han Wudi 漢武帝 (Emperor Wu of Han, r. 141–87 BCE), the longest-reigning ruler of the Han Dynasty. In music philosophy, Wudi is perhaps best known for accepting the Confucian doctrine of his minister Dong Zhongshu 董仲舒 (179–104 BCE), whose scheme of correlative cosmology that included musical phenomena was very influential.⁷² In music repertoire, Wudi was well-known for either creating or greatly expanding the Music Bureau (*Yuefu* 樂府) in 120 BCE; the exact nature of Wudi's change and how it related to official institutions that collected folksongs as a means of better understanding the situation of the common people is unclear.⁷³

⁷¹ Emended from 大豫 in the *Huangyou ji*, following the appearance in the *Song History*. This *Dayu* ("Great Delight") is the title of part of a dance piece from the Jin dynasty (265–420), the second of a two-part piece that was used in the Jin and Southern Qi. See David R. Knechtges, "Xun Xu," in *Ancient and Early Medieval Chinese Literature: A Reference Guide*, ed. David R. Knechtges and Taiping Chang, vol. 3 (Leiden: Brill, 2014), 1746–50.; Du You, ed., *Tongdian*, on CTP tongdian/147 "Ba yu wu za wu wu yi" 巴渝舞雜武舞議 2–3; and Li Fang 李昉, ed., *Taiping yulan* 太平御覽, "Yuebu si" 樂部四 (Music 4), "Lidai yue" 歷代樂 (Music of Historical Eras) 12. The existence of the other title and the sometimes interchanged characters explains the mistake.

⁷² Dong Zhongshu is the purported author of the *Luxuriant Dew of the Spring and Autumn Annals* (*Chunqiu fanlu* 春秋繁露). For a discussion of the music in Han speculative correlative cosmology, see DeWoskin, *A Song for One or Two*, 55–83.

⁷³ Anne Birrell, *Popular Songs and Ballads of Han China* (London: Unwin Hyman, 1988), 5–7.

Though these musical activities were important, Renzong instead highlights Wudi's reforms of ritual music. Renzong's edict mentions the standardization of texts and music for ritual offerings to two universal spirits, Taiyi ("Supreme Unity," written varyingly as 太一, 太乙, and 泰一) and Houtu 后土 ("Lord of the Soil"). Taiyi represented the celestial North Pole, associated with Supernal Lord, the god Renzong claimed earlier that the ancients propitiated. Taiyi is not mentioned in the classics, but appears in a few places in the Daoist corpus and other loci. In 133 BCE, the magician Miu Ji 繆忌 of Bo 亳 (also called Bo Youji 薄誘忌) urged Wudi to offer sacrifices to Taiyi. His memorial is preserved in the Monograph on the Suburban Sacrifice (*Jiaosi zhi* 郊祀志) in the *Book of Han*:

天神貴者太一，太一佐曰五帝。古者天子以春秋祭太一東南郊，用太牢，七日，為壇開八通之鬼道。

That which the spirit of Heaven honors is Taiyi, those who Taiyi assists are the Five Emperors. In ancient times the Son of Heaven offered sacrifices in Spring and Autumn to Taiyi in the southeast suburb. Using sacrificial animals, on the seventh day, the altar will open eight directions of spirit paths.⁷⁴

Miu Ji makes the close connection between Taiyi and the pre-dynastic times clear in his explanation of this spirit's relationship with the Five Emperors. The emperor Wudi acquiesced to Miu Ji's suggestion, and initiated minor sacrifices, in which he did not himself officiate. A few decades later, however, in 112 BCE, Wudi expanded this rite and made it into the central imperial sacrifice.

⁷⁴ CTP shiji/feng-chan-shu 60. Nearly the same text also appears in the *Hanshu* (CTP han-shu/jiao-si-zhi-shang 54).

Houtu was the spirit representing all the land of the realm, in contrast to more local spirits, and was also associated with the soil and harvest. Unlike Taiyi, Houtu did prominently appear in classics; for instance, in a record preserved in the *Classic of Documents*, King Wu of Zhou proclaims his right to rule to it (along with sovereign Heaven *Huang tian* 皇天) as he is about to defeat the Shang king and establish the Zhou dynasty.⁷⁵ In 113 BCE, Wudi initiated triennial sacrifices at the Houtu shrine in Fenyin 汾阴 (in modern Wanrong 萬榮 county, Shanxi), set up as an ancestral temple recognizing the entire realm. Thus, Houtu represents the ancestral sacrifice to match Taiyi's heavenly sacrifice. In Renzong's view, this institution of sacrifices to Taiyi and Houtu with their standard text and music constituted the real start of Han music, perhaps because of the parallel with what he accords to the ancients.

In Renzong's view, this dynastic music continued until the end of the dynasty, being restored in the Eastern Han after the interregnum of Wang Mang by emperor Guangwu 光武 (r. 25–57 CE). Renzong credits Guangwu's successor, Mingdi 明帝 (r. 58–75), with an innovation that fulfilled Han music, the renaming of the post of Grand Director of Music from *Taiyue ling* 太樂令 to *Taiyu yue ling* 太子樂令 in the year 60.⁷⁶ This official was in charge of 388 musicians, previously in the now-defunct Music Bureau, to be used in sacrificial and other ceremonial occasions. Why the renaming of the position is important enough for Renzong to single it out is unclear. According to Charles

⁷⁵ In the chapter "Completion of War" (*Wucheng* 武成). CTP shang-shu/successful-completion-of-the-war 2.

⁷⁶ These positions appear in no. 6268 and 6262 in Hucker, *A Dictionary of Official Titles in Imperial China*, 485.

Hucker, the meaning of the *yu* 予 is disputed, but may have been an ancient term for the musician. Perhaps it was this connection with the music of the past that Renzong wished to remark upon.

The final clause,⁷⁷ alludes to the Chinese system for generating the gamut, known as the *sanfen sunyi* 三分損益 “expanding and reducing by one third.”⁷⁸ This computing process is described in detail in numerous texts from the Han, such as the *Huainanzi* and the *Historical Annals*, although it was certainly developed earlier at least in principle, as it is the mathematical procedure underlying the measurements in the Warring States text *Guanzi*. The specific reference Renzong is making here, related to the Han dynasty, is unclear. However, by adding it to the previous concerns, he is describing three aspects of music practice: the establishment of ritual texts, the bureaucracy associated with ritual music performance, and the theoretical underpinning of the instruments. The latter two were absent from the earlier descriptions (of the ancients and the Zhou dynasty), but as more sources are available he brings them in as important parts of the musical establishment, and they are noted again in his descriptions from later dynasties.

Tang dynasty (618–906)

IV: 唐高祖造邦，至太宗時孝孫、文收始定鐘律，明皇方成唐樂。
Tang Gaozu founded the country; when it came to the time of Taizong,
[Zu] Xiaosun and [Zhang] Wenshou began to set the bell law; it wasn't
until Minghuang that it became Tang music.

⁷⁷ This clause is omitted from the edict in the text of the *Song History*, and thus may not be authentic.

⁷⁸ See Chapter 3 for an explanation of this procedure.

In 618, Gaozu 高祖 (r. 618–626) established the Tang dynasty. He was forced to abdicate to his son Taizong 太宗 in 626. In the two years that followed, Taizong employed the music theorists Zu Xiaosun 祖孝孫 and Zhang Wenshou 張文收 to solve a problem of musical temperament. Zu Xiaosun had been active in court music temperament since the time of Wendi of Sui (r. 581–600).

However, although the researches of these two theorists set the tuning for the music of the Tang, according to Renzong, it wasn't until the major reforms of Xuanzong (here called by his popular epithet, Minghuang 明皇, the “Bright Emperor”) a century later that the real Tang music emerged. Xuanzong's best-known music reforms dealt with entertainment music. For instance, his decree of 714 reorganized banquet music and its system for training performers and set the stage for the celebrated entertainments of the High Tang dynasty. Previously, the personnel involved in ritual and entertainment music had been attached to the Court of Imperial Sacrifices (Taichangsi 太常寺); in 714 Xuanzong decreed that it was inappropriate that secular song was put on the same level as Confucian ritual music, and established a separate training schools (*jiaofang* 教坊) for secular musicians, including women, while ritual musicians continued to be based in the Court of Imperial Sacrifices.⁷⁹ Xuanzong also reorganized secular ceremonial music performances. Previously, the “Ten Types of Music” (*shibuji* 十部伎) was performed as a suite, mostly based on geographic designations that followed a set sequence, perhaps harkening back to the performance *Airs of the States* in the *Classic of Poetry* that Ji Zha

⁷⁹ E.D. Edwards, *Chinese Prose Literature of the T'ang Period*, vol. 1, 2 (New York: AMS Press, 1974), 31.

listened to. These performances were reorganized into “Two Types of Music” (*erbuji* 二部伎), that was divided by their functional categories “standing music” (*libuji* 立部伎) and “sitting music” (*zuobuji* 坐部伎); performances of this type consisted of eight standing pieces and six sitting pieces.⁸⁰ These changes greatly built up the cosmopolitan reputation of the Tang court and were surely noted by the many emissaries and envoys who were their audience.

However, given that Renzong is discussing ritual music, he most likely refers to instead the compilation of the compendium *Ritual of the Tang Kaiyuan Period* (*Da Tang Kaiyuan Li* 大唐開元禮) in 732. Even though Xuanzong held contempt for those he called Confucian “sound tricksters” (*shengjier* 聲伎兒),⁸¹ he did not neglect his duties as emperor in rectifying ritual practices. This widely-cited text provided exhaustive information about how to conduct the ritual, though it lacked musical detail; it remains a very important text on imperial Chinese ritual practice. Renzong took these norms as the essence of Tang music, and thus the characteristic music of the dynasty.

The musical-dynastic cycle

Ⅴ: 是經啟善述，禮樂重事，須三四世，聲文乃定。

This experience and explanation clearly shows that the rites and music are weighty matters, and they need three or four generations [of emperors] for the sounds and the texts to be fixed.

⁸⁰ Nelson, “English Commentary,” 15–17, 24–26.

⁸¹ Wilt Idema and Stephen West, *Chinese Theater 1100-1450: A Source Book* (Wiesbaden: Franz Steiner Verlag, 1982), 96; Edwards, *Chinese Prose Literature of the T'ang Period*, 1:36.

Renzong concludes his account of pre-Song music history with the remark that the important matters of rites and music must wait until the third or fourth emperor to be fully resolved. By this point, it is clear that Renzong's intention has been to present and explain an observed historical pattern. The founder of a dynasty, upon receiving the Mandate of Heaven, inherits the music of the previous dynasty and does not have the chance to reform it, busy as he is with pacification of the realm. Only after some time has passed, around the time of the third or fourth emperor, does the dynasty undertake a major music reform and establish what becomes identified as that dynasty's music. The verbs Renzong used for this establishment in these dynastic sketches are "initiating" (*shi* 始), "setting/standardizing" (*shiding* 始定), or "systematizing" (*zhi* 制); these are all actions aimed at producing not just small modifications but setting forth a new ordering of music. This music system then characterizes the dynasty and continues, with only small modifications, until its end.

Renzong does not allude to the infamous last emperors, perhaps to avoid broaching an inauspicious topic, but since music discourse often emphasized the role music played in the downfalls of dynasties, it seems likely that an educated reader would infer this connection as well. We have encountered already the music of Zheng, the state Ji Zha predicts will be the first to fall because of its music. According to traditional histories many emperors late in a dynasty were fond of licentious music, which was said to represent such danger that it could bring down the dynasty. Probably the most famous example is the music of Zhou 紂 (r. 1075–1046 BCE), the last king of the Shang 商 dynasty. He became the archetype for many Chinese tropes of tyranny and licentiousness,

most likely because, as noted above, it was to justify his downfall that the Mandate of Heaven theory emerged. It is said he forced his Music Master Yan 師延 to compose “Among the Mulberries” (*Sangjian* 桑間), a music so dangerously potent that centuries later Music Master Juan 師涓, hearing it in the wind, tried to keep his master away by warning of its pernicious influence.⁸²

Renzong has thus not only offered one of the world’s earliest non-mythological periodizations of music, but has an explanation for it grounded in concepts from traditional Chinese historiography. In the dynastic cycle, the founder of the dynasty is not the one during whose reign the empire reaches its peak; rather, most often it is one of his grandchildren who expands the empire’s territory to its greatest extent, presides over the longest period of political stability and greatest economic prosperity, and initiates significant social or cultural projects. However, after this pinnacle, the dynasty declines. Traditionally, historians emphasized the declining virtue of the later emperors, particularly the final tyrant, who becomes the target of scholarly invective.⁸³

As the dynastic progression depends on the filial attitude of emperors later in the dynasty, it is worth noting that according to several accounts, Renzong was exceptionally filial.⁸⁴ Of course, such accounts are likely to have been exaggerated, but they show at

⁸² References to this piece of music and story are found in the *Record of Music*, *Zuo Commentary*, *Zhuangzi*, and *Historical Records*. For a synthesizing summary, see DeWoskin, *A Song for One or Two*, 93n17, 137–38. DeWoskin uses the translation “Mulberry Grove,” although that translation seems better suited to the esteemed music of King Tang of Shang, the founder of the dynasty, “Sanglin” 桑林.

⁸³ Sivin, “Chinese Conceptions of Time,” 90.

⁸⁴ Wu Yiyi 吴以义, “Auspicious Omens and Their Consequences: Zhen-Ren (1006-66) Literati’s Perception of Astral Anomalies” (PhD diss, Princeton, 1990), 190–91.

least his awareness of the virtue of filial piety, thus making it more plausible that was a factor he considered in his own theory.

Though the dynastic cycle was always as much part of discourse as part of historical fact, modern historians often recognize some truth in the overall pattern. However, they are more apt to explain the decline as the result of fiscal strains produced by the increasing cost of maintaining the empire or paying for the accumulated special privileges of the gentry.⁸⁵ Similarly, Renzong's observations about musical practice seem to be supported in the actual practice of emperors in Chinese history, including in those which followed his observation. For instance, Rulan Chao Pian observed of the Qing dynasty (1644–1911): “As in several past dynasties in Chinese history, the previous dynasty's sacrificial music was at first adopted. Gradually, new songs, or new melodies set to old texts, then replaced the old songs.”⁸⁶

Renzong's account of the music of a discrete series of dynasties parallels the geographic song collections like the *Classic of Poetry*. The temporal situation of each dynasty, like the geographic situation of a place, gives its characteristic music a sort of natural identity. Again, in this discrete periodization, Renzong may not be too far off the mark. Joseph Lam wrote that a history of Confucian ceremonial rites, “especially those introduced by the emperors and scholar-officials who founded new dynasties (or reigns) would more or less outline the development of Chinese court ritual and music over the

⁸⁵ For instance, J. A. G. Roberts, *A History of China*, 3rd ed. (New York: Palgrave Macmillan, 2011), xiii.

⁸⁶ Rulan Chao Pian, “Music and the Confucian Sacrificial Ceremony,” in *Enchanting Powers: Music in the World's Religions*, ed. Lawrence Sullivan (Cambridge: Harvard University Press, 1997), 248.

past fifteen centuries.”⁸⁷ Thus, the emperor, in consultation with his ministers, choosing specific ways to conduct ceremonies, establishes norms that by and large come to characterize the ritual and music of that dynasty. Joseph Lam gives the founders a larger role than does Renzong, who emphasizes the third or fourth emperor, but does not argue with the periodization set by dynasties.

However, I should note that the musical-dynastic cycle, like the dynastic cycle itself, is not as tidy as it appears in Renzong’s outline. Even drawing only from what he described, none of the three dynasties before the Song had the music reforms set in motion by the “third or fourth” emperor, as he suggested was typical. Instead, these roles were taken either by the founder’s immediate successor (as in the Zhou and the first Tang reform) or by an emperor somewhat after the fourth (as in the Han and the second Tang reform). Indeed, Renzong’s summation is perhaps more than a bit self-serving; he just happened to be the fourth emperor of the Song Dynasty. Thus, this whole historical vignette is better understood as a rhetorical move to justify his own undertaking of the music reforms.

In search of lost time

Continuing forth with the edict, Renzong relates the music reforms so far undertaken by his predecessors in the Song dynasty:

VI: 國初亦循用王朴、竇儼所定周樂，太祖患其聲高，令和峴減下一律，真宗始出聖意大祠用樂隨月用律。

⁸⁷ Joseph S. C. Lam, “Musical Confucianism: The Case of ‘Jikong Yuewu,’” in *On Sacred Grounds: Culture, Society, Politics, and the Formation of the Cult of Confucius*, ed. Thomas A. Wilson (Cambridge: Harvard University Asia Center, 2002), 141.

At the beginning of Song there continued the use of the Later Zhou music as set by Wang Pu and Dou Yan. Taizu (960–976) worried its pitch was too high and ordered He Xian to lower the pitch by one step. At the start of Zhenzong's (997–1023) reign he put forth the sage idea that the music used in the Daci (temple), the pitch should vary according to the month.

Initially they adopted the tuning standard from the previous dynasty, the Later Zhou, that is, the tuning of Wang Pu and Dou Yan. Emperor Taizu, however, felt the music sounded too high and ordered the standard pitch lowered by a tone.⁸⁸ Later, the third emperor Zhenzong ordered that the tonal centers of pieces of ritual music should change each month, in accordance with the cosmic connection between the twelve months of the year and the twelve notes of the Chinese gamut. These reforms are in the same vein as the creative acts of the previous dynasties, setting new tuning standards or performance practice guidelines.

To strengthen his argument or simplify the telling, Renzong omits mention of his previous attempt at musical reform. In the Jingyou 景佑 period (1034–1038), just after he came into power after the regency of Empress Dowager Liu 劉 (969–1033). Perhaps to assert control after the extended regency, which by custom should have ended when he turned seventeen several years earlier, one of his initial acts was to order a music revision. Unfortunately, this reform was derailed when the new tuning and other proposals by Li Zhao 李照 proved unworkable and had to be abandoned. The reform effort lasted several years and produced neither satisfactory results nor consensus.⁸⁹

⁸⁸ See the third case study in Chapter 3 for much more explanation about this reform.

⁸⁹ Hu Qingjun 胡勁茵, "Beisong 'Li Zhao Yue' Zhi Lunzheng Yu Renzong Jingyou de Zhengfu Wenhua 北宋「李照樂」之論爭與仁宗景祐的政治文化 [The Northern Song Dispute Over 'Li Zhao's Music' and the Government Culture of Renzong in the Jingyou Era]," *Hanxue Yanjiu* 漢學研究 33, no. 4 (2015): 213–46.

Renzong himself is said to have compiled the reform proposal in 1035, titled “The New Classic of the Marrow of Music of the Jingyou Period” (*Jingyou yuesui xinjing* 景祐樂髓新經), now lost. The lingering incompleteness of that reform no doubt caused Renzong to seek another reform once the factions that divided the court then and over the next decade settled down.

Though he respected his predecessors’ reforms, even filially noting his father’s idea as “sage” (*sheng* 聖), Renzong doubts that they have yet come close to ancient music:

VII: 屢加案覈，然念《樂經》久墜，學者罕傳⁹⁰，歷古研覃，亦未完緒。如其制作益須切當委。

They repeatedly checked and confirmed, and then become aware that the *Classic of Music* had been lost a long time ago, those who studied it seldom transmitted it. Even if they trace through the ancients and study deeply, they still cannot reach the end. If we are to follow the [ancient] system, we must be even more precise and accurate.

The *Classic of Music* was one of the Six Classics. As noted in Chapter 1, the text had been lost already in ancient times, if it had ever existed.

The term *xu* 緒 (literally “end of thread”) is a reference to how the idea of textual classics originated from a textile metaphor. The word for classic, *jing* 經, originally meant the warp threads on a loom. The classics were thought to be the constant that underlay the wefts of diverse times, or in the terminology I have used in this chapter, the lineages that underlay the vagaries of dynastic cycles. Their study is what held together the fabric of Chinese culture. Unfortunately, when the *Classic of Music* was lost, the

⁹⁰ Emended from 專 to match the *Song History* text.

warp thread was cut and the ends have not yet been found. Renzong goes on to propose a way to recover these lost threads:

VIII: 中書門下集兩制及太常禮樂官，將天地、五方、神州、日月、宗廟、社稷祭享所用登歌、宮縣，黨更定奪聲律是非。

[I order] the Secretariat-Chancellery to gather with the Two Drafting Groups and the Ritual and Music Bureau of the Court of Imperial Sacrifices.⁹¹ For the terrace music and courtyard music⁹² used in the sacrifices to Heaven and Earth, the Five Directions, the sacred land, the sun and moon, the ancestral temple, and the gods of soil and grain, these parties should together make a final decision on whether the sounds and pitches are right or wrong.

The more precise and accurate method Renzong proposes involves a large group of researchers consulting the music used in a large number of ritual practices. This passage is not clear about how the accuracy is improved, though the sheer quantity of research involved differentiates this effort from the previous efforts, particularly the Jingyou reform which was dominated by Li Zhao's controversial theories. We see this particularly in the closing passage of the edict, which explains the benefits of having a large group work together collegially:

IX: 按古今調諧中和，揚較議論允適，經久可用，垂信不朽，使祖宗功德發揚無窮，神祇感格善氣來應。苟獲至當，何憚改為？尚賴洽聞，共圖盛節。

According to [the practice of] antiquity and today they will adjust the concords and center the harmony, bring up and compare proposals and theories to allow the suitable. [The result] can be used for a long time, will stay fast to the true and not be corrupted, will make the ancestors spread forth their merit without limit and move the deities to respond with

⁹¹ For these bureaucratic offices, I follow the translation of Hucker, *A Dictionary of Official Titles in Imperial China*. These three are Nos. 1617, 3660, and 6145.

⁹² These are two different orchestras used in imperial ritual, named after their position in the sacrifice. The terrace ensemble is a few dozen musicians, while the courtyard ensemble is a few hundred. See the descriptions of the ensembles used in Huizong's court in Lam, "Huizong's Dashengyue," 404–10.

favorable *qi*. If we can achieve the extreme, why fear making corrections?
We still rely on listening widely, attempting together to reach the
flourishing end.⁹³

In Chapter 3, I argue that this idea of the harmonization of the opinions of various ministers is a topic is a central metaphor in music reform in the mid-Northern Song and is a ritual-musical response to the factional disputes that had earlier plagued Renzong's reign. Renzong describes his method as one of "listening widely" (*qia wen* 洽闻), the same phrase famously used in the *Book of Han*'s biography of the historian Sima Qian, who was similarly said to have consulted many sources, written and oral.⁹⁴ Sima Qian is a relevant reference here, because he was among the early historians who solidified the dynastic ideology in historiography and wrote on the figures of the distant pre-dynastic period Renzong is trying to resurrect musically.

In the final phrase of the edict, "attempting together to reach the flourishing virtue," "flourishing" (*sheng* 盛) is the same character that Renzong used to describe the Three Kings and Five Emperors. This character has not appeared in this passage elsewhere to describe any of the other periods, and thus directly links the proposed reformed music to this pre-dynastic ideal. In contrast to the historical examples he gave, Renzong seeks to challenge the musical-dynastic paradigm, making the music of the Song match the timeless pre-dynastic music, suturing his own temporal space to the timeless warp of classical learning. Then, with the assistance of the spirits and the ancestors overjoyed by rediscovery of the orthodox music, the dynasty itself will follow

⁹³ This last sentence is completely different in the *Song History* version.

⁹⁴ The full phrase is "broadly [knowing] things and listening widely" (博物洽闻). CTP han-shu/si-ma-qian-zhuan 30.

suit, escaping the cycle of dynastic rise and fall by returning to the sustained glory of pre-dynastic times.

By emphasizing his ancient predecessors instead of the reforms of his recent ones, Renzong posits a choice between competing virtues, filiality and orthodoxy (see Figure 2.1). In general, the emperors of previous dynasties had emphasized the filial virtue and adhered to their predecessor's norms in ritual music, leading to his dynastic periodization of music. However, looking back to the statement with which Renzong began his edict, the music of the ancients was only half based on the filial value of ancestral sacrifice. The other half was the offering to Supernal Lord, the deity associated with the celestial pole unaffected by the cycles of earth, whether diurnal or dynastic.⁹⁵ Renzong's closing grand gesture that the new music will bring forth the blessings of both ancestors and deities links back to that statement about original dual purpose of music that connects the realm with both the ancestors and the deities. Renzong hopes for a reformed music that will "hold true without corruption," enduring beyond dynastic time, and bring the blessings of the spirits unseen since the glorious pre-dynastic period.

⁹⁵ Pankenier, *Astrology and Cosmology*, 92–117.

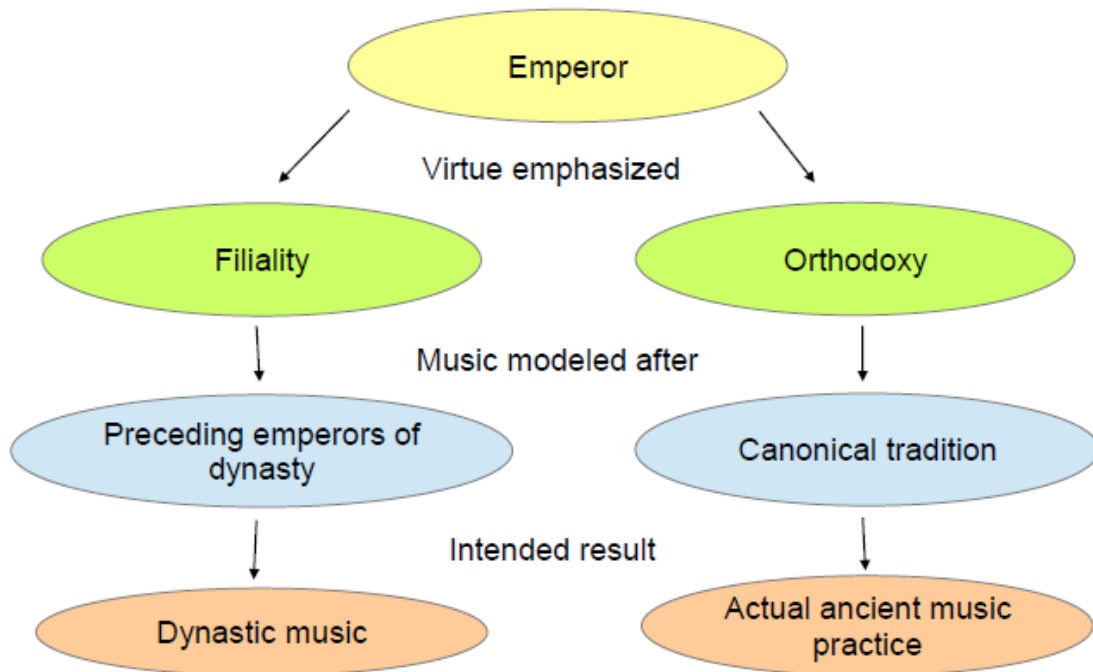


Figure 2.1: Two models of musical agency, from the perspective of a mid-dynasty emperor

Chapter 3: Linguistic Strategies

Introduction: Taking wordplay seriously

Paul Goldin, in investigating the philosophical discourse of ancient China, noted the importance of puns in the argumentation, calling them a “pervasive feature of Chinese philosophical literature.”¹ However, the reader of Chinese philosophy in translation, or even in the original, might not realize this. For one, puns are perhaps more difficult to recognize in ancient Chinese than other languages, because the stability of the morpheme-based writing system obscures phonetic changes that sometimes make the pun no longer recognizable in modern standard Chinese. Without a philologist’s attention and systematic Old Chinese glosses, such homophones or near-homophones can easily be missed. Second, while translation of any sort often encounters difficulties preserving puns, Chinese translation into Western languages suffers another lost layer of punning possibilities, namely the visual similarity between characters with shared radicals or other attributes. Finally, puns have not enjoyed high status in contemporary philosophy,² so even readers equipped to notice them may be more apt to dismiss them as coincidence or inappropriate folk etymology.

However, Goldin argues, this attitude is at odds with the actual practice and intent of the philosophers. Citing a previously obscure passage in *Xunzi*, he recognized that “ancient Chinese writers themselves were aware that the words with which they

¹ Goldin, *After Confucius*, 14.

² Gordon C. F. Bearn, “The Possibility of Puns: A Defense of Derrida,” *Philosophy and Literature* 19, no. 2 (1995): 330–35.

expressed their ideas could be skillfully chosen to resonate with correspondences ingrained in the audience's mind."³ Their understanding of semantics moved beyond Saussure's conception of arbitrary signifiers toward a sense that words can iconically represent their referents. Phonetically, this occurs when the sounds of one word are motivated in some ways by their association with other sounds, a phenomenon now known as "sound symbolism."⁴ However, in Chinese, iconicity in language is not limited to sound symbolism, as similarities between the written dimension of characters provides another possible layer of interaction.

Chinese music discourse is no stranger to this phenomenon, beginning with the word for music itself, *yue* 樂, which famously has a second pronunciation, *le*, meaning "joy."⁵ It is unclear how these two lexemes came to share the same character.⁶ The character itself appears to have originated as a pictogram of a musician playing percussion instruments.⁷ However, the character's double meaning became a favored

³ Goldin, *After Confucius*, 15.

⁴ Also known as "phonosymbolism." Alessandro Duranti, *Linguistic Anthropology* (Cambridge: Cambridge University Press, 1997), 205. Note that the usage "symbolism" in this term is opposed to that in C. S. Peirce's famous typology of signs (he would classify it as an icon).

⁵ According to Imre Galambos, in manuscripts around this time "music" was the default reading, with the sense of "pleasure" secondary. In the Dunhuang manuscript Or.8210/S.2577, for instance, the latter reading is consistently marked with a red dot as phonetic mark. Imre Galambos, "Punctuation Marks in Medieval Chinese Manuscripts," in *Manuscript Cultures: Mapping the Field*, ed. Jörg Quenzer and Jan-Ulrich Sobisch (Berlin, New York: de Gruyter, 2014), 341–357.

⁶ As far as reconstructions have indicated from Tang and earlier forms, the two terms have never shared the same pronunciation; the musical sense always began with "ŋ" and the joy sense with "l" or earlier "r." One explanation is that the musical sense is a prefixed form, but as there is no other word family with a parallel variation, they may also in fact derive from different roots. Axel Schuessler, *ABC Etymological Dictionary of Old Chinese* (Honolulu: University of Hawai'i Press, 2007), 346 and 596.

⁷ Fritz A. Kuttner, "The Development of the Concept of Music in China's Early History," *Asian Music* 1, no. 2 (1969): 13, <https://doi.org/10.2307/833908>. Though English speakers sometimes characterize all Chinese characters as pictographs, relatively few of them in fact are. Technically speaking, pictographs are characters that originated as depictions of what they signify. Instead, most Chinese characters are built up from radicals, usually by combining elements of meaning (significs) and sound (phonetics), in ways that do

explanation of music. The *Record of Music* presents this idea with what Goldin would call a “paronomastic gloss,” following it with an ambiguous passage where the character could be read either way:

故曰：樂者樂也。君子樂得其道，小人樂得其欲。

Therefore, it is said: Music is joy. The superior person delights in achieving his way [or: musics to achieve his way], the petty person delights in achieving his desires [or: musics to achieve his desires].⁸

Charles Peirce’s well-known classification of the manner in which signs can be related to the objects they signify posits a tripartite division of icon, index, and symbol. In terms of this system, Goldin’s point relates to the iconic property of words; onomatopoeia or pictographs are other examples of words (spoken and written, respectively) that function as icons, and both are common in Chinese. On the other hand, the Saussurean arbitrary referent is a symbolic semiotic system, where there is no *a priori* relationship between the sign and referent, but they are simply connected by convention. This is the typical modern understanding of language, and as such is the principal mode underlying the logical discourse in philosophy, musicology, and most other kinds of writing, in Chinese and other languages.

not depict anything. See Geoffrey Sampson, “Writing systems: Methods for recording language,” in *The Routledge Handbook of Linguistics*, ed. Keith Allan (London and New York: Routledge, 2015): 51 for a straightforward explanation.

⁸ CTP liji/yue-ji 32. I believe the musical interpretation here is possible, though it would be more likely with the addition of the coverb *yi* 以. Zheng Xuan’s commentary on this line is similarly ambiguous: “The superior person and the petty person each have their own delight/music 君子小人各有所樂.” Kong Yingda’s subcommentary, however, can only be read with the former meaning, because he uses the binome *huanle* 歡樂 (“pleasure”). Neither James Legge, Walter Kaufmann, nor Scott Cook present musicking as a possibility in their English translations of the passage.

But what about the index? In Peirce's nomenclature, an index is grounded in a physical or causal relationship between the sign and the referent, but for many semioticians, this happens primarily through co-occurrence.⁹ In the traditional educational system of imperial China, young students their studies began largely by memorizing classical texts, a practice that would cause individual words to immediately bring to mind specific classical contexts. The richly allusive Chinese literary tradition is based on this phenomenon, and these indexical associations offer a layer of meaning for words that goes beyond the denotative symbol.

These indexical associations, like the iconic paronomasia, can be as brief as a single character. In a discussion of how Chinese discursive patterns have shaped scientific thought, Derk Bodde gave as an example of an extremely condensed allusion a passage in the *Historical Records* of Sima Qian. Here, Sima criticized Wang Mang and the Qin Emperor as "purple" (zi 紫), which in the context can only be read as an allusion to Confucius's disdain for the color of purple, which he said "usurps from red" (奪朱), meaning acting as a fake substitute for the genuine primary color.¹⁰ Fittingly, Confucius's next words makes a parallel clause that provides the original context for what became the most common index of defective music: "I hate how the sounds of Zheng disorders

⁹ This is particularly the case in music studies. Tom Turino, who has promoted the use of Peircean semiotics perhaps more than any other ethnomusicologist, defines index in this way: "the concept of index refers to the connecting of a sign and object by a perceiver through co-occurrence; i.e. the perceiver has experienced the sign and object together, often repeatedly, and so their connection is simply true of a fact." Thomas Turino, "Peircean Thought As Core Theory for a Phenomenal Ethnomusicology," *Ethnomusicology* 58, no. 2 (2014): 195. As I understand Peirce, this is really a subset of indices, but it is the one relevant for my point here.

¹⁰ Derk Bodde, *Chinese Thought, Society, and Science: The Intellectual and Social Background of Science and Technology in Pre-Modern China* (Honolulu: University of Hawaii Press, 1991), 76.

elegant music” (惡鄭聲之亂雅樂也).¹¹ Writers from that point on would criticize musical attributes that they rejected as the “sounds of Zheng” or the “music of Zheng.” It is doubtful in most cases that the writer believed the offending element actually recreated a specific musical practice from the ancient state of Zheng, but rather it played the same discursive role, as music that usurped from the orthodox practices and thus was to be avoided.

These linguistic connections became a tool for the Northern Song music reformers seeking to recover the authentic music. Because of the seeming non-arbitrary nature of language in Chinese argumentation, the resonances that words bring with them from related contexts became evidence for how they should function. The writers are seldom explicit about this strategy, but draw on a shared knowledge of the Chinese language and classical references that make the framework within which their specific arguments appear more compelling.

Finally, one other aspect of traditional Chinese language ideology deserves mention. Underlying most argumentation about the past is the implicit use of the doctrine of the rectification of names (*zhengming* 正名), the idea that there should be complete correspondence between the symbolic realm of language and the physical realm of reality. The most famous use of the term is perhaps the passage in the *Analects* (*Lunyu* 論語), in Confucius’s response when he is asked about the first step in proper government. He justifies his assertion that the first step is rectifying names in this way:

¹¹ Analects 17:18. A parallel passage is found in Mencius 7b: 83.

名不正，則言不順；言不順，則事不成；事不成，則禮樂不興；禮樂不興，則刑罰不中；刑罰不中，則民無所措手足。

If names be not correct, language is not in accordance with the truth of things. If language be not in accordance with the truth of things, affairs cannot be carried on to success. When affairs cannot be carried on to success, proprieties and music will not flourish. When proprieties and music do not flourish, punishments will not be properly awarded. When punishments are not properly awarded, the people do not know how to move hand or foot.¹²

Here, Confucius is not only quite explicit that having names and their referents be in alignment is a crucial factor in effective music, but also continues the chain of logic to show that this very alignment provides the state order. Given that this concern for accurate names was especially pursued in the field of for offices and titles,¹³ it is possible that the musical analogy, of searching for the right tones to assign to those ranks, might have been similarly favored once the issue was thought of in those terms. This could be further inspired by the paronomastic association between “minister” (*guan* 官) and “pipe” (*guan* 管).

Further development of this principle comes from the chapter “Zhengming” 正名 (“Rectifying names”) in the *Xunzi* 荀子. Hans-Georg Moeller has argued that, in contrast to many other recent exegetes who have interpreted the doctrine as arguing for a conventional language ideology (along the lines of Saussure), Xunzi really meant that designation of appropriate language is a prerogative of the ruler. Showing that this interpretation remained current in later ages, he further cites the ninth-century

¹² CTP analects/zi-lu 3; translation by James Legge.

¹³ Hans-Georg Moeller, “Chinese Language Philosophy and Correlativism,” *Bulletin of the Museum of Far Eastern Antiquities* 72 (2000): 94.

commentator Yang Liang 楊倞 who seems to share this perspective.¹⁴ If this interpretation is correct, then it strengthens the ideas that emperors and their ministers would pay particular attention to the usage of words, as a means of governance.

Given this precedent for proper nomenclature as a prerequisite to order, it comes as no surprise that scholars in the Northern Song expended great effort to understand the true meanings of the names of things, whether to follow the precedents of the ancients or to demonstrate the authority of the dynasty. Because of cultural changes since the classics were written, many musical objects were familiar only from their name and could be interpreted in ways that significantly reshaped the entire discourse. Trying to determine the actuality that best corresponded to this name was therefore a major impetus for music reform in the Northern Song.

In this chapter, I examine three instances of this mode of argumentation. My first case study relates directly to a classical passage, in which the notes of the musical scale are said to correspond with parts of the state. Music reformers cited this passage implicitly or explicitly in their arguments about the design of musical instruments they believed should appropriately reflect this correspondence. My second case study examines the bell-knife, an archaic sacrificial tool that was no longer in use, and the ways in which the scholars' understanding of the word "harmony" (*he* 和) served as a resource in deciding how to recreate it. Finally, I examine a case of what I believe to be an implicit metaphor that guided the repeated need to lower the tuning system over the course of the Northern Song dynasty.

¹⁴ Moeller, 101.

In each case, after explaining the background to the linguistic play and examining the relevant texts, I turn to the socio-political context of the Northern Song and examine how these implications may have been interpreted as a kind of political argument. The networks that exist within Chinese music discourse thus allow music theory, no less than poetry and painting, to be a site for what Alfreda Murck called “the subtle art of dissent.”¹⁵

Case study I: The parts of the state and the scale

Many kinds of Chinese music (whether ancient or modern) use a pentatonic scale; the five notes of the scale have the traditional names *gong* 宮, *shang* 商, *jue* 角,¹⁶ *zhi* 徵, and *yu* 羽 (equivalent to the syllables *do*, *re*, *mi*, *sol*, and *la* in European solfège, or 1, 2, 3, 5, and 6 in numbered musical notation).¹⁷ Let me begin with an often-referenced passage in the *Record of Music* that shows how these five notes relate to the parts of the state,¹⁸ and argues that each of them is essential for its well-being:

¹⁵ Murck, *Poetry and Painting in Song China: The Subtle Art of Dissent*.

¹⁶ Many writers Romanize this as *jiao*, the more common pronunciation for this character. I follow the *Hanyu da cidian* (Hong Kong: Joint Publishing Co., 1993), X: 1346, and several other Chinese dictionaries I consulted. This is, however, a pedantic issue since the *fanqie* 反切 pronunciation given in the *Guangyun* 廣韻 (1007–1008) indicates that there was no distinction in pronunciation made during the Northern Song.

¹⁷ It is not the case that all Chinese music, even at the time, favored pentatonic scales; seven-note scales are well-documented from an early period as well. For an explanation of the five- and seven-note modal practice of Song times, see Pian, *Song Dynasty Musical Sources*, 43–58.

¹⁸ In this section I consistently use the phrase “parts of the state” to represent this series of five: ruler (*jun* 君), minister (*chen* 臣), people (*min* 民), affairs (*shi* 事), and things (*wu* 物), as it appears in the *Record of Ritual*. There is no general term used in the Chinese for this group.

聲音之道，與政通矣。宮為君，商為臣，角為民，徵為事，羽為物。五者不亂，則無怙懣之音矣。宮亂則荒，其君驕。商亂則陂¹⁹，其官²⁰壞。角亂則憂，其民怨。徵亂則哀，其事勤。羽亂則危，其財匱。五者皆亂，迭相陵，謂之慢。如此，則國之滅亡無日矣。

The way of sounds and tones is connected with government. *Gong* corresponds to the ruler; *shang* corresponds to the ministers; *jue* corresponds to the people; *zhi* corresponds to affairs; and *yu* corresponds to things. If these five are not disordered, then there will be no disharmonious tones. If *gong* is disordered, then it is scattered; the ruler of the state is arrogant. If *shang* be disordered, then it is slanted; the minister is corrupt. If *jue* is disordered, then it is anxious; the people are resentful. If *zhi* is disordered, then it is sorrowful; affairs are overburdening. If *yu* is disordered, then it is precipitous; the state finances are exhausted. If the five notes are all disordered, and injuriously interfere with one another, this is called “dissolute.” In this case, then the extinction and loss of the state will occur in no time.²¹

This passage was apparently as important to the ancient compilers of the *Record* as it came to be during the Northern Song, since it appears in the first of the eleven sections (*pian* 篇) into which the extant work is divided, the “Foundations of Music” (*Yueben* 樂本). This section, and thus the work as a whole, begins with an explanation of how music arises from the response in the human heart to external actions. Following this line of thinking, music could serve as a barometer of social well-being, and from there the conduct of a government, as I explained in Chapter 2. If music-makers were moved to

¹⁹ In the parallel passage in the *Historical Records*, this character is *chui* 搥 “throw” (CTP shiji/yue-shu 9), as noted by Walter Kaufmann, *Musical Notations of the Orient* (Bloomington: Indiana University Press, 1967), 57. Neither this nor the change below significantly alters the meaning of the passage.

²⁰ In the parallel passage in the *Historical Records*, this character is *chen* 臣 “minister.” CTP shiji/yue-shu 9; Kaufmann, 57.

²¹ CTP liji/yue-ji 4. Besides the *Historical Records*, a parallel passage also occurs in the *Garden of Stories* (*Shuo Yuan* 說苑), (CTP shuo-yuan/xiu-wen 37). For other translations, see James Legge on CTP; Cook, “Yue Ji,” 30–31.

disorder in the performance of some pitches, this passage asserts that this is the specific fault of certain parts of the state, in very specific ways.²²

Of metaphors and metonyms

What is the nature of the connection between these notes and the parts of society? The answer to this is by no means clear from the original text of the *Record of Music*. To link each pair of terms, the passage uses the word *wei* 為, a very common general verb with a range of possible meanings, covering what in English might be rendered “be,” “do,” “make,” “become,” “act as,” or “govern,” among others. The choices of translators rendering this passage into English indicate different stances on this issue. James Legge and Walter Kaufmann translated this passage assuming a signifier-signified relationship, that the notes “represent” the various parts of the state.²³ Joseph Needham selected “act as,” which also establishes the figure as a link between different fields, but specifies the

²² The concrete musical interpretation of this is less straightforward, and there are several possibilities. I at first interpreted that to mean a certain individual pitch is out of tune; this is plausible in an instrument like chimes, where each note can be separately out of tune from the others, but the rest of the context here makes it just as likely the discussion is about singing, not instruments. Scott Cook offers two other possibilities: that it refers to songs in certain modes which are then disorderly, or (his preferred reading) that the individual notes transgress when they are supposed to play (often by playing too much and interfering with the participation of the other notes). This latter reading is quite compatible with the idea I present for the pitches later. Cook, 31–32.

Walter Kaufmann (Kaufmann, *Musical Notations*, 55) equates the state difficulties with threats of punishments for incorrectly rendering certain tones, which he finds parallel with medieval Indian warnings that “threaten the performer and listener with poverty and a reduced span of life if the *ragas* are not correctly sung or played,” citing in particular Nārada’s *Saṅgīta-Makaranda*. While I appreciate his attempt to draw a parallel, I think he is mistaken in viewing the “punishment” in the Chinese context as a personal matter instead of a state matter.

²³ Legge (CTP shiji/yue-shu 9), Kaufmann, *Musical References in the Chinese Classics*, 33. In *Musical Notations*, Kaufmann uses instead “symbolizes,” which I understand the same way (55).

manner in which they are related as specifically their function.²⁴ On the other hand, Kenneth DeWoskin and Scott Cook opted for a more direct connection, using “is.”²⁵ The question is how literally to take this assertion: is the “is” simply denoting an implicit comparison, or are the things being equated somehow manifestations of the same thing whose connection has been obscured?

Another way to phrase this question is whether the correspondence is properly thought of as a metaphor or a metonym. Cognitive linguists differentiate between metaphor and metonym based on whether the linkage occurs across conceptual domains or within a single one.²⁶ To rephrase the question, then, do the notes merely function similarly to the parts of the state and thus stand in metaphorical relationship to each other, or is there a more direct connection between them, making it a metonymic relationship? Musicologists have tended to view such relations automatically as metaphors, because of the perceived distinctiveness of the musical experience from other domains of experience.²⁷ However, we cannot distinguish *a priori* what constitutes separate conceptual domains, particularly when confronting the radically unfamiliar and inadequately understood musical ontologies of premodern societies. Gary Tomlinson made this point when discussing the pre-Columbian songs of the Nahuatl, cautioning

²⁴ Needham and Robinson, “Sound,” 157.

²⁵ DeWoskin, *A Song for One or Two*, 95; Cook, “Yue Ji,” 30. DeWoskin, 95; Cook, 30.

²⁶ Antonio Barcelona, “Introduction: The Cognitive Theory of Metaphor and Metonymy,” in *Metaphor and Metonymy at the Crossroads: A Cognitive Perspective*, ed. Antonio Barcelona (Berlin: Mouton de Gruyter, 2000), 3–4.

²⁷ To take two examples, neither Lawrence Zbikowski’s standard reference *Conceptualizing Music: Cognitive Structure, Theory and Analysis* (Oxford: Oxford University Press, 2002), in which he devotes an entire chapter to metaphor (chapter 2, “Cross-Domain Mapping”), nor any of the diverse essays in Jamie C. Kassler, ed., *Metaphor: A Musical Dimension* (Sydney: Currency Press, 1999), mention metonymy at all.

against assuming that such links are metaphorical when they do not pertain to adjacent categories in modern Western thought.²⁸

Scott Cook, who has provided one of the more convincing readings of the *Record of Music* passage, makes it clear that his understanding is metaphorical, representing two distinct domains. In his discussion of the passage he frames the connection as a “straightforward analogy” between statecraft and musicianship.²⁹ This is essentially an argument that music functions similarly to social actors; to take one example, a song where the pitch *gong* repeatedly sounded where *jue* would fit better is analogous to an authoritarian state whose leader repeatedly interferes with the proper role of the populace. Moreover, a ruler who did so is certainly arrogant, and the state could well be scattered by popular resentment or rebellion. The point of people fulfilling their role and allowing others to fulfill their different roles is a central point in classical Chinese philosophy; Cook cites as an example the *Doctrine of the Mean* (*Zhongyong* 中庸),³⁰ another chapter of the *Record of Ritual* that went on to have major status in the Song dynasty as one of the newly canonized Four Books (*Sishu* 四書).

The opening of Zheng Xuan’s commentary on this passage suggests a different possibility: “If the ways of the ruler, minister, people, affairs, or things are disordered, then their tones will respond and be disordered” (君、臣、民、事、物，其道亂，則其

²⁸ His chief example here is the conceptual connection between songs and flowers evident in Nahuatl poetry and art. Tomlinson, *The Singing of the New World: Indigenous Voice in the Era of European Contact*, 72–78.

²⁹ Cook, “Yue Ji,” 32.

³⁰ Cook, 32.

音應而亂).³¹ In this explanation, he uses the term *ying* 應, usually translated as “respond.” This character, which also frequently appears in the binome *ganying* 感應 (“stimulus-response”), is a key term in theories of correlative cosmology, as explained in Chapter 1. Such an organizational scheme appears to accommodate the entry of the parts of the state as such a pentad. A passage from the “Treatise on Tuning and Calendrics” (*Lülizhi* 律曆志) from the *Han History* (*Hanshu* 漢書) illustrates this well:

協之五行，則角為木，五常為仁，五事為貌。商為金為義為言，徵為火為禮為視，羽為水為智為聽，宮為土為信為思。以君臣民事物言之，則宮為君，商為臣，角為民，徵為事，羽為物。唱和有象，故言君臣位事之體也。

In accordance with the Five Phases, then *jue* is wood, in the Five Virtues it is benevolence, in the Five Personal Matters it is demeanor. *Shang* is metal, righteousness, and speech; *zhi* is fire, propriety, and seeing, *yu* is water, wisdom, and hearing; *gong* is earth, faith, and thinking. In terms of ruler, minister, people, affairs, and things, then *gong* is the ruler, *shang* is the minister, *jue* is the people, *zhi* is the affairs, and *yu* is the things. In singing and harmonizing there is a likeness, therefore in speaking of the positions of the ruler and the minister it is the essence of matters.³²

Here the Five Notes are linked with the Five Phases, the Five Virtues, and the Five Personal Matters, the latter three being other pentads that come from the *Great Plan* (*Hongfan* 洪範) in the *Classic of Documents* (*Shangshu* 尚書), an enumeration of the cosmic order supposedly set forth by a figure from the early Zhou dynasty, but more

³¹ *Wuyingdian Shisan Jing Zhushu* 武英殿十三經注疏 [Hall of Military Eminence Commentary and Subcommentary on the Thirteen Classics]: *Liji Zhushu* 禮記注疏 [Commentary and Subcommentary on the Record of Ritual] (Beijing, 1739), 37: 5r, <https://ctext.org/library.pl?if=en&file=80204>. For another translation, see Cook, “Yue Ji,” 31.

³² CTP han-shu/lv-li-zhi-shang 4. Note that the name of this treatise, connecting tuning and the calendar, is itself an example of correlative cosmology, though in this case based on groups of twelve (the twelve pitches in the octave and the twelve months of the year). I am uncertain of the meaning of the last sentence.

likely dating to the fourth century BCE, in the Warring States period.³³ However, note that the mapping onto the parts of the state follows the links from the *Great Plan* and is not articulated as part of the same scheme, but instead follows as a separate list afterwards. Moreover, the order in which the notes are presented is different, further suggesting its distinctness from the *Great Plan* system.³⁴ Finally, the use of *xiang* 象 (“likeness”) in the last sentence suggests that this is simply a simile (an explicitly framed metaphor), of distinct ontological status from the other connections. Therefore, this writer probably did not see the correlations as part of the same larger system.

This reservation notwithstanding, other interpreters were more explicit about inserting the parts of the state into existing schemes of resonance, including as the major Tang scholar Kong Yingda 孔穎達 and the unidentified Mr. Cui 崔氏 whose earlier commentary he cites. In his commentary on the *Record of Music* passage, Kong goes note by note, explaining how the parts of the state connect with the larger scheme, drawing largely on another commentary by Zheng Xuan, that of the “Monthly Ordinances” (*Yueling* 月令), another chapter of the *Record of Ritual*.³⁵ Here is the part of the commentary for the first two notes, *gong* and *shang*; the rest proceeds similarly:

³³ Nylan, *The Five “Confucian” Classics*, 139. Michael Nylan, *The “Confucian” Classics*.

³⁴ Alternative orderings of the Five Notes are possible within the system, just as different theorizations of the Five Phases resulted in different orders, such as of conquest and generation. The order of the Five Phases here corresponds to the theory of conquest, which dominated in the Western Han dynasty. See De Bary and Bloom, *Sources of Chinese Tradition, Vol. 1: From the Earliest Times to 1600*, 349. I discuss alternative orderings of the Five Notes below, but have no explanation for this seemingly peculiar order.

³⁵ The “Monthly Ordinances” was in fact one of several such texts with that title, that gives a phenological and ritual description of the year, heavy with cosmological import. The text is closely related to the corresponding chapters of the *Spring and Autumn Annals of Master Lü* (*Lüshi chunqiu* 吕氏春秋), which is often seen as a key text in the development of correlative cosmology.

正義曰：此一節論五聲宮、商、角、徵、羽之殊，所主之事，上下不一，得則樂聲和調，失則國將滅亡也。

The “Correct Meaning” says: This passage explains the distinction between the five sounds *gong*, *shang*, *jue*, *zhi*, and *yu*; the matters they control are all different. If [balance] is achieved, then the music and sounds are harmonious; if it is lost, then the state will perish.

「宮為君」者，宮則主君，所以然者，鄭注《月令》云：宮屬土，土居中央，總四方，君之象也。又「土爰稼穡」，猶君能滋生萬民也。又五音，以絲多聲重者為尊，宮弦最大，用八十一絲，故「宮為君」。崔氏云：「五音之次，以宮最濁，自宮以下，則稍清矣。君、臣、民、事、物，亦有尊卑，故以次配之。」

“*Gong* corresponds to the ruler” means that “*gong* controls the ruler.” In order to be thus, Zheng [Xuan]’s commentary on “Monthly Ordinances” says: “*Gong* belongs to earth, earth resides in the center, combines the four directions, and is the symbol of the ruler.” Moreover, “Earth is the sowing and reaping” [a quotation from the *Great Plan*], as the ruler can cultivate the myriad people. Moreover, the five tones are revered according to the length of the silk or heaviness of the sound. The *gong* string is the largest, it uses 81 silks [i.e. its length is 81 units].³⁶ Therefore, “*Gong* corresponds to the ruler.” Mr. Cui wrote, “As for the ordering of the five tones, *gong* is the lowest in pitch [lit. muddiest], from *gong* on down they get higher [lit. clearer].³⁷ The ruler, minister, people, affairs, and things each have their level of respect, therefore they are ordered in this way.”

「商為臣」者，商所以為臣者何？以鄭注《月令》云：「商屬金，以其濁，次宮，臣之象也。」解者云：「宮八十一絲，商七十二絲，次

³⁶ For the explanation of these numbers, see below. I do not understand why the noun “silks” is used as a measure here, but the meaning is clear enough given the standard discourse of numbers. It may represent a confusion on Kong Yingda’s part.

³⁷ The metaphorical language here can be confusing. Among the most common way of describing musical pitch is that what are called in English “low” sounds are “murky” (*zhuo* 濁), and “high” sounds are “clear” (*qing* 清). In later translations, I have simply rendered these as “low” and “high,” as this usage is nearly exclusive in English-language music discourse. Other ways, which we will encounter later, include heavy-light, long-short, and strong-weak, which I have marked explicitly. There is evidence that in ancient writings, the “murky” and “clear” sounds may have referred to other parameters (timbre or temperament, for example); see Major et al., *The Huainanzi: A Guide to the Theory and Practice of Government in Early Han China*, 931. However, in none of the passages here is anything other than pitch height suggested.

The English metaphorical system also usually maps social prestige onto height (i.e., one looks “up” to “high-status” figures or “down” to the “lowly”). In order to avoid confusion, I have chosen the terms “revered” and “humble” to avoid confusion with the height mapping, which is in fact reversed in this case (that is, “high” sounds are “lowly”). See the discussion of pitch metaphors in the third case study of this chapter.

宮，如臣之得次君之貴重也。」崔氏云：「商是金，金以決斷。為臣事君，亦以義斷為賢矣。」

As for “*Shang* corresponds to the minister,” in what way does *shang* correspond to the minister? In the way that Zheng’s commentary on “Monthly Ordinances” says: “*Shang* belongs to metal, in this way its low pitch is second to *gong*; it is the symbol of the minister.” The explanation reads, “*Gong* is 81 silks, *shang* is 72 silks. It follows *gong* as the minister’s achievement follows the ruler’s depth.” Mr. Cui wrote, “*Shang* is metal, metal is the means of making decisions. Being a minister serves the ruler, also by means of righteousness deciding is a virtuous person.”³⁸

Given the seeming arbitrariness of some of these groups of five, one wonders to what extent these were really thought to reveal a mystical connection and whether they were instead seen as poetic ways of asserting order in the world. In particular, some domains, such as seasons, map poorly onto pentads, though some theorists did find seemingly ad hoc ways of justifying their inclusion. In reference to *kéreta basa*, a similar (but less-developed) practice of finding parallel structures (usually in groups of three) in the oral Javanese tradition, Andrew Beatty has called these “numerical puns” (after an aspect of wordplay involved in their construction that also sometimes obtains in the Chinese practice), although the frivolity of such nomenclature belies their status of transmitted lore and the internal coherence of the systems. He contrasts his belief in the orderliness of such speculation with the more cynical interpretation of Ward Keeler, who believed “they do not represent an analysis of the world. Instead, they assert control by the imposition of a grid upon data.”³⁹ Based on the different levels of suspicion with

³⁸ *Wuyingdian Shisan Jing Zhushu* 武英殿十三经注疏: *Liji Zhushu* 禮記注疏, 37: 5v.

³⁹ Andrew Beatty, *Varieties of Javanese Religion: An Anthropological Account* (Cambridge: Cambridge University Press, 1999), 250n8. The Ward Keeler quotation is from *Javanese Shadow Plays, Javanese Selves* (Princeton: Princeton University Press, 1987), 253. That this is a mostly oral tradition is worth noting in light of the thesis that correlative cosmologies tend to develop within situations of high information flow due to shifts in literate technologies. See Steve Farmer, John B. Henderson, and Michael

which some Chinese thinkers have treated correlative cosmology, I suspect that a similar diversity of interpretation existed.

Moreover, even if such relationships had been taken quite straightforwardly during the Han or Tang, in the context of the Northern Song, the view of the relationship between humans and the cosmos was becoming more complex. The historian of Chinese astronomy Wu Yiyi 吴以义 argued that in the interpretation of astronomical omens a new “pragmatic agnosticism” took hold. Instead of a straightforward *ganying* link between the state and cosmic anomalies, there arose a compromise position that heaven is not wholly independent of humans, but is inscrutable.⁴⁰ Wu’s argument is strictly about astronomy, but it stands to reason that if scholars were rethinking the doctrine of correlative cosmology in this area, it is likely they were rethinking other aspects of it as well. This compromise sounds more like the disarticulated analogies presented in the more skeptical sources above.

Reverence, causality, and agency in the correspondence

The other important point Zheng Xuan makes in his commentary is a generalization from something implicit in the original text, that lower notes are more revered and higher notes are more humble: “As for all sounds, low [lit. muddy] ones are

Witzel, “Neurobiology, Layered Texts, and Correlative Cosmologies: A Cross-Cultural Framework for Premodern History,” *Bulletin of the Museum of Far Eastern Antiquities* 72 (2000): 67–70.

⁴⁰ Wu Yiyi 吴以义, “Auspicious Omens,” 252.

revered and high [lit. clear] ones are humble.” 凡聲濁者尊，清者卑。⁴¹ He draws this conclusion only from the status accorded to the parts of the state, but it is undergirded by some of the other conceptual mapping that was used in Chinese music terminology, wherein low notes were seen as “strong” (*qiang* 強) or “heavy” (*zhong* 重), attributes that seem to correlate more with respect.⁴²

Scott Cook notes that the ordering of the parts of the state is based not only on reverence, but, particularly in light of the upper two notes that do not represent humans, has an aspect of causality: “Affairs in turn are undertaken by the people, and things, in this context certainly referring to products, are merely the outcome of the affairs, and are thus the lowest in the hierarchy and highest in pitch.”⁴³ Cook is not explicit about this point, but within the political systems typical of ancient Chinese states, the scheme works further down as well. The government has a similar relationship to the people, wherein the people are the labor force the state uses to accomplish the affairs. Moreover, the ruler, as the ultimate director of the state, uses his ministers to direct the people effectively.

Though the chain of command proceeds in this order, that of course does not mean that the ruler is unconstrained. Chinese history and mythology is full of accounts of wise ministers remonstrating with foolish rulers, the people revolting against a tyrannical state, or the agricultural yield (those most critical things) of a state succumbing through mismanagement to disaster and causing famine. In any of these cases, a wise ruler,

⁴¹ *Wuyingdian Shisan Jing Zhushu* 武英殿十三经注疏: *Liji Zhushu* 禮記注疏, 5r. Appears in Cook, “Yue Ji,” 31.

⁴² See the third case study in this chapter for a fuller analysis of this conceptual mapping.

⁴³ Cook, “Yue Ji,” 31.

minister, or populace would respond accordingly, to restore the proper balance between these elements. The key factor is timely response to the situation, particularly responding appropriately to natural conditions. This point is made clearly in a later passage within the *Record of Music*:

天地之道，寒暑不時則疾，風雨不節則饑。教者，民之寒暑也；教不時則傷世。事者民之風雨也；事不節則無功。然則先王之為樂也。以法治也，善則行象德矣。

In the Way of Heaven and Earth, if cold and heat are not timely, there is sickness, and if wind and rain are not regular in their occurrence, there is hunger. Teachings are the cold and heat of the people—if teachings are not timely, then harm is done to the age. Affairs are the wind and rain of the people—if affairs are not regular in their occurrence, then there is no accomplishment. This being the case, the making of Music by former kings was in order to provide a model for governance. If it is good, then the actions [of the people] strive to resemble the virtue [of the ruler].⁴⁴

Though this section is not explicitly linked to the arrangement of the parts of the state, it illustrates the movement in both directions in which they should harmonize. In particular, it covers the node between the animate and inanimate parts of the state.

But why is there such a node in the first place? The enumeration of the parts of the state seems to be a curiously mixed list, with three social roles alongside the abstraction of affairs and the inanimacy of things. If the principal argument is about the interaction of different social roles, then why not choose five ranks? Clearly, the ability to think in fives applies for lists of social roles as well. One passage in the “Kingly System” (*Wangzhi* 王制) of the *Record of Ritual* presents such a scheme: “Among the Feudal Lords, the upper counselor (that is, minister), the lower counselor, and the upper, middle,

⁴⁴ CTP liji/yue-ji 24; translation from Cook, 56.

and lower gentlemen formed five degrees” (諸侯之上大夫卿，下大夫，上士，中士，下士凡五等).⁴⁵ If they sought a broader list, simply omitting the gradations while including the ruler at the top and the populace at the bottom would result in five social roles for the state: ruler (*jun* 君), ministers (*qing* 卿, equivalent to *chen* 臣), counselors (*dafu* 大夫), gentlemen (*shi* 士), and commoners (*shuren* 庶人, equivalent to *min* 民).⁴⁶ Another similar list, familiar to every literate person, is the five sections of the *Classic of Filial Piety* (*Xiaojing* 孝經) that pertain to particular classes: Son of Heaven (*tianzi* 天子), Feudal Lords (*zhuhou* 諸侯), ministers and (*qingdashi* 卿大夫), gentlemen, and commoners. Why would the musical correspondence not use a list like these ones?

One possible explanation relates to a division within the Five Tones themselves. Musical tones are not only ordered from lowest to highest, but pairs of them can also have specific relationships. In Western music theory, these relationships are generally known as intervals. In traditional Chinese music theory, there is no corresponding abstract concept,⁴⁷ but scales can be generated in specific orders that differ from a simple ascending order. Scales in traditional Chinese music theory are usually built using the

⁴⁵ CTP liji/wang-zhi 1. Here I follow this punctuation, which makes sense with Zheng Xuan’s gloss. This text may, however, reflect a different source that was later altered to line up with the Five Elements theory, which Zheng Xuan comments it “resembles” (*xiang* 象). Though six titles are listed, according to Zheng Xuan’s commentary, the upper counselor is the same as the minister. Robert Gassmann cites an alternative ordering of the first line, (諸侯之卿，上大夫), and contends that there were in fact six roles, as his punctuation indicates. Robert Gassmann, “Understanding Ancient Chinese Society: Approaches to Rén 人 and Mǐn 民,” *Journal of the American Oriental Society* 120, no. 3 (2000): 349.

⁴⁶ This ranking and translations are given as a chart in Gassmann, 350.

⁴⁷ The abstract concept of interval is now known in Chinese as *yincheng* 音程, but this word is not used before the twentieth century. The earliest citation in the *Hanyu da cidian* (XII: 655) is from the Europe-educated Cai Yuanpei 蔡元培 (1868–1940).

principle of *sanfen sunyi* 三分損益 (“loss and gain by a third part”), wherein the string length corresponding to successive pitches are alternately increased and decreased by one-third.⁴⁸ In Western theory terms, this is equivalent to an alternating ascent by a perfect fifth and descent by a perfect fourth. Thus, a string that sounds *gong*, when reduced in length by a third (i.e., made into two-thirds of its length), will sound *zhi*; if this shorter string is then itself extended in length by a third of its new length (i.e., made into four-thirds of its length), this will produce *shang*. Repeating these two steps will yield *yu* (the shortest string length of these five, and thus the highest pitch) and *jue*, completing the Five Notes but now they are arranged in a different order.⁴⁹ This procedure is often explained using numbers for measured lengths,⁵⁰ as in this passage from the *Historical Records* (*Shiji* 史記) compiled by the Han dynasty historian Sima Qian 司馬遷:

九九八十一以為宮。三分去一，五十四以為徵。三分益一，七十二以為商。三分去一，四十八以為羽。三分益一，六十四以為角。
 Nine times nine is 81 to make *gong*; removing one third yields 54 to make *zhi*; adding one third yields 72 to make *shang*; removing one third yields 48 to make *yu*; adding one third yields 64 to make *jue*.⁵¹

⁴⁸ Traditional Chinese descriptions actually use pipe lengths instead of string lengths, but the principle is the same and string lengths are probably more familiar to the reader. However, in real physics pipe lengths are complicated by the existence of end correction (also known as end effect), which causes overblown fifths to be somewhat smaller than string harmonics. See Chapter 4 for more discussion.

⁴⁹ The Five Notes are thus completed, but one can continue the process to produce the twelve-pitch gamut described later, or even larger schemes, such as the 60 pitches of Jing Fang 京房 (78–37 BCE) or the 360 pitches of Qian Lezhi 錢樂之 (fl. 415–455). For the mathematics involved in such schemes, see Ernest G. McClain and Ming Shui Hung, “Chinese Cyclic Tunings in Late Antiquity,” *Ethnomusicology* 23, no. 2 (1979): 205–224, <https://doi.org/10.2307/851462>.

⁵⁰ This may seem unavoidable, given the modern association of numbers with measurement, but one could imagine Ancient Greek geometers devising a parallel scheme but using unquantified compass-and-straightedge constructions instead.

⁵¹ CTP shiji/lv-shu 20.

Generating the tones in this way, one obtains a natural division between those that were produced by reduction of length (called “inferior generation,” *xiasheng* 下生) and those that were produced by extension (called “superior generation,” *shangsheng* 上生).⁵² This dichotomy maps easily onto *yin-yang* 陰陽 theory, with the higher notes produced by shortening as *yin* and the longer notes produced by extending as *yang*. Such an interplay between the quinary nature of groups of five (particularly the Five Phases) and the binary nature of *yin-yang* was characteristic of many schemes in correlative cosmology.

Therefore, within the Five Tones the *yang* tones are *gong*, *shang*, and *jue*, while the *yin* tones are *zhi* and *yu*.⁵³ This corresponds precisely to the break between the human and the non-human parts of the state, and would therefore account for their division into *yang* agents and *yin* patients.

Northern Song debate on the number of bells

I turn now to how scholars of the Northern Song used this correspondence in their arguments about the use of the four upper-octave tones in bell-chimes.⁵⁴ A word of

⁵² The Chinese terms appear in the *Yinlü* 音律 (“Pitch and Tuning”) chapter of the *Lüshi chunqiu*. CTP lv-shi-chun-qiu/yin-lv 1.

⁵³ *Gong* is counted as *yang*, to make the pattern alternate. Moreover, in the standard numbers used in the passage, presumably originally chosen to simplify the integer mathematics, no number could more *yang* than nine times nine. The twelve-note system is more complex, as two inferior generations in a row are needed at one point to keep the range within an octave. See Falkenhausen, *Suspended Music*, 302–3.

⁵⁴ Though all the quotations I reproduce here are framed in terms of bell-chimes, everything applies equally to the construction of lithophone-chimes; the two chime sets were always built in parallel following the same overall design.

warning, however: the music terminology in this discussion will become much more complex, as the five notes of the pentatonic scale, which we have exclusively encountered so far, are now used in coordination with the twelve standard bell pitches. These two systems of nomenclature are equivalent to the use of movable note names (such as movable-do *solfège* or functional terms like “tonic” and “dominant”) and fixed pitch names (such as C, C#, D, etc.). These two systems can be related in multiple ways, just as a melody in Western music can be played in any key. These combinations are usually indicated by saying a certain bell name (such as *huangzhong*) is *gong* (which, in this context, essentially means “tonic”). Unfortunately for the reader, the bell names themselves are complex and follow no simple pattern.⁵⁵ In the translations below, un glossed italicized two-syllable transliterations are all bell names.

Table 3.1 below, which lists the bell names in various scalar permutations, will serve as a useful aid throughout this discussion. Along the top are the five movable note names, in Chinese terminology and the equivalents in *solfège* and numbered musical notation. Underneath in the same box is their corresponding part of the state, according to the *Record of Music* passage. In the leftmost column, underneath *gong*, are the names of the twelve bells in the chime (these correspond to the twelve notes of the chromatic scale). If any of the bells in that column is taken as the *gong* note (the tonic, so to speak), then the remaining notes in that row are the other bells in that particular pentatonic mode, in ascending scale order. If the bell set has only twelve bells, then the bells in any gray

⁵⁵ There has been significant speculation on the origin of the bell names. For one compelling take (which, if highly speculative, at least helps one remember the names), see Fritz A. Kuttner, “A Musicological Interpretation of the Twelve Lush in China’s Traditional Tone System,” *Ethnomusicology* 9, no. 1 (January 1965): 22–38, <https://doi.org/10.2307/850415>.

boxes would be lower than the preceding bells. If the bell set has the four upper-octave bells, then only the bells in the dark gray boxes would be lower than the preceding bells.

<i>gong</i> 宮 do 1 “ruler” <i>jun</i> 君	<i>shang</i> 商 re 2 “minister” <i>chen</i> 臣	<i>jue</i> 角 mi 3 “people” <i>min</i> 民	<i>zhi</i> 徵 sol 5 “affairs” <i>shi</i> 事	<i>yu</i> 羽 la 6 “things” <i>wu</i> 物
黃鐘 <i>huangzhong</i>	太簇 <i>taicu</i>	姑洗 <i>guxian</i>	林鐘 <i>linzhong</i>	南呂 <i>nanlü</i>
大呂 <i>daliü</i>	夾鐘 <i>jiazhong</i>	仲呂 <i>zhonglü</i>	夷則 <i>yize</i>	無射 <i>wuyi</i>
太簇 <i>taicu</i>	姑洗 <i>guxian</i>	蕤賓 <i>ruibin</i>	南呂 <i>nanlü</i>	應鐘 <i>yingzhong</i>
夾鐘 <i>jiazhong</i>	仲呂 <i>zhonglü</i>	林鐘 <i>linzhong</i>	無射 <i>wuyi</i>	黃鐘 <i>huangzhong</i>
姑洗 <i>guxian</i>	蕤賓 <i>ruibin</i>	夷則 <i>yize</i>	應鐘 <i>yingzhong</i>	大呂 <i>daliü</i>
仲呂 <i>zhonglü</i>	林鐘 <i>linzhong</i>	南呂 <i>nanlü</i>	黃鐘 <i>huangzhong</i>	太簇 <i>taicu</i>
蕤賓 <i>ruibin</i>	夷則 <i>yize</i>	無射 <i>wuyi</i>	大呂 <i>daliü</i>	夾鐘 <i>jiazhong</i>
林鐘 <i>linzhong</i>	南呂 <i>nanlü</i>	應鐘 <i>yingzhong</i>	太簇 <i>taicu</i>	姑洗 <i>guxian</i>
夷則 <i>yize</i>	無射 <i>wuyi</i>	黃鐘 <i>huangzhong</i>	夾鐘 <i>jiazhong</i>	仲呂 <i>zhonglü</i>
南呂 <i>nanlü</i>	應鐘 <i>yingzhong</i>	大呂 <i>daliü</i>	姑洗 <i>guxian</i>	蕤賓 <i>ruibin</i>
無射 <i>wuyi</i>	黃鐘 <i>huangzhong</i>	太簇 <i>taicu</i>	仲呂 <i>zhonglü</i>	林鐘 <i>linzhong</i>
應鐘 <i>yingzhong</i>	大呂 <i>daliü</i>	夾鐘 <i>jiazhong</i>	蕤賓 <i>ruibin</i>	夷則 <i>yize</i>

Table 3.1: Intersection between the five-note and twelve-note conceptions of the Chinese tonal system.

Most of the allusions to the correspondence between the notes and the parts of the state are implicit, relying on the familiarity of the reader with the *Record of Music* passage that sets up the correspondence. However, there were also cases where it was made explicit, which confirm that that allusion forms the ground. Let me begin with a non-polemical excerpt from the imperial records that draws a straightforward connection when describing a set of music:

六月，內出禦撰明堂樂八曲，以君、臣、民、事、物配屬五音，凡二十聲為一曲。

In the sixth month [of second year of Huangyou, 1050], the internal court imperially compiled the eight songs of Music for Mingtang [a palace

building]. Following the ruler, minister, people, affairs, and things, it matched [tunes] belonging to the Five Tones; altogether there were twenty sounds in each song.⁵⁶

More typical are references that simply say something about the order of ruler and minister as a musical argument. In the opening section of the treatise *Huangyou xinyue tuji* 皇祐新樂圖記 (1053), intended to explain the origin of the work and justify its completion, the writers presented a list of ways in which the then-current musical instruments in the Court of Imperial Sacrifice (*Taichangsi* 太常寺) deviated from those the ancients used. Of the list of seven defects of bells and three defects of lithophones, all but one cite passages from the *Rites of Zhou* (*Zhouli* 周禮), the ritual classic that provided the most specific and quantitative information about ancient musical practice available within the transmitted corpus. The remaining one, however, is a reference to this passage in the *Record of Ritual*:

七謂舊鑄鐘聲不正，全失臣民之敘。

7: The sound of the old bells is not correct; they have completely mistaken the order of ministers and people.

[As note] 夫鐘聲清濁各有臣民之敘。今太常寺鑄鐘自黃鐘以⁵⁷上是正聲，其應鐘、無射、南呂三鐘却是倍聲，形制大于黃鐘、大呂等。鐘不惟⁵⁸失臣民之敘，且殊不協音律。所以聖人詔有司詳議修制，以改正前代之失。

Now the sounding pitches of the bells each have the order of ministers and people. Today in the Court of Imperial Sacrifices, the bells from *huangzhong* on up are in the principal register, but the three bells *yingzhong*, *wuyi*, and *nanzhong* are in the lower register; the structures are bigger than *huangzhong*, *daliu*, and so on. The bells not only mistake the

⁵⁶ Tuotuo 脫脫, *Songshi*, 127.2962. I think the last sentence means that each song had a twenty-syllable text set syllabically.

⁵⁷ The *SKQS* edition has “己” (1.2v). The meaning is not significantly different.

⁵⁸ The *SKQS* version has “唯” (1.2r), with the same meaning.

order of ministers and people, but also in particular do not obey the tuning (lit. law of pitch). Therefore, sage people called officials to investigate and rectify in order to correct the mistake of previous eras.⁵⁹

This is the only place the treatise mentions the order of ministers and people, and without a knowledge of the reference we have been discussing, the passage is quite incomprehensible. The point is that the investigated chime sets included three extra bells in the lower register,⁶⁰ which would in certain modes cause the notes corresponding to ministers and people to be reversed. Since at this time the modes centered on the twelve bell names were cycled through calendrically, certain times of the year would be prone to having social disorder encoded in the ritual music. The remedy of this defect, as explained later in the treatise, is the addition of four upper-octave notes to the chimes, which allow the notes corresponding to the minister and people to be higher than that of the ruler. Curiously, when this solution is presented in the second *juan* of the treatise, the frame of minister and people is not reiterated; instead, there the justification for sixteen bells is based on textual authority of the *Rites of Zhou* and the *Sanli tu*.

In the previous excerpt, the reference to the parts of the state is explicit and no note names are given. However, more often in this debate, it is the reverse: there is no explicit reference to the allusion, but merely the idea that the note names given constitute a violation of proper order which is only legible by understanding the correspondence

⁵⁹ *Huangyou ji*, *Congshu jicheng* ed., 1.4.

⁶⁰ This description seems likely to be an error, since nowhere have I seen mention of the practice of using three bells in the lower register, or the apparent resultant size of a complete chime being fifteen bells. Typically, the debates were between sets of twelve bells (*huangzhong* to *yingzhong*) and sets of sixteen (with four additional bells in the next octave up), as it is described in the next excerpt, which was written with respect to the same reform period (1050–1053). However, I wish to focus on the logic of the argument, so we can leave aside the exact arrangement.

between pitch and esteem. Again, without understanding the reference, the logic is impenetrable. The following passage, from a memorial put forth by the Hanlin Academician (*Hanlin xueshi* 翰林學士) and Recipient of Edicts (*chengzhi* 承旨) Wang Yaochen 王堯臣 (1003–1058) in 1050, illustrates this point:

今太常鍾縣十六者，舊傳正聲之外有黃鍾至夾鍾四清聲，雖於圖典未明所出，然考之實有義趣。蓋自夷則至應鍾四律為均之時，若盡用正聲，則宮輕而商重，緣宮聲以下，不容更有濁聲。一均之中，宮弱商強，是謂陵僭，故須用子聲，乃得長短相敘。自角而下，亦循茲法。故夷則為宮，則黃鍾為角；南呂為宮，則大呂為角；無射為宮，則黃鍾為商、太簇為角；應鍾為宮，則大呂為商、夾鍾為角。蓋黃鍾、大呂、太簇、夾鍾正律俱長，並當用清聲，如此則音律相諧而無所抗，此四清聲可用之驗也。至他律為宮，其長短、尊卑自序者，不當更以清聲間之。

Now in the [Court of] Imperial Sacrifice hang sixteen bells. Besides the old transmitted principal register, there are the four upper-octave sounds, *huangzhong* to *jiazhong*. Although in illustrations and classics it does not appear clearly, in the investigation it was successfully argued for. When taking the four pitches from *yize* to *yingzhong* as a standard, if the orthodox sounds are completely used, then *gong* is light [i.e. high-pitched] and *shang* is heavy [i.e. low-pitched], because below the *gong* sound there is not room for a lower sound. Within one mode, if *gong* is weak [i.e. high-pitched] and *shang* is strong [i.e. low-pitched], this is perversely usurping another's authority. Therefore, one must use a higher tone [lit. child-tone], then the lengths [i.e. pitches] will be in order. From *jue* on, it also continues in this way. Therefore, if *yize* is *gong*, then *huangzhong* will be *jue*; if *nanlü* is *gong*, then *dalü* is *jue*; if *wuyi* is *gong*, then *huangzhong* is *shang* and *taicu* is *jue*; if *yingzhong* is *gong*, then *dalü* is *shang* and *jiazhong* is *jue*. Therefore, *huangzhong*, *dalü*, *taicu*, and *jiazhong* in the principal register are all long, they all must use the upper-octave sounds. In this way, then the tuning will be harmonious and not have oppositions; this is the proof of the usability of these four upper-octave sounds. As for other pitches as *gong*, their length and esteem follow the order, it is not necessary to include them among the upper-octave sounds.⁶¹

⁶¹ *Songshi* 127.2963–2964.

This excerpt presents clearly the motivation for the four upper-octave bells, thus recommending that each chime have sixteen bells total, generally hung in two rows of eight, which is in fact the solution that the drafters of the *Huangyou xinyue tuji* produced at the end of this reform (see Figure 3.1a–b). Note the bell names under each bell and lithophone (ascending from lower right to the left, then from upper left to upper right). The four left instruments of each upper row are the upper-octave bells and lithophones; each one uses the term “high” (qing 清) to replace the second character of the name (reading from right to left for the bells and up to down for the lithophones).

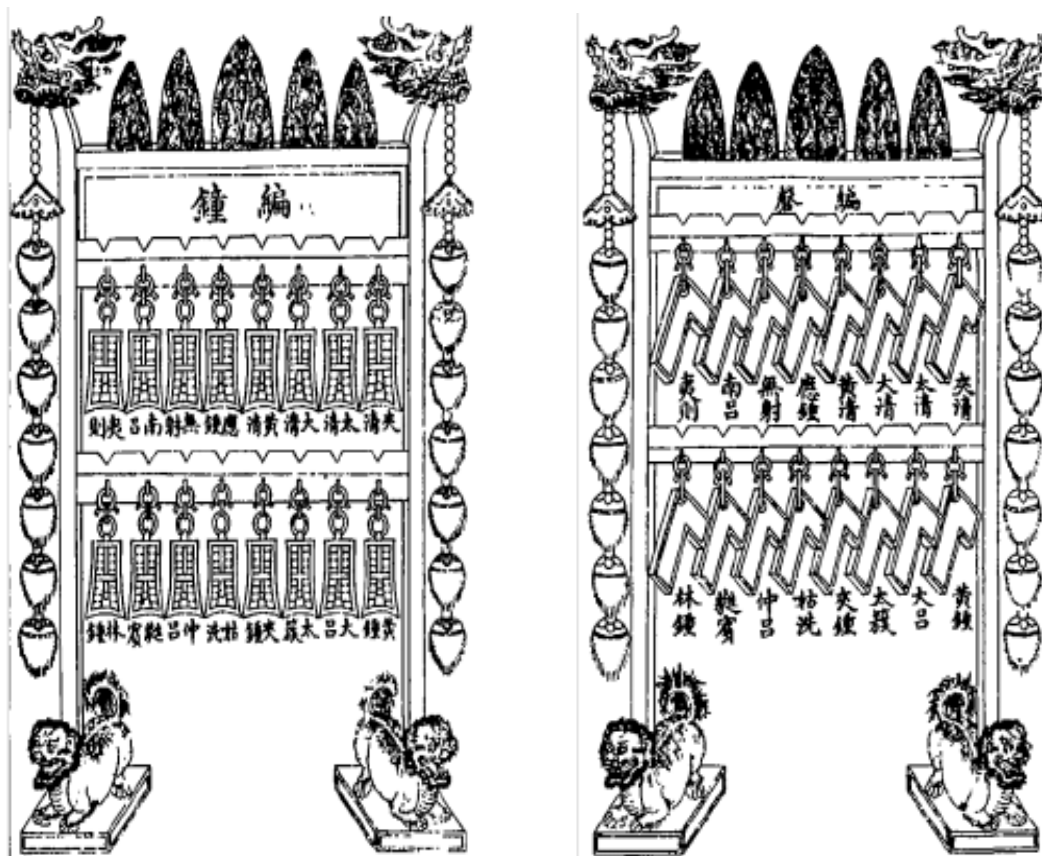


Figure 3.1: Chimed sets in the *Huangyou ji* (a) *bianzhong* (b) *bianqing*⁶²

⁶² *Huangyou ji*, SKQS ed., 2.8r and 10r.

This solution, however, ran up against a different cosmological problem: the number twelve was also numerologically important, representing the twelve pitches, the twelve months of the year, and a few other groups of twelve. Some scholars seized onto this and rejected the use of the four upper-octave tones as unorthodox, as it prevented the chime from having an appropriate number of bells. Typical of this view is the opinion of Li Zhao 李照 in 1034:

先時，太常鍾磬每十六枚為虞，而四清聲相承不擊，照因上言：「十二律聲已備，餘四清聲乃鄭、衛之樂，請於編縣止留十二中聲，去四清聲，則哀思邪僻之聲無由而起也。」

At first, the bells and lithophones in the Imperial Court numbered sixteen each per rack, but following tradition, the four upper tones were not struck. [Li] Zhao then said, “the twelve sounds are complete, the additional four upper sounds are just the music of Zheng and Wei. I request that the suspended chime have merely twelve harmonious sounds, and remove the four upper sounds. Then, the sounds of sad memories and avoiding evil will not have the means of arising.”⁶³

As can be seen in Table 3.1, the problem of the transgression of ministers and people can be resolved for all modes with the addition of four extra tones. But why should these scholars have only cared about the relative order of the first three parts of the state, those that correspond to human agents, and ignored the other two? An excerpt from a memorial from the Hanlin Academician Reader-in-waiting 翰林侍讀學士 Feng Yuan 馮元 (975–1037) gave an explanation in his 1034 defense of the four upper-octave tones:

聲重濁者為尊，輕清者為卑，卑者不可加於尊，古今之所同也。故列聲之尊卑者，事與物不與焉。何則？事為君治，物為君用，不能尊於君故也。惟君、臣、民三者則自有上下之分，不得相越。故四清聲之

⁶³ *Songshi* 126.2949–2950.

設，正謂臣民相避以為尊卑也。今若止用十二鍾旋相考擊，至夷則以下四管為宮之時，臣民相越，上下交戾，則凌犯之音作矣。此甚不可者也。

If sounds are low and heavy, they are revered; high and light, they are humble. The humble cannot be added to in order to become revered, this is the same for the ancients as for today. Therefore, when arranging the esteem of sounds, affairs and things are not the same as them. Why then? Affairs are governed by the ruler, things are used by the ruler, thus they cannot be revered by the ruler. Only the three, the ruler, minister, and people, can be divided according to status and cannot overstep one another. Therefore, the arrangement of the four upper-octave sounds truly is the mutual avoidance of the minister and people, in order to become the revered and the lowly. Now if we only use the twelve bells, each struck in their turn, when the four notes from *yize* on are used as *gong*, the minister and the people overstep one another, the high and low intermingle perversely, this results in the making of infringing and violating tones. This absolutely cannot be allowed.⁶⁴

In Feng Yuan's justification, only the three human agents, corresponding to the three *yang* tones, can be ranked, and affairs or things can appear on either side of this hierarchy without disrespect. This much follows from the passage from the *Record of Music*. However, another possible explanation comes from the note names themselves, that could reinforce the salience of this passage. The origins of the note names is not clear. According to Joseph Needham, based on some early appearances in texts, the terms have had their present meaning of indications of pitch from about the fourth century BCE on, but earlier may have been indications of amplitude or timbre.⁶⁵ He offers the plausible hypothesis that the names themselves may be vestiges of designations for the positions of certain drums or other instruments in very early practice.⁶⁶ In any case, however, those

⁶⁴ *Songshi* 126.2950.

⁶⁵ Needham and Robinson, "Sound," 140–41.

⁶⁶ Needham and Robinson, 157–59.

origins would have been equally obscure to the Northern Song scholar, regardless of how thorough his learning. However, the more ordinary connotations of several of the characters that served as note names may have influenced their view and their desire to see these names rectified. *Gong* 宮 means palace, the residence of the ruler, and was a character frequently encountered in musical contexts in the term “palatial suspension” (*gongxuan* 宮懸, also written 宮县), the suspended music appropriate for a ruler. This term is one of a variety that distinguish four ranks of nobility in the *Rites of Zhou*:

正樂縣之位，王宮縣，諸侯軒縣，卿大夫判縣，士特縣，辨其聲。凡縣鐘磬，半為堵，全為肆。

As for the positions of orthodox suspended music, the king uses palatial suspension (*gongxuan*), the Feudal Lords use carriage suspension (*xuanxuan* 軒縣), the ministers use divided suspension (*panxuan* 判縣), and the knights use individual suspension (*texuan* 特縣); each is distinguished by its sound. For all suspended bells and lithophones, a half [set] is a *du*; a full set is a *si*.⁶⁷

As the writings I examine are all concerned with the music of imperial ritual, only the first term appears frequently, but it was understood as part of a system that performed the hierarchical status of the ritual observant.⁶⁸ This type of tiered observance of ritual was typical of the ancient system represented in the ritual classics, and Northern Song ministers scrupulously tried to preserve the status it conferred, even after the social

⁶⁷ The “Xiaoxu” 小胥 (“Junior Dancing Master”), in the *Chunguan* 春官宗伯 (“Spring offices”). CTP *rites-of-zhou/chun-guan-zong-bo* 107. For another translation, see Needham and Robinson, 158. On how to interpret this last statement about the sizes of the ensembles, see Falkenhausen, *Suspended Music*, 203. This passage and the commentary below opens the text for the eighth image in the *Huangyou ji*.

⁶⁸ My use of the word “perform” here follows Joseph Lam’s view of imperial music performance as an integral part of performing emperorhood. Lam, “Huizong’s Dashengyue.”

context in which it had evolved had long vanished. Zheng Xuan's commentary on this passage explains more concretely what the system meant and its symbolism:

宮縣，四面縣，軒縣去其一面，判縣又去其一面，特縣又去其一面。
四面象宮室，四面有牆，故謂之宮縣。

Palatial suspension is suspended on four sides; carriage suspension removes one side; divided suspension again removes one side; individual suspension again removes one side. The four sides resemble a palace building, walled on four sides, therefore it is called palatial suspension.⁶⁹

The passage continues with a parallel explanation of the other terms, but my point here is the imperial reverence that would be accorded to a note named *gong*. Song scholars are as likely to refer to “palatial rack” (*gongjia* 宮架) to designate the appropriate manner for palatial suspension in their instrument designs.⁷⁰

Meanwhile, the next note name *shang* has a core meaning of “advise,” which certainly fits with the role of a minister. As Needham explains, etymologically, it is probably connected with several near-homophones that relate to facing one another (as a minister and ruler would), such as *xiang* 向 (“to face”), *xiang* 相 (“each other,” “minister”), *qing* 卿 (“minister”), and *xiang* 響 (“echo”).⁷¹

The third note, *jue* 角, can also be pronounced *jiao*. The latter pronunciation, far more common, is derived from a Sino-Tibetan root, has the meaning “horn.”⁷² However, the former pronunciation also has a meaning of “actor” or “role,” which could plausibly

⁶⁹ Zheng Xuan 鄭玄, *Zhouli Zheng shi zhu*, 6.151.

⁷⁰ For example, *Huangyou ji* for the sixth image (the single bell).

⁷¹ Needham and Robinson, “Sound,” 157–58.

⁷² Schuessler, *ABC Etymological Dictionary of Old Chinese*, 309.

connect with the people. However, this meaning seems to have been a late development, and may not have been familiar during the Northern Song.⁷³ The fourth note, *zhi* 徵, does not often appear outside of musical contexts, but also has another reading, *zheng*, “to levy, solicit,” which could possibly relate it to state affairs. The fifth note, *yu* 羽, comes fittingly at the end; its central meaning is “feather” or “wing,” but the derived meanings relate to an inessential part, such as the appendix of a book. However, it seems reasonable that these last two characters lack the immediate connotations that would reinforce the hierarchical ordering, and thus would not lead to impassioned arguments about rank that the others would.

The political context of debates between ruler and minister

The relationship between the ruler, minister, and populace, as expressed in the notes, captured the rhetorical imagination of Northern Song scholars. It was not uncommon to use part of this relationship as a shorthand for the entire argument, as in the *Huangyou ji* complaint, “The sound of the old bells is not correct; they have completely mistaken the order of ministers and people” (舊罇鐘聲不正，全失臣民之敘), cited above. Perhaps this debate resounded from anxiety about the clarity of these roles and the chain of decision-making. Historians of the Song dynasty continue to dispute how the roles of emperor and minister related to one another, how autocratic the emperors were,

⁷³ *Hanyu da cidian* (X: 1346) gives its earliest citation of this sense from the Yuan dynasty, and perhaps it is connected with the flourishing of theater during that period or the Southern Song. Another meaning of that pronunciation, a ritual implement mentioned in the classics, is more likely to have come to mind to scholars interested in classical learning.

and how effective their ranks of ministers were in communication with the emperor above and the people below.⁷⁴

For instance, consider the timing of the passage above, as part of a treatise written in 1053. It therefore came within a decade of the aftermath of the charges of factionalism and favoritism that arose during the short-lived Qingli 慶曆 reforms in 1044, led by Fan Zhongyan 范中淹 (989–1052), which provoked a debate over the appropriate roles of emperors and ministers. In Confucian thought, the emperor should have ultimate authority, but should not transgress his duties, while the ministers should not usurp this authority from the emperor, as conservatives at court had claimed Fan had done during the reforms. Moreover, care was needed by both not to unnecessarily burden the people, many of whom were dealing with the catastrophe of the floods of the Yellow River in 1034 and again in 1048.⁷⁵

Given the assumed connection between musicianship and statecraft, however, this goal could also be achieved by undertaking an effective music revision. Renzong's 仁宗 revision in the 1050s was the third major music overhaul of the Northern Song, but was motivated in part by these concerns. It is impossible to resolve whether the scholars really believed they were effecting cosmic change through a mysterious connection or were

⁷⁴ This debate over the autocracy of the Song emperors stems from the view of the Japanese historian Naitō Konan (1866–1934), though it has been less accepted than his periodization of the Song period as early modern. Paul Jakov Smith, “Introduction: The Sung Dynasty and Its Precursors, 907-1279,” in *The Cambridge History of China, Vol. 5, Part One: The Sung Dynasty and Its Precursors, 907-1279*, ed. Denis Crispin Twitchett and Paul Jakov Smith (Cambridge: Cambridge University Press, 2009), 16.

⁷⁵ Christian Lamouroux, “From the Yellow River to the Huai: New Representations of a River Network and the Hydraulic Crisis of 1128,” in *Studies in Environment and History: Sediments of Time: Environment and Society in Chinese History*, ed. Mark Elvin and Liu Cuirong (Cambridge: Cambridge University Press, 1998), 555.

simply contributing to the legitimacy of the state by addressing issues in a customary way that had important symbolic overtones. However, the nature of the contention that is evident from their writings show they took this correspondence quite seriously.

Case study 2: The bell-knife and its symbolism

After the presentation of defects in the introduction to the *Huangyou ji*, the subsequent sections mainly present reconstructed musical and ritual instruments, drawing mostly on data provided in the *Rites of Zhou* or Zheng Xuan's commentary. This should come as no surprise, since the remaining defects identified in the introduction all specifically invoked this textual precedent, and the explicit details that text provides about ancient instrument construction allow the arguments to proceed rather directly on the basis of textual authority.⁷⁶ However, this applies equally to the instruments that appear in the last *juan*, the entrance drum (*jingu* 晉鼓) and the ritual tripod (*shengding* 牲鼎), which were not mentioned in the introduction, until the treatise concludes at another point where mere textual precedent is grossly insufficient: the bell-knife (*luandao* 鸞刀).⁷⁷

⁷⁶ In fact, there are numerous exceptions to this, such as the accommodation to visual harmony in choosing bell chimes wherein all bells are of the same size. See the discussion in Chapter 5 on the bell-chime in the *Huangyou ji*. However, the overall design of the other instruments is much more constrained by these textual traditions.

⁷⁷ In their translations of the classical references, English translators have taken several approaches to translating this object. James Legge rendered it as “the knife with tinkling bells” or “the knife with the bells attached to it” to make clear the relationship between the bells and the knife. Ernest Faber used the most literal calque “phoenix-knife,” a usage followed by Burton Watson. Harry Miller chose the simple gloss “ceremonial blade.” However, the plurality of translators since the twentieth century have used “bell-knife,” as I have chosen to do here (Arthur Waley, Bernard Karlgren, and Roel Sterckx). James Legge, trans., *The Chinese Classics, Vol. IV: The She King*, 2nd edition (Oxford: Oxford University Press, 1972), 172.; CTP ctext.org/liji/ji-yi 16. Ernest Faber, “A Critique of the Chinese Notions and Practice of Filial Piety,” *The Chinese Recorder and Missionary Journal* 9, no. 1 (1880): 4; Burton Watson, ed., *The*

Unlike any of the other instruments discussed earlier in the treatise, the bell-knife does not appear by name anywhere in the text of the *Rites of Zhou* or Zheng Xuan's commentary. Still proceeding in the manner of argument from textual authority, this final section adduces several citations from classical texts to form the basis of the appeal, but these citations differ in function from those that appear in the other sections. In contrast to the numerological and metrological concerns that dominate *Rites of Zhou* citations, mentions of the bell-knife in the classical corpus are offered principally to illustrate the importance of this instrument in ritual. There are a few specifics that appear in the cited commentaries that are exploited in the reconstructive plan, but on the whole this section is more speculative and creative than the other sections. Just like the major discrepancies between bells reconstructed from textual descriptions and the few historical examples that were unearthed at the time of Emperor Renzong's first music reform project in the 1030s,⁷⁸ these speculative bell-knives were similarly probably quite distant from the actual historical object simply because nobody at the time had seen one, only imagined it from the descriptions found in texts. Furthermore, given that the bell-knife was not included in the *Sanli tu*, even though it is mentioned four times in one of the ritual classicism the *Record of Ritual* (*Li Ji* 禮記) that the *Sanli tu* purports to illustrate, the

Columbia Book of Chinese Poetry: From Early Times to the Thirteenth Century (New York: Columbia University Press, 1984), 222; Harry Miller, trans., *The Gongyang Commentary on the Spring and Autumn Annals: A Full Translation* (New York: Palgrave Macmillan, 2015), 158; Waley, *The Book of Songs*, 212; Karlgren, *The Book of Odes*, 164; Roel Sterckx, "Searching for Spirit : Shen and Sacrifice in Warring States and Han Philosophy and Ritual," *Extrême-Orient, Extrême-Occident* 29 (2007): 43.

⁷⁸ Ebrey, "Replicating Zhou Bells."

Huangyou ji writers almost certainly did not have any visual precedents, however corrupt or inauthentic, either.⁷⁹

The *Huangyou ji* writers seem to have found this absence striking, and gathered together many of the textual references and their orthodox commentaries in an effort to describe in detail how to properly build this ritual tool. Furthermore, they chose to place it at the end of the treatise, even though it is not properly speaking a musical instrument, and this treatise is explicitly titled as one. Since other ritual implements could have been included, it is likely that this one had some value that seemed crucial to the entire enterprise of ritual music reform. Perhaps the writers chose the bell-knife to conclude the treatise because it offered the greatest opportunity to exploit the political resonances implicit within the discourses of bells, music, and harmony.

The bell-knife and its bell types

The reconstructive efforts of the *Huangyou ji* writers culminates in two rather similar diagrams, a more ornate knife for use in the sacrificial temple *zongmiao* 宗庙 and a less ornate knife for use on the circular mound altar *yuanqiu* 圓丘. While the layout and visual effects of the transmitted sources are somewhat different, the overall design and extensive labeling of the knives is identical in the editions I have examined (Figure 3.2a–b shows the sacrificial temple knives of the two editions). In the image, there are five

⁷⁹ There is no reference to the bell-knife in any of the titles of the indices of extant images and lost images in the *Treatise on Images and Tables* (*Tu pu lie* 圖譜列) of Zheng Qiao 鄭樵 (1104–1162), though it is possible that it was included in one of the other works on music or ritual. Han Si, *A Chinese Word on Image: Zheng Qiao (1104-1162) and His Thought on Images* (Göteborg: Acta Universitatis Gothoburgensis, 2008), 235–47.

small bells attached to the knife. Two are attached to the blade, with their pitches indicated; *gong* and *shang*, the two lowest notes of the pentatonic scale. The handle has the remaining three, sounding *jue*, *zhi*, and *yu*. The text included in the image itself here makes clear that these are actually considered two different kinds of bells, though they are not distinguished visually: “The *luan* 鸞 [bells] are on the blade; the *he* 和 [bells] are on the handle” (鸞在鋒; 和在鏢).

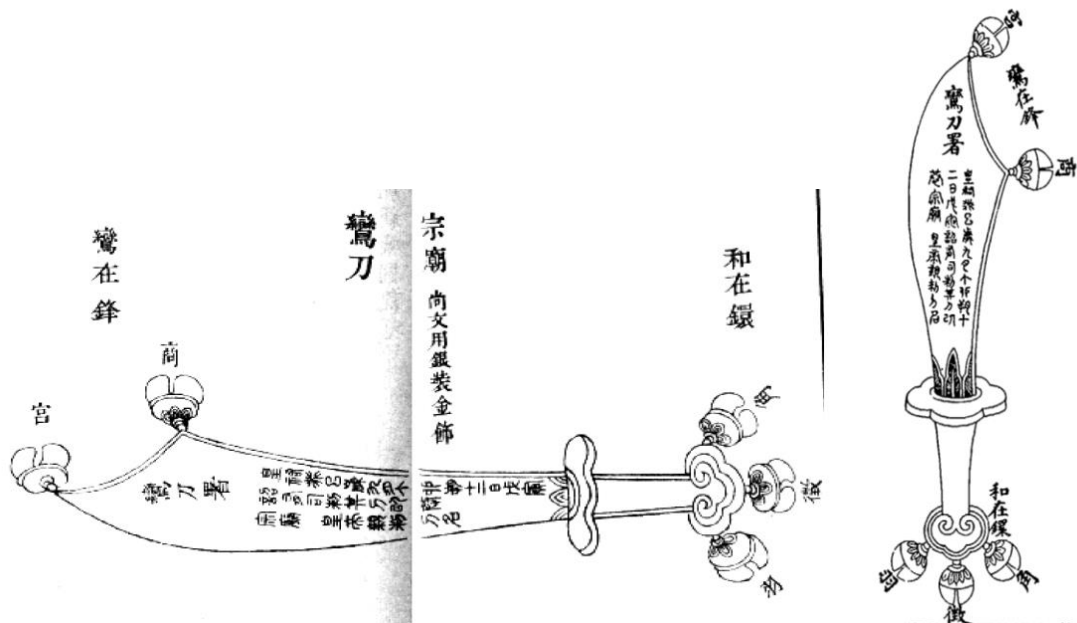


Figure 3.2: The bell knife for the sacrificial temple as depicted in two editions of the *Huangyou ji* (a) *Congshu jicheng* ed. (b) *SKQS* ed.⁸⁰

Much of the scholarship treating the importance of bells in traditional China focuses on the more impressive large bells (*zhong* 鐘, *bo* 罇, and so forth), such as the remarkable set found in the excavation of the grave of Marquis Yi of Zeng in 1978 and

⁸⁰ *Huangyou ji*, (a) *Congshu jicheng* ed., 64–65; (b) *SKQS* ed., 3.9r.

now found at the Hubei Provincial Museum.⁸¹ However, according to the ancient Chinese sources, smaller sounding objects were also deemed worthy of considerable attention. In the *Zuo Commentary* (*Zuozhuan* 左傳) to the *Spring and Autumn Annals*, a major historical source and one of the classics, there is a speech attributed to Zang Aibo 臧哀伯, in which he remonstrates with his superior's behavior by asserting that the regal duty to display one's virtue for the benefit of others and posterity.⁸² The means by which this is done is largely in following the proper (and often humble) ways which illustrate his knowledge or power. Among the many examples cited, which include dress, ornament, cuisine, and so forth, appears the clause, "the *yang*, *luan*, *he*, and *ling*, these illustrate his [attention to] sounds" (錫、鸞、和、鈴，昭其聲也).⁸³ These four objects all produce sound when they are moved. Of these four, the *yang* 錫 is the least important, since it does not figure prominently in the classics and is not mentioned in the *Huangyou ji*.⁸⁴ It was the frontlet, a decorative ornament that attached to a horse's forehead that would produce sound as the horse moved. The other three are all bells with clappers (in contrast to the large, clapperless bells used in large sets) and tied to specific uses, as discussed below.

⁸¹ For basic bell classification, see Falkenhausen, *Suspended Music*, 67–72.; for their historical development to Han times, see 129–195. This book provides an excellent analysis of Zhou dynasty bell culture, but is focused almost entirely on the larger bell types.

⁸² Duke Xuan, Year 2 桓公二年, corresponding to 709 BCE.

⁸³ The full speech appears in Chinese and English in James Legge, trans., *The Chinese Classics, Vol. V: The Ch'un Ts'ew with the Tso Chuen* (Oxford: Oxford University Press, 1972), 38, 40. Legge does not get into listing bell names, but translates it as "The bells on his horses' foreheads and bits, and those on his carriage pole and flags" (40).

⁸⁴ The *yang* does appear once in the *Classic of Poetry* (Mao No. 261, *Han Yi* 韓奕) though not in an onomatopoeic passage as discussed below.

Luan 鸞 literally denotes a mythical bird resembling a phoenix. According to the etymology in the Han Dynasty *Explaining Graphs and Analyzing Characters* (*Shuowen Jiezi* 說文解字), the name of the bird comes from its call, which “combines [*luan* 鸞, the top half of the character of the homophonous bird 鸞] the sounds” (从鳥鸞聲).⁸⁵ Furthermore, the definition there asserts that the tunefulness of this bird’s call is matched by the colorfulness of its body: “the vermillion color has the five hues; it is shaped like a chicken. In its call are the Five Tones,⁸⁶ its call is therefore most exquisite” (赤色，五采，雞形。鳴中五音，頌聲作則至).⁸⁷ As part of a long-standing relationship between birds and bells in iconography and inscriptions,⁸⁸ the word also came to be the name of a bell that was supposed to imitate the sound of that bird.⁸⁹ The character for the bell, perhaps more properly, can also be written with a metal radical (*luan* 鑾), although the character with the bird radical is used exclusively in the *Huangyou ji* treatise and was more common in general at the time.⁹⁰

⁸⁵ CTP shuo-wen-jie-zi/niao-bu 2359. Nearly all etymologies in this book are speculative, and this is no exception, but they were widely cited as authority in the imperial period and would have been among the first resources consulted by anyone seeking the logic behind words and characters.

⁸⁶ The Five Tones (*wuyin* 五音) could refer to the pentatonic scale, as that is an ordinary designation for those five notes, although it could also just represent the full spectrum of sounds, as is generally the case when five is used in a correlative sense.

⁸⁷ CTP shuo-wen-jie-zi/niao-bu 2359.

⁸⁸ Falkenhausen, *Suspended Music*, 123–24.

⁸⁹ In fact, this may be a reverse etymology. Modern historical linguists have determined that the term *luan* 鑾 was borrowed into Thai along with other words relating to horsemanship, suggesting that at an early point it may have been the predominant meaning. Nicholas Bodman, “Proto-Chinese and Sino-Tibetan: Data Towards Establishing the Nature of the Relationship,” in *Contributions to Historical Linguistics*, ed. Frans van Coetsem and Linda R. Waugh (Leiden: Brill, 1980), 74.

⁹⁰ The rime dictionary *Collected Rimes* (*Jiyun* 集韻), completed in 1037, identifies *luan* 鑾 (with the metal radical) as equivalent (*tong* 通) to *luan* 鸞 (with the bird radical), indicating that it was the one considered a

The *he* 和 bell is the bell identified in the *Huangyou ji* as belonging on the handle of the bell-knife. The basic meaning of the word *he* is “harmony” or “together,” or, as a verb, “to respond in singing” or “to harmonize.” These usages are in fact much more common than the bell terminology. These overlapping meanings provide many opportunities for wordplay, grounded in the very name of the bell, as discussed below.

In their typical use, the *luan* and *he* bells are used to provide sound for the royal carriage.⁹¹ There is no textual source that explains how or even whether these two bells differed in construction; the distinction between them is where they are used. The *luan* bells are attached on either side of the bits (*biao* 鑣) in the horses’ mouths; since there were four horses, there are eight *luan* bells. The *he* bells are attached to the cross-bar (*shi* 軾) of the carriage itself. This may reflect the underlying meaning of the words; the *luan* was associated with the mouths (of birds or horses), while the *he* would harmonize with them or respond to them from behind.

Among the many textual appearances of these small bells in the classics, they are perhaps most prominent in the *Classic of Poetry* (*Shijing* 詩經) (see Table 3.2). Most likely, the bells appear frequently in the *Odes* because their sound can be used for poetic effect. In most instances, the bells appear as part of a four-character phrase which ends in a reduplicated onomatopoeic word describing the tinkling of the bell (these phrases are

variant around the time of the *Huangyou ji*. Quoted in the Kangxi Dictionary 康熙字典, CTP kangxi-zidian/167/19 5.

⁹¹ In Mao’s commentary to the *Classic of Poetry*, the type of carriage that would use *luan* is associated with kings, a point that would be later disputed by Zhu Xi. Legge, *She King*, 275.

given in the final two columns of the table).⁹² However, by no means is this structure limited to small bells; for instance, Mao. No. 208 (*Guzhong* 鼓鍾) uses it with the onomatopoeias *jiangjiang* 將將 and *jiejie* 喈喈, both of which appear on the table with respect to *luan* bells, to describe the sound of large bells (the title means “drumming the bells”), repeated anaphorically four times as revered symbols of the past. This continuity suggests that there was not such a dichotomy perceived between the large bell ensembles and small bells on carriages; both were the sonic evidence of the ruler’s authority.

As can be seen in the table, the *luan* appears in the *Classic of Poetry* considerably more often than the other small bells, and in poems in all four main divisions of the book. As the different sections of the *Classic of Poetry* generally represent different times and places, such a distribution suggests that the *luan* was widespread in use for some time, perhaps more so than the other small bells. Nearly all the onomatopoeias are different; this cornucopia of words perhaps reflects the complexity or variety of sounds that the *luan* could produce.⁹³ Lothar von Falkenhausen observed that many of these onomatopoeias are also used to describe birdsong, further emphasizing the discursive connection between sounds from bells (both large and small) and birds.⁹⁴

⁹² There are two appearances of *luan* in the *Classic of Poetry* that do not include an onomatopoeia. Mao No. 127, 駟馘 *Si tie* (an Air of Qin 秦, the only small bell appearance in the Airs of the States 國風), describes the *luan* at the horses’ bits. Mao No. 210, 信南山 *Xinnanshan*, which mentions the bell-knife, is discussed below.

⁹³ However, as can be seen in the chart, the pronunciations are more repeated than the characters, and in particular the rime –an appears in many of them (this pronunciation is generally preserved from the time of the *Classic of Poetry* to today). Jonathan Smith has explained this usage as a manifestation of sound symbolism signifying intensity of light and color (often both synesthetically, as is appropriate in the case of bronze bells). See Jonathan Smith, “Sound Symbolism in the Reduplicative Vocabulary of the *Shijing*,” *Journal of Chinese Literature and Culture* 2, no. 2 (November 2015): 266-268 and 283n27.

⁹⁴ *Suspended Music*, 123. For instance, the unusual word *yongyong* 雝雝 appears in five poems in the *Classic of Poetry* but is found nowhere else within the classical corpus. One place is in Mao No. 173

Mao #	Part	Book/Decade	Poem and verse	Bell(s)	Onomato-poeia ⁹⁵
73	小雅 Lesser Odes	白華之什 Baihua	蓼蕭 <i>Liao xiao</i> 4	和鸞 <i>he and luan</i>	雝雝 ?ywj
78		彤弓之什 Tong Gong	采芑 <i>Cai qi</i> 2	八鸞 <i>eight luan</i>	瑤瑤 ts ^h iaŋ
82			庭燎 <i>Ting liao</i> 1	鸞聲 <i>sound of luan</i>	將將 tsiaŋ
			庭燎 <i>Ting liao</i> 2		噦噦 yat
122	桑扈之什 Sang Hu	采菽 <i>Cai shu</i> 2	鸞聲 <i>sound of luan</i>	喈喈 sfiy ⁹⁶	
160	大雅 Greater Odes	蕩之什 Dang	烝民 <i>Zheng min</i> 7	八鸞 <i>eight luan</i>	鏘鏘 ts ^h iaŋ
			烝民 <i>Zheng min</i> 8		喈喈 kja:j ⁹⁷
161			韓奕 <i>Han yi</i> 4	八鸞 <i>eight luan</i>	鏘鏘 ts ^h iaŋ
183	頌 Encomia	周頌 Encomia of Zhou	載見 <i>Zai jian</i>	鈴和 <i>ling and he</i>	央央 ?iaŋ
199		魯頌 Encomia of Lu	泮水 <i>Pan shui</i> 1	鸞聲 <i>sound of luan</i>	噦噦 yat
202		商頌 Encomia of Shang	烈祖 <i>Lie zu</i> 1	八鸞 <i>eight luan</i>	鶉鶉 ts ^h aŋ

Table 3.2: Small bell onomatopoeia in the *Classic of Poetry*

Most of these bell appearances refer to either the “eight *luan*” (*ba luan* 八鸞) or the “sound of the *luan*” (*luan sheng* 鸞聲). However, in two examples two types of bells

discussed below, while two of the other appearances are also in contexts relating to birds, Mao No. 34 (*Pao you ku ye* 匏有苦葉) and 252 (*Juan e* 卷阿).

⁹⁵ The transliterations of the onomatopoeia are unreduplicated for the sake of compactness. The phonetic value given is that of Late Middle Chinese, from Edwin G. Pulleyblank, *Lexicon of Reconstructed Pronunciation in Early Middle Chinese, Late Middle Chinese, and Early Mandarin* (Vancouver: University of British Columbia Press, 1991). Though this pronunciation dates from about two centuries earlier than the time in which the *Huangyou ji* authors were writing, it is complete and well-documented, and became a koine ancestral to all later dialects. Unfortunately, evidence for Song pronunciations is too sporadic to be so definitive (Pulleyblank, 3). Pronunciations from the time in which the *Odes* were composed are controversial.

⁹⁶ The pronunciation is not given in Pulleyblank; I have included the pronunciation of the similar character 喈 (without the mouth radical), which is pronounced the same in Modern Chinese, and likely in Late Middle Chinese as well.

⁹⁷ For the same reason as in the previous note, the pronunciation is for 皆.

are mentioned. In Mao 毛 No. 173 (*Liao xiao* 蓼萧) the *luan* is mentioned alongside the *he* 和; here the onomatopoeic word is *yongyong* 雝雝, is usually glossed as “harmony.” The *he* as a bell appears in only one other poem, Mao No. 283 (載見 *Zai jian*); here it appears alongside a *ling* 鈴, which designated the bells atop a banner staff, and is the fourth of the small bells mentioned in the *Zuozhuan* passage. The *ling* later became the general term for any small bells with clappers, including both the *luan* and *he*. The *ling* is one of few ancient Chinese bell types (including large bells) that remained in use after antiquity,⁹⁸ and would have been familiar in the Song, unlike most other ancient bell types; it retains the meaning of small clappered bell in general in Modern Chinese.

Textual sources for the bell-knife

The term *luandao* (“bell-knife”) appears six times in the corpus of the Thirteen Classics,⁹⁹ four times in the *Record of Ritual* 禮記 and once each in the *Classic of Poetry* and the *Gongyang Commentary to the Spring and Autumn Annals* 春秋公羊傳. In the *Huangyou ji*, each of the four citations (the text does not cite two of the loci from the *Record of Ritual*) are accompanied by the orthodox commentary: the gloss from the canonical Mao 毛 school and the commentary of Kong Yingda 孔穎達 for the *Classic of Poetry* citation; Kong Yingda for the *Record of Ritual* passages, and He Xiu’s 何休

⁹⁸ Falkenhausen, *Suspended Music*, 122 (Figure 52).

⁹⁹ I use this term anachronistically, as the designation was not settled upon until the Southern Song, but these books were all widely known and studied from much earlier. The Thirteen Classics includes the Five Classics including each of the three ritual texts and the three *Spring and Autumn* commentaries as well as the Four Books of Confucianism that rose in prominence later.

(129–182) commentary on the *Gongyang Commentary*, which Kong Yingda did not comment on.¹⁰⁰ The bell-knife also appeared occasionally in later sources that may have been familiar to the writers. It appears in a pair of Tang poems, “The Song of the Imperial Sacrificial Temple” (*Taimiao Kengdi Geci* 太廟裸地歌辭) by Chen Shuda 陳叔達 (c. 574–625) and “The Song of the Beautiful Ladies” (*Liren xing* 麗人行) by Du Fu 杜甫 (712–770).¹⁰¹ The fame of these poets, especially Du Fu, may have further brought attention to the missing sacrificial instrument, though in Du Fu’s case he does not express reverence for it.

However, not every citation provides specific information about the bell-knife. As Feng Jiren observed in instances of classical quotation in Northern Song architectural sources,¹⁰² in many cases the citation appeared not to provide specific information about something, but rather to illustrate its presence in the established textual tradition and thus provide a venerable precedent for its importance.

Such is the case for the references from the *Classic of Poetry* and the *Record of Ritual*, which describe the sacrificial procedure involving the bell-knife. Kong Yingda’s commentary for the *Classic of Poetry* passage, quoted in the *Huangyou ji* treatise, describes this procedure simply:

駢牡之牲迎入廟門。既告神，乃令卿大夫執持其鸞鈴之刀，以開牲皮毛，取牲血及脂膏腠膋，而退。

¹⁰⁰ Nearly the entirety of the passage related to the bell-knife is translated and discussed in this chapter, but in an order appropriate to the argument.

¹⁰¹ A translation of Du Fu’s poem and a brief background note appears in Watson, *Columbia Book of Chinese Poetry*, 222.

¹⁰² Feng Jiren, *Chinese Architecture and Metaphor*, 120.

The red bull sacrificial victim is introduced to the temple door. Already having summoned the spirits, command the ministers and senior officials to hold the bell-knife, use it to open the victim's skin and fur, take the victim's blood and return the fat, then retreat.¹⁰³

A similar procedure was also performed at the circular mound altar. Here, the central point is the honor symbolized by the bell-knife; the passage is not used to argue for any particular feature in the reconstructed knife.

However, occasionally the commentary offers a bit of specific information that can be used in the reconstruction. In particular, one of Kong Yingda's comments to a passage in a *Record of Ritual* chapter ("The single victim at the suburban sacrifices" *Jiao Te Sheng* 郊特牲 32) is the only source cited in the *Huangyou ji* that appears to indicate that specific pitches can be used for the bells: "One must use the bell-knife, taking the *luan* bells sounding *gong* and *shang* in harmony [or: to harmonize with the *he* bells], and then complete the cut" (必用鸞刀者，取其鸞鈴之聲宮商調和，而後斷割也).¹⁰⁴ *Gong* and *shang* could also refer to sound in general, as the two pitches sometimes served as synecdoche for notes in general, but the treatise writers appear to have taken the sentence literally.¹⁰⁵

In contrast to these loci, the *Gongyang Commentary* to the *Spring and Autumn Annals* mentions the bell-knife in recounting of an incident in the twelfth year of Duke Xuan 宣 (597 BCE) that ultimately led up to the Battle of Bi 郟, one of the Five Great

¹⁰³ *Huangyou ji*, *Congshu jicheng* ed., 60.

¹⁰⁴ *Huangyou ji*, *Congshu jicheng* ed., 60–61.

¹⁰⁵ Given the meaning of the note names, this could also mean harmony between the palace and the advisors, and not have referred to notes originally, although the sonic context makes that unlikely.

Battles in the *Spring and Autumn* history.¹⁰⁶ This incident occurred between King Zhuang of Chu 楚莊王 (r. 613–591 BCE) and Duke Xiang of Zheng 鄭襄公 (r. 604–587 BCE), here called the Earl of Zheng 鄭伯. Chu and Jin 晉, two of the stronger states during this period, were perpetually in conflict. They were geographically separated by the much smaller state of Zheng, which in order to survive had had to walk a careful diplomatic tightrope for some time. In early 597 BCE, Chu besieged the Zheng capital as punishment for allying with Jin in the previous skirmish. After a siege of three months, the Chu forces entered the city and met the Zheng ruler, humbly pleading for forgiveness. At this moment, the *Gongyang Commentary* states that “the Earl of Zheng had a bared torso, his left hand holding a yak tail banner, his right hand holding a bell-knife” (鄭伯肉袒，左執茅旌，右執鸞刀) and then pleaded for mercy.¹⁰⁷

It is impossible to judge anything about its construction from the brief reference to the bell-knife; it appears to have been mentioned as a symbol of the Zheng ruler’s propriety. The yak tail banner (*maojing* 茅旌, also written 旄旌) in his other hand was an important symbol of rank and an object used in ritual dances.¹⁰⁸ Therefore, both the bell-

¹⁰⁶ For a translation of the *Gongyang* account of this incident, see Miller, *The Gongyang Commentary on the Spring and Autumn Annals: A Full Translation*, 258. This incident also appears in the *Zuozhuan*, with somewhat different details; in particular, no mention is made of the bell-knife. See the translation in Burton Watson, trans., *The Tso Chuan* (New York: Columbia University Press, 1989), 84–85. The appearance of the bell-knife was also specified in several other works anthologizing or alluding to the story, including the Western Han works *Records of the Grand Historian* 史記 by Sima Qian 司馬遷 (The Annal for Qin Shihuang 秦始皇本紀 117), *Master Han’s Outer Commentary to the Odes* 韓詩外傳 by Han Ying 韓嬰 (*juan* 6, 18) and *New Arrangements* 新序 by Liu Xiang 劉向 (Miscellaneous Affairs IV 雜事四 84).

¹⁰⁷ The *Zuozhuan* account has him with bared torso, leading a sheep, symbols of submission, which became the origin of the idiom *routan qianyang* 肉袒牽羊, indicating submission. Watson, *The Tso Chuan*, 85n2.

¹⁰⁸ Following the specific meanings of these two characters, they appear to have designated originally two separate banners, the *mao* 旄 decorated with oxtail and the *jing* 旌 decorated with feathers. Their usage together would then suggest ritual banners in general. The former is mentioned in the opening of the

knife and the banner demonstrated the Zheng ruler's devotion to proper ritual, or at least his desire to appear that way in his plea to the Chu ruler, who did not share his status. The function of this citation is thus in accord with the *Record of Ritual* and *Classic of Poetry* citations, as the writers attempt to reinstate the bell-knife for rituals on behalf of the emperor, whose status should be supreme.

However, since the *Huangyou ji* writers only quote the four characters mentioning the bell-knife without any context, the appended commentary was probably more important for their argument. This passage includes a specific detail about the bell-knife that had not appeared elsewhere: “The bell-knife, the knife that cuts in the sacrificial temple, the handle has the *he* bells, the blade has the *luan* bells” (鸞刀，宗廟割切之刀，鐙有和，鋒有鸞).¹⁰⁹ This is the only source in the *Huangyou ji* that specifies that the bells on the bell-knife matched the two types present on the royal carriage, a point important to the symbolic value of the reconstruction.

Recovery of the past

The attention to the reconstruction of the bell-knife is a clear instance of *fugu* 復古 (recovery of the past). One clear articulation of the logic behind *fugu* appears in the passage from the “Sacrificial tools” (*Liqi* 禮器) chapter of the *Record of Ritual* that was

Record of Music as an element that is integral to music (generally understood to be as part of the dance). The latter is mentioned famously in Mencius (3B1 and 5B7), where Confucius praises a servant threatened with death for ignoring his master when he signaled him with a flag not commensurate to his rank. For a discussion of this difficult passage, see Stalnaker, “In Defense of Ritual Propriety,” 120–21.

¹⁰⁹ *Huangyou ji*, *Congshu jicheng* ed., 61.

quoted in part at the beginning of the bell-knife section of the *Huangyou ji*. While the text quoted only the eight characters directly related to the bell-knife (italicized in the translation below), for a reader versed in the classics this would probably evoke the original context, and they might recognize see in the bell-knife a classic example of the cultivation of ancient ways.

禮也者，反本修古，不忘其初者也。故凶事不詔，朝事以樂。醴酒之用，玄酒之尚。割刀之用，鸞刀之貴。莞簟之安，而稿鞣之設。是故，先王之制禮也，必有主也，故可述而多學也。

In ritual matters we should go back to their root and maintain the old, not forgetting what they were at first. Hence there is no need to call attention to demonstrations of grief; affairs of court use music. There is the use of sweet liquid, and the value set on dark liquid;¹¹⁰ *there is the utility of the ordinary knife, and the honor of the bell-knife*; there is the comfort of the rush and fine bamboo mats, and the (special) employment of those made of straw. Therefore, the Former Kings in their institution of the rules of propriety had a ruling idea, and thus it is that they were capable of being transmitted, and might be learned, however many they were.¹¹¹

The brief quotation explains that what makes the bell-knife important is precisely that which separates it from ordinary activities. The knife, used in conjunction with the proper music, spirits, and mats, demarcates the ritual space. In fact, many of the same

¹¹⁰ Han and Tang commentators generally associated dark liquid (*xuanjiu* 玄酒) with water, but according to Zhou Qingquan 周清泉, it originally denoted wine not destined for consumption, and thus was later replaced by water. Zhou Qingquan 周清泉, *Wenzi Kaogu: Dui Zhongguo Gudai Shenhua Wushu Wenhua Yu Yuanshi Yishi de Jiexu* 文字考古: 對中國古代神話巫術文化與原始意識的解讀 [Literary Archaeology: On Ancient Chinese Mythological Magic Culture and the Interpretation of Its Original Meaning], vol. 1 (Chengdu: Sichuan renmin chubanshe, 2003), 192–94. This explains Legge’s use of “water” in his translation. Given that the practice of using water was well established by the Song, it would probably have been the interpretation for the *Huangyou ji* writers as well. A passage in the *Record of Music* also discusses dark liquid in relation to music: “In the ceremonies of the great sacrifices, they valued dark liquid and served uncooked fish, while the grand soup had no condiments [lit. is not harmonized]: there was flavor left hidden.” (大饗之禮，尚玄酒而俎腥魚，大羹不和，有遺味者矣) (CTP liji/yue-ji 6). This passage follows an explanation of the deliberate simplicity of musical arrangements, forming parallel pleas for moderation in ritual and music, in accordance with the practices of the Former Kings, similar to the other examples given in the passage here. See also Cook, “Yue Ji,” 35.

¹¹¹ CTP liji/li-qi 24. Italicized portion quoted in the *Huangyou ji*, *Congshu jicheng* ed., 60.

examples also appeared in Zang Aibo's speech in the *Zuozhuan* cited above. The *Record of Ritual* text implies that in the earliest times these distinctions were widely known, but in later times they were not consistently observed. Another *Record of Ritual* passage (from "The single victim at the suburban sacrifices"), not cited in the *Huangyou ji*, makes the same point comparing the knife choice with food choice: "Vinegar and pickles are beautiful, but boiled suet is esteemed, honoring the product of heaven. An ordinary knife might be used, but the bell-knife is valued, honoring the idea" (醯醢之美，而煎鹽之尚，貴天產也。割刀之用，而鸞刀之貴，貴其義也).¹¹²

The parallel structure evident in both passages, contrasting practical or convenient uses with the proper ritual ways, implies that the latter is inherently more difficult. This point is made explicit in Kong Yingda's commentary on the bell-knife sentence, which is included in the *Huangyou ji*:

割刀今刀也，鸞刀古刀也。今刀便利，可以割物爲用。古刀遲緩，用之爲難。宗廟不用今刀，而用古刀者修古之制。

The cutting knife is the knife of today; the bell-knife is the knife of the ancients. The knife of today is useful and can be used to cut animals. The knife of the ancients is slow and hard to use. In the sacrificial temple, do not use today's knife, but the ancient knife to cultivate the ancient system.¹¹³

Given the awkward position of the bells right on the blade in the bell-knife diagrams in the *Huangyou ji* (see Figure 3.2), it seems that the knife, as the *Huangyou ji*

¹¹² CTP liji/jiao-te-sheng 32.

¹¹³ *Huangyou ji*, *Congshu jicheng* ed., 60.

writers understand it, would have been quite difficult to use practically.¹¹⁴ It is possible that this very difficulty is an illustration of this citation, which, given that it appears first in this section, characterizes the bell-knife as to be cultivated for reasons other than practicality.

The newly-written plea that closes the bell-knife section of the *Huangyou ji*, and indeed the whole treatise, reflects these same ideas. In this way, appeals to *fugu* frame the bell-knife section. There is a clear appeal to the authority of the oldest practices, and further the idea that those practices are in principle recoverable:

右臣逸臣瑗謹按，經制古之宗祀皆用鸞刀，後世因循廢而弗用。皇上精求禮樂至誠不息。幾千百年，古義不講，而一旦用之斯人神之同慶也。

We, [Ruan] Yi and [Hu] Yuan, note that the ancient sacrificial way described in the classics always used the bell-knife, but later ages, because procedures decayed, did not. Your Majesty's energetic quest for the rites and music is completely sincere and ceaseless. For several thousands and hundreds of years, the old and righteous [practice] has not been spoken of, but once it is used again, our people and spirits will celebrate together.¹¹⁵

This passage is parallel to the closing passages of the other two sections of the *juan*, about the rising drum and the sacrificial tripod, including the one quoted in Chapter 1. The other two specifically blame the Tang Dynasty for these changes, though the end result, the decay of the venerable procedures, is the important issue. Each passage further celebrates the beneficial results of reestablishing the proper procedures. Here, music is

¹¹⁴ Legge implied difficulty in this matter when he described that the bells were “somehow” attached (*The Shi King*, 376), though he believed they were only attached to the handle, not to the blade; one can only imagine the further logistical difficulty of the bell attachment to the blade.

¹¹⁵ *Huangyou ji*, *Congshu jicheng* ed., 66.

linked to the agency of supernatural beings whose blessings would be more effectively summoned by using the proper ritual instruments.

In ritual matters, the bell-knife plays a special symbolic role. Sound was deemed essential to court ritual, as is clear in the *Record of Ritual* passage specifying that the use of music was part of the ancient way. Considering the tone of that passage, perhaps even at that time the connection between ritual and music seemed weakened in comparison with ancient times; how much more, the *Huangyou ji* writers might argue, in the millennium since. By putting harmonious sounds directly into the sacrificial instrument itself, the bell-knife could embody the link between music and ritual and reestablish this connection, as long as it was reconstructed in such a way that made the link clear.

Speculative reconstruction

The *Huangyou ji* writers, in their meticulous sourcing, imply that their argument rests entirely on the textual authority of the classics and associated commentaries. However, for practical reasons, the writers sought to synthesize this information into an instrument that could be illustrated in a diagram, but unlike the other sections of the treatise, they cannot rely on the authority of Nie Chongyi (the author of the *Sanli tu*) and the rare images in his collection he claimed to use. They inevitably found that these citations leave much room for interpretation, and had to speculate about many of the details of the bell-knife to produce the diagram. That the *Huangyou ji* illustration of the bell-knife is quite speculative is confirmed by its striking difference from the next earliest illustration of the bell-knife of which I am aware, that which appears in the *Lishu* by

Chen Xiangdao, about forty years later (Figure 3.3). Given that Chen’s purpose was more in the vein of the *Sanli tu* (a point I will make in Chapter 5), it is not surprising that there is both less information and less detail are included in the illustration; thus, the images of bells and lithophones show similar stylistic differences. However, the objects depicted are also quite different. Chen’s has only two bells, presented simply as hoops, at opposite ends of the knife, which otherwise has little ornamentation or guard between the handle and blade. (This simple depiction still captures the formula that appears on the page of the image, “the front has *luan*, the rear has *he*” 前有鸞；後有和). Nonetheless, Chen’s treatise quotes mostly the same passages and presents no reasons accounting for the differences between his reconstruction and that used in the *Huangyou ji*.

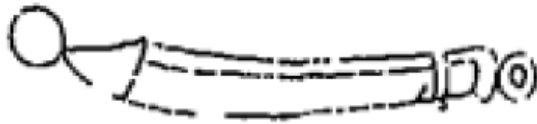


Figure 3.3: Illustration of the bell-knife of the *Lishu*¹¹⁶

The text in the *Huangyou ji*, however, explicitly addresses three points that were not explained in any of their citations for the bell-knife: the arrangement of pitches on the knife, the alloy to be used in the knife construction, and the creation of different models for the circular mound altar and the sacrificial temple. In the other passages of the treatise, this sort of speculation is mostly unnecessary because of the more specific information given in the *Rites of Zhou* or the *Sanli tu*. Since those sources are silent on

¹¹⁶ *Lishu*, *SKQS* ed., 22.2r.

the bell-knife, the authors must speculate on how these might have worked, given the few hints given in the classics, logic, and their own aesthetic sense.

The number of bells that appear on the bell-knife is perhaps the most obvious difference between the illustrations in the *Book of Rituals* and the *Huangyou ji*. The former was drawn with two, presumably a *luan* and *he*, but perhaps not of any distinct pitch, since no music terminology appears in the accompanying text. The *Huangyou ji* writers, however, chose five, likely so that it would match the number of pitches in Chinese music theory and the associated discourses of correlative cosmology and the parts of the state, as explained earlier. Given the prominent attention the *Huangyou ji* authors gave the parts of the state discourse in the introduction, they almost certainly gave much thought to where the notes should be placed on the bell-knife. Furthermore, since the allusion was not made explicit there, the writers probably felt it was self-evident, and would expect any discussion of the pitches to bring those parts of the state to mind, without further prompting.

At the conclusion of the section concatenating classical citations, the treatise reads “[We] petition a far-sighted decree ordering two *luan* bells to be placed at the blade of the bell-knife and sounding *gong* and *shang*, three *he* bells to be placed at the hilt and sounding *jue*, *zhi*, and *yu*” (稟睿旨制成鸞刀，二鸞在鋒聲中宮商，三和在鐙聲中角徵羽).¹¹⁷ The pitches corresponding to the political leaders are thus attached to the blade, while the higher pitches that sound on the handle correspond to those parts of the state which they direct. Since the only relevant source here, the *Gongyang* commentary,

¹¹⁷ *Huangyou ji*, *Congshu jicheng* ed., 61.

mentioned that the *he* bells are in the handle, the writers inferred that they must correspond to those three pitches. There was no precedent for the different pitches of *luan* and *he*; indeed, according to the etymology of the bird call, all of the pitches should be in the *luan* alone. However, given the numerological importance of five and having to divide them between the two bell locations, it perhaps seems reasonable that the “harmonizing” bells should have the higher notes. In this arrangement, the front-back arrangement of the *luan* and *he* bells on the horse carriage, illustrating the harmony between what leads and what follows.

The use of two and three here, while perhaps the most straightforward way to split five, may also have suggested another kind of harmony; 2:3 was one of the two ratios used to generate the gamut in the *sanfen sunyi* procedure, the even two indexing the squareness of Earth and the three (as the classical approximation of π) indexing the roundness of Heaven. The division here, however, contrasts with those explored in the previous case study that placed the note representing the people alongside the other human agents, theoretically divided as *yin* and *yang* notes.

Since the blade performs the cut, the arrangement of bells was perhaps instead designed to reflect the active power of the royal and ministerial elite in their management of the populace, affairs, and things. In Confucian political thought, leaders are required to act harmoniously with the ordinary people, affairs, and things (which, literally, have the harmonizing bells). Once the division of pitches between the two bell types was set, the straightforward arrangement in the illustration, clockwise in scale order, is parsimonious and fits with the logical and hierarchical ordering of society. In this way, this imagination

of the bell-knife presents in microcosm the preferred political ordering of society; social rank is tied to different physical positions and functions, but all parts must harmonize.

The writers describe the alloy used for the knife blade, and use this opportunity to cite their standby, the *Rites of Zhou*. The citation is taken from “The Tao Clan makes the blades” 桃氏爲刃 section from the *Artificer’s Record* (考工記 *Kaogongji*), the final chapter of the *Rites of Zhou* that includes the most specific and quantified prescriptions for construction of various things. As noted in the introduction, this chapter better represents the Han preoccupation with numerology and correlative cosmology than the actual metallurgical practice revealed in artifacts.¹¹⁸ However, for the music-oriented scholars of the Northern Song, that the information it provided harmonized so well with cosmological concerns may instead have been seen as evidence of its authenticity.

The writers conclude that the proper alloy for the construction of the bell-knife should consist of three parts of gold for one part tin (三分其金而錫居其一), which the *Artificer’s Record* specifies as the proper proportion for large blades (大刃).¹¹⁹ This is one of the six alloys it identifies, each distinguished by its specific use (such as for bells, tripods, mirrors, and various weapons) and the proportion of gold to tin. Needham was struck by the systematic use of ratios associated with musical intervals in this passage.¹²⁰

¹¹⁸ Anthony J. Barbieri-Low, *Artisans in Early Imperial China* (Seattle: University of Washington Press, 2007): 49. With specific reference to alloys used in bells, see Falkenhausen, *Suspended Music*, 103.

¹¹⁹ *Huangyou ji*, *Congshu jicheng* ed., 61; CTP rites-of-zhou/dong-guan-kao-gong-ji 33. There is an additional *qi* 其 in the *Huangyou ji* quotation, which does not change the meaning.

¹²⁰ Needham and Robinson, “Sound,” 180. He considers it a misapplication of harmonic laws akin to the story of Pythagoras and the weights of hammers. The numbers given are 5:6, 4:5, 3:4, 2:3, 3:5, and 1:2, which in just intonation (not the *sanfen sunyi* system) correspond to a minor third, major third, perfect fourth, perfect fifth, major sixth, and octave. There is evidence that ratios of this kind, not the strict *sanfen sunyi* kind, played an important part in ancient Chinese music, but were later removed. See Li Mei 李玫,

Indeed, the proportions of each alloy recall the emphasis on proportion in musical tuning, which was a major theme in the first *juan* of the *Huangyou ji*. This specification of the metallic proportions in the bell-knife, which up until this point had never been discussed in surviving texts, gave the writers another opportunity to implicitly connect the bell-knife with musical discourse, and further emphasize its relationship with the musical enterprise of the rest of the treatise.

The *Huangyou ji* writers distinguish between two varieties of bell-knives, one “approaching simplicity” (向質) for use on the circular mound altar, and one “approaching cultivation” (向文) for use in the sacrificial temple. None of their sources distinguished these, but because of the different tenor of the sacrificial procedures in the two locations, the writers speculate that two bell-knives are called for with appropriate ornamentation. In the details, the text and the text in the diagram differ somewhat. According to the diagram, the plainer one “does not require cultivated ornament” (不用文飾) while the other should be “plated in silver and ornamented with gold” (銀裝金飾).¹²¹ In the main text, however, “those used at the circular mound altar stop with using copper to make it; those used at the sacrificial temple use copper to make it, decorated with yellow gold” (用于圜丘者止以銅爲之，用于宗廟者以銅爲之，以黃金飾之), omitting the reference to silver.¹²²

Zhongguo Chuantong Luxue 中国传统律学 [Chinese Traditional Tuning] (Fuzhou: Fujian jiaoyu chubanshe, 2008).

¹²¹ *Huangyou ji*, *Congshu jicheng* ed., 62–65.

¹²² *Huangyou ji*, *Congshu jicheng* ed., 61.

Synesthesia

I now turn to the longest textual reference given in the *Huangyou ji* discussion, the *Classic of Poetry* Mao number 210, *Xinnanshan* 信南山 “The extended Southern Mountain”). The fifth verse of the ode appears in full in the *Huangyou ji*:

祭以清酒，從以騂牡，享于祖考，執其鸞刀，以啓其毛，取其血膋。
Sacrifice with clear wine, follow up with a red bull;
offer them to the ancestors, hold the bell-knife;
use it to open up the fur, take the blood and fat.¹²³

This is followed in the treatise by an explanation from Zheng Xuan’s commentary that gives the reason behind each of these three crucial parts, the fur, blood, and fat. “The fur is to announce the perfection; the blood is to announce the killing; the fat is to make the smell rise, joining the fragrances to present to the spirits” (毛以告全，血以告殺，膋以升臭，合馨香以薦神).¹²⁴

That the animal used in the sacrifice be perfect was an important ritual concern. A perfect (*quan* 牲, here replaced by the related character *quan* 全, literally “complete”) sacrificial animal is primarily distinguished by the condition of its fur. As part of the ritual, ministers and great officers were to inspect the fur of the animal before being sacrificed, especially the ears.¹²⁵ In the *Rites of Zhou*, one of the officials (the fattener, *chongren* 充人) is given the duty of announcing the sacrificial animals are perfect (展牲

¹²³ *Huangyou ji*, *Congshu jicheng* ed., 60; CTP book-of-poetry/xin-nan-shan 5.

¹²⁴ *Huangyou ji*, *Congshu jicheng* ed., 60.

¹²⁵ *Ji yi* 祭義 (“The meaning of the sacrifice”) in the *Record of Ritual*, CTP *lijiji-yi* 16.

則告牲).¹²⁶ However, the sense of perfection in the sacrificial animals contributes to the achievement of perfection in ritual practice, an idea that explains in part the need for the proper knife. It also more effectively captures the attention of the spirits, as do the smells arising from the blood and fat.

This commentary does not mention the sound of the bells, yet a subtle synesthetic connection is suggested between the sounds and the smells of the sacrificial ritual by using the character *xing* 馨 for fragrance. This character is graphically related to the character for sound, *sheng* 聲, which differs only in the radical at the bottom, an ear instead of fragrance. According to its etymology in the *Shuowen Jiezi*, *xing* is “the distant echo/perception/smell [*wen*] of fragrance” (香之遠聞者).¹²⁷ Here the character *wen* 聞 (which in Modern Chinese still can indicate both hearing and smelling) betrays the same aural-olfactory synesthesia.¹²⁸ As noted above, in Chinese correlative thought, both smells and sounds (along with the other senses) are usually organized in corresponding groups of five. The pentad for sound refers to the five pitches of the pentatonic scale, those that surround the bell-knife in the *Huangyou ji* reconstruction. The *Classic of Poetry* gloss suggests that the similarly canonical five fragrances are to be realized at the

¹²⁶ CTP rites-of-zhou/di-guan-si-tu 105. Cited in Roel Sterckx, *The Animal and the Daemon in Early China* (Albany: State University of New York Press, 2002), 47.

¹²⁷ CTP shuo-wen-jie-zi/xiang-bu1 4451.

¹²⁸ Roel Sterckx, *Food, Sacrifice, and Sagehood in Early China* (Cambridge: Cambridge University Press, 2011), 87. The linguistic connection between smelling and hearing may be quite old indeed. The Sino-Tibetan root of the word *wen* possibly referred to both, and the word for “ear” (ancestral to Chinese *er* 耳) now also means “nose” in Tibeto-Burman languages. Schuessler, *ABC Etymological Dictionary of Old Chinese*, 514–15.

same time and that they should be harmonized in an analogous way to the musical pitches.¹²⁹

The subsequent gloss, from Kong Yingda's *Zhengyi*, reads: "The *luan* are bells, they are so called when the knife-rings have bells, in their sound is the rhythm, what was together is later split" (鸞即鈴也，謂刀環有鈴，其聲中節，和而後斷).¹³⁰ My translation of the third line here reads *zhong* 中 in its most common meaning as the preposition "within," although it also could be a verb meaning to "strike." Unlike some of the other wordplay in this passage, a simultaneous reading of both possibilities is less likely, since the tones of the word differed. If the latter reading were adopted, the next character *jie* 節, generally meaning a segment, could here mean either the interstices of the animal's body or musical rhythm (the segmentation of music). By hitting the joints, as one does in separating the organs and fat as described in the procedure, one is literally making a sort of music. This could be a reference the well-known story of the Butcher Ding 庖丁 in the *Zhuangzi* 莊子, who is praised for the way he can cut up a carcass by following the *jie* by intuition and never dull his blade.¹³¹ Moreover, he is praised for the sound he makes while cutting it. (In that text, he hits "the sound," 中音, and the text emphasizes that there is space between the interstices into which the knife can slip 彼节者有间.)

¹²⁹ There were different lists for what constituted the five fragrances. The term appears in the popular ingredient five-spice powder (*wuxiang fen* 五香粉).

¹³⁰ *Huangyou ji*, *Congshu jicheng* 60.

¹³¹ This story appears in Chapter 3, "Nourishing the Lord of Life" (*Yang shengzhu* 養生主). The text and Legge's translation can be found at CTP *zhuangzi/nourishing-the-lord-of-life* 2.

There are several possible interpretations to the final line of this passage, *he er hou duan* 和而後斷, which is also a quotation from the *Record of Ritual* about the use of the bell-knife.¹³² *He* can mean “together,” “harmony,” or “*he* bells,” and *duan* can mean “to cut apart,” “separate,” or “judgment.” Therefore, this phrase could simply refer to the body parts that were together being cut apart during the sacrifice. The commentary to the *Classic of Poetry* passage details the separation of the fur, blood, and fat in the sacrificial procedure; these three parts, once united, are separated and made to serve the three distinct functions of announcing the completion, announcing the slaughter, and making the smell rise.

However, this passage could also refer to the sound of harmony or the sound of the *he* bells proper that precedes the cutting. The bell-knife would presumably tinkle as soon as it was lifted, causing the harmonious sound or the bell sound to come before any cut could be made. More deeply, though, if the *he* bells, the bells on the handle of the knife more distant from the cutting action, sounded, then that indicated that the ritual had been performed using the whole knife, and thus, given the relationship between the bells and the parts of the state, on the behalf of all of society. Since the bells, even in their use on royal carriages, served as a sonic signifier of state action, the same concord between *luan* and *he* on the bell-knife could serve to announce to the spirits the ritual action.

Even though most of the text is simply quotations from sources, I argue that it was the multivalency of these commentarial traditions that inspired the writers of the

¹³² The phrase appears in the “Single victim at the suburban sacrifices” (CTP *liji/jiao-te-sheng* 32), which was not explicitly cited in the treatise. The four-character phrase is slightly abridged from the original *shenghe er hou duan ye* 聲和而後斷也, with essentially the same meaning. This passage was discussed above, noting its similarity to the explicitly cited passage from the “Sacrificial tools” (*Liqi* 禮器).

Huangyou ji to put all of the possibilities together, and draw attention to this instrument as a tool not just to unite music and ritual, but also the diverse sounds and smells that appear in ritual. Choosing carefully from available textual materials and ordering them, the authors have an opportunity for what Joseph Lam in his study of the Imperial Sacrifice in Ming times called “expressiveness,” the possibility of expression even within a strict, canonical, orthodox tradition.¹³³ Although Lam used the term to explain choice within the variable content of the rituals themselves, this example of ritual prescription displays the same opportunity for expressiveness in choosing from orthodox textual sources and putting them together in creative and evocative ways.

Harmonizing politics

Scholars have long noted that the multisensory aspects of sacrificial ritual remarked on above seem to have been an essential part of ritual. Joseph Needham commented that “from the earliest historical periods the Chinese were concerned with a synthesis of sound, colour, and flavour, responding to the synthesis of Nature manifested in thunder, rainbows and spicy herbs.”¹³⁴ More recently, Roel Sterckx, in an analysis of the received classic texts, argued that “sacrificial rituals in early China were multimedia events that offered multiple routes of access to the spirit world. The sacrificial procedure involved all human senses in an amalgam of music, dance, fragrance, and visual

¹³³ Lam, *State Sacrifices and Music*.

¹³⁴ Needham and Robinson, “Sound,” 133.

spectacle.”¹³⁵ The spirits are lured by sensory means; a more fully harmonious sensory experience in ritual is capable of reaching a higher category of spirits. According to Li Chenyang, *he* 和, usually translated “harmony,” always had a multisensory component. The etymology of the alternative characters 盪 and 龠 (both also pronounced *he*) suggest *he* was always imagined as blend of sound and taste, the harmony between the senses as well as within each.¹³⁶ As fragrance and sound are the primary sensory media that attract the spirits, their harmonization with one another was especially important for a successful ritual; this perhaps accounts for their prominence in the bell-knife account.

Moreover, these allusions to the harmonization of sensory information in sacrificial ritual have traditionally been used as a metaphor for government. Sterckx noted, “Harmony, either in the guise of flavor or sound, consists of blending complementary opposites. Likewise unopposed agreement or assent with one’s superior is portrayed as an inferior form of communal relationship.”¹³⁷ This distinction between harmony and mere assent is usually rendered by contrasting the terms *he* 和 (harmony) and *tong* 同 (conformity). The *locus classicus* of this contrast is Yan Ying’s 晏嬰 (d. 500 BCE) speech in the *Zuo zhuan*.¹³⁸ Confucius made the same point in the Analects: “The noble man harmonizes but does not conform; the petty man conforms but does not

¹³⁵ Sterckx, *Food, Sacrifice, and Sagehood*, 87.

¹³⁶ Li Chenyang, *The Confucian Philosophy of Harmony*, 24–38.

¹³⁷ Sterckx, *Food, Sacrifice, and Sagehood*, 63.

¹³⁸ *Zuo zhuan* Duke Zhao 昭公, year 20, corresponding to 521 BCE. See the Chinese and an English translation in Legge, *The Chinese Classics, Vol. V: The Ch’un Ts’ew with the Tso Chuen*, 679 and 684. Legge transliterates the speaker (identified in the text as Yanzi 晏子) as Gan-tsze.

harmonize” (君子和而不同，小人同而不和).¹³⁹ From their perspectives, the ideal minister was one who was willing to respectfully remonstrate with their superiors instead of always following orders, and the wise ruler would find ministers whose opinions harmonized, not conformed, with their own. This allusion was widespread; for instance, literary references to seasoning stew typically had political implications.¹⁴⁰

The character *guan* 官 has two meanings, sensory organs and government ministers, that are linked in a well-established tradition that the ruler’s ministers are like extended organs of the body.¹⁴¹ One clear explication of this tradition occurs in the *Yi and Ji* (*Yiji* 益稷, a conversation recorded in the *Classic of Documents*) where the legendary ruler Shun, describing the importance of ministers in many governing contexts, begins the description with the line “Ministers work as my legs, arms, ears, and eyes” (臣作朕股肱耳目).¹⁴² Following this logic, the job of these ministers is to hone sensory skill for advising the ruler, and the role of the ruler is then to harmonize this sensory input, that is, the information from his *guan*, and judge the wisest course of action. In other words, using the meaning of “judgment” for *duan* 断, that last-mentioned four-character phrase *he er hou duan* 和而后断 could also mean to harmonize different opinions and then decide. In this case, the proper role of the ruler is the same as the effect created by using of the bell-knife.

¹³⁹ Analects 13:23.

¹⁴⁰ Maggie Bickford, “Stirring the Pot of State: The Sung Picture-Book Mei-Hua Hsi-Shen p’u and Its Implications for Yuan Scholar-Painting,” *Asia Major* 6 (1993): 193–94.

¹⁴¹ Sterckx, *Food, Sacrifice, and Sagehood*, 64.

¹⁴² CTP shang-shu/yi-and-ji 3.

Such a reading may have been particularly resonant in the middle of the eleventh century, after charges of factionalism increased in the political environment of the 1030s. Traditionally, Chinese officials had rejected factional discourse as something in which only petty people engaged. When he stood accused of factionalism in 1044, Fan Zhongyan 范中淹 (989–1052) attempted to redefine factions, and assert that superior men could legitimately form factions, and that these factions could benefit society. This redefinition of factionalism was later elaborated by Ouyang Xiu 歐陽脩 (1007–1072) in his *Discourse on Factions* 朋黨論, but he was unsuccessful in persuading the emperor and changing the rhetorical climate.¹⁴³

The *Huangyou ji* was written less than a decade after the demise of the short-lived Qingli 清禮 reforms (1044) sponsored by Fan Zhongyan. In this tumultuous period in the court, alternately the members of the conservative faction and the reformist faction within the imperial court official circles had been left out of decision-making processes. Since Hu Yuan, the co-author of the *Huangyou ji*, was personally involvement in these disputes alongside Fan Zhongyan, the pleas for harmony could have arisen from his personal frustration of the lack of harmony within court circles, after his colleagues were demoted. A decade after the reforms, the reformers were still unable to have their voices heard.

In this final reading, the political concerns of the time form a subtext for the revival of the bell-knife, which appears to be able to bring about harmony amid factional strife. The bell-knife, which was not deemed notable enough to be included in the *Sanli tu*, may have been included in the *Huangyou ji* for political-metaphorical reasons which

¹⁴³ Levine, *Divided by a Common Language: Factional Conflict in Late Northern Song China*, 42–44.

subtly depend on discourses about harmony, sensuality, and government. This underlying message implies an imperial course of action. Given the factionalism in the imperial court under Emperor Renzong, especially in the wake of Fan Zhongyan's reforms, the treatise authors are urging a moderate position, one that demands that the ruler harmonize the perceptions and opinions of the various figures in court, not just those of one faction, before deciding the best policies. While their plea to restore the bell-knife is no doubt a sincere attempt at *fugu*, an attempt to capture the harmonious music and government of the past, it is presented in such a way that speaks to the present political situation. The appearance of the bell-knife in a prominent position in the *Huangyou ji*, then, suggests that in music reconstruction, there is more than meets the ear.

Case study 3: The deep voices of ancestral instruments

One of the most contentious concerns of Northern Song music reformers was pitch standards. Although there were several other issues that music reformers sought to rectify, playing the music at the correct pitch level was generally assumed to be crucial for its efficacy, and the revised pitch standards became the central symbol of each music reform. Usually, this boiled down to the pitch of *huangzhong*, the lowest bell of the twelve-pitch gamut from which would be derived the other eleven pitches using the *sanfen sunyi* procedure.¹⁴⁴ The six major music reforms of the Northern Song each chose a different value for this fundamental pitch. Table 3.3 below summarizes the reforms,

¹⁴⁴ This is not entirely true, as Wang Pu's system adopts an unusual temperament that makes the matters of pitch more complex. However, the adjustments made to individual pitches seem to have been largely ignored by most Northern Song music scholars, who instead argued mainly about the fundamental pitch.

including the approximate frequency the musicologist Yang Yinliu 楊蔭瀏 determined for *huangzhong*. I am doubtful about his precise determinations of pitch, but the relative motion of the standard pitch between the reforms is supported by the statements preserved in the *Song History* that he cites.

Theorist(s)	Emperor	Date	Frequency of <i>huangzhong</i> (Hz)
0. Wang Pu 王樸	(Later Zhou 後周)	960	379.5 (f#+)
1. He Xie 和峴	Taizu 太祖	966	365.2 (f#-)
2. Li Zhao 李照	Renzong 仁宗	1035	286.8 (d#-)
3. Hu Yuan 胡瑗 and Ruan Yi 阮逸	Renzong 仁宗	1050	359.3 (f#-)
4. Yang Jie 楊傑 and Liu Ji 劉幾	Shenzong 神宗	1080	341.9 (f#-)
5. Fan Zhen 範鎮	Zhezong 哲宗	1088	272.2 (c#-)
6. Wei Hanjin 魏漢津	Huizong 徽宗	1104	298.7 (d#+)

Table 3.3: Northern Song dynasty music revisions, after Yang Yinliu 楊蔭瀏¹⁴⁵

Each of these pitch reforms began with the observation that the current pitch was incorrect and needed to be adjusted. In most cases, this determination was simply the result of an intuition that the instruments did not sound quite right or did not accord with the ancient practices. This trust of sensory insight contrasts sharply with the careful and evidence-based argumentation on philological, mathematical, or pictorial grounds that is the primary topic of this dissertation. Moreover, after the music reform was ordered, scholars did generally produce written arguments in support of various positions that

¹⁴⁵ Yang Yinliu 楊蔭瀏, *Zhongguo gudai yinyue shigao 中國古代音樂史稿 [Draft History of Ancient Chinese Music]*, 2:197.

were based on those perspectives, even though that had not usually the impetus for the investigation in the first place.

Yet this trust of the ear as evidence for correct practice should perhaps not be surprising, for it continues a venerable tradition linking the ability to discriminate sounds with the sagely. Kenneth DeWoskin has argued that early Chinese believed aural proficiency to be a key part of being a sage, using as evidence the frequent paronomastic glosses between *sheng* 聲 “sound,” *sheng* 聖 “sage,” and *cong* 聰 “perspicacity” (which all share both similar sound and the ear radical *er* 耳), the reportedly large ears of sages, and numerous anecdotes that record unusual auditory feats of ancient masters.¹⁴⁶ Such stories include the famous account of Ling Lun 伶倫, the minister of the Yellow Emperor who was given the task of setting the pitch standards. In the received account, the music master twice turns to the ear to perform his work: when he blows the first pipe to check its sound and while listening to the phoenixes in order to divide the pitches.¹⁴⁷ Therefore, a ruler or minister who could similarly determine based on the sound alone whether the pitches were in concord with the ancient system or the natural harmony of the cosmos could simply be using the performance as a judgment demonstrating his fitness for the position.

¹⁴⁶ DeWoskin, *A Song for One or Two*, 32–37. Though many of these are in Daoist or apocryphal texts that may not have been widely known among Song Confucian scholars, many are also reported in orthodox sources such as Sima Qian’s history so the connection remains likely.

¹⁴⁷ The story is frequently recounted in discussions of ancient Chinese music; examples include DeWoskin, 59–60; Needham and Robinson, “Sound,” 178–79. The original appears in the *Spring and Autumn Annals of Master Lü* and the *Han History*, among other places. See the more detailed discussion in Chapter 4.

However, there is a more curious fact in the Northern Song accounts that demands explanation: each time the reform was ordered, the emperor or the theorist who had reviewed the instruments had found that the pitches were too high. Though the standard pitch was not consistently lowered each time, as can be seen easily in the table, complaints were never expressed about the pitch being too low, and the two reforms that led to raised pitch (the third and sixth) still framed the problem as the need for a lower pitch, just not from the pitch of the immediately preceding reform. To show this, let me present the accounts of how each of the reforms began, as compiled from contemporary sources and presented in the *Song History*.

Music reforms of the Northern Song

The first debate in the Song dynasty began six years after the dynasty was founded. As was typical of new dynasties, the court initially had used the previous dynasty's ritual instruments, and therefore tuning. In this case, that tuning had been set by Wang Pu 王樸 (also written 王朴; 914–959)¹⁴⁸ with assistance from Dou Yan 竇儼 (919–960) during the preceding Later Zhou dynasty, which had lasted but a decade. However, unlike many music reformers, Wang Pu did not have access to his predecessor's music as they were lost at the founding of his dynasty. For this reason, there was a considerable amount of suspicion about his system. Taizu 太祖 (r. 960–976),

¹⁴⁸ Wang Pu should not be confused with the nearly contemporaneous Wang Pu 王溥 (922–982), who compiled the important historiographical works *Tang Huiyao* 唐會要 and *Wudai Huiyao* 五代會要 in the early Song.

the founding emperor of the Song, worried about what he perceived as the high pitch of the instruments:

太祖每謂雅樂聲高，近於哀思，不合中和。又念王朴、竇儼素名知樂，皆已淪沒，因詔峴討論其理。峴言：「以朴所定律呂之尺較西京銅望臬古制石尺短四分，樂聲之高，良由於此。」乃詔依古法別創新尺，以定律呂。自此雅音和暢，事具律歷志。

Taizu often claimed that the sound of the elegant music was high, it brings forth mournful thoughts and does not match the central harmony. He also thought Wang Pu and Dou Yan had little fame for knowing music and that both had already died. Thus, he summoned [He] Xian to discuss its principles. Xian said: “The ruler used by [Wang] Pu to set the gamut, when compared with the stone ruler of the old-system copper inspection law in the Western Capital, was short by four *fen*. That the sound of the music is high surely stems from this.” Then [the emperor] ordered a new ruler to be made in accordance with the old measures, in order to set the gamut. From this the pitch of elegant music was relaxed, and everything matched the “Treatise on Pitch and Calendrics.”¹⁴⁹

It comes as little surprise that the Emperor Taizu would find the music flawed. As explored in Chapter 2, the right musical practice should have protected the dynasty, and given how brief the Later Zhou reigned, it quite obviously had not done so. A wise emperor would as soon as possible revise the music, whether he believed he was making up for whatever the musical shortcomings of the preceding dynasty were or was simply demonstrating politically his dynasty’s separation from such inauspicious music. This intention is made clear from his use of the word “mournful” (*ai* 哀); this term specifically indexed the victims of the downfall of a dynasty, as can be seen in many of the posthumous names of rulers who suffered this fate.

¹⁴⁹ *Songshi* 126.2941.

However, music could, of course, be problematic for all sorts of reasons, so it is significant that the emperor's sense that the specific problem was that the sounds are too high (高 *gao*). He provides no evidence other than his sense, but he did apparently complain multiple times. By this time, Wang Pu and Dou Yan had died,¹⁵⁰ so He Xie 和峴 (940–995) lowered the tuning, pitching it about a note lower than Wang Pu's system. This passage is also a good example of the pattern wherein the emperor's intuition about the sound was shown to be correct by more analytical means, in this case the discovery of the erroneous use of the ruler. This system remained in use for about seven decades, making it by far the longest-enduring pitch reform of the Northern Song.

Then, in 1035, Taizu's great nephew Renzong 仁宗 (r. 1022–1063), upon investigating the ritual music, made a similar observation about the pitch of the music in a question he asked Li Zhao 李照, who had been delegated the task of investigating the musical instruments.

帝御延福宮臨閱，奏郊廟五十一曲，因問照樂音高，命詳陳之。照言：「樸準視古樂高五律，視教坊樂高二律。蓋五代之亂，雅樂廢壞，朴创意造準，不合古法，用之本朝，卒無福應。」

The emperor made an appearance at the Hall of Prolonged Happiness to inspect [the instruments]; they played 51 melodies from the suburban sacrifice and the ancestral temple. Then the emperor asked [Li] Zhao why the music was pitched so high, and asked him to give a careful account. Zhao answered: “[Wang] Pu's standards were five notes higher than ancient music and two notes higher than the music of the Jiaofang [the institute for entertainment music]. In the chaos of the Five Dynasties, the

¹⁵⁰ Had they not died, it seems likely they may have worked for the Song as well. Dou had served in the Later Jin, Later Han, and Later Zhou, and revised some sacrificial music for the Song just before his death. Unlike in some later dynasties, when ministers emphasized loyalty to their dethroned masters, many of the Five Dynasties ministers continued to serve the new rulers. Another music-related example is Nie Chongyi, whose *Sanli tu* was originally commissioned in the Later Zhou, but was presented to the new Song emperor.

elegant music was abandoned and ruined. [Wang] Pu created new ideas to create the standards, they did not accord with the ancient way. Our dynasty has used them, in the end there has been no fortunate response.”¹⁵¹

The process proved more difficult than Li Zhao had imagined. His first attempt, based on measures from conveniently obtained millet grains, was still unsatisfactory to his ear, as the account continues:

照遂建議請改制大樂，取京縣秬黍累尺成律，鑄鍾審之，其聲猶高。更用太府布帛尺為法，乃下太常制四律。

[Li] Zhao then developed ideas and requested to reform and systematize the ritual music. He took the millet grains from the capital region and lined them up to establish the pitch, cast bells and judged them, but found that the pitch was still high. He instead used the cloth and textile ruler from the Court of the Imperial Treasury as a standard, then lowered the Imperial Sacrifice system by four notes.¹⁵²

This reform was unworkable and faced strong criticism from other officials, and according to the account presented in the *Song History*, the musicians soon reverted to the old system.¹⁵³ Given that the musicians themselves were involved, it seems likely that it was unsatisfactory due to being too low to accommodate the voices well, but no text makes this certain.

Emperor Renzong remained unsatisfied with this abandoned attempt at rectifying the music, and when another opportunity presented itself in 1050, he repeated the project, trying to make use of a broader array of scholars and achieving different results. Unlike the two previous reforms, this one did not begin with a perception that the music was too high, but it was also not caused by the music seeming too low; rather, as observed in the

¹⁵¹ *Songshi* 126.2948.

¹⁵² *Songshi* 126.2949.

¹⁵³ For more on the contentious music reform of Li Zhao, see Hu Qingjun 胡勁茵, “Li Zhao Yue.”

analysis of the edict in Chapter 2, the emperor simply wished to ensure that it conformed to the ritual canons. Nonetheless, the description of the reform never mentions that in effect raised the pitch of Li Zhao's system, resulting in a pitch not far from He Xian's. The precise pitch difference mentioned in the *Song History* frames the change as a lowering of "only" a certain amount from Wang Pu's system.

阮逸、胡瑗實預其事，更造鍾磬，止下一律。

Ruan Yi and Hu Yuan in fact made the preparations, then remade the bells and lithophones, only lowering it [lit. stopping the lowering at] one pitch.¹⁵⁴

Here yet again, the conceptualized direction in which the pitch adjustments are to be made is downward, even though the net movement appears to be upward. At no place in the *Song History* is it written that pitches were to be raised.

Renzong's reforms were not fully adopted and the ritual music remained problematic, but other political issues distracted his successor Yingzong 英宗 (r. 1062–1067). When Shenzong 神宗 (r. 1067–1085) ascended to the throne, bringing to ministerial positions the faction of reformers led by Wang Anshi 王安石 (1021–1086) to enact thoroughgoing reforms. In 1080, perhaps prompted by the incomplete success of Wang's controversial agenda and Wang's resignation, the emperor Shenzong turned his attention to the musical instruments and ordered a team led by Liu Ji 劉幾 (1008–1088) to investigate them. The team found three sets of lithophones, corresponding to the original music of the dynasty and two of the reforms. Two were defective for other

¹⁵⁴ *Songshi* 126.2937

reasons, but the remaining set, that cast in the most recent reform, was again found to be too high. These lithophones were then retuned to be somewhat lower.

幾等又以太常磬三等，王樸磬厚，李照磬薄，惟阮逸、胡瑗磬形製精密而聲太高，以磬氏之法摩其旁，輕重與律呂相應。

[Liu] Ji and his colleagues also considered the three kinds of lithophones in the Court of Imperial Sacrifices. Wang Pu's lithophones were too thick; Li Zhao's were too thin; only Ruan Yi and Hu Yuan's lithophones had a shape and construction that were precise, but their sound was too high. In accordance with the way of the "House of Lithophones" [section of the *Rites of Zhou*], they filed down the sides, in order to make their lightness or heaviness [i.e. pitch] correspond to the gamut.¹⁵⁵

A few years later, after Shenzong had died and Zhezong 哲宗 (r. 1085–1100) had ascended to the throne, another music reform was undertaken. This reform addressed more the use of the upper-octave tones, which, as shown in the first case study, were adopted mainly in accordance with the correspondence between the notes of the scale and parts of the state. However, Fan Zhen 範鎮 (1007–1088), offered another complaint with regard to the use of the upper-octave tones, namely that they were too high in pitch. This passage from his treatise "Proposing the Sixteen Bells and Lithophones" (*Yi shiliu zhongqing* 議十六鍾磬) is quoted from the *Song History*:

鎮謂：「清聲不見於《經》，惟《小胥》注雲『鍾磬者，編次之，十六枚而在一虞謂之堵。』至唐又有十二清聲，其聲愈高，尤為非是。國朝舊有四清聲，置而弗用，至劉幾用之，與鄭、衛無異。」

[Fan] Zhen says: "The [four] high notes are not found in the classics, but only in [Zheng Xuan's] annotation of the 'Junior Dancing Master' (*xiaoxu* 小胥) which says 'The bells and lithophones are arranged in order, sixteen bells on the rack is called a *du*.'¹⁵⁶ Until the Tang, there were also twelve

¹⁵⁵ *Songshi* 128.2985.

¹⁵⁶ This commentary is on the section of the text just following that which was analyzed in the first case study above. It is slightly modified from the form in appears in Zheng Xuan 鄭玄, *Zhouli Zheng shi zhu*, 151.

clear [i.e. upper-octave] sounds, their sound exceedingly high; this was quite against what is right. In this dynasty, there were formerly four upper-octave sounds, placed there but not used, until Liu Ji used them, just as in [the music of] Zheng and Wei.”¹⁵⁷

Thus, for Fan Zhen, there are two issues with upper-octave notes, that they were unclassical, and that they were unpleasantly high in pitch. Slightly later in the same treatise he brings up how Song pitch reforms had impacted their use:

其王樸樂內編鍾、編磬，以其聲律太高，歌者難逐，故四清聲置而弗用。及神宗朝下三律，則四清聲皆用而諧協矣。

The bell-chimes and lithophone-chimes of Wang Pu’s music were in their pitch too high, the singers found them hard to follow. Therefore, the four high notes fell out of use. Since the court of Shenzong lowered the pitch by three notes, the four high notes all are used and are harmonious.¹⁵⁸

Here he suggests another possibility with the high pitches, namely that they were impossible for the singers.

Finally, in the sixth music reform undertaken by the penultimate Northern Song emperor Huizong 徽宗 (r. 1101–1127) at the start of his reign in 1102, we come full circle. His complaint about the music expressed in a very similar to that of his distant ancestor Taizu, who had started off the whole emphasis on reform:

以大樂之製訛繆殘闕，太常樂器弊壞，琴瑟製度參差不同，簫笛之屬樂工自備，每大合樂，聲韻淆雜，而皆失之太高。

It was found that the system of ritual music was defective. The instruments of the Court of Imperial Sacrifices were in poor condition. The design and measurements of the string instruments were mismatched. Wind instruments were provided by the musicians themselves. When they

¹⁵⁷ *Songshi* 128.2992.

¹⁵⁸ *Songshi* 128.2992.

played together, there was cacophony, and the pitches were consistently too high.”¹⁵⁹

Here the high pitch goes along with the general chaos of the instruments. The emperor then appointed the eccentric Wei Hanjin 魏漢津 (c. 1010–1110)¹⁶⁰ to make the final reform of the Northern Song dynasty. Wei Hanjin claimed to have inherited arcane teachings from the Yellow Emperor about the length of the emperor’s fingers as a basis for the standard pitch. However, as explained in the *Song History* account of the story, Huizong’s fingers were not measured, because he was told it was inauspicious to show his hands to those outside the court. Despite the bizarreness of the account, the reform was largely successful, and the pitch system was followed through the Southern Song dynasty, for more than a century and a half.

Metaphors for pitch

Let us examine further what these accounts of pitches being too “high” might mean. Few languages have a specialized unique vocabulary to describe musical pitch; instead, nearly all adopt a wide variety of overlapping metaphors. In English, the most common metaphor is, of course, high and low, framing the dimension of pitch on a vertical scale which is sometimes replicated in gestures of performers (hands moving up or down alongside melodies)¹⁶¹ and the staff in Western music notation. But this is not

¹⁵⁹ *Songshi* 128.2997. For another translation, see Watt, “Cultural Efflorescence During the Sung Dynasty: Antiquarianism and Naturalism,” 224.

¹⁶⁰ The dates follow the estimate of Tsuyoshi, “Tuning and Numerology in the New Learning School,” 208.

¹⁶¹ Matt Rahaim compares such gestures to the melograph, a machine which transcribes pitch vs. time graphs, while noting that the gestures of vocalists only sometimes conform to this scheme. Though such an explanation of gesture is widespread, the actual gestures of singers are more complex because they may

the only metaphor that can encode pitch in English. We also speak of relatively higher pitches as sharp and lower as flat, which was the dominant metaphor for higher pitch in ancient European writings on music before it was replaced by a vertical mapping in the late medieval period.¹⁶² This metaphor is not completely restricted to the small differences that the corresponding accidentals in notation indicate, as “sharp” remains a characteristic description of a screech, while “dull” is more suitable for a thud.

Writers on Chinese music have often treated the clear-muddy dichotomy as the principal pitch metaphor in Chinese.¹⁶³ It is indeed common, but perhaps context is a significant factor; in the passages from Northern Song scholars quoted above, high-low appears more frequently.¹⁶⁴ In Table 3.4, I have listed pitch metaphors found in various musical cultures around the world. Those that I have encountered in Chinese music discourse are identified by the appearance of the relevant Chinese terms.

instead reflect other musical parameters or represent alternative metaphorical mappings of those parameters. Matt Rahaim, *Musicking Bodies: Gesture and Voice in Hindustani Music* (Middletown, Connecticut: Wesleyan University Press, 2012), 37–46.

¹⁶² David E. Cohen, “Notes, Scales, and Modes in the Earlier Middle Ages,” in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (Cambridge: Cambridge University Press, 2002), 315–16.

¹⁶³ Needham and Robinson regard this as the typical metaphor, with the justification that their “economy was so bound up with hydraulic engineering.” This phrasing echoes August Wittfogel’s famous theory of “hydraulic civilizations” from his book *Oriental Despotism* (1957) published a few years before Needham’s comment. Perhaps this theoretical frame accounts for the lingering sense that this was the dominant pitch metaphor in Chinese. Needham and Robinson, “Sound,” 157.

¹⁶⁴ Here I must disagree with François Picard, who wrote that the use of the high-low spatial pitch metaphor, now widespread in modern Chinese, was at best sparingly used before the twentieth century. François Picard, “Espace et Musique en Chine,” in *L’espace: Musique/Philosophie*, ed. Jean-Marc Chauvel and Makis Solomos (Paris: L’Harmattan, 1998), 1-2 (on repaginated version on HAL <halshs-00743870>).

high (<i>gao</i> 高)	low (<i>xia</i> 下)
shallow	deep
sharp	flat/dull
clear (<i>qing</i> 清)	muddy (<i>zhuo</i> 濁)
weak (<i>ruo</i> 弱)	strong (<i>qiang</i> 強)
light (<i>qing</i> 輕)	heavy (<i>zhong</i> 重)
short (<i>duan</i> 短)	long (<i>chang</i> 長)
small	large ¹⁶⁵
thin	thick ¹⁶⁶
young	old ¹⁶⁷

Table 3.4: Some pitch metaphors found in various music cultures

According to the theory of metaphor developed by George Lakoff and Mark Johnson and their followers, these collocations develop from the embodied perceptions a person experiences making sense of the world,¹⁶⁸ so it is generally not hard to find a physical basis that grounds the metaphor. For instance, for high and low pitch, this may have to do with perception of which parts of the body resonate with the certain kind of

¹⁶⁵ This metaphor is common on Bali and Java. Zbikowski, *Conceptualizing Music*, 67–68. It is also found among the Kpelle of Liberia. Ruth M. Stone, “Toward a Kpelle Conceptualization of Music Performance,” *The Journal of American Folklore* 94, no. 372 (1981): 197–98.

¹⁶⁶ This metaphor is found in Farsi, Turkish, and Zapotec. Shakila Shayan, Ozge Ozturk, and Mark A. Sicoli, “The Thickness of Pitch: Crossmodal Metaphors in Farsi, Turkish, and Zapotec,” *The Senses and Society* 6, no. 1 (2011): 96–105.

¹⁶⁷ As noted below, this is associated with the Suyá. Zbikowski, *Conceptualizing Music*, 68.

¹⁶⁸ George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 2003). For a good musical analysis grounded in the embodiment of these metaphors, see Johnson’s analysis of “Over the Rainbow” in “Merleau-Ponty’s Embodied Semantics—From Immanent Meaning, to Gesture, to Language,” *EurAmerica* 36, no. 1 (2006): 1–27.

pitch: head voice is literally higher than chest voice. Alternatively, it may relate to the proprioception of the height of one's larynx when singing at various pitches. Some of these other metaphors are more likely to be grounded in our experience with the sounds objects make, such as the strumming of thick or thin strings, the ringing of large or small bells, or the clatter or thud that falling objects of various sizes make as they hit the ground. This continual experience of a wide variety of stimuli makes such metaphorical grounds seem natural. For this reason, even those metaphors that never appear in a given language can often be correctly understood by its speakers. However, at the point they become lexicalized and subject to the linguistic and cultural matrices that surround them, yielding the complex situations within any given language.¹⁶⁹

The metaphorical mapping of pitch I wish to focus on is young-old. This likely piggybacks on the mapping of pitch with size, as younger people (and other organisms) are usually smaller, and then grow larger as they age. However, it is also true that while that is happening, their voices generally get lower in pitch, most noticeably in males but in females also. In nature, this process stops sometime in the teenage years, when a person's height and voice have largely stabilized. However, these metaphors tend to be conceptualized early on, when all grown-ups seem unimaginably old and one might have a few older siblings or neighbors whose size and voice corresponds to their age. Once this correlation between age and pitch is established, it is easy to extrapolate it far beyond its natural basis, and continue not just past puberty but also past death. Such an extension, of course, becomes more culture-dependent, depending as it does on the nature of the

¹⁶⁹ A fine example of metaphorical dissonance appears in Shayan, Ozturk, and Sicoli, "Thickness of Pitch."

afterlife, but in many societies around the world people hold a special reverence for their deceased ancestors and ascribe to them some continuing role in their lives.

To illustrate this, let me turn to a completely unrelated musical culture, the Suyá, a small indigenous tribe of the Xingu River in Brazil. Anthony Seeger tells a curious story in his ethnography, *Why Suyá Sing*. He came across an LP recording of a Suyá chant by an earlier ethnographer that sounded very strange.¹⁷⁰ He drew the conclusion that it had been incorrectly mastered and was reproduced at about five-sixths of the speed it should have been, causing the voices and shakers in the recording to sound preternaturally deep. On his next visit to the Suyá, he played this recording for the villagers, expecting them to be amused by the error. Instead, the ritual specialist told him, “It is beautiful, Tony. That is the way the Suyá really sang in the old days” (98). In fact, this response fits in with the common attitude among the Suyá to idealize the past; they frequently report that the men in the past were not just more morally upright, but physically taller (99). Given a worldview that values the authority of the ancestors, imagining that their voices could sing so low is a way of humbling oneself before their authority. Therefore, it comes as no surprise that in the Suyá language, speakers do describe relative pitch using, among other metaphors, age and authenticity (102).

Lawrence Zbikowski named this metaphor, following the Lakoff-Johnson notation, PITCH RELATIONSHIPS ARE AGE RELATIONSHIPS.¹⁷¹

¹⁷⁰ Anthony Seeger, *Anthony Seeger, Why Suyá Sing* (Bloomington: University of Illinois Press, 1987), chap. 5. Page numbers are cited in the text.

¹⁷¹ *Conceptualizing Music*, 68.

To my knowledge, young-old is not an explicit pitch metaphor in Chinese. However, in an excerpt that appeared in the first case study above, Wang Yaochen justifying the use the term “child-tones” to designate those of higher pitch (i.e. the four upper-octave notes) in order to avoid usurpation of authority:

一均之中，宮弱商強，是謂陵僭，故須用子聲，乃得長短相敘。
Within one mode, if *gong* is weak [i.e. high-pitched] and *shang* is strong [i.e. low-pitched], this is perversely usurping another’s authority. Therefore, one must use a “child’s sound” [i.e. higher tone], then the lengths [i.e. pitches] will be in order.¹⁷²

Of course, given the context of usurpation of authority within a culture characterized by age hierarchy, the use of the “child” in this passage has a further metaphorical basis, the mapping from ruler-minister (implied by the corresponding notes) to father-son. Still, given this mode of discussion, it seems plausible that even if the age metaphor does not explicitly appear in the language, it may have grounded the discussion implicitly.

Ancestral veneration

Like the Suyá, traditional Chinese placed great value on ancestral authority. As part of the hugely important virtue of filial piety, all people were expected to care for their parents and grandparents not just during their lives but also after their death, by offering them sacrifices. Moreover, this practice extended beyond the forebears one knew personally, as families recognized several generations of ancestors. Those with the means

¹⁷² *Songshi* 127.2963.

constructed family shrines, where offerings can be made to tablets which were believed to house part of the soul of the deceased. In an allowance that parallels sumptuary laws, higher social ranks were entitled to venerate more distant ancestors.¹⁷³ The most elaborate of shrines, of course, belong to the emperor, who has the privilege of venerating the longest lineage because of his central role in the world. In this conception of the universe, everybody should be invested in the emperor's sacrifices, since the people benefit when the emperor's ancestral spirits use their power to ensure that the entire country experiences peace and prosperity.

The ritual musical instruments used in the imperial ancestral sacrifices were said to have had the power to propitiate the spirits to receive their blessings.¹⁷⁴ One way to ensure that the sacrifices are successful is to use the very same set of instruments the ancestors themselves used in their sacrifices. If more distant generations of ancestors respond, it will be the filial duty of the more recent to respond as well. In part for this reason, ancestral vessels have long been passed down within families. Western Han vessels often their inscriptions implore the future generations to ceaselessly maintain the ritual, showing a future orientation by the use of such set phrases as “May the sons and grandsons treasure and use it” (子子孫孫實用).¹⁷⁵

For those in government, there are two kinds of forebears, one's genetic ancestors and one's predecessors in office. In dynastic government, these are usually the same, but

¹⁷³ Brashier, *Ancestral Memory*, 62.

¹⁷⁴ This is the earliest mode in which music was thought to function, but remains prominent in the motivations of Northern Song dynasty reformers. See Chapter 1.

¹⁷⁵ Xiaobing Wang-Riese, “Conceptions of Future in Early China,” in *Time and Ritual in Early China*, ed. Thomas O. Höllmann and Xiaobing Wang-Riese (Wiesbaden: Harrassowitz Verlag, 2009), 169–188.

there is a rupture between each successive dynasty. As I noted above, while rulers wanted to avoid the shortcomings that led to the downfall of the previous dynasty, they also wished to adopt some of the customs of their predecessors in order to demonstrate their own legitimacy as part of the larger historical progression of rulers, particularly those customs which may have reached further back into the distant past. For this reason, material regalia was often passed between dynasties as indicators of the particular office, including ritual vessels. Musical instruments were also part of this tradition, and ancestral sets of instruments were often sought after by the founders of new dynasties, so they could perform orthodox rituals.

As described in Chapter 1, the ancestral set of instruments had been lost during the Later Han (947–950), the penultimate of the largely chaotic Five Dynasties. Though it seems doubtful that the entire set had been preserved from antiquity, Northern Song musicians may have reasoned that even if the instruments had seen significant replacement over the years, it was likely that the pitch system had been kept constant due to a few lingering instruments from the older set. However, in the decade between the loss of instruments until new vessels were cast under Wang Pu in the Later Zhou, it was probably no longer possible to ensure the accuracy of the pitches.

The knowledge of this recent loss seems to have stimulated much of the anxiety about musical practice during the Northern Song. As rulers and scholars sought to find the right pitches for what are the grandest of ancestral rituals, I believe they made an implicit conceptual mapping between age relations and pitch relations, and sought the deepest pitches possible. Even when constrained by other factors to raise the pitch, the metaphor seems to have guided their conception of the problem and led to a discursive

frame that nevertheless emphasized the lowering of pitch. Moreover, in many cases the favoring of low pitch standards appears to have resulted in musical confusion, as many reforms, particularly Li Zhao's and Fan Zhen's, proved unworkable, and the musical instrument storehouse filled with mutually incompatible instruments. Apparently, like the Suyá, they believed that the music of their true ancestors, as ancient as it is, must have used unusually deep voices.

Chapter 4: Discourse of Numbers and Measures

Mathematized and non-mathematized Chinese music theory

One of the striking features of the *Huangyou xinyue tuji* is the sheer quantity of numbers that appear in the text (see Table 4.1). Of the 8,540 characters in the full treatise, 925, or more than ten percent, are numerals.¹ To put this in perspective, the corresponding figures for the standard textbook for mathematics throughout the imperial period, *The Nine Chapters on the Mathematical Arts* (*Jiuzhang suanshu* 九章算术), is 6,175 numerals out of 21,115 characters, or 29.2%.² This is significantly more, to be sure, but as a work entirely about geometry and algebra, it sets a ceiling for such figures; it is hard to imagine a meaningful work of any kind would include much more than this. For a work about music to reach more than a third of this maximum is surely a remarkable. How can this be explained?

¹ For the purposes of the calculations of numerals throughout this chapter, I counted the following characters as numerals: the digits 1–9 (一, 二, 三, 四, 五, 六, 七, 八, 九), the powers of ten (十, 百, 千, 萬, 億), and one-half (半; other fractions are designated using combinations of other digits). I would also count zero (零, often written “0” in modern editions) but it does not appear in the treatise. I did not include the Heavenly Stems and Earthly Branches (tiangan dizhi 天干地支), which sometimes designate ordinal numbers, because such counting would include many false positives (such as the common character *zi* 子, with meanings such as “son” or “you”) and furthermore they are not used in this text. I have simply counted the number of times these appeared in the text, without regard for context. Not all appearances are clearly “mathematical,” for instance in enumerations in a list, conventional names or titles (such as the time period Five Dynasties *wudai* 五代), etc. Rather than determine what counts as “mathematical” or not, I have chosen to include all numerals, but do so in the comparative figures that follow as well.

² The calculation here is done analogously from footnote 1. The text used consisted of the problems, answers, and Liu Hui’s commentary (but not Li Chunfeng’s), but excludes the problem numbers (which includes 412 numerals that were not part of the original text, but are often included for reference).

Section of treatise	Total numerals	Total characters	Percent numerals
1. Introduction	60	1515	4.0%
2. <i>Lülü</i>	437	1420	30.8%
3. Millet ruler	29	410	7.1%
4. Four measures	70	423	16.5%
5. Millet scale	61	445	13.7%
6. Single bell	107	1217	8.8%
7. Single lithophone	53	486	10.9%
8. Bell chime	33	576	5.7%
9. Lithophone chime	2	250	0.8%
10. <i>Jingu</i> drum	14	394	3.6%
11. Ritual tripods	49	913	5.4%
12. Bell knife	9	491	1.8%
Total	925	8540	10.8%

Table 4.1: Appearances of numerals in the *Huangyou ji*

One possible explanation, given the connection often made between music and mathematics, is that music texts are always like this. In particular, the foundation of tuning in numerical ratios, and the idea that this forms some kind of basis for music in general, is widespread. This explanation has some merit, as the numerals particularly dominate the second section, on *lülü* 律呂, the standard tuning pitch pipes. It quite literally reads like a mathematical textbook, since the proportion of numbers even slightly

exceeds the *Nine Chapters*. Much of the *liülü* section consists of simply working out the arithmetic of the proper lengths of pipe for each note in the gamut, which, given its basis in repeated multiplication, results in numbers with many digits.

However, at least some numerical discourse is found in nearly every other section of the *Huangyou ji*, including those that would not appear to require this type of mathematized tuning discourse.³ For instance, sections 10 and 11 describe the dimensions of instruments where pitch was not a concern at all, namely the unpitched *jingu* drum or the paramusical tripods (an unsounded ritual instrument). Meanwhile, section 6 and 8 on bells do not calculate how the measurements of various dimensions should vary with pitch, as would be analogous to the section on tuning did with the pitch pipes. Instead, all the bells are to be the same size.⁴ Yet each of these sections includes a substantial amount of text quantifying measurements, ratios, or other numerical figures. There must be an explanation beyond the demands of tuning.

Moreover, by no means is it the case that all Chinese texts that deal with music employ numbers to such an extent, or indeed hardly at all. For instance, consider the highly revered classical source, the *Record of Music*. The text is a discussion of the importance of music from the Confucian perspective and is a *locus classicus* for many

³ Section 9, on the lithophone chime, is the exception here. The two instances of numbers in it appear in a book title and in number five racks of chimes.

⁴ The authors go against the provision of the *Sanli tu*, which otherwise is an important authority for them, that stipulates that chimes of bells and lithophones should vary according to pitch. Instead, these authors recommend that all to be the same size for a pleasing visual effect. Technically this is possible by varying the thickness of the stone or the walls, though the timbre will not be consistent. The actual calculation that would be analogous to the pitch pipe discussion of section 2 would not really be possible, given the difficulty in scaling for pitch for three-dimensional idiophones, which is much more mathematically complex than for pitch pipes, which in Chinese discourse are idealized to one dimension. See Falkenhausen, *Suspended Music*, 91–96..

tropes about music, such as the explanation of the origins of music as response to external stimulus in its famous opening,⁵ the relationship of the five notes to the parts of the state,⁶ the explanation of the homonym “music/joy” *yue/le* 樂,⁷ and the conversation between Marquis Wen of Wei 魏文侯 and Zixia 子夏 on the boredom of ritual music.⁸ While the text stipulates that “The hundred measurements are numbered and achieve permanence” 百度得數而有常,⁹ it does not include much explanation of what these numbers and measurements might be. In terms of my textual comparison, there are far fewer numbers within this source; of the 6,342 characters in the text, only 58, less than one percent, are numerals. Nor is the *Record of Music* unusual in this regard. Most of the other classical references for music adopt a similar non-mathematical frame. In the standard corpus of the Five Classics and Four Books 五經四書,¹⁰ which held tremendous influence over the

⁵ CTP *lij*/yue-ji 1; Kaufmann, 32 (37 I/1); Cook, 24–25 (1.1). This passage was not only influential in music discussions, but because of its modified appearance at the start of the Great Preface (*Daxu* 大序) of the Classic of Odes, it is often taken as the prototypical discussion of art in a Chinese context. See Haun Saussy, “‘Thunder, Rainbows and Spicy Herbs’: The Lore of Qi and the Tokens of Chineseness” (Presentation at the Disunity of Chinese Science, Chicago, 2002), 5, <http://rhart.org/conferences/chinesescience/>.

⁶ CTP *lij*/yue-ji 4; Kaufmann, 33 (37 I/5); Cook, 30–31 (1.4). See the first case study in Chapter 3.

⁷ CTP *lij*/yue-ji 32; Kaufmann 40 (37 II/19); Cook 59 (6.3). See the introduction in Chapter 3.

⁸ CTP *lij*/yue-ji 42; Kaufmann 42 (37III/6–11); Cook 61–64 (8.1–16).

⁹ CTP *lij*/yue-ji 31; Kaufmann 40 (37 II/17); Cook 59 (6.2; not mentioned in the summary). This sentence is misleadingly translated by Kaufmann as “The lengths of the pitchpipes have their fixed measurements.”

¹⁰ In their traditional listing, the Five Classics are: The Classic of Odes (*Shijing* 詩經), the Classic of Documents (*Shujing* 書經), the Classic of Changes (*Yijing* 易經), the Spring and Autumn Annals (*Chunqiu* 春秋), and the Record of Ritual. The Four Books are: the Analects (*Lunyu* 論語), the Doctrine of the Mean (*Zhongyong* 中庸), the Great Learning (*Daxue* 大學), and Mencius (*Mengzi* 孟子). Referring to them here is somewhat anachronistic, as the listing was codified only in the late Song, but they certainly were among the most important books in the eleventh century.

imperial examination and thus the education of the specialists who would discuss music, there are no significant discussions of the mathematical parameters of music.¹¹

Indeed, Chinese music scholarship had had for a long time parallel mathematized and non-mathematized discourses. While the references in the classics, eschew numerical reference, a separate line develops, beginning with several other sources from the late Warring States and Western Han periods that did not become strictly canonical, such as the, *Spring and Autumn Annals of Master Lü* (*Lüshi chunqiu* 呂氏春秋; c. 239 BCE), *Huainanzi* 淮南子 (c. 139 BCE), and *Guanzi* (edited into its present form in 26 BCE).¹² In general, these works were more influenced by theories from the Yin-yang school (陰陽家), Legalism (*fajia* 法家), and Daoism (*daojia* 道家) than the more strictly Confucian classical works; however, all of these texts show significant amounts of syncretism.

That this formed a parallel discourse is evident in the music sections of the standard histories. In the treatises section of Sima Qian's *Historical Records*, completed around 94 BCE, there are separate treatises in the two styles, the non-mathematized *Book of Music* (*Yueshu* 樂書; this is textually the very similar to the *Record of Music*) followed by the mathematized *Book of Tuning* (*Lüshi* 律書). In the dynastic histories which

¹¹ The classical work that is exceptional in this regard is the *Rituals of Zhou*, as discussed in Chapter 1. However, while it uses significant numerical discourse, it does not specifically refer to tuning.

¹² Of these works, *Guanzi* is the most difficult to date, so it is unclear how the passage in question fits into the chronology of the others. About all that can be said is that it was written sometime between its seventh-century BCE namesake and its officially sponsored recension in 26 BCE. Like the others, it is certainly a compilation of other works, and the section on tuning in particular has so little to do with the ostensible topic and the immediate context that it likely was a relatively late addition. W. Allyn Rickett, *Guanzi: Political, Economic, and Philosophical Essays from Early China* (Princeton: Princeton University Press, 1998), 255. It is often dated earlier, however, so frequently appears at the heads of lists like this; for instance, Ernest McClain claimed called its system the “oldest surviving Chinese tuning” (McClain and Hung, “Chinese Cyclic Tunings in Late Antiquity,” 206).

followed, these two approaches are often combined with two non-musical fields that share similar framing vis-à-vis mathematics; in the *Book of Han* (*Han shu* 漢書), completed in 111 CE, there appear the *Treatise of Ritual and Music* (*Liyuezhì* 禮樂志) and a *Treatise on Tuning and Calendrics* (*Lülizhì* 律曆志). This pairing suggests that the affinities that the non-mathematized ritual had with one strain of music discourse and that the mathematized calendrics had with the other was stronger than the two approaches to music had with each other. Significantly, the sections on tuning and calendrics are generally kept rather separate in these treatises,¹³ suggesting that the commonalities between calendrics and tuning occurred only at an abstract level. In other words, the pairing was not a pragmatic move to simplify organization or avoid repeated material, but represented a specifically constructed link between the fields.

The *Treatise on Tuning and Calendrics* in the *Han History* epitomized the mathematized tuning discourse in the histories. This monograph discusses in the opening section mathematics, tuning, length, capacity, and weight, and in the longer closing section calendrical matters. Throughout it uses a heavily numerical discourse, including 3,632 numerals within a text of 22,123 characters (16.4%). The calculations in the *Huangyou ji* section on *lülü* are largely derived from this source.

The distinction between these two modes of music discourse is often glossed over in modern scholarship on ancient Chinese music in order to emphasize the mathematical contents. For instance, in Walter Kaufmann's translation of the musical references in the

¹³ Hans Ulrich Vogel, "Metrology and Metrosophy in Premodern China," *Une Activité Universelle: Peser et Mesurer à Travers Les Ages (Acta Metrologiae IV: VIe Congrès International de La Métrologie Historique, Cahiers de Métrologie, 11–12)*, 1994, 326n40.

classics, the essays in the second section of the book are full of numbers and mathematical argumentation (particularly that on *liu* [139–150], which reads like mathematics textbook, complete with lemmas and QEDs, but it also crops up in the essays on *qin* [98], *qing* [104], *yunluo* [138], and *sheng* [163]), while the first section, his direct translations of the Five Classics and Four Books, contains none.¹⁴ Similar content is typical of the work of Fritz Kuttner or Ernest G. McClain.¹⁵ This tendency has been adopted by some modern Chinese musicologists, through the influence of the German-educated Wang Guangqi 王光祈 (1892–1936).¹⁶

I believe that much of this discrepancy is due to the continuing influence of Pythagoreanism on how musicologists think about the history of musical thought. The idea that musical intervals can be reduced to ratios between small integers continues to pervade many discussions of tuning. Even when encountering a musical discourse that does not use ratios at all, music theorists in the past have often “translated” other ways of discussing musical intervals into mathematical ratios. For instance, in the Sanskrit tradition before 1600, intervals were not defined by ratios but rather they were assigned certain numbers of *sruti* whose “size” was unclear. Nonetheless, Sourindro Mohun Tagore’s survey of mostly nineteenth-century European scholarship on the Sanskrit shastric tradition, *Hindu Music from Various Authors* (1875), includes the writing of two scholars, J.D. Paterson and R. Bosanquet, who present their arguments in ratio form as

¹⁴ Kaufmann, *Musical References in the Chinese Classics*.

¹⁵ Fritz A. Kuttner, “The 749-Temperament of Huai Nan Tzu (+ 123 B. C.),” *Asian Music* 6, no. 1/2 (1975): 88–112, <https://doi.org/10.2307/833844>; McClain and Hung, “Chinese Cyclic Tunings in Late Antiquity.”

¹⁶ A good example of his work in this vein is Wang Guangqi 王光祈, *Zhongguo yinyue shi* 中國音樂史 [A History of Chinese Music].

though that were clear from the original sources.¹⁷ Nor is this problem limited to the nineteenth century; the sixteenth-century *Svara-mela-kalānidhi* has been widely misunderstood to be discussing specifically numerical ratios, though they do not appear in the text itself.¹⁸ Another example is Javanese tuning discourse, which has never been mathematized indigenously at all, resting instead on a mysterious sense of *rasa* from master musicians, but was nonetheless shoehorned into the matrix of just intonation.¹⁹

In the case of China, where a mathematized discourse has long been available, the material is frequently assimilated to ancient-Greek derived ideas instead of examining the local meaning. For instance, the generation of the system of pitches in traditional Chinese music is often explained by means of direct connection with the Ancient Greek system.²⁰ This phenomenon goes as far back as Jean Joseph Marie Amiot (1718–1793), the Jesuit resident of Beijing who wrote in his *Mémoire sur la musique des Chinois* (1780).²¹ Amiot concluded that, based on the similarities of their achievements, Pythagoras must have traveled to China and brought back a debased version of Ling Lun’s 伶倫 much earlier discoveries.²² Writers based in Europe adopted Amiot’s diffusionist paradigm even as

¹⁷ Reprinted as Sourindro Mohun Tagore, ed., *Hindu Music from Various Authors* (Varanasi: The Chowkhamba Sanskrit Series, 1965).

¹⁸ Matt Rahaim, Srinivas Reddy, and Lars Christensen, “Authority, Critique, and Revision in the Sanskrit Music-Theoretic Tradition: Re-Reading the Svara-Mela-Kalānidhi,” *Asian Music* 46, no. 1 (Winter/Spring 2015): 39–77.

¹⁹ Marc Perlman, “American Gamelan in the Garden of Eden: Intonation in a Cross-Cultural Encounter,” *The Musical Quarterly* 78, no. 3 (October 1, 1994): 510–56, <https://doi.org/10.1093/mq/78.3.510>.

²⁰ A good analysis and critique of the efforts to connect the tonal systems of ancient Greece, China, and Babylon is Joseph C. Y. Chen, *Early Chinese Work in Natural Science: A Re-Examination of the Physics of Motion, Acoustics, Astronomy and Scientific Thoughts* (Hong Kong University Press, 1996), 66–78.

²¹ This important source has been reproduced as Amiot, *Mémoire sur la musique des Chinois*.

²² Ling Lun was the legendary founder of music, the minister of the Yellow Emperor (*Huangdi* 黃帝 trad. 2698–2598 BCE), who using his ear chose appropriate bamboo lengths to make the set of tuning pipes. The traditional account of Ling Lun appears in the *Spring and Autumn Annals of Master Lü*, 5.8a–9a. See

they presented different explanations. Pierre-Joseph Roussier (1716–1792), who edited Amiot’s *Mémoire*, found the completeness of the Chinese system compelling and believed it more fully preserved the ancient Egyptian system that underlay all of the world’s music, including the Greek.²³ Later, the French Sinologist Émmanuel-Édouard Chavannes (1865–1918), who, *pace* Amiot, dated the earliest Chinese sources to the late third century BCE, concluded the opposite, that the discoveries of Pythagoras were carried to China via Alexander’s conquests.²⁴

Following the development in Near Eastern archaeology in the late nineteenth century, comparative musicologists such as Otto Abraham and Erich von Hornbostel remained certain of a link between the cultures, but speculated that there might both have stemmed from a central origin in Babylon or India.²⁵ Joseph Needham and Kenneth Robinson ran with the Babylonian argument, though they provide no specific evidence from Babylonia that would support this.²⁶ Meanwhile, the diffusionist paradigm of comparative musicology and the hypothesis of Babylonian origin were introduced to Chinese scholarship with Wang Guangqi, who studied in Berlin with Curt Sachs and

discussions by DeWoskin, *A Song for One or Two*, 59–61; Needham and Robinson, “Sound,” 178–79. Amiot took Ling Lun’s apparent dating literally, from which he concluded that the system significantly predated Pythagoras.

²³ Pierre-Joseph Roussier, *Mémoire Sur La Musique Des Anciens* (Paris: Lacombe, 1770).

²⁴ See his “Des rapports de la musique grecque avec la musique chinoise,” appendix II of *Mémoires Historiques de Se-Ma Ts’ien* (Paris: Librairie d’Amérique et d’Orient Adrien-Maisonneuve, 1967), III, 630–45. Of course, the shift from Amiot to Chavannes neatly illustrates the shift from Enlightenment views of Chinese rationalism to the discourse of European exceptionalism that underlay colonialism. Needham and Robinson, “Sound,” 176.

²⁵ Erich Moritz von Hornbostel and Otto Abraham, “Studien über das Tonsystem und die Musik der Japaner/Studies on the Tonsystem and Music of the Japanese,” in Hornbostel Opera Omnia, ed. K. P. Wachsmann, D. Christensen, and H.-P. Reinecke, trans. Gertrud Kurath (The Hague: Martinus Nijhoff, 1975), 34–35.

²⁶ Needham and Robinson, “Sound,” 177–83.

Hornbostel.²⁷ Though Wang did not return to China before his death, he was influential in the nascent field of musicology in China and Japan through his many publications in Chinese, which remained influential for decades.²⁸

More recent scholars, such as Kaufmann, Kuttner or McClain, have tended to set aside questions of origin but still discuss the Chinese system following these conventions.²⁹ One is reminded of a central difficulty in ethnomusicology, wherein analytical frames of European derivation become implicitly universal standards (i.e. form the basis for “etic” descriptions) which can prove nearly impossible to escape.³⁰ While this assimilation does often provide interesting and useful comparisons, it limits the possibility that the mathematical discourses might express their own native meanings. In fact, given his rather idiosyncratic cosmic vision, Pythagoras himself would probably be surprised at the manner in which his theories have been invoked as a symbol of global unity. In this chapter, I explore a different frame to understand why Northern Song musicologists, particularly the authors of the *Huangyou ji*, extensively adopted mathematical discourse in their music writing.

²⁷ Gong Hong-yu 宫宏宇, “An Accidental Musicologist: Wang Guangqi and Sino-German Cultural Interaction in the 1920s and 1930s,” in *The Strange Sound: Proceedings of the International Symposium on Chinese Musicology in Bonn, October 3-4, 2014*, ed. Mariana Münnig, Josie-Marie Perkuhn, and Johannes Sturm (Bonn: Ostasien-Institut e.V., 2016), 107, https://www.academia.edu/30432295/An_Accidental_Musicologist_Wang_Guangqi_and_Sino-German_Cultural_Interaction_in_the_1920s_and_1930s.pdf.

²⁸ Gong Hong-yu 宫宏宇, 112–13.

²⁹ Kaufmann, *Musical References in the Chinese Classics*; Kuttner, “749-Temperament”; McClain and Hung, “Chinese Cyclic Tunings in Late Antiquity.”

³⁰ Martin Clayton, “Comparing Music, Comparing Musicology,” in *The Cultural Study of Music: An Introduction*, ed. Martin Clayton, Trevor Herbert, and Richard Middleton (London and New York: Routledge, 2003), 57–68.

Classicizing mathematics

In line with the thesis of this dissertation, I argue that mathematics can function as a system of thought of unusual resistance to time, and thus form another time-suturing technology of the Northern Song musicologists. This is hardly an unfamiliar role for mathematics in other cultural contexts. Mathematical relationships seem to somehow transcend time and context in ways that remain hard to explain. Even in our own skeptical and disenchanted times, realist ontologies of mathematics have a remarkably robust following. Even among mathematicians who do not formally endorse this philosophical view, it often still closely matches the way in which they privately conceptualize their work.³¹

Among premodern societies, the most famous mathematics was ancient Greek geometry, epitomized by Euclid's *Elements*. Euclid presents his proofs completely ahistorically, following only the atemporal logic of axiom, postulate, and proof. There are no citations to the work of other scholars (though surely he must have been indebted to many). Even before Euclid's compendium, the inexorable logic of geometry was seen as so emblematic of rational thought that Plato supposedly made knowledge of it the entrance requirement to his Academy.³²

³¹ For instance, take the philosophical position Penelope Maddy argues in *Realism in Mathematics* (Oxford: Clarendon Press, 1990). Many philosophers of mathematics disagree with her assessment and the mainstream view of the structures of mathematics is that they are simply consequences of arbitrarily chosen axioms, but the starting point of Maddy's argument is that few mathematicians think of their own research in this way.

³² The only sources for this are from about a thousand years later, so there is ample reason to doubt it, though given the importance Plato accorded geometry in dialogues such as the *Republic*, it is certainly plausible. Bernard Suzanne, "Frequently Asked Questions about Plato: 'Let No One Ignorant of Geometry Enter,'" Plato and his dialogues, accessed January 19, 2019, <http://plato-dialogues.org/faq/faq009.htm>.

With regard to music, the Greeks seem to have believed that mathematics underlying music theory would preserve music against temporal flux. Boethius, before recounting the famous anecdote about Pythagoras and the hammers, gave Pythagoras's reason for distrusting human hearing and advocating instead numerical measurement as a way of protecting against change:

*Haec igitur maxime causa fuit, cur relicto aurium iudicio Pythagoras ad regularum momenta migraverit, qui nullis humanis auribus credens, quae partim natura, partim etiam extrinsecus accidentibus permutantur, partim ipsis variantur aetatibus, nullis etiam deditis instrumentis, penes quae saepe multa varietas atque inconstantia nasceretur.*³³

This, then, was primarily the reason why Pythagoras, having abandoned the judgment of hearing, had turned to the weights of rules. He put no credence in human ears, which are subject to change, in part through nature, in part by external circumstance, and undergo changes caused by age. Nor did he devote himself to instruments, in conjunction with which much inconstancy and uncertainty often arise.³⁴

Pythagoras (or Boethius) here appears to be more concerned with the day-to-day changes in one's perceptions due to weather or age (*aetas* usually indicated an individual lifetime), rather than the grander historical sense that concerned the Song musicologists. Nonetheless, in both cases the mistrust is brought about because of the inherent fluctuations over time, from which mathematics presents a means of escape.

In the Chinese context, no form of mathematics was as overwhelmingly influential or important to philosophers as Euclidean geometry, and classical philosophical argumentation seldom employs mathematical analogies in the way that ancient Greek

³³ Boethius, *De institutione arithmetica libri duo, De institutione musica libri quinque*, ed. Godofredus Friedlein (Lipsiae: in aedibus B.G. Teubneri, 1867), 196, <http://ebooks.library.cornell.edu/cgi/t/text/text-idx?c=math;cc=math;view=toc;subview=short;idno=cdl274>.

³⁴ Boethius, *Fundamentals of Music*, trans. Calvin M. Bower, Music Theory Translation Series (New Haven: Yale University Press, 1989), 17–18.

does. However, mathematics still had a prestigious pedigree as an important skill of training the elite. Mathematics (*shu* 數) was included in the Six Arts (*liu yi* 六藝) listed in the *Rites of Zhou* that were said to form the basis of education; the others were ritual (*li* 禮), music (*yue* 樂), archery (*she* 射), charioteering (*yu* 御), and calligraphy (*shu* 書).³⁵ Half of these had corresponding classics (the *Record of Ritual*, the *Classic of Documents*, and the lost *Classic of Music*), but not so for mathematics.³⁶ For this reason, especially following the canonization of classics alongside the growth of the Imperial Examination, mathematics may have been relatively neglected among classicists. In part, this was a result of social distinction; professional mathematicians were not elite, and elite explanations of their work often misunderstood or misrepresented it.³⁷

Nonetheless, elite literati were often versed in amateur mathematics. In the early Tang dynasty, a court astronomer complained that the extant editions of mathematical works were full of mistakes. The founding emperor of the Tang, Gaozu 高祖 (r. 618–627), commissioned Li Chunfeng 李淳風 (602–670) to edit and annotate a collection of the major mathematical works, after which they would be used in the National School

³⁵ The designation comes from the House of Protectors (*Baoshi* 保氏) of the Earthly Offices (*Diguan* 地官) of the *Rituals of Zhou*. See also the discussion in “The Magic Number Nine” section below.

³⁶ Kenneth DeWoskin says the subject was unique among the six genres of classical learning in that it did not have its own classic. I’m not sure what he meant by this. Several of these arts have no explicit representative in the Six Classics, and even in the three cases where classics share a name, it does not necessarily share a referent. Most obviously, the Six Kinds of Characters (*liu shu* 六書) mentioned in the passage has nothing to do with the *Classic of Documents*, despite both using the designation *shu* 書, which can be ambiguously understood as “writing.” DeWoskin, *A Song for One or Two*, 7.

³⁷ Roger Hart, *Imagined Civilizations: China, the West, and Their First Encounter* (Baltimore: Johns Hopkins Press, 2013), 132.

(*Guoxue* 國學).³⁸ The result, presented after a few decades of work to Emperor Gaozong 高宗 (r. 649–693) in 656, was the Ten Mathematical Classics (*Suanjing shishu* 算經十書). The exact contents and nature of this work are not entirely clear; for instance, it is not clear whether there really were ten or that was merely an approximate count that implied completeness. However, the first woodcut edition, prepared in the Northern Song in 1084, included ten works.

The use of the term “classics” (*jing* 經) in the title implied a status as a legitimate adjunct to the traditional Confucian classics. In fact, they hardly could be considered classics in any ordinary sense, since most of them were no more than a century or two old at the time of the compilation. In their present titles, eight of these ten works invoke *jing* in their titles. However, these were apparently not the titles used in the earliest printed edition, from 1084. At that time, most of the titles used “method” (*fa* 法) where *jing* now appears.³⁹ One of the two which did bear the word in their titles were and the *Computational Methods of the Five Classics* (*Wujing suanfa* 五經算法), which is organized as mathematical glosses to passages from the Five Classics. Here the work itself is not designated as a classic, but is nonetheless clearly an effort to legitimize mathematics as a branch of classical learning.

The work that was designated as *jing* in the earliest printed edition was the *Computational Classic of the Zhou Gnomon* (*Zhoubi suanjing* 周髀算經), known before

³⁸ This story appears in the biography of Li Chunfeng in the *Old Tang History* (*Jiu Tangshu* 舊唐書). A translation appears in Jean-Claude Martzloff, *A History of Chinese Mathematics*, trans. Stephen S. Wilson (Berlin: Springer, 2007), 123.

³⁹ Martzloff, 123–26.

its canonization in the Ten Computational Classics simply as the *Zhou Gnomon* (*Zhoubi* 周髀).⁴⁰ Probably the oldest of Li Chunfeng's compilation, it was probably composed in the Han dynasty and was the first book in the compilation.⁴¹ In addition to the designation as a classic, the title appears to reference the greatly esteemed Zhou dynasty, though it is unclear if the character refers to the Zhou dynasty or means the revolutions of heavenly planets, which is treated in the book. (Hence the alternate translation of the title as the *Arithmetical Classic of the Gnomon and the Circular Paths of Heaven*.) If it was in fact the latter, and was later re-interpreted in such a way to offer dynastic imprimatur, it may parallel the title of the *Rites of Zhou*, better known in Han times as the *Zhouguan* 周官. This title is now usually translated as the "Offices of Zhou," but David Schaberg has argued that the original meaning was "Comprehensive Offices," a reference to its constitutional nature.⁴² Regardless of how the title is interpreted, the Duke of Zhou (*Zhougong* 周公) appears as a conversant in the *Zhou Gnomon*, establishing its connection with the orthodoxy of the early Zhou dynasty.

It was also around the time of the Ten Mathematical Classics that the Mathematics School (*Suanxue* 算學) was founded, to provide a means for those trained in mathematics to participate in officialdom. The institution itself had a rocky history, first established under the Sui dynasty but later disestablished and re-established several times

⁴⁰ Christopher Cullen, *Astronomy & Maths in Ancient China: The "Zhou Bi Suan Jing"* (Cambridge University Press, 2007), xi.

⁴¹ Martzloff, *A History of Chinese Mathematics*, 126.

⁴² David Schaberg, "The Zhouli as Constitutional Text," in *Statecraft and Classical Learning: The Rituals of Zhou in East Asian History*, ed. Benjamin A. Elman and Martin Kern (Leiden: Brill, 2010), 34–63.

through the Song with different functions and organizational structures.⁴³ Regardless of its status, however, its existence provided at least the appearance of a corpus of mathematical knowledge paralleling classical learning. The editing and reprinting of the Ten Mathematical Classics in 1084 indicated not only renewed mathematical interest by the late Northern Song but the perceived legitimacy of the subject, due to the association between printing and imperial imprimatur and classical learning (see Chapter 5). No doubt the perceived need for the edition and the increasing institutionalization of the Mathematics School in the late eleventh century reflected the government emphasis on practical measures endorsed in the New Policies (*Xinfa* 新法) of Wang Anshi 王安石 (1021–1086).

Some of the mathematical works provide clues to the latent values of mathematical discourse in their prefaces. The most elementary of the Ten Mathematical Classics was the *Computational Classic of Master Sun* (*Sunzi suanjing* 孫子算經), perhaps dating to the fifth century.⁴⁴ In Master Sun's brief preface (*xu* 序), he extols the powers of calculation (*suan* 算), in particular noting its resistance to changes of time and place:

夫算者，天地之經緯...歷億載而不朽，施八極而無疆。
[Calculation] is the warp [*jing*, also meaning classic] and weft of Heaven

⁴³ Hucker, *A Dictionary of Official Titles in Imperial China*, 461.

⁴⁴ This work is apparently called the *Computational Methods of Master Sun* (*Sunzi suanfa* 孫子算法) in the 1084 printing. The dating of this work is difficult. For a survey of the evidence and interpretation, see Lam Lay Yong and Ang Tian Se, *Fleeting Footsteps: Tracing the Conception of Arithmetic and Algebra in Ancient China* (Singapore: World Scientific, 1992), 4–7. Virtually nothing is known about this Master Sun, but he is not the same person as the ancient author of the *Art of War* (*Sunzi bingfa* 孫子兵法).

and Earth...It has undergone 100,000,000 years but has not decayed; extending to the farthest regions, it has no boundaries.⁴⁵

The enormous age Master Sun ascribes to calculation is unusual and far outstrips even the most outlandish estimates of when the Chinese sages lived, but may relate to his apparent predilection for Buddhism.⁴⁶ Nonetheless, the idea that mathematics could bridge such huge temporal divides would certainly be appealing to anyone seeking continuity with the ancients.

The second of the Ten Mathematical Classics, *The Nine Chapters on the Mathematical Arts*, became the best-known and was used as a textbook until the late Ming.⁴⁷ The early history of the work is difficult to reconstruct, but the earliest sections seem to date from before the Qin dynasty.⁴⁸ Its present form is the version recompiled in the Western Han, with commentary by Liu Hui 劉徽 (c. 225–c.295) and subcommentary by Li Chunfeng, which was presented to the Tang emperor in 656.⁴⁹ The text mainly consists of classified mathematical problems, but Liu Hui's preface from the third

⁴⁵ CTP sunzi-suan-jing/xu. For a less literal and (and, to me, less evocative) translation, see Lam Lay Yong and Ang Tian Se, 151. In this translation, I adopt the usual value for *yi* 億 as 100,000,000, as Master Sun prescribes in the first fascicle (142). Other interpretations are possible, such as 100,000 in the lower number scale as given in the *Memoir on the Traditions of the Numerical Arts* (*Shushu jiyi* 數術記遺) by Xu Yue 徐岳 of the Han dynasty (18–19), though that interpretation is still an astonishing antiquity.

⁴⁶ The evidence for Master Sun's association with Buddhism is described in Lam Lay Yong and Ang Tian Se, 4. The evidence is weak but widely accepted in the absence of hardly any information about his life.

⁴⁷ A full English translation is Shen Kangshen, John N. Crossley, and Anthony W.-C. Lun, trans., *The Nine Chapters on the Mathematical Art: Companion and Commentary* (Beijing: Oxford Science Press, 1999).

⁴⁸ Shen Kangshen, Crossley, and Lun, 1.

⁴⁹ This is the version that all modern editions and translations aim to reconstruct. Roger Hart is critical of these efforts, as this version is not the most mathematically significant (Li Chunfeng seems to be far less mathematically adept than Liu Hui, for instance) but is the most politically significant. In this way it subsumes mathematical achievement to political recognition as such, an error he sees repeated throughout the Chinese historical sources and histories that do not engage sufficiently with source criticism. Roger Hart, *The Chinese Roots of Linear Algebra* (Baltimore: Johns Hopkins University Press, 2011), 30–43.

century provides some context on the position of mathematics within Chinese discourse.

The opening passage ascribes the development of mathematics to the ancient culture

heroes and sees them as manifestations of the same cosmic principles that underlay music

and the calendar:

昔在包犧氏始畫八卦，以通神明之德，以類萬物之情，作九九之術，以合六爻之變。暨於黃帝神而化之，引而伸之，於是建歷紀，協律呂，用稽道原，然後兩儀四象精微之氣可得而效焉。

In antiquity, Pao Xi [i.e. Fu Xi 伏羲] created the Eight Trigrams, in order to penetrate the virtues of the gods and reason out the conditions of the Myriad Things, created the Art of the Nine Nines [i.e. arithmetic] in order to unite the changes of the six lines of the hexagram. Later, the Yellow Emperor marvelously transformed and extended these, consequently constructing the calendar and harmonizing the pitch pipes. These were used to examine the origin of the Way, afterwards the subtle and exquisite power of the *yin* and *yang* and the Four Images could be effectively harnessed.⁵⁰

This explanation of the origin of arithmetic places it in the distant past with culturally orthodox figures, making it part of the lineage of the *Classic of Changes* that formed part of the canonical heritage. No doubt Liu Hui employed this classicizing trope in order to legitimize his own commentary, but the frame allowed subsequent scholars to treat mathematics as a legitimate branch of classical learning in its own right.

Following this excerpt, and parallel to familiar discourse of music, Liu Hui continues on to describe how the Qin Emperor's Burning of the Books destroyed the original mathematical works, which had to be recreated in the Han Dynasty. Since the *Classic of Changes*, as a divination manual, was one of the works that was said to be spared in the burning, the text implies again the connection of mathematical works with

⁵⁰ *Jiuzhang suanshu* preface. Translation modified from Shen Kangshen, Crossley, and Lun, *The Nine Chapters*, 52.

that classic. Similarly, many works of Chinese music theory frame their numerical content with reference to the *Classic of Changes*. Though there are few references to music in the work, the *Classic* was highly associated with number in the Northern Song, so that many discussions of the ontology of number in the period begin by discussing it.⁵¹

Given the relevance of the *Classic of Changes* in mathematical discourse, it is not surprising that the mathematical ideas of Northern Song dynasty musicologists would vary with their interpretation of the *Classic*. The interpretation of the work was always quite varied, and had already split into different interpretive schools by the time of the Han dynasty. Historians have grouped most scholars into two major schools, the School of Images and Number (*Xiangshupai* 象數派) and the School of Meaning and Principle (*Yilipai* 義理派). Both schools produced their own commentaries and had their own lineages of exegetes who specialized in them, supplementing the texts that have survived with personal teachings.⁵²

The School of Images and Numbers was dominated by the idea that the cosmos was built out of the a relatively small set of forces, which combined in manifold ways to bring about the complexities of the real world. These combinations could be displayed

⁵¹ Zuo Ya 左雅, "Beisong 'Shu' Lun 北宋"數"論 [On 'Number' in the Northern Song]," *Tang Yanjiu 唐研究* 18 (2012): 483–507.

⁵² Richard J. Smith has recently stressed, the schools were not nearly as distinct as I present here; many scholars adopted ideas from both, and the specific lineage of one's teachers was an important consideration. Richard J. Smith, *Fathoming the Cosmos and Ordering the World: The Yijing (I-Ching, or Classic of Changes) and Its Evolution in China* (Charlottesville: University of Virginia Press, 2008), 59–60. No doubt he is correct, and it can be problematic to regard these schools as monolithic or their lineages as pure. In my own work, I recognize that many figures are not easy to classify; for instance, the musicological theories of Chen Yang as they appear in the *Book of Music* seem to draw from both schools. However, I find the simplification helpful in organizing this discussion. Smith himself, though he reiterates his warning specifically when discussing the Song dynasty (113), seems to similarly use it when dividing that chapter into sections on Chen Tuan's successors and Cheng-Zhu metaphysics. I follow a similar division here, though the analogue of the former division appears mainly in Chapter 5.

neatly in diagrams, the archetype of which are the set of hexagrams in the *Classic of Changes*. This school had been dominated by esoteric teachings that were obscure after the Han dynasty, but the revival and transmission of these teachings is usually credited to the Daoist priest Chen Tuan 陳搏 (d. 989).⁵³ His esoteric ideas were passed on through chains of disciples, but in the eleventh century became public as they filtered into the cosmological ideas of the works of literati, particularly Liu Mu 劉牧 (1011–1064), Shao Yong 邵雍 (1011–1077), and Zhou Dunyi 周敦頤 (1017–1073).⁵⁴ Though the ages, the reception of this school among the elite literati was quite mixed, with some dismissing them as a Daoist corruption of orthodox teachings, while others insisted that they revealed hidden aspects of the classical teachings. This became especially clear in the Southern Song, when the bastion of Neo-Confucian orthodoxy, Zhu Xi 朱熹 (1130–1200) traced his sage lineage through the esoteric teachings of Zhou Dunyi. From Zhu's pervasive influence on later Confucianism, these teachings became well-known, though still sometimes treated with suspicion.

The cosmological visions of the school are underlaid by a mathematical structure, that the cosmos results from the permutation of a small set of primitive elements. Moreover, this structure is atemporal, so a music theory that derived from it properly would be resistant to historical change and could preserve the ancient orthodoxies. However, in contrast to the practice of modern cosmologists, who express the universal invariants in terms of numerical constants and equations, theorists of the School of

⁵³ Smith, 115.

⁵⁴ Smith, 120.

Images and Numbers eschewed mathematical presentation, using instead diagrams. Moreover, though they are closely associated with the term number, including as part of the school's name, and some of the exponents regarded numbers as the key to the underlying structures, combinatorics was not a significant part of orthodox Chinese mathematics at the time, but was instead classified with numerology and other vulgar mathematical practices. They were not usually treated in mathematical treatises, and thus form a largely independent strain of mathematical discourse.⁵⁵ Moreover, the mathematics that the school favored are quite simple; though Shao Yong accorded numbers a prime position in his cosmology and frequently invokes quite large numbers, his work imitates the precise calculations of mathematicians, without requiring their sophisticated technique.⁵⁶ For these reasons, I will discuss them in Chapter 5, on the significance of images. In this chapter, I continue this discussion with the explicit and orthodox mathematical reasoning of the School of Meaning and Principle.

The discourse of measurement

The School of Meaning and Principle did not explore the appearance of the hexagrams but focused on the text and the commentarial apparatus that claimed to explain the work, seeing in them messages about orthodox ritual and moral guidance. The text of the *Classic of Changes* itself is incredibly obscure, but scholars following these traditions would point to particular passages as allusions to certain historical incidents or

⁵⁵ Hart, *The Chinese Roots of Linear Algebra*, 133.

⁵⁶ Kidder Smith Jr. et al., *Song Dynasty Uses of the I Ching* (Princeton: Princeton University Press, 1990), 127.

warnings against certain behaviors. In this way, the text serves mainly as a demonstration of authority, a passage that one can quote to defend a particular moral teaching. In the Northern Song, a time of great literati political activism, these invariably took on a political shade, as scholars would construct an argument out of such citations and use it to prove the orthodoxy of their position.⁵⁷

Hu Yuan, the more prominent of the pair of officials who composed the *Huangyou ji*, was quite interested in the *Classic of Changes*; his lectures on it made him famous. Some of his notes were later transcribed as *Oral Exposition of the Zhou Changes* (*Zhouyi kouyi* 易經口義), which survives today. However, there is no numerical content in the *Huangyou ji* that explicitly appeals to the *Changes* as justification or draws on similar discursive strategies.⁵⁸ In the *Huangyou ji*, the mode of mathematics is arithmetical, based on calculation and explicit mensuration. These discursive strategies account for the huge quantity of numbers in the text, the point with which I opened this chapter. Conceptually, the domain of numbers includes not just integers but rational numbers such as the minutely calculated fractions that generate the gamut via the repeated iteration of the “gain and loss by thirds” (*sanfen sunyi* 三分損益, explained in Chapter 3) or decimal approximations of square roots (which will be seen shortly). This instrumental use of number is in stark contrast to the numerology and correspondences between sets of small cardinalities that undergirded the School of Images and Number.

⁵⁷ Tze-ki Hon, *The Yijing and Politics: Classical Commentary and Literati Activism in the Northern Song Period, 960-1127* (Albany: State University of New York Press, 2005).

⁵⁸ In Chapter 5 I argue otherwise with regard to the implicit justification for the figurative content, and below I argue for an implicit justification for the root measure of *huangzhong*. In neither case is the *Changes* specifically invoked or used as a model for arguments.

The *Huangyou ji* is also remarkable for citing *The Nine Chapters of the Arts of Calculation* alongside the classical references taken to be authoritative and using its techniques to interpret and further develop the more standard works. The citation occurs in this passage which appears at the end of section 2, about the measurement of pitch pipes (*lülü*):

右臣逸臣瑗謹按周禮嘉量法并前漢志等計黃鐘之管積八百一十分容一千二百黍，又以《九章·圓田》算法計之黃鐘管，每長一分積九分，容十三黍三分黍之一，空徑三分四釐六豪。

At right, we, Yi and Chen, carefully and in accordance with the *Rites of Zhou jialiang* [auspicious measure] system and the *Book of Han Treatise* [on Tuning and Calendrics] calculate that the *huangzhong* pipe is of 810 *fen* and holds 1200 grains of millet, and from the *Nine Chapters on the Mathematical Art* “Circular Field” method we measure the *huangzhong* pipe, each *fen* in length piles in nine *fen*, this gives $13\frac{1}{3}$ grains of millet,⁵⁹ so the interior diameter is 3 *fen* 4 *li* 6 *hao* [=3.46 *fen*].⁶⁰

The significance of the allusions to the *jialiang* and the millet grains will be explained later in this chapter, but the calculation using the mathematical methods is unusual in what is essentially a work of classical exegesis. Its invocation here shows how far the project of classicizing mathematics had succeeded, at least for those in the eleventh century who were more concerned with activist reconstruction. The “Circular Field” method can be found in the first chapter of the *Nine Chapters*, the problems of which

⁵⁹ The number $13\frac{1}{3}$ actually derives from $1200 \div 900$, not $1200 \div 810$. This discrepancy seems to be the meaning of the previous clause which is otherwise unclear, suggesting that the calculation is using a nonary system instead of the ordinary decimal one (for reasons that will be explained later in this chapter). The interior diameter given is the square root of 12, which seems to derive from the comment below.

⁶⁰ *Huangyou ji*, *Jicheng congshu* ed., 14.

treat the relationship between the diameter and area of a circle.⁶¹ The actual working through of the algorithm appears in this comment which follows the passage above:⁶²

算法：置九分，三分益一得十二分，以開方除之。得空徑之數不盡二豪八絲四忽。

Method of the calculation: take 9 *fen*, adding one third yields 12 *fen*, taking the square root yields it [the result, 3.46]. The resultant interior diameters do not deplete/exhaust (?) 2 *hao* 8 *si* 4 *hu* [=2.84 *hao*].⁶³

The citation of mathematical works in justification of certain measurements suggests that these authors perceived a quality to these formulas that could yield a permanent solution to ritual controversies. However, the actual problem here addresses one of the unexplained questions raised by the *Huangyou ji*, which, unfortunately, I have been unable to resolve. Each pipe in *lüli* diagram in the section 2 (Figure 4.1) is labelled with a length in larger characters followed by an interior diameter in smaller characters in two columns.

⁶¹ For a translation of the procedure and discussion of this procedure, see Shen Kangshen, Crossley, and Lun, *The Nine Chapters*, 88. Notice in the passage the distinction between the precise rendering of the fractional solutions of linear equations ($13\frac{1}{3}$) and the decimal approximations of quadratic equations (3.46), suggesting that they derive from different mathematical procedures, which indeed they do.

⁶² The author or the origin of the comment is unclear. It may have been in the original text or interpolated by a later commentator.

⁶³ *Huangyou ji*, *Jicheng congshu* ed., 14.

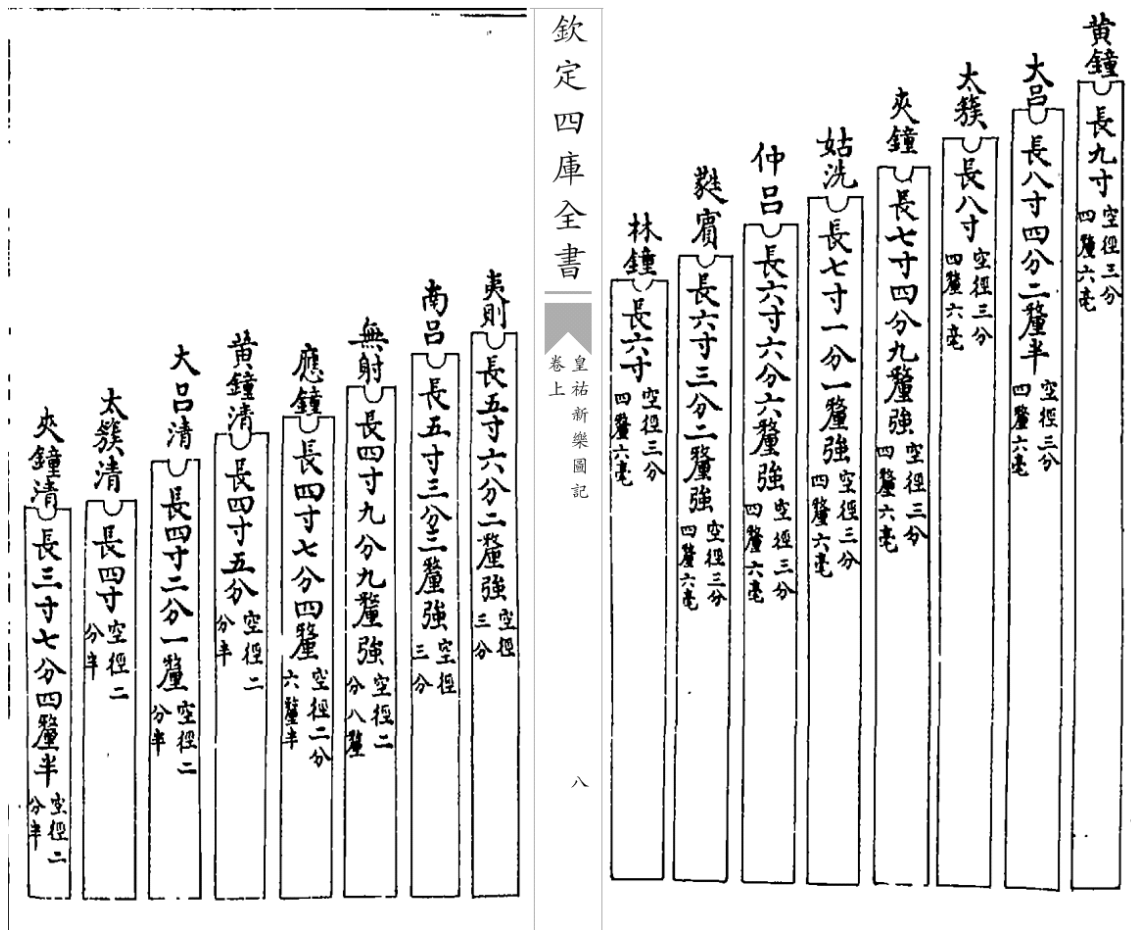


Figure 4.1: The *lülü* in the *Huangyou ji*⁶⁴

However, unlike the lengths, the interior diameters are not explained well in the text, in fact, not mentioned except for these passages and another statement that claims other scholars have stuck to a tradition that the interior diameter should be 3 *fen*, the origin of which is not explained. In the diagram, the interior diameter for the lowest eight pitches (*huangzhong* through *linzhong*) is given as 3 *fen* 4 *li* 6 *hao*, the number calculated above; the next two (*yize* and *nanzhong*) have the supposedly standard 3 *fen*, and higher pipes have successively smaller diameters until they reach at 2.5 *fen*, which is the same

⁶⁴ *Huangyou ji* 8, SKQS ed., 8r–8v.

for all the four upper-octave tones. The decrease is thus monotonic (that is, no pipe of higher pitch has a larger diameter than a lower one), but hardly very consistent.

Meanwhile, there seems to be a step missing from the commentary; the number whose square root is 2.84 is 8 (or nearly so—2.83 would be a closer rounding), perhaps intended to correspond to the third pipe, *taicu*. However, that number appears nowhere in the diagram for any of the notes, and the interpretation of that number is unclear, since it falls between the interior diameters of the second and third pipes from the top of the principal octave (*nanzhong* and *wuyi*).

Scholars have wondered whether the mysterious series of the *Huangyou ji* pipe diameters may represent some attempt to deal with the phenomenon in pipes known as end correction (also known as end effect), which causes overblown fifths to be somewhat smaller than string harmonics and would compromise the mathematical simplicity of *sanfen sunyi* calculations.⁶⁵ The modern scholar Xu Fei 徐飞 has argued that the decreasing measurements suggest that they were trying to compensate for this effect.⁶⁶ However, Liu Qiuhua 刘秋华 responded that the compensation is far too small to account for the numbers in the image.⁶⁷ Both arguments make sense to me, since the decreasing

⁶⁵ For an explanation of the phenomenon, see Murray Campbell, “End Correction,” in *New Grove Dictionary of Music and Musicians*, ed. Stanley Sadie (London: Macmillan, 2001). Needham and Robinson believed that ancient Chinese acousticians must have been aware of the phenomenon, and speculated that the traditional account of pipe lengths may in fact refer to using the bamboo to measure string lengths. In any case, the effect appears to have been known by the Han dynasty. Needham and Robinson, “Sound,” 186 fn. d.

⁶⁶ Xu Fei 徐飞, “Songdai Ruan Yi, Hu Yuan yijing guanglü shengxue chengjiu de shuli yanzheng 宋代阮逸、胡瑗异径管律声学成就的数理验证.—中国古代三分损益法在律管上的首次成功,” *Ziran kexueshi yanjiu* 自然科学史研究 2001, no. 3 (2001): 206–214.

⁶⁷ Liu Qiuhua 刘秋华, “Dui Ruan Yi, Hu Yuan yinlüxue chengjiu de zai pingjia 对阮逸、胡瑗音律学成就的再评价,” *Huangzhong* 黄钟 2010, no. 1 (2010): 147–150.

widths of higher-pitched pipes are hard to explain otherwise but it is unclear why the calculations would be so nonsystematic and erroneous; the algorithm the text implies they were using would indeed work if applied consistently (the needed end correction is proportional to the diameter, so if the diameters changed to correspond, it should eliminate the need for the correction). For now, the confusion must be blamed on that perennial culprit of difficult texts, corruption in transmission, though this assignment is perhaps less of a cop-out than usual: few scholars would be equipped to deal with the calculations, especially ones not laid out clearly, and there are a few other places where numerical mistakes appear, though they are easily emended by understanding the calculations.

A Chinese metrosophy

However, I do not wish to dwell on the specific calculations in this treatise, but instead point out how the addition of calculated measurements not found in the classical sources supports the idea that the lost instruments of the distant past could be reconstructed. The calculations the writers of the treatise use are never abstract, but always refer to units of measure. Therefore, a key part of their effort had to be recovery of the original metrological system, so that the instruments could be reconstructed in ways that exactly matched the dimensions used by the ancients. But what else did these measures index that so inspired the musicologists?

In the modern age measurement is treated as objective and positivistic, but its historical trajectory shows it has always been part of other discursive networks.⁶⁸ Around the world, measurement began from the normative dimensions of readily available objects, the most obvious example of which is human bodies. In many cases, these origins continue to underlie modern systems of measure, as can be seen in the transparent etymology of the unit of one foot. As societies grew more complex, the variation in human sizes and other convenient measures caused problems, so gradually standardized units came to be adopted.⁶⁹ This development coordinated with the power of a centralized government to unify, promulgate, and enforce standards of measure, in some cases brutally.⁷⁰

None of these ages of measurement are objectively neutral, and in each case, measurement came with a set of associations from outside that colored its significance. Scholars of measurement divide “metrology,” the study of the material and quantifiable aspects of measurement, from “metrosophy,” the cultural background that explains the purpose and function of measurement. Such a division of course applies to any

⁶⁸ I adopted the framework of the historical sketch in this paragraph from Robert P. Crease, *World in the Balance: The Historic Quest for an Absolute System of Measurement*, 1st ed (New York: W.W. Norton, 2011).

⁶⁹ Crease calls this process the “embodiment” of the units, and contrasts this terminology from that of Robert Tavernor, who called this process “disembodiment” (27 and 280n11). Crease’s choice of words seems confusing to me, as in the earlier system the measures were more directly connected with the body. For this reason, I will avoid using this terminology with either referent.

⁷⁰ Crease, 31–32. One example of such an injunction is Leviticus 19:35–36. Crease’s history continues into a third phase, the rationalization of these units in terms underlying scientific constants, with the establishment and ongoing consolidation of *Système Internationale d’Unités*, in which power of them was taken away from states and given to scientific authorities. One could argue that to the Chinese, the grounding of the system in the natural millet seeds, yin-yang cosmology, and the coherence of the dimensions were the earliest step of this phase, though obviously the scientific epistemology differed tremendously. Since this phase is not distinct from the earlier phases in the Chinese case, and my concern is not with modern systems of measurement, I will not discuss this further.

measurement culture, but since measurement is a practically invisible technology, conspicuous only when problems emerge, metrosophy tends to be similarly invisible.⁷¹ In this context, it is worth noting that the term “metrosophy” was popularized primarily from a scholar of Chinese measurement, Hans Ulrich Vogel.⁷² Perhaps the metrosophical substrate was particularly visible in Chinese culture, with its early emphasis on measure and explicit discussion of measurement in historical treatises.

One of the earliest accounts that includes explicit discussion of measurement can be found in the “Canon of Shun” (*Shundian* 舜典) from the *Book of Documents*, which supposedly records of the actions of the Sage Emperor Shun 舜 (trad. dates 2233–2184 BCE). The text states that in his first year, he undertook inspection and ceremonial tours to the east, south, west, and north. Among other tasks, the description of the tour east in the second month is explicit that this entailed concerns about systems of measurement:

歲二月，東巡守，至于岱宗，柴。望秩于山川，肆覲東后。協時月正日，同律度量衡。修五禮、五玉、三帛、二生、一死贊。如五器，卒乃復。

In the second month of the year, he made a tour of inspection to the east, as far as Daizong, where he presented a burnt-offering to Heaven, and sacrificed in order to the hills and rivers. Thereafter he gave audience to the princes of the east. He set in accord their seasons and months, and

⁷¹ Robert Crease is critical of the modernist viewpoint that since the development of SI standards over the past century, metrology has “evolved beyond metrosophy.” This skepticism accords well with the framework of science and technology studies, which I support. Robert P. Crease, “The Metroscopic Phenomenology of Measurement,” in *The Multidimensionality of Hermeneutic Phenomenology*, by Babette Babich and Dimitri Ginev (Springer Science & Business Media, 2014), 82.

⁷² Crease, 81. Crease cites Hans Ulrich Vogel, “Aspects of Metrology and Metrology during the Han Period,” *Extrême Orient Extrême Occident* 16, no. 16 (1994): 135–52, <https://doi.org/10.3406/oroc.1994.995>. Vogel himself defines “metrosophy” as “number speculation within cosmological philosophemes,” noting that “the relationships between magical, religious, and political thought on the one hand and metrology on the other also have to be taken into account” (Hans Ulrich Vogel, “Weights and Measures in China,” in *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures*, ed. Helaine Selin (Dordrecht: Springer Netherlands, 2008), 2242, https://doi.org/10.1007/978-1-4020-4425-0_8932).

regulated the days; he made uniform [*tong*] the [measurement systems of] pitch, length, capacity, and weight. He refined the five rituals, the five symbols of jade, the three kinds of silk, the two living [animals] and the one dead one. As to the five instruments [of rank], when all was over, he returned them.⁷³

“Making these uniform” (*tong* 同) could mean promulgating a single set of measures across the land, but it more likely means that the measures of different kinds relate to one another. For example, a standard capacity measure of millet grains might define a standard weight, or a bell shaped to have a length, capacity, or weight of certain standard measures might define a certain standard pitch. This relationship between measures of different dimensions, known to metrologists as coherence, was characteristic of Chinese measures, but virtually unknown elsewhere in the world until the French Revolutionary experiments with what ultimately became the metric system.⁷⁴ This fact demonstrates the overwhelming importance of measurement in Chinese discourse relative to other ancient civilizations.

Discussions of the Chinese system of measurement generally focus on four dimensions, musical pitch (*lü* 律), length (*du* 度), capacity (*liang* 量), and weight (*heng*

⁷³ *Shundian* 3. Translation adapted from Legge. The same story appears in the *Historical Records* of Sima Qian, *Historical Annals of the Five Emperors* (五帝本紀) 15.

⁷⁴ Thomas McGreevy notes that some scholars have attempted to show that some ancient systems coordinated volumes of a certain substance and the resultant weights, but the evidence is weak outside of China, where the intentionality of the relationship is prominent in discourse. Thomas McGreevy, *Basis of Measurement, Volume 1: Historical Aspects* (Chippenham: Picton Publishing Limited, 1995), 24. Curiously, the Chinese also frequently used decimal relationships between different measures, as the metric system does. Given the widespread fascination among Enlightenment thinkers with the Jesuit reports from China, I wonder if these ideas of measurement were an influence, though I am not aware of any evidence.

衡, literally “steelyard”),⁷⁵ which were all said to have originated coherently from *huangzhong*. This ideology first appears in the *Guoyu* 國語 (*Discourses of the States*), which relates the measures to the dimensions of a bell:

是故先王之制鍾也，大不出鈞，重不過石。律度量衡于是乎生。
Therefore when the Former Kings made bells, the size did not transgress
the uniform standard, and their weight did not exceed one *dan* 石.⁷⁶
Measures of musical pitch, length, capacity, and weight all took their
origin from this.⁷⁷

This system was said to have been devised by the sage kings of yore; as Vogel notes, “their antiquity was an important criteria for their purported eternal validity.”⁷⁸ Moreover, the ordering above, which is usually observed in other sources as well, reflects a hierarchy in which musical pitch is central to the discussion. This ordering is typical not only of the treatment in music treatises like the *Huangyou ji*, in which the opening fascicle on measurement covers each of these dimensions in that order (viz. sections 2–5 on Table 4.1), but also enumerations like the Canon of Shun passage above.⁷⁹

⁷⁵ *Du* 度 is sometimes used in a more general sense to indicate measurement of any of these dimensions. This is unusual, since that synecdoche is more common with the stereotyped first member of a set, but I have not seen *li* used in this way.

⁷⁶ On the thorny issue of whether this character should be read *shi* or *dan* at the time of composition, see Michael Loewe, *Problems of Han Administration: Ancestral Rites, Weights and Measures, and the Means of Protest* (Leiden: Brill, 2016), 255–59. I use *dan*, as I believe that is how Song scholars would recognize it regardless of the original.

⁷⁷ CTP *guo-yu/zhou-yu-xia* 30. Translation adapted from Falkenhausen, *Suspended Music*, 315. Falkenhausen points out the problems with the interpretation of this passage in Needham and Robinson, “Sound,” 199. Perhaps because the *Guoyu* was not part of the classical corpus, though it was contemporary and describes the events in the *Spring and Autumn Annals*, it is not cited as frequently as later references, such as the “Canon of Shun” passage above.

⁷⁸ Vogel, “Metrology and Metrosophy in Premodern China,” 328.

⁷⁹ Listings wishing to bring the number of dimensions of measurement up to five to coordinate better with the many groups of pentads in Chinese thought often add calendar-reckoning (*li* 歷). The *Book of Han* “Treatise on Tuning and Calendrics” instead adds number (*shu* 數), referring to the powers of ten that for

Remarkably, it was possible to connect the measures of pitch, length, capacity, and weight into a single device, known as a *jialiang* 嘉量 (“excellent measure”) from this passage from the “Artificer’s Record” of the *Rites of Zhou*, which explains how one could be built:

栗氏為量。改煎金錫則不耗，不耗然後權之，權之然後準之，準之然後量之。量之以為釜，深尺，內方尺而圍其外，其實一釜。其臀一寸，其實一豆；其耳三寸，其實一升。重一鈞。其聲中黃鐘之宮。概而不稅。其銘曰：「時文思索，允臻其極。嘉量既成，以觀四國。永啟厥後，茲器維則。」

The Li clan made measuring instruments (*liang* 量). He fashions the metals so that they are not to be reduced further; only when there is no reduction does he weigh it; only when he has weighed it does he level it; only when he has levelled it does he measure it; thereby forming it into a *fu* that is one *chi* deep, one *chi* square in the interior within a circular surround. Its capacity is one *fu*; its lower part measures one *cun* with a capacity of one *dou*; its ear measures three *cun*, with a capacity of one *sheng*. The weight of the vessel is one *jun*; its sound matches the *gong* of *huangzhong*. It is an exact measure but it is not used for purposes of tax. Its inscription reads: “This is what a virtuous ruler sought, its reliability is perfect. Once this excellent measure has been made, let it be displayed to all quarters; may it long be valid in the time to come; this vessel is the standard.”⁸⁰

the decimal basis for Chinese counting. This treatise also treats calendrics, of course, but in a separate section which follows.

⁸⁰ CTP rites-of-zhou/dong-guan-kao-gong-ji 45–47. Translation adapted from Loewe, *Problems of Han Administration*, 235. The language of the inscription, especially the first eight characters, is rather opaque; Loewe’s translation follows the traditional commentators.

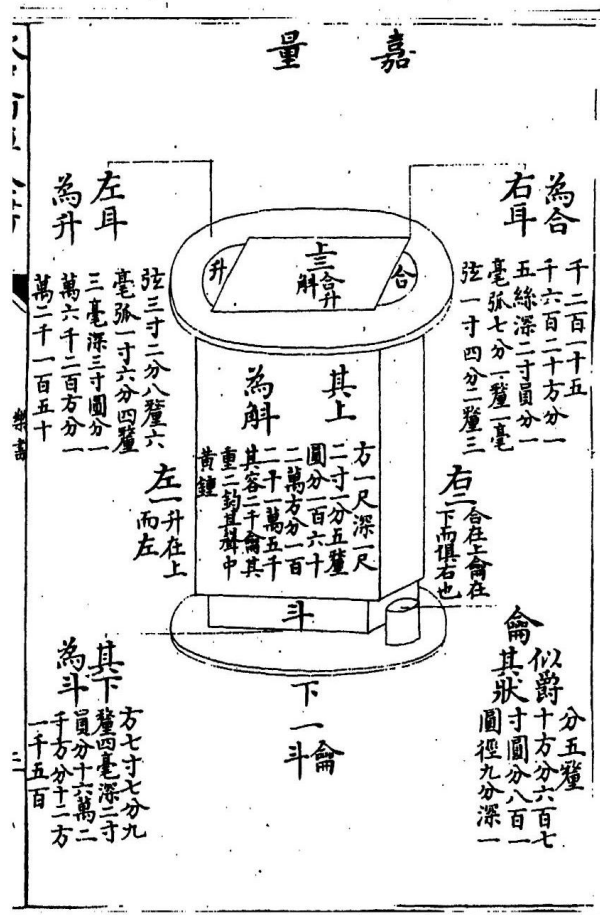


Figure 4.2: The *jialiang* in the *Yue shu*⁸¹

Chen Yang illustrated one such *jialiang* in the *Book of Music* (Figure 4.2), including as text the metrical prescriptions given in the *Artificer's Record*. Chen's diagram appears to be speculative, suggesting he had never seen one. However, the gilt bronze *jialiang* of Wang Mang 王莽 (r. 9–23) does survive, which now resides in the National Palace Museum, Taipei (Figure 4.3).⁸² Wang Mang was the minister and general

⁸¹ *Yueshu*, SKQS ed., 97.3r.

⁸² On this artifact, see James C.Y. Watt, "The Bronze Age and the First Empires," in *Possessing the Past: Treasures from the National Palace Museum, Taipei*, ed. Wen C. Fong and James C.Y. Watt (New York: The Metropolitan Museum of Art, 1996), 73–95; Loewe, *Problems of Han Administration*, 217–36.

who acted as regent for the last two emperors of the Western Han dynasty, before taking the throne himself and declaring the short-lived Xin 新 dynasty. The vessel features inscriptions that indicate the dimensions of each measuring space and the resulting volume, plus a longer inscription legitimizing the device and the Xin dynasty itself. The longer inscription is 81 characters long, written in nineteen rows of four characters and one row in between them with five characters.⁸³ The row with five characters, which stands out visually because of its different spacing, is “to make uniform to [the measures of] pitch, length, capacity, and weight” (同律度量衡),⁸⁴ the phrase quoted and discussed above from the “Canon of Shun,” who Wang Mang is thereby emulating.

⁸³ Given the significance of 81 explained later, this may not be a coincidence. Loewe, *Problems of Han Administration*, 236.

⁸⁴ The complete inscription and two somewhat different translations appear in Loewe, 227–28. A reproduction of the inscription in the vessel’s seal script and modern characters appeared in the Qing antiquities catalog *Xi Qing gu jian* 西清古鉴 (“Ancient Mirror of Western Clarity”); this appears as Figure 2.7 on page 209 of Loewe’s book.



Figure 4.3: The *jialiang* of Wang Mang⁸⁵

Although scholars generally regard this object as authentic, its provenance is not well-documented.⁸⁶ There are several passages that seem to refer to it in the records up to about the sixth century which would have been familiar to scholars. For instance, Liu Hui referred to what seems to be this object in his *Nine Chapters* commentary of 263, which he says was stored in the Royal Arsenal of the Jin 晉 state (265–420).⁸⁷ Its status in the Song is not clear; although Fan Zhen 范鎮 (1007–1088) refers to the inscription in a letter, his interlocutor Sima Guang doubts that he saw the real artifact. The great

⁸⁵ Photograph from the National Palace Museum collection by User:Jason22, via Wikimedia Commons.

⁸⁶ Loewe, *Problems of Han Administration*, 217–23.

⁸⁷ Shen Kangshen, Crossley, and Lun, *The Nine Chapters*, 302. Loewe notes the chronological discrepancy that Liu Hui's commentary is dated earlier than the founding of the Jin state, without being able to resolve it (218).

epigrapher Ma Heng 馬衡 argued that in Song times it was not known whether it existed.⁸⁸ In any case, the object, even if it was somewhere in the palace complex, was not accorded much attention, perhaps because of the low opinion official historians had towards Wang Mang, who they regarded as a usurper.

Though Song musicologists had to be wary of the political context in which they might discuss Wang Mang, many must have been sympathetic to his realization of metrological coherence. Wang Mang had used the *Rituals of Zhou* extensively in his comprehensive political reordering, having selected the text as a way of providing a Zhou imprimatur for his activist form of government, leading extensive organizational and bureaucratic reforms.⁸⁹ Wang Mang's namesake, the most powerful minister of the eleventh century, Wang Anshi, employed a similar strategy. But even those conservatives suspicious of the text for its association with this style of government had to admit that, as the only classical text that included specific numerical information that could be brought to bear on the issues of music reconstruction, the *Rituals of Zhou* was indispensable in ritual music reform.

⁸⁸ Loewe, *Problems of Han Administration*, 221. He notes the chronological discrepancy between the accepted date of Liu Hui's commentary and the founding of the Jin state. However, that seems unlikely to compromise its authenticity.

⁸⁹ Puett, "Centering the Realm: Wang Mang, the Zhouli, and Early Chinese Statecraft."

Metals and tools

Wang Mang's device was made of bronze, a material that was considered appropriate for measurement standards, as explained in the "Treatise on Tuning and Calendrics" from the *Book of Han*, one of the earliest accounts of measurement:

凡律度量衡用銅者，名自名也，所以同天下，齊風俗也。銅為物之至精，不為燥溼寒暑變其節，不為風雨暴露改其形，介然有常，有似於士君子之行，是以用銅也。

All tuning, length, capacity, and weight [standards] use bronze [*tong*]; the name comes from the purpose of uniting [*tong*] all under heaven and evening out local customs. Using bronze to make things is the ultimate precision. It does not change its segments in dryness moisture, cold, or heat; it does not change its shape due to wind, rain, storms, or dew; unshakeable and constant, it resembles the behavior of scholars or gentlemen. For this reason, they use bronze.⁹⁰

Here two of the desirable attributes of tools of measurement are linked, their permanence and pervasiveness. These standards, which transcends weather conditions, are to be universal in both space and time, uniting all. These were exactly the goals of those concerned with ritual music in the Northern Song: unite the realm and match the practices of the ancient ancestors. These concerns were grounded in the current political situation: in space, contestation with other polities in North China, and in time, anxiety about the orthodox learning and practice had been lost since ancient times. In this way they echoed the concerns of Confucius, whose plea to "carefully attend to authorized weights and measures" (謹權量，審法度)⁹¹ reflected his disunited era and felt sense of

⁹⁰ CTP han-shu/lv-li-zhi 17.

⁹¹ Analects 20:1. Because there is no subject to this clause, its interpretation is ambiguous. D.C. Lau understands this as a normative injunction, whereas Legge believed it described the actions of the early Zhou, who is quoted in the previous sentence. Regardless of the interpretation, given Confucius's use of

disconnection from the heroes of the early Zhou. For him, metrological unification would be tantamount to political unification.⁹²

Bronze metalwork, the most conspicuous and prestigious product of the early period of technological efflorescence in early China, was apparently also a symbol of permanence at this early time. Even during the Song period, bronze seemed to be a lasting technology, as ancient vessels survived or were uncovered by changes in river courses and served as a rare window into ancient culture (as I explore further in Chapter 5). Moreover, the material that will unite is homophonous with the act of uniting itself (*tong* 銅 and *tong* 同); following the logic explored in Chapter 3, this linguistic link makes the connection appear natural.⁹³

The use of measuring instruments such as these tools greatly extended human abilities of judgment. In this quotation from Mencius, the tools of measurement surpass even the most gifted individuals, and are directly compared with the way of the ancient sage kings in their efficacy:

孟子曰：「離婁之明，公輸子之巧，不以規矩，不能成方員；師曠之聰，不以六律，不能正五音；堯舜之道，不以仁政，不能平治天下。」

Zhou as a model, he surely thought this was behavior to be emulated. D.C. Lau, trans., *The Analects* (Penguin, 1979), 158. Legge (reproduced on CTP *analects/yao-yue* 1).

⁹² Vogel, “Metrology and Metrosophy in Premodern China,” 329.

⁹³ Both terms are currently pronounced *tóng* in modern Mandarin and were pronounced the same way (*duwng*) in Middle Chinese just later than what Song dynasty speakers would have known. According to the reconstructions of Baxter and Sagart, they may have been slightly different in Han dynasty times (there is uncertainty in reconstructing the initial consonant of the term for bronze), but it certainly would have been close enough to make the paronomasia obvious. Moreover, the characters are very similar, with the bronze one simply adding a metal radical on the side. Phonetic reconstructions from William H. Baxter and Laurent Sagart, “Baxter-Sagart Old Chinese Reconstruction, Version 1.1,” September 20, 2014, <http://ocbaxtersagart.lsa.umich.edu/BaxterSagartOCbyMandarinMC2014-09-20.pdf>.

As Vogel points out, this pair is just one of several phonetically similar paired terms in this chapter that bring together the technical side of toolmaking with moral qualities. Vogel, “Aspects of Metrosophy and Metrology during the Han Period,” 143.

Mencius said, “The power of vision of Li Lou, and skill of hand of Gongshuzi, without the compass and square, could not form squares and circles. The acute ear of the music-master Kuang, without the pitch-tubes, could not determine correctly the five notes. The way of Yao and Shun, without a benevolent government, could not secure the tranquil order of the kingdom.”⁹⁴

Li Lou 離婁 was a legendary contemporary of the Yellow Emperor and was famed for his clarity of vision at great distances. Gongshuzi 公輸子 (also known as Lu Ban 魯班) (c. 507–444 BCE) was a famed carpenter and engineer. Master Kuang 師曠, who served as Music Master for the Jin 晉 court during the Spring and Autumn period, was likewise famed for his sonic judgment. Yao and Shun were the last of the sage rulers of the pre-dynastic period. Mencius’s point is that none of these people could make their achievements on their own, but required skillful use of technologies to display their inborn acuity. This does not override their stunning achievements and their fame is justified, but that cannot be separated from the tools that they wielded so effectively.

In fact, Mencius’s ordering in this passage recapitulates the program musicologists would follow in their construction of reformed musical instruments. The first sentence emphasizes the importance of the instruments used to measure and build the musical instruments, thereby ensuring that their construction is correct. The second sentence is the musical test of the correctly built instruments, where they will be judged using the standard pitches. Finally, the correctly performed ritual music that would result from these is a tool of benevolent government, which in Mencius’s reckoning would stabilize the realm and regulate the behavior of each social class.

⁹⁴ CTP mengzi/li-lou-i 1.

Given the primacy of the dimension of musical pitch in the system of measurement, we can see rectifying musical measurements was not just important for achieving music's effects, but the entire system of knowledge in imperial China depended on it. Given this overarching status, it is not surprising that there would be ritual implications. In the passage from the Canon of Shun above, the ritual origins of the metrological rectification are clear, since it was performed as part of a sacrifice and rituals themselves were also rectified on the same occasion. Similarly, in a passage in the "Positions in the Hall of Brightness" (*Mingtangwei* 明堂位) from the *Record of Ritual*, the Duke of Zhou is said to have set ritual and brought up music alongside promulgating measures; this wise act elicited the complete submission of all the feudal lords:

六年，朝诸侯于明堂，制礼作乐，颁度量，而天下大服。

For six years [as regent to King Cheng 成], he [Duke of Zhou] invited the Feudal Lords to the Hall of Brightness, set ritual and brought up music, promulgated the standards of length and capacity, and all under heaven submitted completely.⁹⁵

The dual purpose of musical instruments as producers of sound and units of measure allows the metrical and numerical precision of treatises like the *Huangyou ji* to index the administrative tradition of sage rulers like Shun or the Duke of Zhou establishing or maintaining coherent systems of measurement. Through the course of imperial Chinese history, new rulers were expected to rectify systems of measurement to ensure their fairness and accuracy as they promulgated them throughout the realm. This was coordinate with the rectification of music and ritual; both served as an opportunity

⁹⁵ CTP liji/ming-tang-wei 2. The translation is based on Legge.

for the new ruler to assert his legitimate authority in Confucian matters of state. This task was particularly important for rulers who were founding a dynasty, as it was believed that the standards (of measurement, ritual, and music alike) of the previous dynasty must have degraded since they lost the Mandate of Heaven, and were consequently in need of rectification. This creates the dynamics that led to the codified dynastic cycle that I explored in Chapter 2.

The calendar of metrological rectification

But herein lies a paradox. I already mentioned the passage of the *Record of Music*, “The hundred measurements are numbered and achieve permanence” (百度得數而有常). This phrase nicely summarizes my central argument in this chapter, that the mathematized measurements used in music can transcend time. But if these standards were permanent, why would new rulers be expected to periodically rectify them?

The explanation lies on the necessity for a role for the cultivation of personal virtue. In Confucian ethics, one’s personal virtue (or lack thereof) was an overriding factor in almost all matters, and what otherwise appear to be impersonal cosmological systems had to take it into account. Music was especially susceptible to the influence of the virtue of the maker or listener, because of its status mediating internal and external manifestations, as in the famous opening sentences of the *Record of Music*:

凡音之起，由人心生也。人心之動，物使之然也。

In all cases, the arising of tones is from the hearts of people. The

movement of people's hearts is made so by external things. They are touched off by things and move, thus they take shape in sound.⁹⁶

This was particularly true with government, the principal example in the *Record* that is introduced a few sentences later: “The way of sounds and tones is linked to government” (聲音之道，與政通矣).⁹⁷ Thus, music was not simply a matter of calculation but was inherently tied to inner states of the ritual participant, and when that participant was the ruler, it would reflect on his statecraft. There is a sincerity to music that cannot be matched in other forms of ritual and statecraft: “Only music cannot be faked” (唯樂不可以為偽).⁹⁸

There is a parallel here to be made with mathematical astronomy. Both Ouyang Xiu and Shao Yong observed that while number builds consistent and lasting patterns, it cannot account for the ceaseless changes of heaven and earth.⁹⁹ Unlike the assumptions of unchanging orbits that underlay the systems of Western astronomers like Ptolemy, Chinese astronomical thought regarded such modeling as inherently flexible and approximative.¹⁰⁰ Instead, undetectable inaccuracies or subtle changes in the motion could slightly modify celestial motions, especially over long periods of time. For this reason, calendars were never anticipated to be accurate beyond the few centuries that a

⁹⁶ CTP liji/yue-ji 1. Translation adapted from Cook, “Yue Ji,” 24.

⁹⁷ CTP liji/yue-ji 4.

⁹⁸ CTP liji/yue-ji 33. The philosophical implications of this sentence are further explored by Meilin Chinn, “Only Music Cannot Be Faked,” *Dao* 16, no. 3 (2017): 341–354.

⁹⁹ Smith et al., *Song Dynasty Uses of the I Ching*, 129.

¹⁰⁰ Jean-Claude Martzloff, “Chinese Mathematical Astronomy,” in *Mathematics Across Cultures: The History of Non-Western Mathematics*, ed. Helaine Selin (Dordrecht: Kluwer Academic Publishers, 2000), 380–83.

dynasty lasted. The result was eclipses and other astronomical anomalies that were not strictly natural phenomena, but were simultaneously cosmic commentary on affairs on Earth. A virtuous statesman could avoid such omens, even if they were predicted, by the cultivation of virtue. Thus, the accuracy of a calendar depended not only on its calculation but on the smooth operation of government.

A similar degradation across time was also assumed to happen with measures, particularly the eventual decay of devices. In the opening fascicle of the *Huangyou ji*, the authors reconstruct ancient measures and note their inconsistencies. In the concluding sentences of two of the sections, they show their lack of surprise that measures from the Sui dynasty several centuries before would no longer be accurate:

蓋自隋開皇至聖朝五百餘年矣，其間製造得無差舛哉！

Thus, since the Kaihuang period of the Sui dynasty [581–600] until your majesty more than five hundred years have already elapsed, during that time how could there not be defects or errors in the manufacture?¹⁰¹

亦以年代浸遠而製造有差也。

[The scale] also in the gradual but long passage of time has created discrepancies in the devices.¹⁰²

However, this is not to deny numbers and measurements a role. In astronomy, it set bounds on what sort of displays were cosmically possible—or, in the case of predicted but unobserved eclipses (in other words, avoided bad omens), provided a baseline against which good omens could be noted. In music, the role was somewhat different. The

¹⁰¹ *Huangyou ji*, *Congshu jicheng* ed., 22.

¹⁰² *Huangyou ji*, *Congshu jicheng* ed., 26.

Record of Music presents numbers and measurement as the link mediating the internal (individual) and external (interpersonal) manifestations of music:

是故先王本之情性，稽之度數，制之禮義。

Therefore the Former Kings based it [music] in feelings and [human] nature, investigated it using measurements and numbers, systematized it into propriety and righteousness.¹⁰³

The measures and numbers allow the commensuration of the interiors and exteriors that are involved in music, and need to be able to respond to and transmit both. Achieving a design that could do so demonstrated the wisdom of the ancient sages that later ages wished to emulate.

The ancient sages were able to establish effective control over music and timekeeping because of their exemplary virtue. A ruler seeking to emulate their virtue might best do so by learning from their example. Their virtue was evident in, among other things, the ritual objects that they employed. Jeffrey Moser has shown how Song antiquarians such as Lü Dalin treated the inspection of ancient ritual artifacts as an opportunity to receive the moralizing influence of ancient sages, by observing their words (inscriptions) and forms.¹⁰⁴ The physical artifacts that Lü was interested in no doubt offer more opportunities for direct instruction than their textual traces in transmitted classics and their reconstructed illustrations, but by using this data to reconstruct the instruments properly, one might similarly glean insights into why they were effective, and thus increase one's own virtue. In the process of design, as the musicologists were forced to

¹⁰³ CTP *lij*/yue-ji 28.

¹⁰⁴ Jeffrey Moser, "The Ethics of Immutable Things: Interpreting Lü Dalin's Illustrated Investigations of Antiquity," *Harvard Journal of Asiatic Studies* 72, no. 2 (2012): 278, <https://doi.org/10.1353/jas.2012.0015>.

solve problems regarding how the sundry data could fit together into an effective instrument, that they could finally understand the wisdom of the sages that had designed it in the first place.

I should note that resolving this problem was only an issue for this approach to musical mathematics. The partisans of the School of Images and Numbers, who conceptualized the numbers differently, did not worry about the numerical consequences of design in this way, as the mathematics that underlay their cosmic schema were not thought of as manifestations of virtue but simply enumerations of the possible. For instance, though Shao Yong used calendrical ideas to organize his thought, he understands these as a symbolic, not mathematical, representation of processes that resist precise measurement and require a sage who can intuit the underlying principles to react appropriately to them.¹⁰⁵ His approach bespeaks an epistemological optimism that contrasted with the anxiety stemming from the conundrums of actually accomplishing precise and accurate measurement.¹⁰⁶

The *Huangyou ji* writers in particular seem to have believed that proper music depended on understanding the numbers and measurements that the Former Kings had

¹⁰⁵ Smith et al., *Song Dynasty Uses of the I Ching*, 123–25.

¹⁰⁶ My use of the term “epistemological optimism” here is indebted to the description of Shao Yong in Henderson, *The Development and Decline of Chinese Cosmology*, 121. However, shortly after that publication, Thomas Metzger used it in a much-cited article to describe the distinctive and characteristic philosophical approaches of Confucius and Mozi. Others have extended his argument to essentialize Chinese philosophy from early times up to the present. While there were obvious exceptions to this characterization of earlier thought as well (such as Zhuangzi), the Northern Song seems to form a historical node in which many thinkers became more skeptical in a variety of matters, for reasons that I have explored in this dissertation. After the rise of Neo-Confucianism in the Southern Song, this inclination seems to have receded. However, those associated with the School of Images and Number seem to have resisted this temporary intellectual preoccupation. Thomas A. Metzger, “Some Ancient Roots of Modern Chinese Thought: This-Worldliness, Epistemological Optimism, Doctrinality, and the Emergence of Reflexivity in the Eastern Chou,” *Early China* 11/12 (1985): 61–117.

used. Doing so could make for effective ritual, but might also transmit aspects of their teachings that could not be so easily communicated in writing. A key part of their effort thus consisted of recovering the original metrological system, so that the instruments could be reconstructed in ways that exactly matched those used by the ancients.

Recovering ancient standards

There were two means by which the *Huangyou ji* treatise attempts to recover ancient measures. The first is tracing historical changes in measurement units as recorded in the dynastic histories, and reverse engineering the original units. The second employs a standard that were believed to have remained unchanged over time to establish units that match the original standards.

Because, as noted above, measures were most often rectified near the beginning of dynasties, their history tends to follow a periodic structure not unlike that of ritual music discussed in Chapter 2. The effect of this is that tables of historical measures tend to change on dynastic lines. Using such information, it should be possible to read the information backwards to correctly interpret older measurements. This methodology is found in the passage from the *Huangyou ji* that was excerpted above. The full passage explains how the old standards were changed during the Kaihuang reign period (581–601) of the Sui dynasty and what that should mean for measures now:

右臣逸臣瑗謹按隋志開皇中以古斗三斗爲一斗。今以黍斗校之，尚少五合未合三斗者。蓋自隋開皇至聖朝五百餘年矣，其間製造得無差舛哉！

At right we, Yi and Yuan, carefully and in accordance with what is in the Book of Sui Treatise note that during the Kaihuang period (581–601) three old *dou* were made to equal one *dou*. Now using the millet dipper to check

it, at first less than five *ge* was not yet one *ge* three *dou*. Thus, since Sui Kaihuang until his majesty, it has already been over five hundred years, during that time how could there not be defects or errors?!

¹⁰⁷

Although this method should work, and the *Huangyou ji* authors claim that it does when they use it to verify their investigation, it is not their preferred method. Instead, they spend far more space rectifying measurement by means of a natural standard that would be unaffected by historical changes. Perhaps made anxious by the propensity of material artifacts to disappear, they sought a reference that could be reproduced and therefore outlast any political turmoil that might disrupt artifact standards.¹⁰⁸ The practice to which they refer is first described in the Treatise on Tuning and Calendrics in the *Book of Han*, where units of length, capacity, and weight, as well as the standard pitch *huangzhong*, are defined in terms of the properties of medium-sized grains of black millet (*zigu jushu zhongzhe* 子谷秬黍中者).¹⁰⁹ Because of the early date of the *Book of Han*

¹⁰⁷ *Huangyou ji*, *Congshu jicheng* ed., 22.

¹⁰⁸ The most salient disappearances would be the loss of the Nine Tripods and the Burning of the Books, which would have figured prominently in the historiographical imagination of Han scholars, but there were surely many such instances in the Warring States period. A modern echo of this concern is the trend for SI units, originally defined in terms of physical metal bars, to be redefined without reference of any physical artifact. For instance, in 1960, the meter was redefined as a certain number of wavelengths of a particular emission line of krypton-86. On May 20, 2019, the kilogram will be the final SI unit to be redefined without reference to an artifact standard. Though it took generations to work out the technologies, the movement to redefine units to avoid reference to artifacts gained considerable strength from incidents like the 1834 fire in the British parliament, which destroyed the standard measures and disputes over how to recreate them. Crease, *World in the Balance*, 105.

¹⁰⁹ *Ju* 秬 is not a common character, but the *Erya* 爾雅, the standard vocabulary reference from classical times, glosses it as “black millet” (*heishu* 黑黍). Based on philological and graminological evidence, Homer Dubs believed that this referred the black veronesh variety of *Panicum miliaceum* (which has numerous common names, including broomcorn millet and proso millet). Homer H. Dubs, trans., *The History of the Former Han Dynasty*, vol. 1 (Baltimore: Waverly Press, Inc., 1938), 276–78.

and its role in setting the protocols of the treatises on tuning in the dynastic history, most later works on metrology cite this work specifically.¹¹⁰

According to the *Book of Han* treatise, the *huangzhong* pipe that would sound at the standard pitch when blown has a length of 90 grains (corresponding to 90 fen 分 or 9 *cun* 寸) and a capacity of 1,200 grains (corresponding to 1 *yue* 龠, which would weigh 12 *zhu* 銖 or half a *liang* 兩).¹¹¹ The name of the unit *yue* illustrates the role that the *huangzhong* pipe played as the basis of these definitions. Like to the transparent etymologies of body-derived units like feet, *yue* means “pitch pipe.”¹¹² It is also worth clarifying that these measurements derive from a pipe that sounds *huangzhong* when blown. Though it draws on the same ideology of metrological coherence, this definition differs substantially from the bell in the *Guoyu* or the *jialiang* in the *Rites of Zhou*

¹¹⁰ This work is cited far more often than the treatise on tuning from Sima Qian’s *Historical Records*, though otherwise this work more often set the standards for future official histories. Sima Qian’s chapter is far more imbued with speculative cosmology. The only mathematical discussion is of the *sanfen sunyi* method, which is less fully explained than other works. A parallel passage to the *Book of Han* discussion can be found in the somewhat earlier *Huainanzi* 淮南子 (c. 140 BCE), with traces of an older, duodecimal system that might echo the Twelve Pitches. Needham and Robinson, “Sound,” 201 fn. a.

¹¹¹ CTP han-shu/ly-li-zhi-shang 11–15; the length is in section 11, the capacity in 12, and the weight in 15. The numerical significance of the length will be explored more below. Qiu Guangming reproduced the experiment using medium-sized brown corn millet, with these results, which he compared to the measures of Wang Mang: (1) 100 pieces laid side by side, the length was 23 cm, close to the *chi* of Wang Mang. (2) capacity of 1,200 pieces, came to 11.5 mL, a bit greater than the *yue* of Wang Mang (which was about 10 mL). (3) weighting 1,200 pieces, came to 7.4 g, which was about the same as 12 *zhu* of the Wang Mang period. Qiu Guangming 丘光明, *Zhong Guo Gu Dai Ji Liang Shi* 中國古代计量史 [*The History of Ancient Chinese Measures and Weights*], trans. Zhang Yanming 张延明 (Hefei: Anhui kexue jishu chubanshe, 2012), 70–73. Laying the millet end to end resulted in the considerably longer measure of 32 cm (152–153). That these came close but perhaps not close enough to set effective standards was a root cause of the frustration of Song musicologists.

¹¹² According to Narike Tetsurō 成家徹郎, the *yue* seems to have been introduced somewhat late in the system of measurement; the first reference to it is probably in 5 BCE. Cited in Loewe, *Problems of Han Administration*, 162. This may suggest that it was invented as part of a pipe-based reorganization of units in the last Western Han. For the Song musicologists, it would imply that the system truly did derive from the pitch pipe system.

passages that appear above, in which the measurements are part of a solid body that sounded *huangzhong* when struck.¹¹³ The definitions of measurements that relate the pitches of an idiophone and an aerophone seem to reflect separate traditions.¹¹⁴ Song scholars drew on both; the *Huangyou ji* authors base their calculations on the pipe measurements, while Emperor Huizong's *Dashengyue* tripod that doubles as a bell draws on the idiophone principle, though combining ritual implements rather than measuring implements.¹¹⁵

There are practical and ideological reasons that motivate the use of millet grains as a standard. Robinson and Needham noted that, given the approximate uniformity of grains of millet and the statistical effects of counting the large numbers of grains given in these measures, it probably served this function as well as any technology available at the time could.¹¹⁶ Moreover, millet seed, as a natural product that reproduces itself given an appropriate balance of water, sunlight, soil, and other nutrients, fits well with the organic *yin-yang* principles that were part of tuning discourse, such as finding the “central sound” (*zhongsheng* 中聲) and *sanfen sunyi*. Millet seeds are also reminiscent the designation of the defining pitch *huangzhong* (“Yellow Bell”). In the glosses of the names of the gamut in the *Book of Han*, *huangzhong* is explained as: “Yellow is the central color; the color of

¹¹³ Watt, “The Bronze Age and the First Empires,” 578.

¹¹⁴ The persistence of two complementary but physically contradictory ways of grounding measurements in *huangzhong* parallels the Pythagorean assertion that harmonic ratios would be reproduced by both hammers of various weights and string lengths. In both cases, it was no doubt the ideology that underlay both stories that accounted for their persistence. See the discussion in Claude V. Palisca, “Scientific Empiricism in Musical Thought,” in *Seventeenth-Century Science and the Arts*, ed. Hedley Howell Rhys (Princeton: Princeton University Press, 1961), 127–29.

¹¹⁵ Tsuyoshi, “Tuning and Numerology in the New Learning School,” 210.

¹¹⁶ Needham and Robinson, “Sound,” 202.

the ruler's clothing. Bell [*zhong*] is the seed [*zhong*].” (黃鐘：黃者，中之色，君之服也；鐘者，種也).¹¹⁷ The passage then continues with cosmic relationships that stem from the seed of this note, but if one took that etymology literally, millet would be the yellow seed that came to mind.

However, at least by the Song, scholars had observed that different varieties of millet and growing conditions would yield different size grains, and thus one had to be careful about which was used to set standards. As noted in Chapter 2, Li Zhao observed that the millet from different regions would give different measures, and this reflected ideologies about geographical effects. Afterwards, reform measures were more careful to specify what kind of millet. According to the preface of the *Huangyou ji*, Emperor Renzong's order a dozen years after Li Zhao's discovery specified Shangdang millet as the standard to match:

尋勅太常禮樂官及修制官臣…同依祥經典歷代制度用上黨秬黍制成律呂度量等法物。

[The Emperor] searched and ordered the Court of Imperial Sacrifices Ritual and Music department and the Revision department ministers ... to together investigate the [musical] systems of the classic texts and dynastic histories, using Shangdang black millet system to become the measuring system and materials for the gamut”¹¹⁸

Measurement by grains of millet, in addition to this textual legacy and its utility as a convenient uniformity, has other legitimating factors. According to well-known legends transmitted mainly the *Classic of Poetry*, millet cultivation was introduced to

¹¹⁷ CTP han-shu/lv-li-zhi-shang 5. The pun on *zhong* would be even stronger with the visual similarity between the character for “seed” (*zhong* 種) and an alternate character for “bell” that was more common in pre-Han texts, *zhong* 鍾, which share the same right-hand sides.

¹¹⁸ *Huangyou ji*, SKQS ed. 1v.

humanity by the culture hero Hou Ji 后稷 (“Lord Millet”), who lived during the Xia dynasty. As the Xia power declined, his son Buzhu 不窋 and grandson Ji Ju 姬鞠 lived among the neighboring pastoral tribes, ultimately abandoning cereal agriculture, before his great-grandson Duke Liu 公劉 re-established grain agriculture as the staple food.¹¹⁹ Hou Ji was the apical ancestor of the Ji 姬 clan, who many centuries later took political control as the Zhou dynasty. In the sacrificial altar of the Zhou, he was consistently revered as the lineage founder, and his tablet remained at the deepest part of the temple, even as other tablets were moved back as time passed.¹²⁰

His story is primarily told in the poem “The Birth of the People” (*Sheng min* 生民; Mao No. 245), preserved in the Major Odes (*Daya* 大雅) of the *Classic of Poetry* alongside other hymns of the early Zhou court. The poem describes Hou Ji’s birth and life in eight stanzas. Below are the final four stanzas, the fifth and sixth, which deal with his success in planting millet and the varieties he planted, and the seventh and eighth, about how the people came to sacrifice to him offerings which included this very grain:

誕后稷之穡、有相之道。
 芴厥豐草、種之黃茂。
 實方實苞、實種實裛、實發實秀、實堅實好、實穎實栗。
 即有邠家室。
 Truly Hou Ji’s husbandry
 Followed the way [*dao*] that had been shown.
 He cleared away the thick grass,
 He planted the yellow crop.
 It failed nowhere, it grew thick,
 It was heavy, it was tall,

¹¹⁹ This account derives from Sima Qian’s *Historical Records*, in the *Basic Annals of Zhou* 周本紀. CTP shiji/zhou-ben-ji 3.

¹²⁰ Brashier, *Ancestral Memory*, 67–74.

It sprouted, it eared,
It was firm and good,
It nodded, it hung—
He made house and home in Tai.

誕降嘉種、維秬維秠、維糜維芑。
恆之秬秠、是穫是畝。
恆之糜芑、是任是負。
以歸肇祀。

Indeed, the lucky grains were sent down to us,
The black millet, the double-kernelled,
Millet pink-sprouted and white.
Far and wide the black and the double-kernelled
He reaped and acred;
Far and wide the millet pink and white
He carried in his arms, he bore on his back,
Brought them home, and created the sacrifice.

誕我祀如何。
或舂或揄、或簸或蹂。
釋之叟叟、烝之浮浮。
載謀載惟、取蕭祭脂、取羝以軋。
載燔載烈、以興嗣歲。
Indeed, what are they, our sacrifices?
We pound the grain, we bale it out,
We sift, we tread,
We wash it—soak, soak;
We boil it all steamy.
Then with due care, due thought
We gather southernwood, make offering of fat,
Take lambs for the rite of expiation,
We roast, we broil,
To give a start to the coming year.

印盛于豆、于豆于登。
其香始升、上帝居歆。
胡臭亶時、后稷肇祀、庶無罪悔、以迄于今。
High we load the stands,
The stands of wood and of earthenware.
As soon as the smell rises
God on high is very pleased:
“What smell is this, so strong and good?”
Hou Ji founded the sacrifices,

And without blemish or flaw
They have gone on till now.¹²¹

There are several aspects of this poem that might have drawn the attention of Song musicologists. The epithet of “yellow crop” (*huangmao* 黄茂) brings to mind the royal importance of yellow, which indexes the name *huangzhong* (“Yellow Bell”). Insofar as this poem was taken seriously as a description of the beginning of ritual sacrifice (there are other accounts of the beginnings of the sacrifice in the classics which were more often quoted), it would certainly grant the grain Hou Ji preferred a special status in the design of ritual instruments, including the musical instruments. Moreover, the allusion in the final line about the perfect preservation of his ritual traditions over long spans of time (Hou Ji lived about a millennium before this poem was recorded) implies the power of millet to protect against the vagaries of time.

In the Northern Song, such legends had a lingering resonance as an index for the ancient agricultural practices of the Chinese heartland of the Yellow River. Millet was domesticated long ago, but its role as a dominant staple grain had been challenged by wheat in the north and rice in the south, both of which originated from outside of the Chinese culture zone and had somewhat less cultural prestige, though they had already been introduced in ancient times. Millet was so significant in ancient China that two varieties of it were included within the canonical Five Grains (*wugu* 五穀), *ji* 稷 and *shu*

¹²¹ Chinese text from CTP book-of-poetry/sheng-min 5–8. The translation is by Arthur Waley. The full poem appears as poem #238 in *The Book of Songs*, 241–43. The spellings have been modified to confer with my usage.

黍.¹²² According to the fourth stanza of the poem “The Birth of the People,” Hou Ji himself did engage also in agriculture of these other cereal grains, but favored the millet varieties most. The increasing commercial and political power of southern China, which concerned traditional elites, was made possible in part by the introduction of a variety of early-ripening rice in the early eleventh century had allowed increased yields and double-cropping.¹²³ The assertion of the continuing discursive power of millet may be a reaction aimed at stabilizing the traditional culture, part of the reinvigoration of classical learning at the time.

But even the use of cereal in general took on a special meaning in the Northern Song. At the time of the *Huangyou ji* treatise, this subsistence was being challenged in the far north by the pastoral Khitans and Tanguts, who had both established states on what, during the militarily stronger Han and Tang dynasties, had been Chinese territory and forced the Song to pay an annual tribute in silk and silver. Song was even forced to recognize the Khitan Liao emperor as diplomatic equals, challenging the long-held belief in the uniqueness of that position.¹²⁴ The contrast with the pastoral way of life had always contributed to the sense that steppe people were outsiders to the Chinese civilizational project and served as a perpetual discursive foil, from the time that Hou Ji’s descendants

¹²² Enumerations of the Five Grains vary, but always include these two, wheat (*mai* 麥) and pulse (*dou* 豆), plus either hemp (*ma* 麻) or rice (*dao* 稻). The precise identification of *shu* and *ji* are uncertain, but may represent *Panicum miliaceum* (broomcorn or paniced millet) and *Setaria italica* (foxtail or spiked millet), respectively, which were both cultivated in China since Neolithic times. Rickett, *Guanzi*, 260n13.

¹²³ Randolph Barker, “The Origin and Spread of Early-Ripening Champa Rice: It’s Impact on Song Dynasty China,” *Rice* 4, no. 3 (December 1, 2011): 184–86, <https://doi.org/10.1007/s12284-011-9079-6>.

¹²⁴ Tao Jinsheng, *Two Sons of Heaven: Studies in Sung-Liao Relations* (Tucson: University of Arizona Press, 1988).

lived among the Rong 戎 and Di 狄 tribes, to the Xiongnu 匈奴 that dominated the region during the Han dynasty, to the Turkic peoples that had established states during the Five Dynasties, on to the Khitan and Tanguts that worried the Northern Song. The insistence upon a cereal to rectify measures thereby bolstered the legitimacy of the Song state as the inheritor of the ancient Chinese tradition in the face of this challenge.

The magic number nine

I turn now to another characteristic of the measurement of the *huangzhong* pipe, the fact that it is usually measured to be 9 *cun*.¹²⁵ Given the predominantly decimal relationships between Chinese measures, this number might be surprising. Moreover, given that the true length of *huangzhong* was open to such vigorous debate, we might ask how this measurement could even be known with certainty at all, or agreed upon by both sides in a debate. Where did this number nine come from? To answer this, I first need to discuss the principles of measurement.

In the ordinary process of measurement, a measured length consists of a magnitude which is expressed in terms of a fixed unit of length.¹²⁶ In the usual accounts

¹²⁵ The *cun* is frequently translated as “inch,” which it approximates.

¹²⁶ In limiting this discussion to length, I refer to the scale of measurement that Stanley Smith Stevens termed “ratio.” Other scales of measurement have different composition and properties. In the Chinese usage, capacity and weight are also ratio scale, but musical pitch is usually thought of as interval scale, though those prone to technicalities might consider it to be in fact ordinal scale (since it was known that the intervals were acoustically, if not discursively, unequal). I think the mismatch of scales of measurements in a coherent metrological system accounts for the surprise that modern scholars have that pitch would be considered a fundamental measure. S. S. Stevens, “On the Theory of Scales of Measurement,” *Science* 103, no. 2684 (June 7, 1946): 677–80, <https://doi.org/10.1126/science.103.2684.677>. Metrologists also usually include uncertainty as part of a measurement. I have omitted uncertainty because it is not discussed in the Chinese sources I refer to here, which employ a theoretical perspective in which arbitrary precision is possible.

of the history of numbers, nonintegral and irrational numbers were developed as ways of defining magnitudes that could not be measured neatly in terms of the unit using the kinds of numbers that already existed. The unit may be arbitrarily chosen or motivated by outside factors, but it must be held constant in the course of comparing measurements for such a comparison to be meaningful. A measurement expressed using a different magnitude and a different unit can even be judged equivalent, as long as the ratio of the magnitudes is the reciprocal of the ratio of the units.

Imagine instead that an object was always measured as a certain fixed number of inches, and larger and smaller objects were of different sizes because those inches that measured them were larger or smaller. In such a situation, the numerical magnitude is fixed while the unit was variable. From a modern perspective, the fixing of a magnitude and variability of the unit seems backwards. However, in premodern societies, a distinction could be made, which relied on the numerological or indexical significance of the magnitudes involved, which prevented the arbitrary conversion into other units. In this case, confusion or disputes would arise over the size of the unit itself, rather than the magnitude.

For instance, the architects of Gothic cathedrals frequently wished the dimensions of the buildings to reflect a suitable precedent, such as the numbers found in biblical descriptions.¹²⁷ The art historian Stephen Murray has found that several cathedrals reflect

¹²⁷ Henderson writes that “unlike medieval and Renaissance European debates regarding the proportions an symbolism of Solomon’s Temple or of the Holy City of Saint John the Divine, Chinese controversies on the form of the Ming-t’ang [Hall of Brightness] were not solely the business of scholars, but interested political figures as well.” This may be literally true as it stands, since Gothic cathedrals were not built by fiat to match a ruler’s vision. However, it obscures the important consideration that cathedral architects were apparently interested in these debates and left tangible evidence to that effect. Henderson, *The Development and Decline of Chinese Cosmology*, 80.

such biblical measurements, but made using local measures. In his understanding, the cathedrals of Amiens and Beauvais were both built to 144 feet, the measure of the Celestial City given in Revelation 21:17. But the latter was taller, disastrously so, because its designers chose to use the Royal foot, which was slightly longer than the Roman foot used at Amiens.¹²⁸

Like medieval France, Song dynasty reformers had a bewildering array of measures at their disposal.¹²⁹ Historical almanacs tend to show changes in measurement standards diachronically in an orderly progression, but in fact this is a great simplification, in line with the typically Chinese historiographical fiction of unitary and discrete dynasties that I explored in Chapter 2.¹³⁰ In Hans Ulrich Vogel's count, the Song had more than thirty distinct designations for the standard length measures, in use at different times, for different purposes, or in different regions, each of which had a somewhat different measure.¹³¹ He divides them into three categories, official measures that would be in use more or less everywhere, special measures adopted for ritual, musical, or astronomical purposes, and those for regional or customary usage. Of course,

¹²⁸ Stephen Murray, *Notre Dame, Cathedral of Amiens: The Power of Change in Gothic* (Cambridge [England]; New York: Cambridge University Press, 1996), 163. For more information on the measurement of Beauvais, see Stephen Murray, *Beauvais Cathedral: Architecture of Transcendence* (Princeton University Press, 1989), 110–11.

¹²⁹ On the situation of measurement in medieval Europe, see Witold Kula, *Measures and Men* (Princeton: Princeton University Press, 2014).

¹³⁰ A typical example is the chart of lengths on Chuang Pen-li, *Panpipes of ancient China* (Institute of Ethnology Academia Sinica, 1963), 55.

¹³¹ Hans Ulrich Vogel, "History of Length Measures During the Song Period (960-1279): Some Reflections on the State of the Field and Research Prospects," *Acta Metrologiae Historicae V, 7. Internationaler Kongreß Des Internationalen Komitees Für Historische Metrologie (CIMH), 25.-27. September 1997 in Siegen*, ed. Harald Witthöft, 156, accessed August 25, 2018, https://www.academia.edu/5194025/History_of_Length_Measures_During_the_Song_Period_960-1279_Some_Reflections_on_the_State_of_the_Field_and_Research_Prospects.

this discussion focuses on the second of those, but in the standard measure used for music was changed eight times during the century and a half of the Northern Song. He also tabulates modern scholars' reconstructions of these measures, but I leave that to the metrologists and instead focus on the other half of the measure of *huangzhong*, the magnitude nine. Why nine?

The power(s) of three

The obvious answer is that starting with nine makes the calculation of the successive lengthening and shortening of pitch pipes used in *sanfen sunyi* less cumbersome. In theory, these calculations could start on any number, but the mathematics is most simplified by starting with a power of three, which would factor out more and more completely after iterated multiplications by $2/3$ or $4/3$. In the description of the *sanfen sunyi* from Sima Qian's *Historical Records* quoted in Chapter 3, the lengths of the Five Pitches in generative order is given as:

宮 <i>gong</i>	81	(=3 ⁴)
徵 <i>zhi</i>	54	(=2 · 3 ³)
商 <i>shang</i>	72	(=2 ³ · 3 ²)
羽 <i>yu</i>	48	(=2 ⁴ · 3)
角 <i>jue</i>	64	(=2 ⁶)

Each of the successive multiplications increases the exponent of the 2 by one or two and reduces the exponent of the 3 by one. Since at the end of this enumeration there is no power of 3 remaining, this listing is the lowest integral numeration for the Five Pitches.¹³²

¹³² McClain and Hung, "Chinese Cyclic Tunings in Late Antiquity," 206. The *Guanzi* listing, referred to by McClain and Hung, is unusual, for beginning with the superior generation, thus placing *huangzhong* in the

Along this line of reasoning, sometimes the length of *huangzhong* was expressed as a higher power of three that would further reduce the number of fractional lengths.¹³³

Consider this passage from the *Huainanzi* 淮南子, a book collecting court debates assembled in the Western Han dynasty (c. 140 BCE):

以三參物，三三如九，故黃鍾之律九寸而宮音調，因而九之，九九八十一，故黃鍾之數立焉。… 律之數六，分為雌雄，故曰十二鍾，以副十二月。十二各以三成，故置一而十一，三之，為積分為十七萬七千一百四十七，黃鍾大數立焉。

Using three to examine matters: $3 \times 3 = 9$. Thus the *huangzhong* pitch pipe is nine *cun* long and harmonizes with the note *gong*. Furthermore, $9 \times 9 = 81$. Thus the number of the *huangzhong* is thereby established. ... The number of pitch pipes is six, classified as female and male [for a total of twelve]. Thus it is said there are twelve bells to act as adjuncts to the twelve months. Each of the twelve is based on three. Thus if one starts at one and triples it eleven times, the total is 177,147. The Great Number of the Yellow Bell is thereby established.¹³⁴

This passage is a bit confusing, because it posits three different values for *huangzhong*, 9, 81, and 177,147. The first is designated as the length of *huangzhong* in *cun*, while the others correspond to the number (*shu* 數) and the Great Number (*dashu* 大數) of *huangzhong*, respectively. The point is that for ease of calculation, the calculation

middle of the gamut rather than at the bottom (giving the lengths 81, 108, 72, 96, and 64). Sima Qian's is analogous except that it begins with inferior generation, thus placing *huangzhong* as the lowest pitch. Later theorists usually followed the latter approach. Mathematically, the only difference is in the powers of two for every other pitch.

¹³³ I mean here, the number of fractional lengths in a precisely calculated listing. Lengths were sometimes rounded off to the nearest integer, so starting with a higher number would also allow more precision by making the error in such rounding smaller. John Major points out that rounding is less typical of many treatises, such as those that I investigate which prioritize precision. The *Huainanzi*, where *huangzhong* is given a length of 81 and all of the Twelve Pitches are assigned integer lengths, is a prominent exception. Major argues that it might demonstrate the author's awareness that such hyperprecision might be useless to an artisan. John S. Major, "Celestial Cycles and Mathematical Harmonies in the *Huainanzi*," *Extrême-Orient, Extrême-Occident* 16, no. 16 (1994): 128, <https://doi.org/10.3406/oroc.1994.994>.

¹³⁴ CTP *huainanzi/tian-wen-xun* 16. Translation modified from Major, 126.

can be extended to further powers of three, though these longer measures do not refer to lengths in *cun*, but numbers used in calculation. The choice of these particular powers of three is quite intentional, as they would be the initial whole number that would avoid fractions for the Five Pitches (the pentatonic scale) and the Twelve Pitches (the full Chinese gamut). The existence of multiple such numbers illustrates that one purpose of choosing the number is clearly based on the idea of the lengths expressed as integers.

Let me turn now to one well-known story about the origin of music is the story of Ling Lun, the minister of the Yellow Emperor assigned the task of creating pitch standards. The earliest extant version of this story appears in the *Spring and Autumn Annals of Master Lü* (*Liushi Chunqiu* 呂氏春秋), compiled around 239 BCE. In this version, the story begins:

昔黃帝令伶倫作為律。伶倫自大夏之西，乃之阮隃之陰，取竹於嶰谿之谷，以生空竅厚鈞者、斷兩節間、其長三寸九分而吹之，以為黃鐘之宮，吹曰「舍少」。次制十二筒。

In the past, the Yellow Emperor commanded Ling Lun to create pitch standards. Ling Lun, having passed through the western regions of Daxia, then went to the shady northern slopes of the Ruanyu [=Kunlun] Mountains. He selected bamboo from the valley of Xiezi which had hollows and walls of uniform thickness. Cutting it between two nodes to a length of 3 *cun* 9 *fen*, he blew on it and fixed its sound as the *gong* of *huangzhong*. The sound it made was *styag-rhyag*. He then made the twelve pipes.¹³⁵

Note the strange measurement of 3 *cun* and 9 *fen* (i.e. 3.9 *cun*), which seems bizarrely precise and out of place in such a fanciful story. Needham and Robinson argue

¹³⁵ CTP lv-shi-chun-qiu/gu-yue 5. Translation based on John Knoblock and Jeffrey K. Riegel, trans., *The Annals of Lü Buwei = [Lü Shi Chun Qiu] : A Complete Translation and Study* (Stanford, Calif Stanford University Press, 2000), 147, <https://trove.nla.gov.au/work/6589515>.

two possible significances of this number, but I find neither of them convincing.¹³⁶ First, 3.9 *cun* may be derived from the difference between the lengths of *huangzhong* (measured at 8.1 *cun*) and the highest note *yingzhong* (4.2 *cun*). However, such a subtraction makes no acoustic sense (the pitch lengths being geometric, not arithmetic) and a similar calculation comparing two pitch lengths that are not adjacent in generative order does not appear in any extant discussions of tuning to my knowledge. In their second explanation, 3.9 *cun* would be the measure of the note that would follow the last note of the gamut in generative order (*zhonglü*) by multiplying by 2/3, to get the pitch a Pythagorean comma and the octave above *huangzhong*. They calculate this length at 3.9 *cun*, but an unrounded value of which is much closer to 4.0 *cun*.¹³⁷

More likely, the author of this passage wished to emphasize the importance of powers of three, but either downplayed or misunderstood how the calculations worked. By writing it as 3 *cun* 9 *fen* (not the seemingly equivalent 3.9 *cun*, though this distinction is usually hidden in translation), the author doubles the importance of the powers of three by placing them in two units. That this results in the awkward magnitude 3.9 when the units are combined is an incidental detail.

When this story was retold, that detail seems to have been forgotten. The *Lüshi Chunqiu* itself was treated with suspicion, as it was associated with the state of Qin and

¹³⁶ Needham and Robinson, "Sound," 178 fn. k.

¹³⁷ This hypothetical thirteenth pitch corresponds to Jing Fang's *zheshi* 執始, though an octave above. (See the explanation of this tone in Chapter 5.) A calculation that does not round anywhere in the process comes to, to the nearest ten-thousandth, 3.9955. The integer approximations that appear in the *Huainanzi* calculations immediately following this passage, which became standard, set the value of *zhonglü* at precisely 60, so using this input the result would also be 4.0. Their value is apparently based on two-thirds of 59, but that value is neither exact nor in the standard set of approximations.

the controversial policies of the Qin emperor. Song scholars would have been more likely to encounter the story in the *Garden of Stories* (*Shuoyuan* 說苑), the collection of anecdotes assembled in the Han dynasty. There the story is nearly the same, with one important difference:

黃帝詔伶倫作為音律，伶倫自大夏之西，乃之崑崙之陰，取竹於嶰谷，以生竅厚薄均者，斷兩節間，其長九寸而吹之，以為黃鐘之宮，日含少次，制十二管。

The Yellow Emperor commanded Ling Lun to create pitch standards. Ling Lun, having passed through the western regions of Daxia, then went to the shady northern slopes of the Kunlun Mountains. He selected bamboo from the valley of Xie which had hollows and walls of uniform thickness. Cutting it between two nodes to a length of 9 inches, he blew on it and fixed its sound as the *gong* of *huangzhong*. In the dawn in a small series, he then made the twelve pipes.¹³⁸

Whether the change from 3.9 to 9 *cun* was the result of a scribal error or a deliberate emendation, it follows a clear pattern. Wherever the 3.9 came from, it was replaced in later versions of the story by the far more motivated nine. When the story appears again in the Chen Yang's *Book of Music*, the measure for *huangzhong* is 9 *cun*.¹³⁹

The number for the Middle Kingdom

But nine also had several implications beyond simple mathematical convenience. A poem in the Minor Odes (*xiaoya* 小雅) of the *Classic of Poetry*, “The Crane Calls” (*Heming* 鶴鳴, Mao. No. 184) illustrated how a nine in the center could reverberate

¹³⁸ CTP shuo-yuan/xiu-wen 32.

¹³⁹ Chen Yang, *Yueshu*, *juan* 103, third section “The Circumference and Diameter of *Lülü*” (*Lülü weijing* 律呂圍徑). The story is condensed and presented somewhat differently, with the responses of the phoenixes (showing the naturalness of these pitches) mentioned before the length.

throughout the realm. The poem has two stanzas, identical except for a few characters, each of which consists of nine clauses (all four-character clauses except the first one).¹⁴⁰

The two stanzas begin:

鶴鳴于九皋，聲聞于野。
When a crane calls in the nine marshes,
Its voice is heard in the wilds.

鶴鳴于九皋，聲聞于天。
When a crane calls in the nine marshes,
Its voice is heard in heaven.¹⁴¹

This construction parallels a line from another Minor Ode, “The White Flower” (*Bai Hua* 白華, Mao No. 229): “Drums and bells in the palace hall; the sounds are heard outside” (鼓鍾于宮、聲聞于外).¹⁴² When these lines were juxtaposed, as the Western Han official Dongfang Shuo 東方朔 (c. 160–c. 93 BCE) did in a speech recorded in his biographies in the *Historical Records* and *The Book of Han*,¹⁴³ their structural and semantic parallelism came to the fore. When read politically, the conventional hermeneutic approach to the *Classic of Poetry*, these lines illustrate the characteristic Confucian ideology of the pervasive influence of the center, whether good or bad. When taken literally with sound, this notion became an important justification for orthodox

¹⁴⁰ In quotations, the first clause is frequently shortened to 鶴鳴九皋, omitting the preposition to make it a regular four-character phrase, although this elision obscures the grammar.

¹⁴¹ CTP book-of-poetry/he-ming 1–2.

¹⁴² The actual poem is an intimate love poem, which probably suggested to Waley the translation of *gong* as “house,” but when quoted out of context, the ritual music of the palace court would be the most likely interpretation. Waley translates it as No. 110 in *The Book of Songs*, 103. They are quoted together in the parallel passages at CTP shiji/hua-ji-lie-zhuan 16 and han-shu/dong-fang-shuo-zhuan 25. The line from “The Crane Calls” is also quoted by itself in a musical context in the *Fengsu tongyi* 風俗通義 (CTP fengsutongyi/sheng-yin 4).

¹⁴³ CTP shiji/hua-ji-lie-zhuan 16 and han-shu/dong-fang-shuo-zhuan 25.

court music, since the sounds at court would be heard and have their effects far beyond the court, including by those in the uncivilized wilderness or in the heavens. This ideology also was the basis for the perennial concern for the moral virtue of the emperor, since his behavior would influence the entire empire and even the cosmos. The number nine in this position in “The Crane Calls” may have originally denoted something else, but in this context fit into a centralizing political discourse and came to represent the correct number to be heard at court to influence positively the outside.

Nine was a natural choice to index central control, as it was manifest in the most basic depiction of a separation of core and periphery, the 3×3 grid of classic Chinese political theory. The *locus classicus* is the “Tribute of Yu” (*Yu gong* 禹贡) chapter of the *Classic of Documents*. This text purports to be the record of the tributary arrangements of Yu the Great, the supposed first king of the Xia dynasty (trad. 2205–1766 BCE), the dynasty that heads listings of Chinese dynasties, though scholars disagree on whether it had any historical basis. The Tribute of Yu is essentially a survey of the Nine Provinces (*jiu zhou* 九州) of his realm, describing each province, what public works Yu had done there, the distinctive plants and trees, and the articles of tribute. In this way the listing illustrates the unity of the domain and the exercise of central control in the exchange of tribute and government projects.

Maps that track in actual geography do not depict the symmetry and order of the discourse of the Nine Provinces very well, but those that remained within the realm of the imagination extended the discourse to a variety of levels. In the well-field system (*jingtian zhidu* 井田制度), feudal holdings were ideally divided into 3×3 grids, with the

central unit worked in common on behalf of the land-owning aristocrat. The system has nothing to do with wells, but comes from the character for well, *jing* 井, which divides space into a 3×3 grid. How fully implemented this system ever was is certainly open to debate but really beside the point: it became associated with the esteemed Western Zhou and Mencius wrote highly of it, so it became an important trope in the Song to scholars like Zhang Zai 張載 (1020–1077) and Su Xun 蘇洵 (1009–1066).¹⁴⁴

Cities, too, were ideally planned analogously. In a passage that still forms the starting point for most discussions of Chinese city planning, the *Artisan's Record of the Rituals of Zhou* describes the arrangement of the idealized capital city (called *Wangcheng* 王城, “King’s city”) in this way:

匠人營國。方九里，旁三門。國中九經九緯，經涂九軌。左祖右社，面朝後市。

The master-builder constructs the state capitals. He makes a square nine *li* 里 on each side; each side has three gates. Within the capital are nine north-south and nine east-west streets. The north-south streets are nine carriage tracks in width. On the left [east] is the Ancestral Temple, and to the right [west] are the Altars of Soil and Grain. In the front is the Hall of Audience and behind the markets.¹⁴⁵

Though the text does not specify it, this description is believed to represent the laying out of King Cheng’s city Luoyi 洛邑 (modern Luoyang 洛陽 in Henan 河南 province) at the beginning of the Zhou dynasty, under guidance from the Duke of Zhou. Note, in addition to the 3×3 arrangement, the number of nines in the street arrangement and dimensions of

¹⁴⁴ De Bary and Bloom, *Sources of Chinese Tradition, Vol. 1: From the Earliest Times to 1600*, 129–31, 605–9.

¹⁴⁵ CTP /rites-of-zhou/dong-guan-kao-gong-ji 72. Translation modified from Nancy Shatzman Steinhardt, *Chinese Imperial City Planning* (University of Hawaii Press, 1999), 33. Steinhardt also noted the ubiquity of this passage in contemporary discussions of Chinese city planning.

the city walls and street widths. Moreover, because of the crossing of the east-west and north-south streets, the number of intersections is the square, 81, another of the numbers associated with *huangzhong*. A depiction of this ideal city is found alongside depictions of ritual paraphernalia in the *Sanli tu* (Figure 4.4).

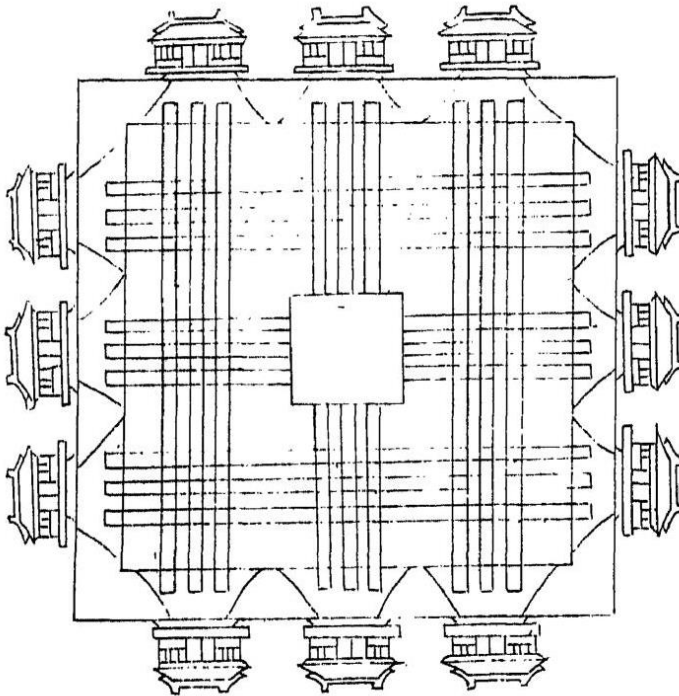


Figure 4.4: The King's City in the *Sanli tu*¹⁴⁶

Drawing on these traditions, nine (and its square, 81) continued to index authority throughout the imperial period. Guides point it out to Beijing tourists today in details in Ming and Qing architecture. For instance, on the top tier of the Circular Mound Altar 圓丘壇 at the Temple of Heaven 天壇, around the central circle are nine stones, then in the next row twice as many, and so on until you reach the last, ninth row, where there are 81.

¹⁴⁶ *Sanli tu*, SKQS ed., 4.6r.

The doorways in the Forbidden City 故宫 are festooned with a 9×9 grid of studs. Earlier palaces and temples are no longer extant, but they probably also invoked this imperial number in such architectural details. Nines figured prominently in all kinds of court ritual, not just in tangible decoration but also in performed suites like the songs of the “Nine Virtues” and the dances of the “Nine Shao” (《九德》之歌, 《九韶》之舞) mentioned in the *Rites of Zhou*.¹⁴⁷

But neither is the importance of nine limited to mere temporal power. Through the discourse of correlative cosmology, the nonary mapping was also extended to the sky. In the astrological system known as “field allocation” (*fenye* 分野), astronomical anomalies (such as comets) were associated with locations on earth according to the location in the sky in which they appeared. Early Chinese skywatchers normally divided the sky into Twenty-Eight [Lunar] Mansions (*ershiba xiu* 二十八宿) and Twelve [Jupiter] Stations (*shier suici* 十二歲次), representing asterisms and stars that appeared in the daily motion of the Moon and the yearly motion of Jupiter, respectively. These systems continued to be important, but by the Han, nine-based systems had become so potent that a system correlating Nine Fields (*jiu ye* 九野) in heaven with the Nine Provinces became the standard formulation of field-allocation principles, and astrologers found ways to correlate them with the other more visually salient astronomical features.¹⁴⁸

¹⁴⁷ CTP rites-of-zhou/chun-guan-zong-bo 102.

¹⁴⁸ Henderson, *The Development and Decline of Chinese Cosmology*, 69–70. A standard way of interrelating these divisions appears in Tables 1 and 2 of David W. Pankenier, “Applied Field-Allocation Astrology in Zhou China: Duke Wen of Jin and the Battle of Chengpu (632 B. C.),” *Journal of the American Oriental Society* 119, no. 2 (1999): 265, <https://doi.org/10.2307/606110>. The standard version of Nine Fields derives from the *Lüshi Chunqiu* and the *Huainanzi*.

These layouts also intersected with the mysterious diagram known as the *Luoshu* 洛書 (“Luo [River] Writing”). As I explore further in Chapter 5, images of the *Luoshu* do not survive from early times, and the textual references are not completely clear. However, starting with the earliest extant diagrams dating to the Song, it is depicted as a magic square of order three, that is, a 3×3 arrangement of the digits 1–9 such that all rows, columns, and diagonals add up to the same number, 15 (see Figure 4.5). The arrangement is unique, leaving aside rotations and reflections, and of the smallest nontrivial order, since a magic square of order one is trivial (consisting only of a single number one) and one of order two is impossible.¹⁴⁹ In other words, the fact that such an arrangement becomes possible only with nine squares seems to grant that number a mysterious significance.¹⁵⁰

¹⁴⁹ Frank J. Swetz, *Legacy of the Luoshu: The 4,000 Year Search for the Meaning of the Magic Square of Order Three* (Chicago: Open Court, 2002), 121–25. Including rotations and reflections, eight arrangements are possible (shown on Swetz, 67), but they do not seem to have played an important role in Chinese practice.

¹⁵⁰ Schuyler Cammann notes that the center number (and therefore the ruling one, in the centralized political ideology) of the *Luoshu* always being five was probably related to the prevalence of pentads in correlative cosmology. Schuyler Cammann, “The Magic Square of Three in Old Chinese Philosophy and Religion,” *History of Religions* 1, no. 1 (1961): 48–49.

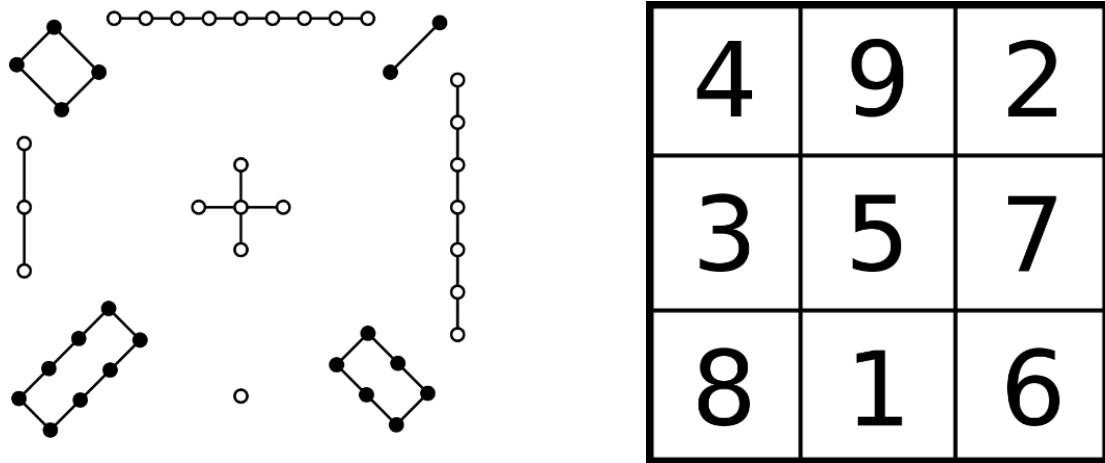


Figure 4.5: The *Luoshu* (a) As it is typically drawn in Chinese sources (b) The equivalent rendering usually seen in present-day mathematics¹⁵¹

Though visual depictions only occur later, this arrangement seems to stem from a chain of numbers that appears in the description of the Hall of Brightness (*Mingtang* 明堂) in the *Elder Dai's Record of Ritual* (*Dadai Liji* 大戴禮記): “Two, nine, four, seven, five, three, six, one, eight” (二九四七五三六一八).¹⁵² No further explanation of what this list signifies or how it relates to the Hall of Brightness is given,¹⁵³ but since the Hall of Brightness was hugely important in ritual discourse, this enumeration would surely be thought to hold some symbolic key. However, interpretations and speculative recreations of the Hall itself varied enormously.¹⁵⁴

¹⁵¹ Both images are in the public domain from Wikicommons.

¹⁵² CTP da-dai-li-ji/ming-tang 2.

¹⁵³ Schuyler Cammann suggests that the passage may have lost the significance of the list in transmission. Cammann, “The Magic Square of Three in Old Chinese Philosophy and Religion,” 43n22.

¹⁵⁴ Henderson, *The Development and Decline of Chinese Cosmology*, 75–82..

The *Luoshu* was sometimes also called the “Nine Halls Diagram” (*jiugong tu* 九宮圖).¹⁵⁵ This name not only emphasizes the nine, but gives a musical connection with the note name *gong*, the first of the Five Notes. This name would be wholly appropriate in connecting nine with *huangzhong*; though *huangzhong* is in the separate set of Twelve Pitches, it held an analogous position as the base of the system. Moreover, *huangzhong* and *gong* were discursively connected in the phrase “the *gong* of *huangzhong*” (黃鐘之宮), which has already been encountered in the quotations from the *Artificer’s Record* and the Ling Lun story in this chapter.¹⁵⁶ In later sources, this phrasing would clearly designate a function within a modal system, but its significance in such early sources is not clear.¹⁵⁷

John Henderson has grouped all of these patterns, from the divisions of the realm and sky to the city and magic square, as manifestations of “nonary cosmography.”¹⁵⁸ These discourses tiled together neatly, creating a network that reinforced each other, making the measure seem natural and not arbitrary. This lent a sense of completeness and naturalness such that systems of nine became a common organizational trope. For instance, the “Great Plan” (*Hongfan* 洪範) of the *Classic of Documents* is divided

¹⁵⁵ Schuyler Cammann found that the “Nine Halls” name was more common among Daoists and the *Luoshu* among Confucians, but doubts that this distinction in usage was very strict. Cammann, “The Magic Square of Three in Old Chinese Philosophy and Religion,” 39n6.

¹⁵⁶ In addition to the quotations in this chapter, this phrase appeared in Monthly Ordinances (*yueling* 月令) sections of the *Record of Ritual* (CTP *lij*/yue-ling 57) and the *Lüshi Chunqiu* (CTP *lv-shi-chun-qiu/liu-yue-ji* 8), the tuning chapters of the *Historical Records* (CTP *shiji*/*lv-shu* 22) and the *Book of Han* (CTP *han-shu*/*lv-li-zhi-shang* 5), and another musical discussion in the *Lüshi chunqiu*, entitled “Balanced Tones” (*Shi yin* 適音; CTP *lv-shi-chun-qiu/shi-yin* 4).

¹⁵⁷ For the interpretation of such names in Tang and Song music theory, see Pian, *Song Dynasty Musical Sources*, 43–58.

¹⁵⁸ Henderson, *The Development and Decline of Chinese Cosmology*, 59–87.

explicitly into nine sections, numbered one through nine. In the introduction, the count of Qi explains this as mirroring “the unvarying principles of the nine divisions of the Great Plan” (「洪范」九疇彝伦)¹⁵⁹ bestowed exclusively upon worthy rulers by Heaven (*tian* 天). This text was associated with Yu, which provided commentators another reason to associate the enumeration with the *Luoshu*.¹⁶⁰

Besides political centralization, nine also represented for mathematics itself. I mentioned earlier the Six Arts that underlay classical education. In the *Rites of Zhou* passage that is the basis of this understanding, each of these arts is associated with a number, which describes the number of techniques associated with them:

養國子以道，乃教之六藝：一曰五禮、二曰六樂、三曰五射、四曰五御、五曰六書、六曰九數。

[They] raise the country’s children according to the Way, and teach them the Six Arts: The first is the Five Rituals, the second is the Six Musics, the third is the Five Archeries, the fourth is the Five Chariots, the fifth is the Six Kinds of Characters, and the sixth is the Nine Mathematics.¹⁶¹

The Nine Mathematics seems to correspond with the contents of the standard mathematical work *The Nine Chapters of the Mathematical Arts*.¹⁶² Though the title is usually translated as chapters, it corresponds to how ancient Chinese conceptualized the branches of mathematics; the division into nine seems to long pre-date the work. The

¹⁵⁹ CTP shang-shu/great-plan 1.

¹⁶⁰ Henderson, *The Development and Decline of Chinese Cosmology*, 84–86; Cammann, “The Magic Square of Three in Old Chinese Philosophy and Religion,” 42.

¹⁶¹ The designation comes from the House of Protectors (*Baoshi* 保氏) of the Earthly Offices (*Diguan* 地官) of the *Rituals of Zhou*.

¹⁶² I believe the “Six Musics” refers to the Six Eras of Music discussed in Chapter 2. The Six Kinds of Characters is the typology introduced in the *Shuowen jiezi*. I am not familiar with the other enumerations. However, if I am correct about those three ascriptions, the system is clearly not constructed in a parallel manner and the scheme of numeration must serve mainly a rhetorical purpose.

origin of nine as a synecdoche for mathematics may lay in the use of decimal place value notation. Although the use of place value indicates the Chinese had a concept of zero, they did not explicitly mark it, instead leaving an empty space when calculating with counting rods or skipping a power of ten when writing in characters.¹⁶³ This left nine numerals. It is possible the “Nine Mathematics” actually referred to this set of numerals or arithmetic operations involving them.¹⁶⁴

As the highest digit in decimal notation, nine was the focus of multiplication, which was known as “the nine nines” (*jiu jiu* 九九). In Song times, multiplication tables began with nine nines and counted down.¹⁶⁵ The table was memorized and transmitted by singing the “Song of the Nine Nines” (*jiujiu ge* 九九歌), which became so popular that examples of multiplication in the style of the song appeared in many classical texts.¹⁶⁶ The two nines at the beginning of the recitation and in the title would further solidify the metonymy between arithmetic and nine.

¹⁶³ The modern word for zero, *ling* 零 or 〇, is not used in early texts in this sense. When written out in characters, numbers generally follow each digit with an indication of place value, so that 365 would be rendered “three hundreds six tens five” (*sanbai liushi wu* 三百六十五). A number with a zero would just skip that place, so that 3,065 would be “three thousands six tens five” (*sanqian liushi wu* 三千六十五).

¹⁶⁴ See Agathe Keller and Alexei Volkov, “Mathematics Education in Oriental Antiquity and Middle Ages,” in *Handbook on the History of Mathematics Education* (Springer, 2014), 56–57.

¹⁶⁵ Shen Kangshen, Crossley, and Lun, *The Nine Chapters*, 54n3; Lam Lay Yong and Ang Tian Se, *Fleeting Footsteps*, 49. Shen, Crossley and Lun suggest that it is still the case that Chinese recite multiplication tables beginning with nine, but my colleagues who grew up in China have told me this is not the case. Lam and Ang say that the table began to be presented in ascending order by the thirteenth century (50). Multiplication tables were surely recited far more than they were committed to writing, but one child seems to have inadvertently left us a portion of a written one on a clay brick that was used in an Eastern Han tomb near present-day Shenzhen, Guangdong. The brick counts down from nine as expected. Keller and Volkov, “Mathematics Education,” 58.

¹⁶⁶ Lam Lay Yong and Ang Tian Se, *Fleeting Footsteps*, 50.

Because of its status in the decimal system, nine took on a numerological valence of completeness, the largest digit beyond which lay a return to one. In a passage extolling the importance of three (central to *sanfen sunyi*), the Song dynasty music scholar Chen Yang wrote: “By means of the square of three, nine, the numbers are completed” (以三參物而九數成矣).¹⁶⁷ Here the nine indexes both the mathematics and the cosmic completeness discourse, an appropriate combination for a musicologist equally concerned with rectifying orthodox measures and consolidating ritual power.

Why the Nine of Changes can't change

Finally, one other implication of nine deserves special note, since it ties these overlapping discourses together so well: its use in the *Classic of Changes* divination. In the core text of the *Changes*, each hexagram is followed by the hexagram name (*guaming* 卦名), a hexagram statement (*tuan* 彖 or *guaci* 卦辭), and line statements (*yaoci* 爻辭) for each of the six broken or unbroken lines that make up the hexagram. At the beginning of each line statement appears the line number (beginning from the bottom) and a number used to indicate which kind of line it is: nine for *yang* or solid lines and six for *yin* or broken lines.

As an illustration, in Table 4.2 I show the line statements and the image for hexagram, no. 21 “Biting” (*shihe* 噬嗑). I include the full line statements in punctuated Chinese (to give a sense of the full text), but translate only the first characters, which

¹⁶⁷ *Yueshu juan* 103, opening section of “The Numbers and Measures of the *Lülü*” (*Lülü shudu* 律呂數度).

identify the position of the line in the hexagram and either a six (*liu* 六) to indicate a broken line or nine (*jiu* 九) to indicate a solid line. In the first and last lines (which are not numbered but called “starting” *chu* 初 and “top” *shang* 上), the six or nine appears after the line identification; in the middle four (which are numbered, and I translate as ordinal numbers), the six or nine appears first. These correspond to the lines counted from bottom to top in the image of the hexagram, which on the right.

初九：屨校滅趾，无咎。

Starting – nine

六二：噬膚滅鼻，无咎。

Six – second

六三：噬臍肉，遇毒；小吝，无咎。

Six – third

九四：噬乾肺，得金矢，利艱貞，吉。

Nine – fourth

六五：噬乾肉，得黃金，貞厲，无咎。

Six – fifth

上九：何校滅耳，凶。

Top – nine



Table 4.2: Line statements (with translation of the first two characters) and image for Hexagram No. 21, “Biting” (*Shi he* 噬嗑)¹⁶⁸

In explaining the use of six and nine here, it probably comes as no surprise that one is even and the other is odd; *yang* is always associated with odd numbers and *yin* with even ones. But why six and nine in particular? In the traditional system of divination

¹⁶⁸ CTP book-of-changes/shi-he 2–7. The statements here are divided into six lines, but it never appears that way in early texts. One function of the fixed opening of each line statement (which includes the nine or six) is to clarify the structure of a text with no punctuation or line divisions. I have omitted the commentary which follows each of the line statements, since it does not form part of the core text but rather the ubiquitous interpretive apparatus. CTP provides Legge’s translation of both the line statements and the commentary, but one should be aware that the textual interpretation (even the punctuation) of the entire *Changes* text is quite open. This is the reason, besides space, which I omitted it here.

by milfoil stalks, one casts each line separately, beginning with 49 yarrow stalks¹⁶⁹ and then following a complex and time-consuming procedure that yields either 6, 7, 8, or 9.¹⁷⁰ Each of these numbers has a meaning: six represents old *yin*, meaning *yin* that will change into *yang*; seven represents young *yang* that will not change; eight represents young *yin* that will not change; and nine represents old *yang* that will change into *yin*. How the basic *yin* and *yang* of the numbers will appear in the hexagram is also apparent in their characters: the *yang* numbers seven (*qi* 七) and nine (*jiu* 九), representing unbroken lines, do not have any disconnected strokes, while the *yin* numbers six (*liu* 六) and eight (*ba* 八), representing broken lines, do.¹⁷¹

It is not clear why the old forms, nine and six, are the ones used in the line statements; perhaps it is connected with the entire titular concept of changes. But in a music theory context, it fits very nicely with the process of *sanfen sunyi*, where the lengthening and shortening of pipes does change the pitch. For this reason, in a subtle allusion to the *Changes*, music theory texts sometimes conflate the numbers six and nine with *yin* and *yang* generation, as in this passage from the “Treatise on Tuning and Calendrics” in the *Book of Han*:

¹⁶⁹ One begins with fifty stalks, but one is immediately discarded and plays no further part in the divination.

¹⁷⁰ For a sympathetic and practical explanation of the procedure, see Stephen L. Field, *The Duke of Zhou Changes: A Study and Annotated Translation of the Zhouyi 周易* (Wiesbaden: Harrassowitz Verlag, 2015), 252. The obscurity of the procedure is presumably to prevent one from gaming the system, and allowing a purely random result in which supernatural forces are afforded the space to intervene.

¹⁷¹ The reason for this is unclear to me, but as *Changes* divination developed in the Shang dynasty around the same time as writing, the characters may well have been intentionally designed that way. On the other hand, the fact that the Arabic numerals 6 and 9, the ones used to indicate *yin* and *yang* in the line statements, are rotations of the same figure (and are the only digits that are rotations like this), is a coincidence that astonishes me.

五聲之本，生於黃鐘之律。九寸為宮，或損或益，以定商、角、徵、羽。九六相生，陰陽之應也。

The origin of the Five Sounds is born in the pitch-standard of *huangzhong*. Nine *cun* makes *gong*, by either losing or gaining [a third] one determines *shang*, *jue*, *zhi*, and *yu*. The mutual generation of nine and six is the response of *yin* and *yang*.¹⁷²

But nine and six also happen to be the lengths of the first two pitchpipes, *huangzhong* and *linzhong*, as long as one starts with a standard pipe length of 9 *cun* and calculates using the *sanfen sunyi* process. The conflation of the measurement of the pipes and the *yin* and *yang* of *Changes* terminology is quite evident in two more passages from the “Treatise on Tuning and Calendrics,” which explore the alternation and interdependence of *yin* and *yang* forces largely in parallel constructions:

黃鐘初九，律之首，陽之變也。因而六之，以九為法，得林鐘初六，呂之首，陰之變也。皆參天兩地之法也。上生六而倍之，下生六而損之，皆以九為法。九六，陰陽夫婦子母之道也。

Huangzhong is the starting nine,¹⁷³ it is the head of the *yang* pitch-standards [*lü* 律]¹⁷⁴ and the transformation of *yang*. Taking it and “sixing” it, using nine as the rule, yields *linzhong* [which is] the starting six, the head of the *yin* pitch-standards [*lü* 呂] and the transformation of *yin*. These both are the rule of the three of Heaven and the two of Earth.¹⁷⁵ By superior generation six is increased, by inferior generation six is reduced,

¹⁷² CTP Hanshu han-shu/lv-li-zhi-shang 5.

¹⁷³ This phrasing (as well as the phrasing for *linzhong* in the next sentence) echoes the first line statements of hexagrams. In the next excerpt these are equated with the actual hexagrams representing pure *yang* and *yin*.

¹⁷⁴ The character *lü* 律 can be ambiguous, since it can refer to either all Twelve Pitches, or only the six of them that are correlated with *yang*. In this context, because it is contrasted with *lü* 呂 in the following sentence in a parallel construction, it must mean the former. The two characters are not homophonous, but close in modern Mandarin: they are distinguished by tone. In Old and Middle Chinese, they were more distinct, with different vowels and exiting consonants. Phonological information from Baxter and Sagart, “Old Chinese Reconstruction.”

¹⁷⁵ This correlation of three with Heaven and two with Earth is very common. Besides the obvious odd/even correspondence, it relates to the shapes of them. Heaven was imagined as a round dome and depicted as a circle, and three was the value given for π in early mathematics, including in the *Nine Chapters*. The flat Earth, on the other hand, was square and two-dimensional. The harmony between Heaven and Earth, a 3:2 ratio, is sonically manifest in each step of the *sanfen sunyi* process.

both take nine as the rule. Nine and six are the Way of husband and wife and son and mother.¹⁷⁶

十一月，乾之初九，陽氣伏於地下，始著為一，萬物萌動，鐘於太陰，故黃鐘為天統，律長九寸。九者，所以究極中和，為萬物元也。《易》曰：「立天之道，曰陰與陽。」六月，坤之初六，陰氣受任於太陽，繼養化柔，萬物生長，楙之於未，令種剛彊大，故林鐘為地統，律長六寸。六者，所以含陽之施，楙之於六合之內，令剛柔有體也。「立地之道，曰柔與剛。」

In the eleventh month,¹⁷⁷ *Qian* [the all-*yang* hexagram]'s starting-nine,¹⁷⁸ the *yang qi* lies underneath the earth, it starts as one and causes the Myriad Things to sprout and move, the bell is extreme *yin*, so *huangzhong* is the governor of Heaven, and the length of its pitchpipe is nine *cun*. Nine is the means by which the central harmony is attained and is the origin of the Myriad Things. The *Classic of Changes* says, “the Way of Heaven standing upright is *yin* and *yang*.” In the sixth month, at *Kun* [the all-*yin* hexagram]'s starting-six, the *yin qi* takes the responsibility from the extreme *yang*. It continues to nurture and change to softness, the Myriad Things grow. Trees are not yet finished, it orders seeds to be firm, strong, and large. Therefore *linzhong* is the governor of Earth, its pitchpipe is six *cun*. Six is the means by which the inherent *yang* is driven; trees from six are inside of togetherness, it gives firmness and strongness body. [The *Classic of Changes* says:] “The Way of Earth standing upright is soft and firm.”¹⁷⁹

In the appearance of the nine and six in *Changes* terminology, especially considering the political, mathematical, and acoustical resonances, the convergence of

¹⁷⁶ CTP han-shu/lv-li-zhi-shang 25.

¹⁷⁷ The Twelve Months were each associated with the Twelve Pitches in ascending order. The eleventh month, which included the Winter Solstice, was associated with *huangzhong*. As the basis of the tuning system, this was the most important month for rectifying the tuning, as can be seen in the timing of the Edict in Chapter 2. Although at that moment *yin* characteristics may seem the most visible, it is the moment of largest potential *yang*, since it is the moment when *yang* finally overpowers *yin* and begins its path to domination.

¹⁷⁸ *Qian* 乾 is the first hexagram in the *Changes*. It consists entirely of *yang* lines (or all nines in the line statements). Its counterpart is *Kun* 坤, the second hexagram, which consists entirely of *yin* lines (or all sixes in the line statements). Unlike most hexagram names, these characters do not have meanings other than the idealized forms of *yin* and *yang*. *Qian* has been translated as “The Creative,” “Active,” and “Pure Yang,” while *Kun* has been translated as “The Receptive,” “Earth,” and “Pure Yin.”

¹⁷⁹ CTP han-shu/lv-li-zhi-shang 6.

multiple layers of richly elaborated meaning forms a tapestry from which it is nearly impossible to pull out individual strands without fraying the entire fabric. Even though not all of these layers would be palatable to learned people of various traditions, especially those associated with vulgar or occult practices (for instance, the forms of divination and divine protection that came to be associated with the *Luoshu*), one would be unlikely to deny the reality of the underlying phenomenon, just that the principles were somehow being used incorrectly or inappropriately. Since some of these significances originated in different discourses and were not related to one another at the beginning, one is tempted to call them coincidences, in the sense of interesting but essentially random events. However, I believe for Chinese musicologists were more likely to perceive them as coincidences in a deeper sense, that of different patterns, even patterns describing different things, that intersect (coincide) in this place. The constellation of significances anchored them into place and confirmed the orthodoxy and fixity of music theory as well as all the surrounding discourses.

A.L. and Judith Becker explored the implications of powerful terms in discourse, words like “orbit,” which can describe concepts in nature and interpersonal relationships at so many levels that they operate across epistemologies and kinds of reality and seem to transcend a status of mere metaphor (in the etymological sense, something “moved” across discourses).¹⁸⁰ I argue here we have a numerical instance of such a phenomenon,

¹⁸⁰ Judith Becker and Alton L. Becker, “A Musical Icon: Power and Meaning in Javanese Gamelan Music,” in *The Sign in Music and Literature*, ed. Wendy Steiner, 1st ed, The Dan Danciger Publication Series (Austin: University of Texas Press, 1981), 215. They do not dwell much on the example of “orbit,” but it strikes me as an evocative one given how lasting its power is even after the falsification of Newtonian mechanics and the Bohr model of the atom.

where the number has acquired this power and floats across discourses. The intersecting patterns of thought that gave rise to it no longer seemed to come from anywhere but instead be iconic of the universe itself. This extreme coherence is what made Shao Yong, the foremost theorist of the School of Images and Number, regard his system not as a model of the cosmos, but as the order of the cosmos itself.¹⁸¹ However, in the case of Shao, there was considerable disagreement about his premises, so scholars with different intellectual inclinations and interpretive practices could escape the logic. Not so in the case of the *huangzhong* measure of nine, where the origins in a great variety of discursive traditions would protect it and render its premises invisible.

This also made it nearly impossible to disentangle those premises and explore measurement from a new perspective. Scholars of protoscience have tended to emphasize the power of authority in explaining the persistence of ideas that seem to have little empirical basis. I certainly do not dispute the importance of authority in the epistemologies of classically trained Chinese scholars; no doubt the invocation of Yu or the *Changes* were major factors. However, I would argue that the points of coincidence within a complex of ideologies is also an important factor in this resistance to reevaluation, for the practical reason that the sources cannot be disentangled and the complex must be rejected wholesale. In Thomas Kuhn's terms, the complex insulates the paradigm from criticism, since it is nearly impossible to criticize something so all-encompassing, and produces an extended period of normal science.

¹⁸¹ Henderson, *The Development and Decline of Chinese Cosmology*, 121.

But for Song scholars, whose concept of scientific progress was quite removed from our own, this resistance was not an impediment but an asset, one which could assure scholars that the finding was correct and would remain so. In this way it served as a piling that would stay fast no matter what changes time brought to the surrounding soil. But this foundation worked against the vagaries of time in both directions, and could equally bring them back to the timeless root of the system, the ritual music the ancients had mastered that they wished to restore.

Chapter 5: Visual Discourse

Illustrations in Chinese visual culture

Alongside strategic use of music-theoretical and mathematical discourses, another tool the framers of music reform tapped into was visual argumentation. Unlike music theory and mathematics, which had been used in music treatises for a long time before the Northern Song, visual representations were a relatively recent development and had not appeared in earlier writings on music. Of course, Chinese visual culture had included various types of images since preliterate times, but there had seldom been a conscious effort to use them in argumentation; the famous philosophical debates of the Hundred Schools were textual.

The main exception to that statement is the *Classic of Changes* and its traditions, which were always closely connected with the image of the hexagrams, usually designed *xiang* 象. The text of the *Changes* was among the most trusted of ancient texts, since as a divination manual it was not destroyed during the Qin Dynasty Burning of the Books. *Changes* scholarship increased greatly during the Song dynasty; for the first time it received more attention than any other Confucian classic.¹ Many scholars produced commentaries that reflect their interest in coordinating the text with their own experiences.² Among those who did were partisans within the music debates, including

¹ Smith, *Fathoming the Cosmos and Ordering the World: The Yijing (I-Ching, or Classic of Changes) and Its Evolution in China*, 112. For some of the many contemporary studies on Song scholarship on the *Changes*, see the list at the endnote (293n3).

² Smith et al., *Song Dynasty Uses of the I Ching*.

Hu Yuan, the coauthor of the *Huangyou ji*. For this reason, I will first turn briefly to a discussion of the *Changes* and its relationship with images.

Perhaps the most important of the supplementary texts (Ten Wings *Shi yu* 十羽) associated with the *Classic of Changes* is the “Commentary on Attached Phrases,” *Xici zhuan* 繫辭傳 (traditionally ascribed to Confucius, but more likely dating to the second century BCE).³ The nominal purpose of this text is to explain and justify the phrases attached to the hexagrams. The commentary discusses the importance of visual forms and text as follows, suggesting that the importance of images is that they can reveal truths inexpressible in language, even ones relevant to the music and dance of the supernatural communication in ritual:

子曰：「書不盡言，言不盡意。」然則聖人之意，其不可見乎？子曰：「聖人立象以盡意，設卦以盡情偽，繫辭焉以盡其言，變而通之以盡利，鼓之舞之以盡神。」

The Master [Confucius] said: “Writing does not express all of speech, and speech does not express all of thought.” In that case, can the thought of the sages not be seen? The Master said: “The sages set up images [*xiang*] in order to express all of thought. They set up the hexagrams in order to express all of the actual and the false. They attached phrases to them in order to express all of their speech. They made it in flux and comprehensive in order to express all of the benefits. They drummed it and danced it to express all of the spirits.”⁴

Though the *Xici zhuan* is principally about the phrases attached to the hexagrams, it also mentions two crucial images which are not among the hexagrams, but are associated with *Changes* divination: the *Hetu* 河圖 (“[Yellow] River Chart”) and *Luoshu*

³Willard J. Peterson, “Making Connections: ‘Commentary on The Attached Verbalizations’ of The Book of Change,” *Harvard Journal of Asiatic Studies* 42, no. 1 (1982): 72–76, <https://doi.org/10.2307/2719121>.

⁴CTP book-of-changes/xi-ci-shang 12. The translation is my own but are informed by the understanding of Peterson, 98–99, 107.

洛書 (“Luo [River] Writing”) (see Fig. 4.4). These were two mysterious referents that were taken as illustrations of primordial order discovered by the sage kings, especially Fuxi who was also credited with the system of *Changes* hexagrams. It is unclear what these were thought to have looked like at the time the *Xici zhuan* was composed or if thinking of them as images that can be usefully displayed is even a productive conceptualization. Most commonly, the *Hetu* was identified with the Eight Trigrams, and the *Luoshu* with the nine sections of the “Great Plan” (*Hongfan* 洪範) of the *Classic of Documents*. However, the classical sources are extremely terse and enigmatic, so there was a wide variety of interpretations by the commentators.⁵

Images of the *Hetu* and *Luoshu* from before the Song dynasty do not survive, and knowledge of them seems to have been restricted. They seem to have been transmitted through Chen Tuan 陳搏 (d. 989), a Daoist master who gained retrospective fame as his teachings were later transmitted to Liu Mu 劉牧 (1011–1064) and Shao Yong of the School of Images of Number.⁶ As they are now understood, they appear like mathematical enigmas: the *Hetu* shows equivalences between the odd (*yang*) and even (*yin*) numbers, and the *Luoshu* (as discussed in Chapter 4) depicts the Magic Square. Though they depict mathematical relations, both are traditionally drawn not with numerals or characters representing numbers, but with series of dots connected on a line, rather like knots on a rope. This convention draws on the tradition that before writing,

⁵ Henderson, *The Development and Decline of Chinese Cosmology*, 84.

⁶ Bent Nielsen, *A Companion to Yi Jing Numerology and Cosmology* (London: Routledge, 2003), 29. Swetz mistakenly confuses Chen Tuan with Zheng Xuan, but the dates given match Chen Tuan's. Swetz, *Legacy of the Luoshu: The 4,000 Year Search for the Meaning of the Magic Square of Order Three*, 14 and 29.

Chinese communicated using knotted ropes.⁷ Drawing on this tradition, the creators of the diagrams make them appear ancient indeed.⁸

The *Hetu* and *Luoshu* are mentioned in passing in the *Xici zhuan*: “The Chart came from the [Yellow] River and the Writing came from the Luo [River], and the sages modeled on them” (河出圖，洛出書，聖人則之).⁹ In his translation of the above passage, Willard J. Peterson parenthetically interpolates “with both the Diagram and the Writing being taken to refer to arrangements of numbers with fortune-telling potential.”¹⁰ The charts, along with the hexagrams of the *Changes*, certainly betray a strong influence in mathematics in the development of the images, as I explored in Chapter 4.¹¹ However, I disagree that the charts were exclusively regarded as numerical arrangements for divination. In line with the previous discussion about the possibility of illustrations expressing the inexpressible, the visualization of those arrangements that the images made possible was itself important.

According to the *Xici zhuan*, the figures were especially important in recapturing the ideas of the sages, as they were both the traces of the sages’ cosmic understanding and the means by which they achieved it. In a summary describing four aspects of the

⁷ Martzloff, *A History of Chinese Mathematics*, 179. He cites passages alluding to this practice from the *Xici zhuan*, *Zhuangzi*, *Daodejing*, and *Liezi*, so it would have been familiar and available to scholars of a wide variety of intellectual inclinations.

⁸ Swetz, *Legacy of the Luoshu: The 4,000 Year Search for the Meaning of the Magic Square of Order Three*, 14.

⁹ CTP book-of-changes/xi-ci-shang 11.

¹⁰ Peterson, “Making Connections,” 108.

¹¹ Francesca Bray notes the prominence of *tu* in mathematics, though they seem not to have been used in the earliest writers. Francesca Bray, “Introduction: The Powers of Tu,” in *Graphics and Text in the Production of Technical Knowledge in China: The Warp and the Weft*, ed. Francesca Bray, Vera Dorofeeva-Lichtmann, and Georges Métaillé (Leiden: Brill, 2007), 23.

Classic of Changes that reflect their sage origins, the text says, “From their [the sages’] making implements [*qi*], esteem is given to the figures.” (以制器者，尚其象).¹²

Implements could mean a variety of things, but since they were made by the sages in ancient times, this would surely be understood as things that would either be passed down as heirlooms or models for future generations.¹³ The most archetypical examples of such things are ritual implements, including ritual musical instruments. That figures were esteemed by the sages in their process of designing the instruments certainly supports their use in the recovering and dissemination of the original forms.

The type of image used in argumentation is the *tu* 圖. *Tu* is not a general term for images; it can be contrasted with at least two other terms, *xiang* 象 and *hua* 畫. The distinction is not stylistic, but functional: *tu* are images that convey specialist knowledge, *hua* have decorative purpose, and *xiang* indicates a more general sense of icon or figure.¹⁴ *Tu* can vary in style from rather realistic illustrations to schematized diagrams, but their function is consistent: they are intended to add a visual layer that aids in a text’s explication. In most cases, including all of the musical cases examined here, the illustrations either contain text or are placed adjacent to text, which is crucial for its interpretation. It was also possible to construct a *tu* entirely of text, arranged in some non-linear fashion. Often, it was the context distinguished the function, and thus the type, of

¹² CTP book-of-changes/xi-ci-shang 10.

¹³ Peterson (“Making Connections,” 114) translates this as “cultural artifacts,” which surely reflects how the Song would image the implements of the sages.

¹⁴ This typology is actually quite complex and historically dependent. See Bray, “Powers of Tu,” 2–3. Craig Clunas’s discussion of this distinction, though in a Ming context, is also very helpful. Craig Clunas, *Pictures and Visuality in Early Modern China* (Princeton: Princeton University Press, 1997), 102–11.

the image. In other words, the same image could be for instruction, and thus be a *tu*, or be for entertainment, and thus be a *hua*.¹⁵ In the right context, any image could serve as a *tu*.¹⁶

In a collection of essays about *tu*, co-editor Francesca Bray proposes a pragmatic distinction between two types of *tu* as an organizing principle for the book, “those which revealed or explained cosmic processes and were thus endowed with symbolic or ritual power; and those which represented or organised secular information or knowledge, whose power was by and large didactic.”¹⁷ This typology collapses into the division I made in Chapter 4 about the schools of *Changes* interpretation: the diagrams from the School of Images and Numbers are mostly of the former type, while the School of Meaning and Principle mostly used the latter.¹⁸ I will use this distinction to organize the sections of this chapter, but first I will explore why illustrations became more important during the Northern Song.

The significance of printing

Though *tu* are much older, the emphasis placed on illustrations beginning in the Northern Song is striking, in contrast to the scanty references to or records of illustrations in earlier times. For many Song works, the illustrations were deemed so important or

¹⁵ Bray, “Powers of Tu,” 3.

¹⁶ Clunas, *Pictures and Visuality in Early Modern China*, 105.

¹⁷ Bray, “Powers of Tu,” 34.

¹⁸ The caution remains that the two schools were not always so separate, and a scholar presenting comprehensive information, such as Chen Yang and his *Yueshu*, uses both types of illustrations.

distinctive for the concept of the work that this fact is registered in their titles. Typically, written works in Chinese include an indication of genre as the final character or two in the title.¹⁹ As illustrations became more central to the epistemological practices in the tenth and eleventh century, many works included the character *tu* into the title, either preceding the written genre designation, as in the *Huangyou xinyue tuji* 皇祐新樂圖記, or replacing it, as in the *Sanli tu* 三禮圖. In later periods, such naming became less common, as it became more assumed that books would include appropriate illustrations, making the marker seem less of a distinctive characteristic.

One key reason that illustrations rose in importance during this period is the spread of printing. As is well-known, printing was invented in China, probably in the early Tang around the year 700.²⁰ Originally restricted to Buddhist contexts, the officially sponsored printing of the Confucian classics under Feng Dao 馮道 (882–954), completed in 953, introduced its usage in orthodox Confucian circles and allowing it to index imperial sanction of a rectified text. Unlike Buddhist printed texts, which valorized the production of large quantities of printed texts, the purpose of Feng Dao's project was to authenticate a specific textual version with an official printed text; private printing of the

¹⁹ A lengthy list of prose genres, based on the typology of the Qing scholar Yao Nai 姚鼐 (1731–1815), can be found in E.D. Edwards, "A Classified Guide to the Thirteen Classes of Chinese Prose," *Bulletin of the School of Oriental and African Studies, University of London* 12, no. 3–4 (1948): 770–788. Many of the primary sources cited in this dissertation use one of the enumerated types to close their titles.

²⁰ The precise date has proven difficult to narrow down. The earliest surviving printed page dates to 751 in Korea, but the process is known to have been developed in China sometime earlier. For an imaginative but plausible reconstruction of the discovery of printing that also explains the dearth of sources and its seemingly slow spread, see Timothy Hugh Barrett, *The Woman Who Discovered Printing* (New Haven: Yale University Press, 2008).

classics remained forbidden until 1064.²¹ In this way, printing drew on the tradition of stone carvings of the Confucian classics, which dated back to the Xiping Stone Classics 熹平石經 (completed in 183) of Cai Yong 蔡邕 (132–192) of the Eastern Han dynasty and initially also served the point of presenting and preserving an authoritative text.

However, the increased acceptability of printed material in non-Buddhist contexts led to the large increase in printing of all types in the Northern Song, a period that has been characterized as the “high tide of Chinese block printing”²² or the first “golden age” of print in China.²³ Beyond printing, the overall accessibility of books, printed as well as manuscript, spiked in the Northern Song, as official and commercial presses produced huge quantities of books and traditional hand-copying acquired a new cultural meaning.²⁴ Memorizing texts remained important, for the process still served as the foundation of the Imperial Examination and bore the prestige of millennia of scholastic tradition, but scholars were able to acquire an increasing variety of works in their libraries.

Ronald Egan suggested that the proliferation of written materials during the eleventh century, connected with new printing technologies, no doubt had massive effects on learning generally, but the preliminary forays he provides focused only on the effects

²¹ Thomas Francis Carter, *The Invention of Printing in China and Its Spread Westward* (New York: Columbia University Press, 1925), 49–52.

²² Carter, 55. Though dated, Carter provides a reasonable overview of how printing grew in use and prestige during the Northern Song. For more detail, see K.K. Flug, *История Китайской печатной книги сунской эпохи* (Moscow: Izdatel'stvo Akademii Nauk SSSR, 1959).

²³ Lucille Chia and Hilde de Weerd, “Introduction,” in *Knowledge and Text Production in an Age of Print: China 900-1400*, ed. Lucille Chia and Hilde de Weerd (Leiden: Brill, 2011), 1.

²⁴ Ronald Egan, “To Count Grains of Sand on the Ocean Floor: Changing Perceptions of Books and Learning in the Song Dynasty,” in *Knowledge and Text Production in an Age of Print: China 900-1400*, ed. Lucille Chia and Hilde de Weerd (Leiden: Brill, 2011), 41–42.

on the written word.²⁵ However, as noted, an increasing number of printed books contained illustrations. The woodblock printing technology favored in China allowed for easy reproduction of images within a text;²⁶ in contrast to the annoyance of negotiating specially created illustrations within moveable-type printing, woodblocks allowed images to be carved alongside text and stored as part of the block collections for later printings. This transformation in the use of illustrations in printed works paved the way for a more visual epistemology, which resulted in the spread of technical images even in unprinted works. Thus, though several of the treatises I examine here were not originally conceived as works to be printed, and were not printed until much later, I posit that the intellectual changes wrought by printing technology encouraged the authors to embrace visual epistemology as an organizing principle in their argumentation.

As such printed books became more familiar, the age-old practice of reciting texts by memory and without visual stimulus lost some ground to a new experience of reading text while considering images. By the Southern Song, the scholar Zheng Qiao 鄭樵 (1104–1162) wrote a treatise defending the interpenetration of reading and illustration as central to a Chinese way of knowing.²⁷ Using a wonderful metaphor that works in translation as well, he saw text and illustration as warp (*jing* 經) and weft (*wei* 緯) that interweave the form text/texture (*wen* 文).²⁸ Furthermore, this metaphor does not make

²⁵ Egan, 45.

²⁶ Bray, “Powers of Tu,” 25.

²⁷ Han Si, *A Chinese Word on Image*.

²⁸ Han Si, 57; Bray, “Powers of Tu,” 39. In the traditional nomenclature of Chinese scholarship, the warp and weft generally indicated classics and apocrypha, the latter of which often bore a stigma as unorthodox. However, the context in Zheng Qiao’s comment makes it clear that the images (the weft) was in no way less important than the text (the warp).

the text and image equivalent, but, as Francesca Bray noted, “Zheng Qiao’s *jing-wei* contrast ... implies that while images and words work together ..., it is the image which is prior, and which establishes the fundamental matrix of understanding—an interpretation fully in accord with the *tu*-practices of other *daoxue* philosophers of the Song.”²⁹

Zheng argued that illustrations were widely used up until the Han Dynasty, but because of the neglect of early bibliographers, they were accorded a secondary status to texts.³⁰ He regarded this situation as detrimental to scholarship and encouraged a return to the ways the ancients used images. Zheng stated that in the ancient method of learning, scholars “put images on the left side and writing on the right side. They looked for the appearance in the images and the reason in writings” (置圖于左，置書于右，索象于圖，索理于書).³¹ In these concerns, Zheng Qiao is responding to the availability of illustrations by his time and constructing a historical argument that justifies their prevalence.

The development of these technical illustrations, of both categories, was independent of the more aesthetic strain in the visual culture of the Song Dynasty. Though, for other reasons, the Song Dynasty is recognized as a highpoint in brush painting, both in technique and in aesthetic sensibility, the goals of technical illustrations remained apart from these considerations, and relatively uninfluenced by those aesthetic

²⁹ Bray, “Powers of Tu,” 39.

³⁰ There seems to be little historical justification for this claim, but the association with the loss of learning with Liu Xin 劉歆 (c. 50 BCE–23 CE), the curator of the library during Wang Mang’s interregnum, is another trope of historical rupture that allows Zheng to claim ancient forebears.

³¹ Han Si, *A Chinese Word on Image*, 60.

considerations. Dedicated to depicting real or ideal objects and the arrangements between them, the illustrations certainly did not move “beyond representation” as Wen C. Fong argued was the case for certain styles of fine art during this time period.³²

A note on the reliability of illustrations

As is typical of works of this age in China, the original manuscripts of none of these treatises I examine here are extant, nor are the earliest copies of those originals. Therefore, one must be cautious about interpreting the illustrations, as they certainly could have been modified in their copying, with a greater likelihood than text variants (which could also occur, of course). Most of the illustrations I cite in this dissertation come from the *Siku quanshu* 四庫全書 (hereafter *SKQS*), the major Qing compendium compiled in the late eighteenth century that gathered together many historical works from across the empire for official use. There were four versions of the *SKQS* made; this one is the *Wenyuange* 文淵閣 edition which has been reproduced in print and online.³³

Although many hands were involved in the *SKQS* project, the project was carefully organized and overseen by a small group of editors and a team of scholars with similar cultural background proofread all parts of it.³⁴ Moreover, the *SKQS* editors were trained in the sophisticated philological techniques of the Qing dynasty and often had

³² Wen C. Fong, *Beyond Representation: Chinese Painting and Calligraphy 8th-14th Century*, Princeton Monographs in Art and Archaeology (New York: Yale University Press, 1992).

³³ When the illustrations are from the *Siku quanshu*, they are identified by the work, with pagination indicated by *juan* and folio separated by a period. All images are reproduced from the Electronic Version of the *Siku quanshu* (www.sikuquanshu.com).

³⁴ For an overview of the processes and techniques of the *SKQS* project, see R. Kent Guy, *The Emperor's Four Treasuries: Scholars and the State in the Late Ch'ien-Lung Era* (Harvard Univ Asia Center, 1987).

access to multiple versions of manuscripts, from which they could select the best exemplar or use emendation to get the best possible renderings of the illustrations. In many cases, they left a preface describing the bibliographic situation available to them and justifying their decisions. Moreover, since the *SKQS* was a manuscript, the illustrations did not need to be modified in order to suit woodblock printing better, when they were drawing on manuscript sources.

A later edition does not necessarily correlate to a less accurate reproduction of images. That this was generally true was the basis of a theory of William Watson, who attributed the unorthodox designs of later bronzes to supposedly less and less accurate reproductions of the ancient models in the catalogs *Kaogutu* and *Bogutu*.³⁵ More recent scholars have concluded instead that these design variants were in fact deliberate and creative adaptations, and they were not dependent on the antiquities catalogs anyway since new artifacts continued to be unearthed over the centuries.³⁶ However, the premise that the printed editions they supposedly were working from were increasingly defective is also not tenable. In the case of the *Kaogutu*, the images in the earliest extant version, dated 1299, are of low quality, and evidence suggests that other traditions more accurately reflect the precision and detail of the original.³⁷ The *SKQS* edition is based on a transcription of a Northern Song printing by the book collector Qian Zeng 錢曾 (1629–1701), who was known for his reproductions and expertise in Song printed editions. As

³⁵ William Watson, "On Some Categories of Archaism in Chinese Bronze," *Ars Orientalis* 9 (1973): 1–13.

³⁶ Ulrich Hausmann, "Notes on the Topic of Archaism in Later Chinese Bronzes," *Orientalis* 46, no. 3 (2015): 68–78.

³⁷ Moser, "Why Cauldrons Come First: Taxonomic Transparency in the Earliest Chinese Antiquarian Catalogues," 13n25.

explained in their preface to the *Kaogutu*, the editors of the *SKQS* selected his transcription as their basis both because of the quality of its images in this transcription and Qian's claim to have reproduced them from his original highly accurately.³⁸ (Qian's transcription itself is now lost.)

When I compared one treatise for which I could examine a photographic reproduction of an early exemplar, the *Sanli tu* in the facsimile edition of the 1175 printing, with the *SKQS* version, I found that the images under consideration were handled very similarly in the two sources, in all respects except layout on the page. The *SKQS* placed all of the images on a separate page, while the 1175 edition placed them in the upper right (following conventional text direction, where the page would begin to be read) and had text flow below and to the left of the image. The similarity between the two editions suggests that the eighteenth-century copiers and their overseers were able to reproduce images accurately.

In a few cases below, where there is a significant discrepancy, I reproduce more than one version of the same image. Without intensive bibliographical study, and perhaps even with it, determining which image should be considered more representative of the work from Northern Song times is difficult. It is even possible that parallel versions of the image arose already in early editions. However, the situation should not be compared to medieval Europe, where farflung monasteries could perpetuate local traditions in their manuscript copying and many works feature quite distinctive illustrations. For one thing, most of these texts were produced centrally and circulated among a relatively small class

³⁸ Moser, "The Ethics of Immutable Things," 261n4.

of literati who, though they came from different areas, had similar scholarly backgrounds and experiences regulated by the norms of imperial examination culture. For another thing, the availability of printing allowed early editions to circulate much more widely and hence set standards more effectively for copies that might be produced.

Envisioning a combinatorial cosmos

The scholars of the School of Images and Numbers illustrate well Bray's first category of images. These were cosmic diagrams that revealed order in their symmetrical and systematic patterning. These diagrams were not crafted to support or illustrate an argument, but served as the argument itself.³⁹ If the various cosmic forces could be arrayed in a parsimonious manner, a chart that does so would not only show but explain their correlative natures. Frequently, such diagrams are comprised of mainly text, even as the argument is not linguistic, as the text labels various cosmic concepts. On the other hand, some mathematical *tu* in this category, such as the *Luoshu*, do not use text at all.

This type of *tu* has a long history in the textual tradition, going back to the *Hetu* and *Luoshu* first mentioned in classical texts. However, it is uncertain to what extent these ideas ever took form as images before the Song, or if indeed they were simply imagined as the prototype of auspicious images and cosmic order. As interpreted and (re)created by Chen Tuan and his intellectual descendants Shao Yong and Liu Mu, they were associated with the *Classic of Changes* and the associated systems of divination and

³⁹Bray, "Powers of Tu," 35–36. Also see Michael Lackner, "Diagrams as an Architecture by Means of Words: The *Yanji Tu*," in *Graphics and Text in the Production of Technical Knowledge in China: The Warp and the Weft*, ed. Francesca Bray, Vera Dorofeeva-Lichtmann, and Georges Métaillé (Leiden: Brill, 2007), 341–77.

correlative cosmology.⁴⁰ Inspired by the images of the 64 hexagrams, such diagrams often worked as cyclic permutations in the way of the hexagrams. This approach is exemplified by a line from the “Commentary on Attached Phrases” (*Xici zhuan* 繫辭傳), which was a favorite of Shao Yong’s:

是故，易有太極，是生兩儀，兩儀生四象，四象生八卦。
Therefore in (the system of) the Yi there is the Grand Terminus, which produced the two elementary Forms. Those two Forms produced the Four emblematic Symbols, which again produced the eight Trigrams.⁴¹

Here the mathematical process of binary division gives structure to the world. Using broken lines to representing *yin*, and unbroken lines to represent *yang*, successive divisions yield the eight trigrams, and by extension the 64 hexagrams, derive from a combinatorial process, that represents the supremacy of number and image. Their properties trace back to these serial divisions. Musicologists inclined to this line of thought emphasized categorization and structure of musical phenomena. Just like structuralist thought in the twentieth century (from the point of view of its historicist critique), these approaches worked to counter the effects of time, by reducing reality to a rigid ahistorical scheme. Like the individual hexagrams in the *Changes*, which represented the situation at the moment of divination, any sound would fit somewhere in

⁴⁰ Clunas, *Pictures and Visuality in Early Modern China*, 105–7. As he notes, later this was considered an obfuscation. Holger Schneider explores Liu Mu’s recreations of these diagrams in “Diagrammatic Aspects of Cosmological Thought. An Early Song Image and Number (Xiang Shu) Debate Reconsidered” (PhD diss, Friedrich-Alexander-Universität Erlangen-Nürnberg, 2017).

⁴¹ CTP Xicizhuan 11. This translation is directly from Legge. This line is the basis of much of Shao Yong’s thought. For his illustration and interpretation of this line, and how it connects with his *Xiantian* 先天 hexagram ordering, see Smith et al., *Song Dynasty Uses of the I Ching*, 112–20.

the categorization but was ultimately to be understood as a surface phenomenon that formed part of the deep and timeless underlying structure.

The establishment of these schemes relies heavily on the mode of thinking usually called “correlative cosmology,” which I discussed in Chapter 1. The phenomenon of resonance, observed straightforwardly among string instruments, was extrapolated to other domains and, it was supposed, other interactions could be explained by similar but non-audible kinds of resonance. Enthusiasts of this theory attempted to group together in correlations the musical groups of various sizes, particularly the Five Notes, Eight Sounds, and Twelve Pitches, and the corresponding cosmic schemes, the Five Phases, the Eight Directions (*bafang* 八方, the primary and secondary points of the compass rose) and the Twelve Months (*shi'er yue* 十二月) of the lunisolar calendar.

Since those numbers do not have many common factors, determining how to relate these different cardinalities was a major difficulty of scholars of this school. In particular, for those who privilege hexagram-based thought as the basis of the cosmos, one must determine how to correlate the groups of five or twelve with sets derived from the *Classic of Changes*, which always number in powers of two that results from the alternation of *yin* and *yang*, analogous to what Judith Becker called in a Javanese context “rigid binariness.”⁴² Theorists tried three ways of reconciling the different cardinalities: not lining them up at all, simply asserting a mysterious process of derivation; lining them up with interpolated points appearing for only one of the groups; and adding additional

⁴² Judith Becker, “Time and Tune in Java,” in *The Imagination of Reality: Essays in Southeast Asian Coherence Systems*, ed. Alton L. Becker and A. A. Yengoyan (Norwood, New Jersey: Ablex, 1979), 202.

members to one of the sets to generate a one-to-one correspondence. I will use this typology to frame the remainder of this discussion; presenting examples of each of these approaches will illustrate the variety of these diagrams. However, it is also worth keeping in mind that beyond this diversity, each diagram is intended as ways to visualize what are eternal, cosmic patterns, and thus forcefully argue for the possibility of tapping into musical properties (or their analogues) to transcend time.

First approach: Without explicit correspondence

The first approach, by not illustrating how the sets are related to one another, avoids the issue altogether. This approach is implicitly invoked every time diagrams of the Five Tones and the Twelve Pitches appear on different pages. Since the Five Tones are certain subsets of the Twelve Pitches, the sets must be somehow related, but presenting them separately allows the correlated cosmic properties to form a separate dimension. If such presentations count, then it is surely the most common approach. Less commonly, they can also appear in the same illustration, but without any particular correlation indicated. This is the case with the most famous cosmic diagram of the Northern Song, the *Taijitu* (“Diagram of the Supreme Polarity”) devised by Zhou Dunyi 周敦頤 (1017–1073), shown in Figure 5.1.

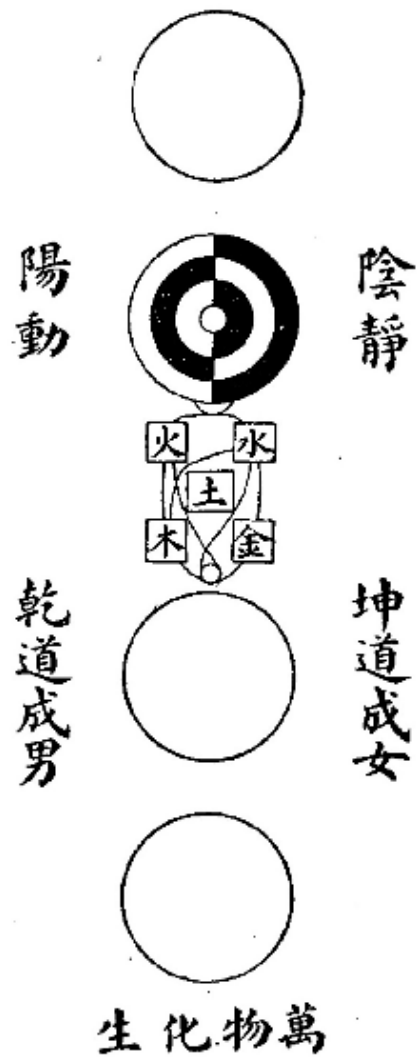


Figure 5.1: *Taijitu* by Zhou Dunyi⁴³

There is no explicit reference to music in the diagram or in the explanatory text attributed to Zhou Dunyi, but those familiar with music theory would immediately associate the depictions of *yin* and *yang* with the superior and inferior generation of the gamut, and the Five Phases with the Five Notes. This diagram is read from top to bottom.

⁴³ Reproduced from Joseph A. Adler, *Reconstructing the Confucian Dao: Zhu Xi's Appropriation of Zhou Dunyi* (Albany: State University of New York Press, 2014), 159.

In general, the left side represents yang qualities; those explicitly mentioned are movement (*dong* 動), the completely yang hexagram *qian* 乾, and male (*nan* 男). Meanwhile, the right side represents the opposite *yin* qualities, stillness (*jing* 靜), the hexagram *kun* 坤, and female (*nü* 女). The top circle represents the undifferentiated nature of the Supreme Polarity that is paradoxically also the absence of polarity (*wuji er taiji* 無極而太極), which then divides into yin and yang in the circle below. Below that the alteration and combination of *yin* and *yang* beget the Five Phases (陽變陰合，而生水、火、木、金、土) and ultimately the Myriad Things (*wanwu* 萬物) at the bottom.⁴⁴ Therefore, Zhou's diagram asserts the interdependence of the binary and the quinary schemes, without depicting or explaining how the connection works.

The diagram itself is of the sort Bray notes where the words are relatively unimportant. There are the labels noted above, and the diagram's interpretation would be difficult without them, but the relationship between them is shown iconically by the undifferentiated circles, reversing black and white fields, and snaking ligatures connecting the Five Phases, none of which are explicitly explained in the diagram. The diagram is accompanied by text, but the diagram remains ontologically prior; the cosmic pattern is more easily grasped all at once in this visual representation than through a discursive argument that proceeds through a logical order.

⁴⁴ My understanding of this diagram and the associated text is helped by Zhu Xi's commentary and the annotated translation in Adler, *Reconstructing the Confucian Dao*.

Second approach: Interpolation in a regular pattern

The second approach, which does attempt to illustrate the connection between sets of different cardinality, presents the two sets as commensurable by including interpolated items on only one side in a regular pattern. Figure 5.2 shows a diagram included in Chen Yang's *Yueshu*, the “Twelve Tones Distinguishing the Sounds of the Four Directions of Heaven and Earth” (*Lülü bian tiandi sifang sheng* 律呂辨天地四方聲).



Figure 5.2: Diagram of “Twelve Tones Distinguishing the Sounds of the Four Directions of Heaven and Earth” from the *Yueshu*⁴⁵

This diagram shows a correlation between a set of twelve and a set of eight (and four). Along the outside are arranged the Twelve Pitches and the corresponding Earthly Branches, proceeding clockwise from *huangzhong* and the Earthly branch *zi* in the lower

⁴⁵ Chen Yang, *Yueshu*, SKQS ed., 102.4r.

left. In the inner square are the Eight Trigrams (*bagua* 八卦) and the Four Directions. The Eight Trigrams had long been used to indicate an eight-point compass, and these follow that arrangement, beginning with north and *kan* 坎 (representing the trigram ☵) at the bottom.⁴⁶ Because of the incommensurability of the sets, the intercardinal directions lie in the corners of the square, adjacent to two of the Twelve Pitches/Earthly Branches. There they seem to float, falling between the two or corresponding to both together. Since twelve and eight share the factor of four, the insertions are evenly spaced and fit inside the square neatly, making the numerical mismatch more subtle.

There is a further precedent to this pattern, as it reflects one of the possible interpretations of the Hall of Brightness, introduced in Chapter 4. In this interpretation, the Hall of Brightness has nine rooms, arranged in a 3×3 grid,⁴⁷ but holds ceremonies every month of the year by proceeding monthly around the twelve outer wall segments, beginning in the north for the eleventh month (which includes the Winter Solstice). According to this pattern, the eight outer rooms are used for these monthly observances, while the center space was reserved as the base for a tower observatory. This pattern

⁴⁶ North is typically located at the bottom of Chinese maps. The eight-point compass is a subset of the 24-point compass used in navigation especially during the Ming and Qing, which combines in one listing the Eight Trigrams, the Ten Heavenly Stems, and the Twelve Earthly Branches. This compass also appears in a musical diagram in the *Yueshu*, *juan* 102, where it is correlated with the Twenty-Four Seasonal Divisions (*ershisi jie* 二十四節) as well as the twelve months and pitches. This diagram is also an example of this approach to commensuration, though it is less interesting because it is simply a two-to-one correspondence.

⁴⁷ This is called the Nine-Chamber Hall of Brightness (*jiushi mingtang* 九室明堂). The other principal plan had five chambers. The nine-chambered hall is associated primarily with the *Record of Ritual of the Elder Dai* while the five-chamber hall is associated primarily with the *Artificer's Record*. Vera Dorofeeva-Lichtmann, "Ritual Practices for Constructing Terrestrial Space," in *Early Chinese Religion: Part One: Shang Through Han (1250 BC-220 AD) (2 Vols)*, ed. John Lagerwey and Marc Kalinowski (Leiden: Brill, 2008), 599. However, the nine-chamber plan did not always use a 3×3 grid, but could also use an X-shaped arrangement. Both a five-chamber and a nine-chamber plan appear in diagrams in the *Sanli tu*, attributed to the Zhou and Qin dynasties, respectively, but neither is based on the grid arrangement, but rather both use X-shaped arrangements. Compare the illustrations in Louis, *Design by the Book*, 136–37.

ultimately derives from the *Monthly Ordinances* chapter of the *Record of Ritual*, in which the Son of Heaven is said to occupy (*ju* 居) the left, central, and right areas of four spaces. This prescription could be interpreted in various ways, but if imagined in the context of a square building with the spaces being the outer walls, it maps neatly onto the nine-chambered grid arrangement. I have not been able to find an illustration of this system from the Northern Song that depicts this interpretation, but it was known by the Southern Song, as Ye Shi 葉時 (dates unknown, *jinshi* 1184) included it in his compilation *Summary of the Ritual Classics* 禮經會元, shown in Figure 5.3.

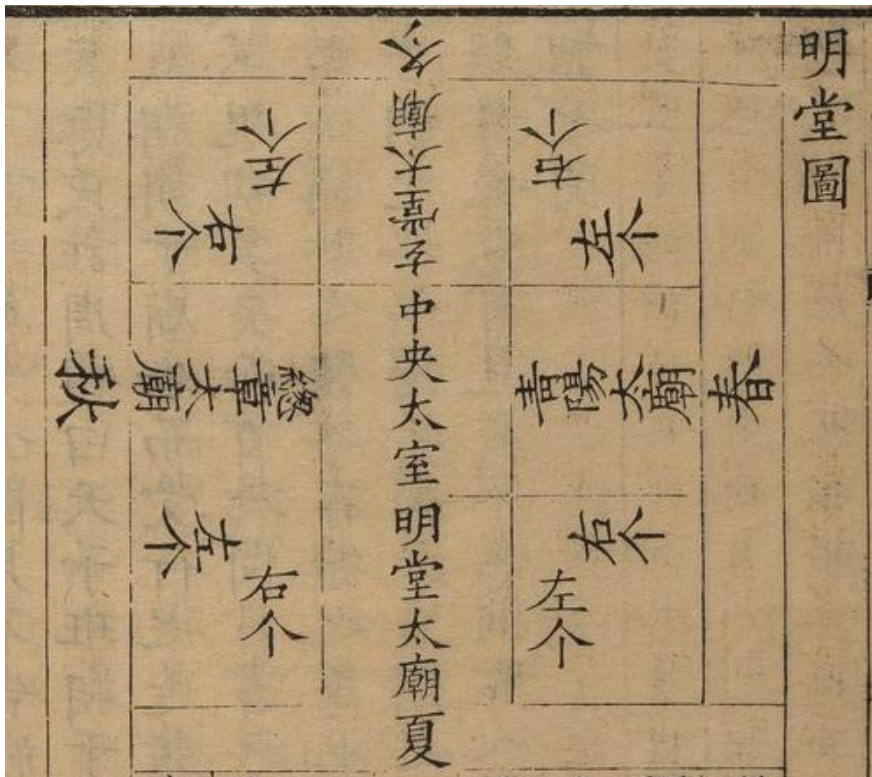


Figure 5.3: The Hall of Brightness in Ye Shi's *Summary of the Ritual Classics*⁴⁸

⁴⁸ Tongzhichang 通志堂 ed., 1680, *juan* 4, fol. 9v. Digitized by Harvard Library, [https://iif.harvard.edu/manifests/view/drs:16364656\\$245i](https://iif.harvard.edu/manifests/view/drs:16364656$245i). This diagram is inverted from the usual

As can be seen in this diagram, the sovereign occupied the rooms in the corners were used in two consecutive months, first facing in the same way of the previous month, then turning 90° for the following month, before proceeding to the following room.⁴⁹ The result, in the same location but with a different orientation, matches the arrangement of pitches in Figure 5.2. In the *Monthly Ordinances* text, each of the months is associated with a musical pitch, as well as many other correspondences. Even without the specific Hall of Brightness arrangement in mind, the twelve months and the twelve pitches in order suggests the notion of progressing around a circle. In the context of nonary cosmology, the arrangement that interweaves the Eight Trigrams and cardinal and intercardinal directions with the Twelve Months and Pitches in this pattern seems a logical adjustment.

Third approach: Addition of terms

The third approach is quite rare, but was adopted by a major Northern Song representative of the Images and Number school, Liu Mu 劉牧 (1011–1064), from the last section of his book *Yishu gouyin tu* 易數鉤隱圖 [“Esoteric Illustrations of the Hooks of the Numbers of Changes”]. This book presents a series of formalized and consistent cosmological images, entirely grounded in numbers and their abstract relationships.⁵⁰ The

orientation, as summer appears at the bottom, whereas that is usually associated with winter and the north. The *Monthly Ordinances* prescriptions begin at the left-hand side at the top, in the first month of spring.

⁴⁹ William Edward Soothill, *The Hall of Light: A Study of Early Chinese Kingship* (London: Lutterworth Press, 1951), 88–90.

⁵⁰ On this work, see Schneider, “Diagrammatic Aspects.”

final image of the book (Figure 5.4) draws on some familiar notions but makes bold innovations that are completely unlike any other music theory illustration I have seen; thus it is worth exploring at some length.

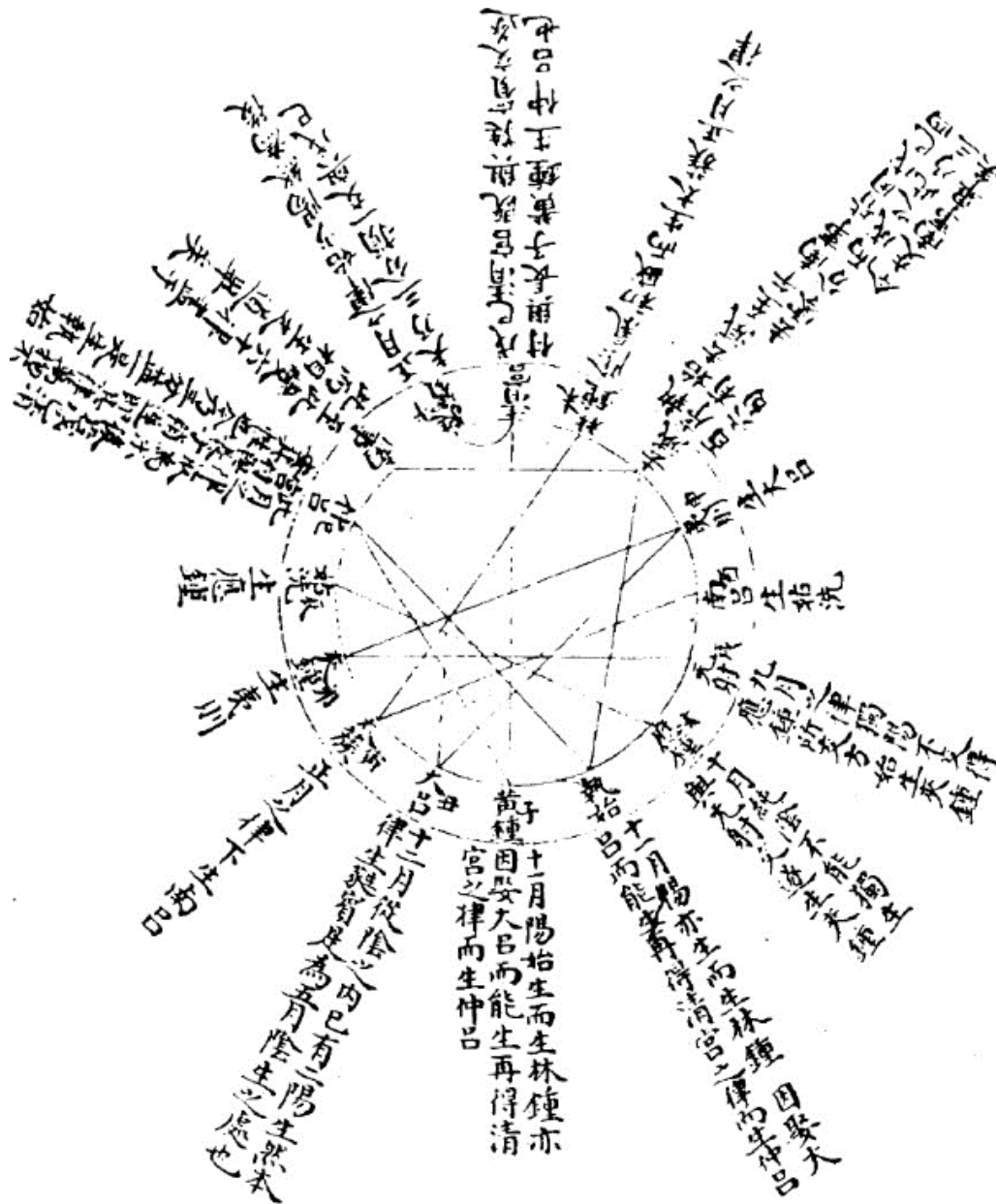


Figure 5.4: Liu Mu's numerological illustration of the generation of pitches⁵¹

⁵¹ Liu Mu 劉牧, *Yishu gouyin tu 易數鉤隱圖* (Shijie shuju yinghang 世界書局印行, 1050), 3.15r, <http://archive.org/details/06075335.cn>.

Ostensibly, this is a chart of the notes of the gamut, presented in circular form that is common enough. Around the circle are the note names, each with two characters presented radially outward from the center. Note, however, that there are sixteen, not twelve pitches in this gamut. To conform to his binary inclinations stemming from *Changes* ideas, he added four pitch names to the standard set of Twelve Pitches. In this expansion he is following a precedent, namely the sixty-note tuning gamut by Han scholar Jing Fang 李房 (78–37 BCE), as recorded in the treatise credited to Sima Biao 司馬彪 (c. 240–306) that appears in the *Book of the Later Han*.⁵² In the traditional *sanfen sunyi* procedure for generating notes (explained in Chapter 3), the cycle need not stop with the twelfth pitch; in this case, the thirteenth note generated will be slightly higher than the starting pitch, by just under one quarter of the interval between the two lowest pitches (an amount acousticians call the Pythagorean comma). Jing Fang experimented with continuing on past twelve, which he calculated to the calendrically significant number of 60 tones; he was unable to close the cycle but did discover a much smaller comma that occurs later.⁵³ To each of these 48 new tones, he gave a name.⁵⁴

⁵² McClain and Hung, “Chinese Cyclic Tunings in Late Antiquity,” 208–14. For a discussion of the authorship and textual history of this treatise, see B. J. Mansvelt-Beck, *The Treatises of Later Han: Their Author, Sources, Contents, and Place in Chinese Historiography*, Sinica Leidensia; v. 21 (Leiden; New York: Brill, 1990), 58–59.

⁵³ McClain and Hung, “Chinese Cyclic Tunings in Late Antiquity,” 212.

⁵⁴ The full list of names can be found in the chart in McClain and Hung, 209–11. They downplay any meaning to the names, calling them merely “convenient labels” (209). Given the difficulty in understanding the reasoning behind Chinese pitch names and Jing Fang’s expertise in astrology and divination, I am not confident that there are no meanings to be extracted, but I offer no theories.

Liu Mu took names of the first two and the last of Jing Fang's 48 additional tones, that is, respectively, *zhishi* 執始, *qumie* 去滅, and *nanshi* 南事.⁵⁵ To these three, he added *qinggong* 清宮, meaning “clear *gong*,” which does not derive from Jing Fang's work. This term ordinarily meant an octave above the *gong* pitch, which in the court music practice of the time varied according to the month. However, it is likely Liu is thinking of the pitch one octave higher than the *huangzhong*, which was sometimes regarded as a sort of default *gong* since it was the standard tuning pitch from which the others were derived. In this text he appears to interpret it as the mother of the *huangzhong*; this might be because the Earthly Branch connected with *huangzhong*, *zi* 子, also has the meaning “son.”

In the diagram, the three pitches that use Jing Fang's names are inserted close to how their pitch would figure according to Jing Fang's calculation. However, in two cases, the order is reversed from a purely pitch-frequency (or pipe length) perspective: *huangzhong* is clockwise from *zhishi*, though it is lower, and likewise *ruibin* is clockwise from *nanshi* though it is lower. The reason why these pitches are reversed remains obscure to me, perhaps it is an error due to the miniscule differences in pitch involved (the Pythagorean comma of 23.5 cents and Mercator's comma of 3.6 cents, respectively). Meanwhile, *qinggong* is situated diametrically opposite *huangzhong*, perhaps because he was thinking that a pitch pipe sounding an octave above would be half as long as the *huangzhong*, represented as the even division of the circle into halves.

⁵⁵ These are the thirteenth, fourteenth, and sixtieth tones when listed in the order in which they are generated, but the third, 38th, and 32nd of the 60, respectively, when ordered by pitch. See the chart in McClain and Hung, 209–11.

The twelve pitches that are in the normal gamut are each marked with a small third character in the middle ring, which is the Earthly Branch, as in Figure 5.2; the other pitches are missing any designation. Because of the arrangement, these pitches missing designations are not in a symmetrical arrangement, but are separated by gaps of 6, 1, 1, and 4 pitches, in clockwise order. Outside of the pitch names in the inner circle, Liu Mu adds designations of the corresponding months, and explains how the pitches relate to one another, literally. For example, the text for *huangzhong* reads:

黃種，子：十一月，陽始生而生林種，亦因娶大呂而能生，再德清宮之律，而生仲呂。

Huangzhong, zi [the eleventh Earthly Branch]: In the eleventh month, the *yang* begins life and gives birth to *linzhong*, and then takes as wife *dalü* and can give birth, yielding the pipe of *qinggong*, and gives birth to *zhonglü*.

Following tradition, *huangzhong* corresponds to the eleventh month of the Chinese calendar, which includes the Winter Solstice (*Dongzhi* 冬至), the moment when *yin* energy begins to turn to *yang*. Not all of the notes give so much information, but the text is all of this nature. The lines across the circle mark these family relationships between the pitches; generally, these follow the cycles of *sanfen sunyi* generation, but there is also a diametrical line connecting *qinggong* and *huangzhong*, and not every *sanfen sunyi* relationship is marked.

After the image he includes some text justifying the scheme, which comes to four pages. The images of the first two hexagrams appear prominently on those pages, suggesting they are central to his musical understanding. The hexagram *qian* 乾, representing primordial *yang*, is associated with *huangzhong*, while *kun* 坤, representing

primordial *yin*, is associated with *dalü*. These pitches are lowest *yang* and *yin* pitches of the normal set of twelve, respectively. In general, the text does not provide additional information to the illustration; as in Bray described this category of *tu*, the illustration itself is the argument.

By adding the additional pitches from Jing Fang's system, Liu Mu is able to make fully commensurable the pitches with the binary *Classic of Changes* system. The biological analogy, including the identification of the pitches as male and female and the process of generation, is orthodox, from the primordial account of Ling Lun's creation of the gamut from cutting bamboo, and comparing the *yang* and *yin* pitches to the sounds of the male and female phoenixes. However, Liu Mu takes it to the next level by increasing the number of elements in the system to a power of two, strictly adhering to the binary divisions that theorists of the School of Images and Numbers emphasized.

Note that despite the comprehensive use of mathematical reasoning, there are no numbers that appear in any of the diagrams in this section, aside from the ordinals of the heavenly stems. Instead, the mathematical style is permutative, focusing on arrangements and ordering. The relationships between pitches, which in other schools might be calculated numerically, are instead mystically expressed as relationships between objects in other domains, such as *yin* and *yang* energies, directions, or familial relations. Nonetheless, those relations are structural and atemporal, providing a means of taking the musical scale outside of the vagaries of time and preserving it as a cosmic invariant.

Blueprints for proper instruments

Bray's second category of *tu* includes what we would class as technical diagrams. A good example of this type of diagram is an architectural plan, either a practical blueprint or an idealized diagram specifying architectural elements. Li Jie's 李誡 (1065–1110) *Yingzao fashi* 營造法式 (“Building Standards,” 1103), the earliest intact Chinese architectural treatise, is full of such *tu* that explain building designs. As the modern scholar Feng Jiren 馮繼仁 wrote of these *tu*, “the main purpose was to provide clear information. The illustrations were intended as...a code for specialists. As part of a text written with a specialist audience in mind, they were produced for people who would know what the diagrams meant.”⁵⁶

Tu in music treatises in the Northern Song provide many of the earliest extant self-conscious and labelled illustrations (as opposed to incidental depictions) of musical instruments in the China.⁵⁷ The relatively straightforward and expositive appearance of these images is useful for scholars tracing the history of musical instruments, especially those which were adopted from neighboring music cultures.⁵⁸ However, my purpose here, besides being more narrowly restricted to the ritual musical instruments that most concerned Song musicologists, is more conceptual. I will examine how the technology of

⁵⁶ Feng Jiren, *Chinese Architecture and Metaphor*, 112–13.

⁵⁷ This was Rulan Chao Pian's observation of the *Sanli tu*, though the fact that the depicted instruments were supposed to represent ancient instruments and did not purport to represent Song musical culture made it untrustworthy for her goals. Pian, *Song Dynasty Musical Sources*, 2.

⁵⁸ For instance, the analysis of the images of “foreign” instruments in the *Yueshu* as analyzed by Filipiak, *Chen Yangs Darstellung der “barbarischen” Musikinstrumente im Buch der Musik (Yueshu)*.

illustration that developed in the eleventh century allowed these musicologists to connect with the music of their deep past.⁵⁹

In her discussion of her typology of *tu*, Bray asserts that one can usually determine quickly which of her two categories a *tu* falls into.⁶⁰ The fact that music had such a rich cosmological discourse even among scholars not inclined to systemic diagrams suggests that musical illustrations may be a good test of this statement. Take, for example, the first *tu* in the *Huangyou ji*, the *Lulu tu* 律呂圖 (“Diagram of *lulu*”) (Figure 4.1), which depicts the series of pitch pipes in the gamut. It might appear to hover in function between the two varieties, with both cosmological and practical properties. On one hand, this *tu* illustrates the generation of the gamut by the *sanfen sunyi* principle, which relies on cosmic justification. Moreover, the illustration, spread over two adjacent pages, displays a symmetry between the two sets of eight pitches, just as the bells and lithophones would be hung on the upper and lower rails of the rack of sixteen.⁶¹ However, the diagram functions more as Bray’s second class of diagram. It provides the practical information about the construction of these pitch pipes by indicating the precise measurement of each pitch pipe, both in the written numbers and in the depicted length. This feature gives it a largely didactic function, despite its connection with cosmic processes and symbolism, that fits neatly within Bray’s second category.

⁵⁹ An abridged version of this section, focusing on a prescriptive and descriptive dialectic, has been published as Lars Christensen, “Imag(in)ing Musical Instruments: Prescriptive Iconography in the Northern Song Dynasty,” *Music in Art: International Journal for Music Iconography* 43 (2018): 101–12.

⁶⁰ Bray, “Powers of Tu,” 34.

⁶¹ Bells and lithophones were sometimes hung in sets of twelve and sometimes in sets of sixteen, depending on the perceived legitimacy of the four upper-octave tones. In the case of the *Huangyou ji*, the authors argue for sixteen, and thus this set of pitch pipes fits their prescriptions.

Among illustrations intended as blueprints for ritual objects, those depicting musical instruments provide a special test of the powers of visual technology. Not only need illustrations of them need to conform to textual protocol, but, if actualized, they also need to actually be effective as musical instruments.⁶² This is especially difficult for bells and lithophones since they are idiophones, instruments in which the vibration of the instrument body as a whole (as opposed to, say, a string or membrane) produces the sound. For this reason, they cannot easily be tuned or have parts adjusted or replaced. While they can be filed or soldered to some extent to adjust the pitch or timbre, they must be sized and shaped approximately correctly to begin with in order to have a chance of working at all. In normative illustrations, these measurements and shapes are of great importance, and thus likely to be explicitly and prominently indicated.

Typologies

Considering the diversity in function and style of the six illustrated treatises under consideration here (see Chapter 1), it is instructive to consider how the treatises are constructed differently with respect to illustrations. A simple typology of these treatises can be made by examining the kind of sources the illustration is based on. Though all of these illustrations depict three-dimensional tangible objects, only certain ones were drawn based on three-dimensional tangible models. Others are drawn based on textual description, while still others are based on preexisting images that depict the object. It is also possible, and in fact typical, to have hybrid illustrations that have underlying them

⁶² Ebrey, "Replicating Zhou Bells," 179.

the bases of two or three of text, images, and artifacts, though most often one basis dominates.

Among those illustrations with a textual basis, the most important sources were the classics and their commentaries. Since music was strongly associated with ritual, the Three Ritual Classics (*sanli* 三禮, consisting of the *Record of Ritual*, *Rites and Ceremonies*, and *The Rites of Zhou*) were especially important and cited frequently; these texts are the reference in the title *Sanli tu*. However, classical citations were not always included in order to provide specific information about something; often their presence is simply to establish a venerable precedent for the object's importance and its presence in the textual tradition.⁶³ This is especially true of citations from such non-technical works as the *Classic of Songs* or the *Classic of Documents*, which provide no useful information about musical instrument design. Later sources, including dynastic histories and commentaries on classic works, were more likely to be technical, and thus were frequently cited for the exact information that they give, particularly information that could provide precise measurements for the illustration. Several works even incorporate the classical citations themselves into the illustrations.

Fewer works appear to be based on images, as illustrations were uncommon before this time. The obvious exception is the six collections of diagrams Nie Chongyi claims to have examined, which do not survive today. His primary work was synthesizing the images that appeared in these collections with the textual traditions. However, as Feng Jiren noted of Nie's architectural reconstructions, his conjectures were inevitably

⁶³ Feng Jiren noted a similar phenomenon in instances of classical quotation in architectural sources *Chinese Architecture and Metaphor*, 120.

influenced by “a more or less characteristic contemporary style that was more familiar to him.”⁶⁴ Being the earliest extant illustrations for later generations,⁶⁵ and considering the prominence of his work, his illustrations were no doubt consulted by the later writers, though depending on those writers’ own epistemologies, they may have ended up ignoring them.

Although ancient artifacts had been accidentally unearthed many times in history, they had not been used as a basis for knowledge about the past until the midpoint of the eleventh century. Instead, such discoveries were seen as auspicious omens or objects treasured for their magic power.⁶⁶ Furthermore, even if artifacts were admissible as evidence, their origins were seldom known and thus it could not be determined whether they were made according to orthodox practice; they could just as easily be intentionally discarded models or inferior imitations. For this reason, for a long time the texts, especially those that provide mathematical precision remained the most important arbiter of orthodoxy.⁶⁷ However, as more artifacts were found and patterns were observed on them, the artifacts could also serve as a basis of illustrations intended for both description and rectification.

⁶⁴ Feng Jiren, 78.

⁶⁵ The sources he used do not seem to have been passed down. Only his own work is indexed in Zheng Qiao’s records of extant images, and several of the works he drew from are listed on the records of lost images. Han Si, *A Chinese Word on Image*, 237 and 243.

⁶⁶ Hsu Ya-hwei, “Reshaping,” 25–26. Some examples of the numinous interpretations of ancient artifacts in the Han dynasty appears in Rong Geng 容庚, *Shang Zhou Yi Qi Tong Kao 商周彝器通考 [Comprehensive Study of the Sacrificial Vessels of Shang and Zhou]*, 6. Note that Huizong synthesized this supernatural view with a practical concern for artifacts as information in his bell-casting project. See Ebrey, “Replicating Zhou Bells.”

⁶⁷ Ebrey, “Replicating Zhou Bells,” 188.

Another consideration is how the treatises arrange the illustrations, which are presented somewhat differently in different treatise. The first matter is whether the illustrations are presented before the text or afterward. In the Chinese textual tradition, commentary was added interlinearly, usually in smaller writing. That is, the original (oldest) material would be placed first, and then commentaries added in historical order, even if some later commentaries refute earlier ones. This practice was so pervasive that it seems reasonable that the illustrations discussed here should continue its assumptions. In other words, the placement of images communicates whether the writers conceptualized the illustrations or the text as ontologically prior.

Among the works describing artifacts, the *Kaogutu* and *Bogutu*, not surprisingly the illustration is consistently placed first, since for them the objects reproduced in the illustrations are the object of study; perhaps they would be compared with texts, but they would be the primary object requiring exegesis. In these cases, the illustration is always followed by a copy of the inscriptions and its transcriptions,⁶⁸ and then the complete discussion of the artifact. The *Kaogutu* is more interested in context than the *Bogutu*, carefully recording the provenience of all objects or explicitly stating that it was unknown.⁶⁹ Especially in the case of the *Kaogutu*, the discussion functions as a commentary on the illustrations, which are primary. In the *Bogutu*, there are also framing essays based on classical references that open the sections on each vessel type. This

⁶⁸ The inscriptions were considered especially important because many of the scholars were mainly interested in ancient vessels as a means of correcting accumulated errors in transmitted historical texts. In particular, Ouyang Xiu, the figure most directly responsible for the revival of interest in ancient artifacts, had this purpose specially in mind. Egan, *The Problem of Beauty: Aesthetic Thought and Pursuits in Northern Song Dynasty China*, 7 and 17.

⁶⁹ Sena, "Cataloguing Antiquity," 224–25.

structure implies that the idealized classical objects discussed in them are primary, and frames these specific objects as examples to be seen within that context.⁷⁰

The *Sanli tu* is similarly organized to the *Kaogutu*. Not only are the illustrations placed first, framing the remainder as subsequent textual commentary on the image, but throughout the entire work, the images are given priority and there is little introductory material in any chapter. This supports the view that Nie Chongyi saw his main task as the collation of illustrations, using the text to resolve ambiguities but treating the illustrations as ontologically prior. The *Lishu* and *Yueshu* also follow this presentation, suggesting that they were modeled after the *Sanli tu* structure, even as they included newer findings. The *Lishu* even goes one step further, gathering all of the illustrations for each *juan* together in an opening section labeled “*Lishu* illustrations” (*Lishu tu* 禮書圖) before discussing them in order.

Among the works considered here, only the *Huangyou ji* consistently places the illustrations somewhere other than the head of the sections treating them, even though the sections are named after the illustrations (each of them designed as “such-and-such *tu*”). Instead, each section of the treatise has a substantial unillustrated introduction. Each section first cites the appropriate classical references, which are then summarized, leading up to an illustration, usually by means of the phrase *jin tu xing zhi yu zuo* 謹圖形制於左 (“a carefully rendered illustration showing the construction is on the left [i.e. follows]”). This formulation emphasizes the illustration as one part of the details of form and plan that are included within it. Following each illustration, the text recapitulates the

⁷⁰ Sena, 221.

distinctions and continues with an imploring tone to recommend the adoption of their suggestions. In contrast with all other works considered here, then, the *Huangyou ji* most consistently gives the classical references primacy, while the illustrations are instrumentalized to serve them.

Another difference in presentation is the use of captions. Nearly all of the illustrations have captions, presented either at the top of the image or in the upper left, both of which have a sense of beginning within the context of the prevailing text direction of top-to-bottom and right-to-left. The exception to this rule again is the *Huangyou ji*, which sometimes does not include a caption (when the illustrations include a great deal of text, such as the bell and lithophone) or includes it inside the illustration (in the bell-chime and lithophone-chime, where the instrument name is written on the rack itself).

The illustrations also differ with regard to the inclusion of text within the illustration. Few images anywhere in the *Sanli tu* have no textual content beyond the caption.⁷¹ For the most part, the illustrations simply provide an overall orientation to the explanation in the text itself, rather than an analytical framework or part of an intellectual argument. Similarly, the archaeological treatises never include text within the illustration, since those are the primary sources reproduced. By contrast, the illustrations in the *Huangyou ji* frequently have textual components, identifying specific features or even describing them with words. This reflects an argumentative function, where the image serves as an analytic partner to the text in the service of the practical reconstructive aim.

⁷¹ There are a handful of cases where text is included in the image, although these are comparatively rare and do not occur at all in the sections describing musical instruments.

The bell and lithophone illustrations in the *Lishu* and *Yueshu*, are also of this sort, although only the *Yueshu* includes the great amount of text in the *Huangyou ji*. Those are exceptional illustrations, however; most of the treatises are presented in the manner similar to the *Sanli tu*.

Finally, looking at the treatises more broadly, another typology can be based on the intentions and reasoning of those producing the illustration and whether they were intended as descriptive or prescriptive. Descriptive illustrations depict objects in ways that indicate what the object is or was like, in order that the object or its context may be more fully understood. Note that the objects need not really exist, that is, the illustrations may be based purely on textual description or other illustrations, but the illustration should be neutral in how it regards the object. By contrast, prescriptive illustrations depict objects as they could or should be. This type of illustration could depict objects that did not exist, serving as blueprints on how they should be constructed, but they could also depict real objects that were to be taken as models. These two intentions perhaps reflect different understandings of the *fu* in *fugu*, as the mere recovery of historical knowledge or the reconstruction of a previous era.⁷²

The principal difficulty with this typology, however, is that, due to the politicization of arguments about ritual objects during the Northern Song, nearly everything is prescriptive. Scholars were primarily interested in the past not for antiquarian curiosity but as a model for the present.⁷³ Most obvious are the works that in

⁷² See the discussion in Chapter 1 and Wu Hung, "Patterns of Returning," 16.

⁷³ This probably even applies to those interested in correcting historical records based on epigraphy. If one better understood the events of the past as they really happened, they could more appropriately be used as models for present behavior. This is the natural consequence of the traditional Chinese blame-and-praise

text explicitly frame the illustration as presenting a rectified copy that should be followed; this is particularly the case with the *Huangyou ji*. However, the images in the *Sanli tu* were also intended as models, collations of images passed down from near-antiquity outside of the textual tradition and emended in accordance with orthodox texts. The *Lishu* and the *Yueshu* continue this tradition but taking into account more recent ritual debates. Finally, the *Bogutu* was apparently compiled to guide the construction of ritual objects and recognize categories of objects not on their own terms, but in accordance with the system and terminology that appears in the *Rites of Zhou*.⁷⁴ The only treatise of the six that could reasonably be labeled descriptive is the *Kaogutu*, which sees its mission primarily as allowing those in the present to make a connection with the sages of the past.⁷⁵

In the following sections I will survey the images of bells and lithophones that appear in the treatises in light of the functional and stylistic differences noted above. The illustrations are organized into three groups. I begin with the illustrations for the single bell, which, because of the complexities of bell design, has the most detail and shows the most diversity between the treatises. Following that, I will examine lithophones. Third, I will discuss together the chimed sets of both instruments, the *bianzhong* 編鍾 and the

(*baobian* 褒貶) historiography. The most obvious example of this attitude during the Song was Sima Guang's 司馬光 (1019–1086) extremely influential work *Comprehensive Mirror and Aid to Government* (*Zizhi tongjian* 資治通鑑, 1084). Sima Guang's work was praised for his judicious integration of diverse sources. Hoyt Cleveland Tillman, "Textual Liberties and Restraints in Rewriting China's Histories: The Case of Ssu-Ma Kuang's Re-Construction of Chu-Ko Liang's Story," in *The New and the Multiple: Sung Senses of the Past*, ed. Thomas H. C. Lee (Hong Kong: Chinese University Press, 2004), 63.

⁷⁴ Sena, "Cataloguing Antiquity," 218–23.

⁷⁵ Moser, "The Ethics of Immutable Things."

bianqing 編磬. Since the treatises are organized differently and only some of the images are comparable, the order in which I discuss these is somewhat arbitrary, but bells and lithophones are nearly always treated at the beginning of sections relating to musical instruments and in that order, and I focus on them for the reasons explored in Chapter 1. To conclude, I return to how the epistemologies that frame these treatises demonstrate how the writers and illustrators used these illustrations to connect with a remote time.

Single bells

The bells depicted individually are the illustrations I examine which vary the most. The treatises reflect several different understandings of bell design, representing quite different interpretations of the descriptions in the classical sources. Because of the complexity of the design of Chinese bells, the writers seem to have recognized that the great deal of technical vocabulary would be more easily conveyed in a schematic illustration than in text. In fact, it seems possible that the need to explicate bells in particular set the standard for the use of illustrations within many of these texts, as the bell illustrations are in most cases more complex and detailed than nearly any other illustrations in the treatises.

Let us begin by examining the information about bell construction that was available in the classical sources. The principal textual source on bell design, quoted in full by all the treatises here except the archaeological ones, is a section from the *Artificer's Record* chapter of the *Rites of Zhou* that identifies the parts of the bell in their

physical order. For reasons that will become clear, I will leave the names of those parts untranslated:

甝氏爲鐘。兩樂謂之銑，銑間謂之于，于上謂之鼓，鼓上謂之鉦，鉦上謂之舞，舞上謂之甬，甬上謂之衡，鐘縣謂之旋，旋蟲謂之幹。所以縣之也，謂之旋。鐘帶謂之篆，篆間謂之枚，枚謂之景，于上之攏謂之隧。

“The House of Wild Ducks⁷⁶ makes bells. The two vertical sides are called *xian* 銑, what is between the *xian* is called *yu* 于, what is above the *yu* is called *gu* 鼓 (“striking place”), what is above the *gu* is called *zheng* 鉦, what is above the *zheng* is called *wu* 舞, what is above the *wu* is called *yong* 甬, what is above the *yong* is called *heng* 衡. That from which the bell is suspended is called *xuan* 旋, the bug on the *xuan* is called *wo* 幹.⁷⁷ The bands on the bell are called *zhuan* 篆, what is between the *zhuan* are called *mei* 枚, the *mei* are called *jing* 景. The trough above the *yu* is called the *sui* 隧.⁷⁸

The text continues on with measurements of some of the named pieces, but in general it is very difficult to understand to what the parts of a bell this long list of names could possibly refer to. These technical terms do not appear in this sense elsewhere in the classical corpus. Most of them have other meanings, but with the exception for the term *gu*, which literally means “drum” and was common in many contexts for striking or plucking an instrument, how they would apply by metaphor or metonym to a bell would be obscure. Since most people during the Northern Song, including quite learned scholars, were primarily familiar with the round bells associated with Buddhism, the

⁷⁶ Given the context, this means those in charge of making the bells. It is a formulaic beginning for each of the manufactured products in the *Artificer's Record*, most of which have an obvious connection with the categories of makers. Falkenhausen believes that the name was swapped with a group of feather-coloring artisans in error. Falkenhausen, *Suspended Music*, 65n115.

⁷⁷ This ring is erroneously labeled *gan* 幹 in many appearances; see Falkenhausen, 74n5.

⁷⁸ CTP rites-of-zhou/dong-guan-kao-gong-ji 41–42. Translation from Falkenhausen, 72–73 and 75. Falkenhausen believes this last sentence is corrupt, and it is unclear what the *jing* originally meant.

identification of so many separate parts, not explained beyond this listing of locations, would be bewildering.

Probably for this reason, the *Sanli tu* illustration of the bell (labeled the “single suspended bell” *texuanzhong* 特縣鍾, Figure 5.5) has few features that can be related to this description. Even though the passage from the *Artificer’s Record* above is quoted next to the illustration, and runs quite long by the standards of the texts accompanying other instruments, the simplicity of the illustration flatly contradicts that long enumeration of parts. Moreover, in line with all of the *Sanli tu* images, there is no text included in the image itself that could identify any of the parts of the bell described in the quotation. The bell design itself is quite simple, seemingly round and with few distinguishing features. Ironically, the rack that it is hung on is more complex and would better accommodate such a list. In the earliest extant edition of the *Sanli tu* (from 1175, in the Southern Song), the roundness is even more apparent.

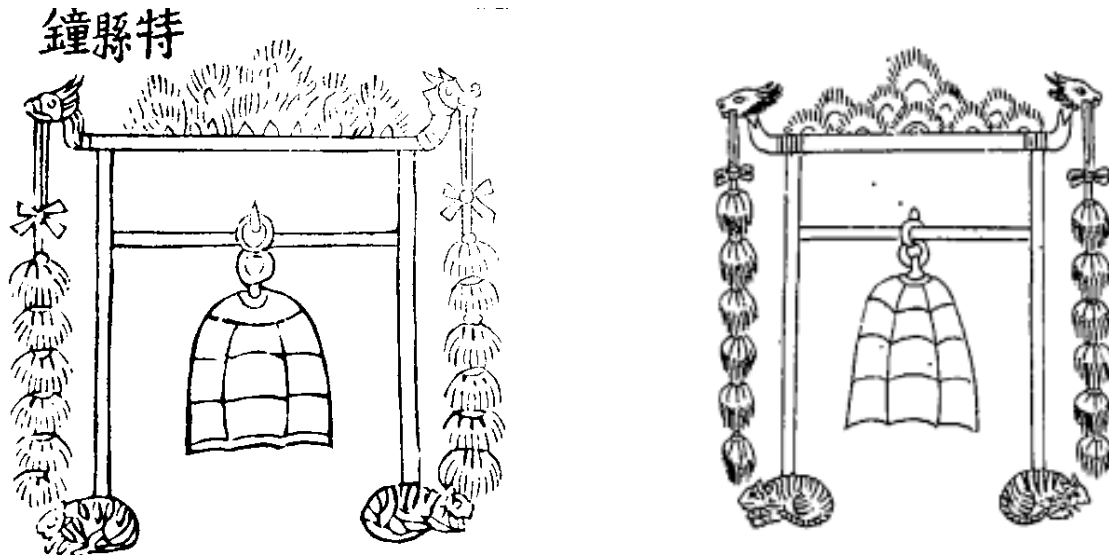


Figure 5.5: Single suspended bell (*texuanzhong* 特縣鐘) in two editions of the *Sanli tu* (a) Southern Song edition (b) SKQS ed.⁷⁹

Later, the *Sanli tu* also presents other bells that may be related to the *zhong* bell (Figure 5.6 a–c), all of which are similar to each other.⁸⁰ Though they appear in a later chapter, this is keeping with *Sanli tu* organization that is based on functional, not organological, principles.⁸¹ These three are not identical from the *zhong* that appeared earlier, but given that the text defines the first of these, the *jinzhuo* 金鑼, as a “small

⁷⁹ (a) Reproduced from the photo-offset reproduction *Xinding Sanlitu* 新定三禮圖, vol. 2 (Shanghai: Shanghai: Guji Chubanshe, 1984): 5.2. (b) SKQS ed., 5.7v.

⁸⁰ That there were many types of ancient Chinese bells was clear because of the number of names. In Falkenhhausen’s typology, which represents a consensus of archaeologists today, the *zhong* family refers to mallet-struck bells of broadly similar design that can be arranged in chimed sets (*Suspended Music*, 69). However, the typology presented there reflects a modern understanding, among archaeologists who know details about far more ancient objects than were known in Song times, and who are especially conscious of formal considerations. Falkenhhausen’s *zhong* family leaves out the *duo*, because it has a clapper. In the understanding of the *Sanli tu*, however, since it otherwise is similar in construction, it should be included here.

⁸¹ The *zhong* above, as well as the chimed *bianzhong*, lithophones, and various other musical instruments appear in *juan 5*, on the pitch-pot game (*touhu* 投壺), during which these instruments played in ensemble. These three bells, along with a more distinct one and a plethora of drums, appear in *juan 7*, on archery targets (*hou* 侯). In both cases, the musical instruments seem to be included as a matter of ritual use, rather than any organological principles.

zhong” (*xiao zhong* 小鐘), they certainly can be seen as related. The other two, the *jinnao* 金鐃 and *jinduo* 金鐸, are illustrated similarly, with slight differences in ornamentation, and the inclusion of a clapper in the *jinduo*. All of these bells appear to be round and have a rounded top, from which the handle emerges.

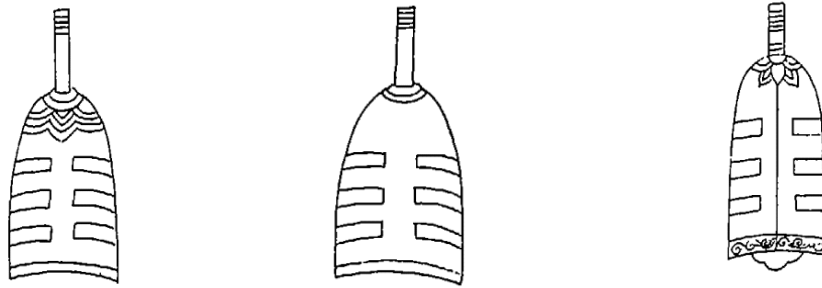


Figure 5.6: Three broadly similar bells in the *Sanli tu* (a) *jinzhuo* 金鐃 (b) *jinnao* 金鐃 (c) *jinduo* 金鐸⁸²

These three are worth mentioning because the *Lishu* and the *Yueshu* also discuss and illustrate three other kinds of bells that appear to related to these. In the works’ more organological organization, these discussions immediate follow the *zhong*. The *Lishu* illustration of the *bo* and the *Yueshu* illustration of the the *bo piao zhan* 罇剽棧 (Figure 5.7 a–b) are quite similar to each other, and resemble in many ways the *Sanli tu* style. The name of the latter of these, according to the ancient lexicon *Erya* 爾雅, appears to be an amalgamation of distinct sizes of bells,⁸³ so why it is depicted as a single bell here is

⁸² *Sanli tu*, *SKQS* ed., 7.17r, 7.18r, 7.19r.

⁸³ CTP *er-ya/shi-yue* 9. This passage identifies three kinds of bells (*zhong* 鐘), *yong* 罇 as large, *piao* 剽 as medium, and *zhan* 棧 as small. It does not mention the *bo*.

unclear. The *Yueshu* also illustrates the *yong* 鏞 (“handle”), with a distinct appearance (hanging from a rack and with a different design), but in overall shape is also similar to the *Sanli tu* precedent. In the *Yueshu*, while the text makes clear that these are generally similar in design to the *zhong*, their illustrations are far more similar in style to the *Sanli tu* bell image than the far more complex illustration provided for the *zhong* reproduced further below.

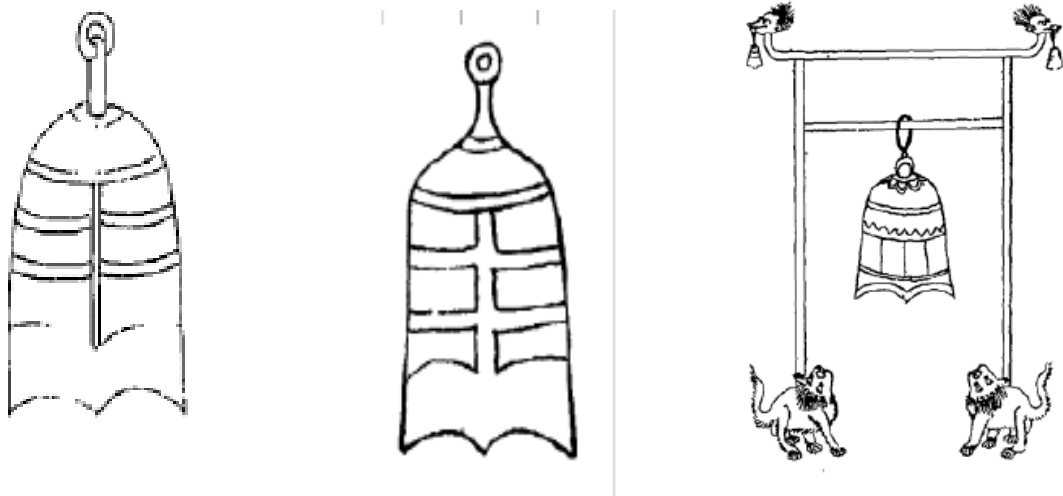


Figure 5.7: Three other bells in the *zhong* family, depicted in the style of the *Sanli tu*. (a) *Bo* in the *Lishu* (b) *Bopiao zhan* in the *Yueshu* (c) *Yong* in the *Yueshu*⁸⁴

None of these illustrations so far can be reconciled with the *Artificer’s Record* passage that describes the parts of the *zhong*. However, the depictions in the *Huangyou ji* and *Yueshu* (Figure 5.8 a–b), attempted to resolve this discrepancy using detailed analytic illustrations that are completely different in style, as well as content, from the *Sanli tu* depiction. Both diagrams identify each part of the bell and give detailed measurements

⁸⁴ (a) *Lishu*, *SKQS* ed., 120.3; (b-c) *Yueshu* *SKQS* ed., 120.7 and 109.5.

and citations (in all but one case, the *Rites of Zhou*) in descriptions connected with the relevant place by a line. In the case of the *Huangyou ji* the information simply repeats the contents of the accompanying text, allowing the diagram to function on its own without reference to the text. The illustrations in the two treatises are so similar in design that it seems almost certain that the *Yueshu* image was based on that found in the earlier work. However, the images are not identical. In the *Yueshu* illustration the bell is dwarfed by its suspension device, all the lines are far straighter, and the bosses are difficult to understand.

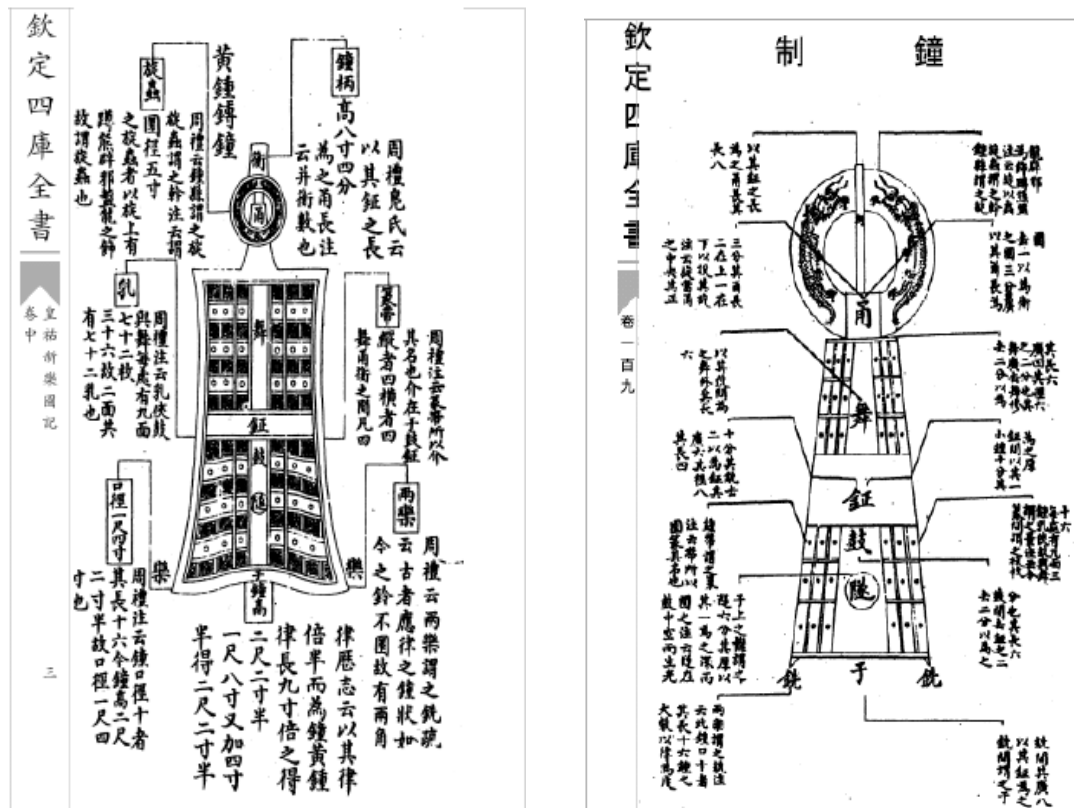


Figure 5.8: Analytic diagrams of the zhong (a) from the *Huangyou ji* (b) from the *Yueshu*⁸⁵

⁸⁵ (a) *Huangyou ji*, SKQS ed., 2.3r; (b) *Yueshu*, SKQS ed., 109.2r.

Between these two approaches, the *Lishu* (Figure 5.9) appears to offer a compromise in both style and content. Several parts of the bell are labelled (off to the side, not on the surface), but the citations do not appear directly in the picture and there are no lines connecting the parts and their referents, and only some of the parts in the *Artificer's Record* are identified. Meanwhile, the bell design was clearly influenced by the *Huangyou ji* understanding, but in overall appearance remains much more akin to the round *Sanli tu* construction, with three indentations on the bottom (compared to one in the *Huangyou ji* and a flat bottom in the *Yueshu*) and without the completely flat top to the bell that appears convincingly in the *Huangyou ji* and *Yueshu* illustrations.

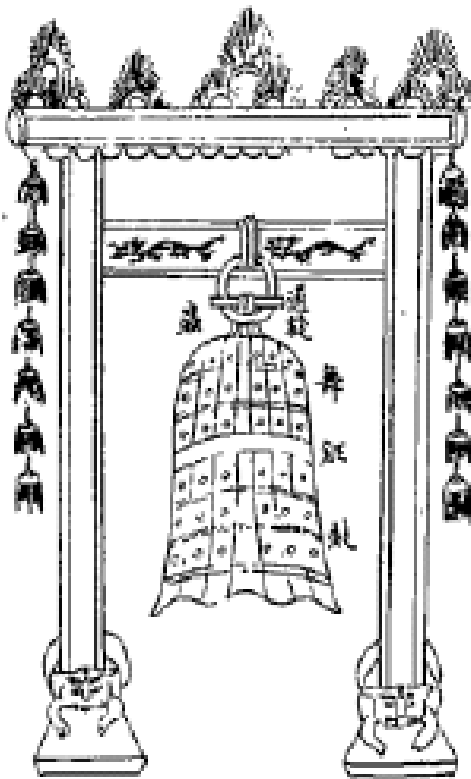


Figure 5.9: The Great Bell (*dazhong* 大鐘) in the *Lishu*⁸⁶

⁸⁶ *Lishu*, SKQS ed., 109.2v.

The details provided in the *Huangyou ji* and *Yueshu* illustrations makes much more sense alongside the prescriptions given in the *Artificer's Record* text, at least to a far greater extent than in the *Sanli tu*. The *Huangyou ji* includes in its introduction a list of seven shortcomings of the bells currently in use. These shortcomings, all rectified in the drawing, include the round shape of bells, absence of *zheng*, misplacement of *sui*, spade-shaped handle instead of *yong* and *heng*, and absence of the bug on the handle (the two other flaws concern measurement and pitch relations).⁸⁷ These objects suggest that the bells they were complaining about were similar in design to those illustrated in the *Sanli tu*, since they are all absent from that illustration.⁸⁸ Those deficiencies seem to have been remedied in the *Huangyou ji* and *Yueshu* diagrams, which are explicit about each of those features.

Where did these new details that contribute to the understanding of the *Artificer's Record* passage come from? The archaeological treatises, the first of which dates around the same time as the *Lishu*, provide the answer, in the many illustrations of bells that had been unearthed. Included in the illustrations is the first set of three bells which came to the attention of the court during the 1030s. In the *Kaogu tu*, the bells are designated *Zou* 走 (the name of the maker and the first character in their inscription), but in the *Bogu tu* they use a phrase later in the inscription, *Baohe* 寶和 (“Precious harmony”) (Figures 5.10

⁸⁷ *Huangyou ji*, SKQS ed., 1.2r–3r.

⁸⁸ Hsu Ya-hwei, “Reshaping,” 88. Unfortunately, no bells from the Song Dynasty are extant before the *Dashengyue* bells created in Huizong’s court, and there are no descriptive illustrations of the court bells that did exist, so their exact nature cannot be determined.

a–b).⁸⁹ As is typical of the illustrations of objects that appear in both works, the reproductions are quite similar to one another. Three bells and their inscriptions, all virtually identical, are separately illustrated in the *Bogutu*, while the *Kaogutu* only presents one and leaves the text to describe the differences between each.⁹⁰

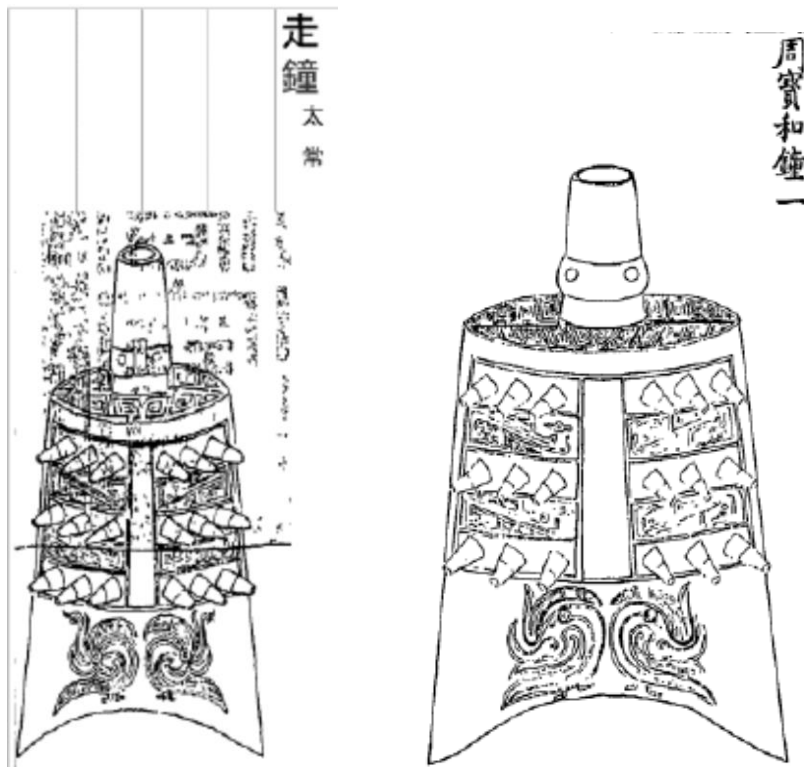


Figure 5.10: The Baohe bell, as reproduced in the archaeological treatises (a) from the *Kaogutu* (b) from the *Bogutu*⁹¹

⁸⁹ Ebrey uses the characters 寶龕, using a variant for *he* that incorporates the character *yue* 龠, meaning flute, suggesting an especially musical interpretation. Ebrey, “Replicating Zhou Bells,” 186. This character clearly appears in the inscription (as copied in the Song treatises), but nowhere else within the text of the Song treatises. I follow the usage of the Song treatises.

⁹⁰ Five bells are described in the *Kaogutu*, whereas only three in the *Bogutu*. Unfortunately, since the *Bogutu* does not cite the *Kaogutu* directly, there is no indication of why two bells were omitted. Only three bells were originally discovered, and Ebrey reports that “somewhere two other matching bells were found” for the *Kaogutu* description. Ebrey, 186. Since the other two are not illustrated in the *Kaogutu*, it is also possible that they were determined to be from some other set, and the misattribution was rectified in the *Bogutu*.

⁹¹ (a) *Kaogutu*, SKQS ed., 7.1v; (b) *Bogutu*, SKQS ed., 22.22v. In the *Kaogutu* image, the illustration is obscured by a seal.

The illustrations of the *Huangyou ji* and *Yueshu* seem to have been influenced by careful examination of the *Baohe* bells. In particular neither the separation of the bosses in two horizontal bands nor the appearance of 36 bosses have a textual precedent but they are executed in manners quite similar to the discovered bells.⁹² Once they realized how distinctive the ancient Chinese bell design was from the round bells associated with Buddhism, the referents of the *Artificer's Record* became much clearer. The conclusions of these scholars have largely stood the test of time; a diagram of bell terminology by the modern archaeologist Lothar van Falkenhausen identifies the parts mostly in the same way, with the use of writing and indicating lines in the diagram showing a remarkable similarity in presentation.

There are, however, a few minor differences. All of these authors understood the listing of bell parts as indicating parts entirely visible from the front, perhaps because of the restriction of visual epistemology inherent in treatise illustrations. This is even the case in the way the parts of the bell are identified in the text of the archaeological treatises, which measures the distance between the two *wu* to mean the dimensions of the flat top of the bell. By contrast, current scholarship believes that the *heng* and *wu* referred to the flat top of the shank and the flat top of the bell proper, respectively, and would not be especially visible from the front (Figure 5.11). Moreover, the suspension ring *wo* is fully visible from the front in the *Huangyou ji* and *Yueshu* illustrations, whereas it is now considered to lie perpendicular from that view, and hence be invisible from a frontal

⁹² Hsu Ya-hwei, "Reshaping," 89. She also argues that the dragon pattern is indebted to an examination of the bells, but I am less convinced on this point, as the decorative motif did appear in the text (an earlier passage quotes that the suspension ring *wo* "a squatting bear, coiled dragon, and *bixie*" 蹲熊盤龍辟邪), and the largest location of decoration has been replaced by another set of bosses.

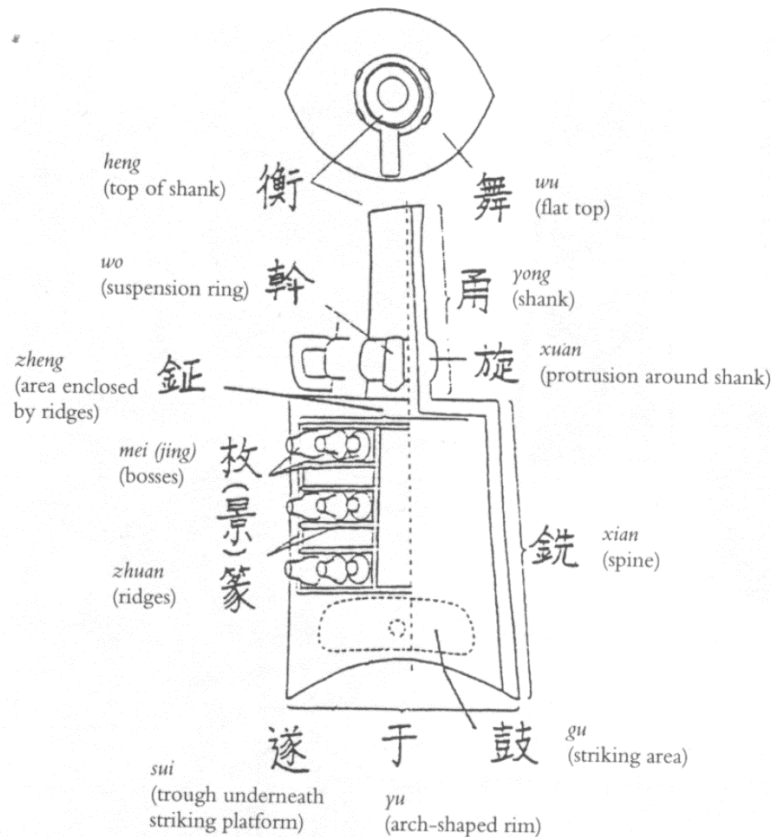


Figure 5.11: Lothar van Falkenhausen’s schematic diagram of bell design⁹³

perspective.⁹⁴ Finally, the 36 bosses are all located on the front side of the bell, with the *zheng* dividing them into upper and lower halves. It appears that while the *Huangyou ji* writers were aware that the familiar bells and those described in the *Sanli tu* were quite distinct from those described in the *Rites of Zhou*, they remained unable to understand correctly the description in their reconstructed bell design.

⁹³ Falkenhausen, *Suspended Music*, 73.

⁹⁴ It is possible that these characteristics represent intentional twisted perspective, but this seems unlikely given its absolutely flat appearance. The ring may have been intentionally emphasized (especially in the *Yueshu* illustration, where it is gigantic) because the omission of the ring in contemporary instruments is one of the errors lamented at the beginning of the *Huangyou ji*. This appearance also matches the design in the chimed bell set, where the rings appear unornamented, presumably because of their small size.

One of the other results of the increased attention paid to excavated ancient bells as a source of knowledge is the realization of the variety of ancient bell types. Several terms had been preserved in the classical texts, but it was not known if these were simply synonyms or represented significantly different designs. As bells with different appearance were discovered, some of which identified what they were in their inscriptions,⁹⁵ the diversity of ancient Chinese bell culture became clearer, although this process was just getting underway by the end of the Northern Song. The archaeological treatises also treat bells that would now be recognized as *bo* or *niuzhong*, but these terms are not systematically used in either treatise.⁹⁶ Instead, these bells, which have a rather different appearance and do not fit well into the textual explication of bell design because of their distinctive handles, are still labeled *zhong* (Figure 5.12 a–b).

⁹⁵ This is the so-called “self-naming method” (*zimingfa* 自名法). See Moser, “The Ethics of Immutable Things,” 264–65.

⁹⁶ Both of these bell types fall into Falkenhausen’s *zhong* family. There are some bells “correctly” designated as *niuzhong* in *juan 25* of *Bogutu*, but this seems to be used in description more appropriately parsed with the preceding character. For instance, one is designated the “phoenix-knob bell” *fengniu zhong* 鳳鈕鐘.

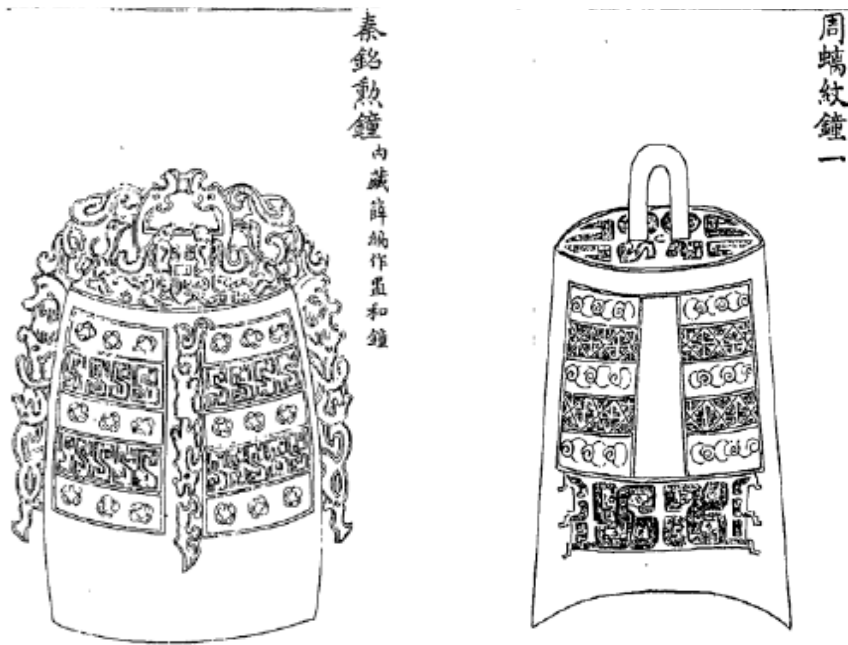


Figure 5.12: Two other types of bells depicted in the archaeological treatises. (a) Qin inscribed meritorious bell (*Qin ming xun zhong* 秦銘勳鐘) from the *Kaogutu* (b) Zhou dragon-patterned bell No. 1 (*Zhou chi wen zhong yi* 周螭紋鐘一) from the *Bogutu*⁹⁷

Single lithophones

Many of the observations for the bells are paralleled in the lithophone illustrations. In the *Sanli tu*, the “single suspended lithophone” (*texuanqing* 特懸磬) is hung just like the single bell, and the rack is of similar design, excepting the flourish above the top rail (Figure 5.13). The instrument exhibits left-right symmetry and is hung from a central right angle. This positioning contradicts the prescriptions given in the appended text (which specify that one side is longer than the other and that the central

⁹⁷ (a) *Kaogutu*, *SKQS* ed., 7.8v; (b) *Bogutu*, *SKQS* ed., 25.4v.

angle should be greater, as explained below); instead, like the bell, the image appears to have been greatly simplified.

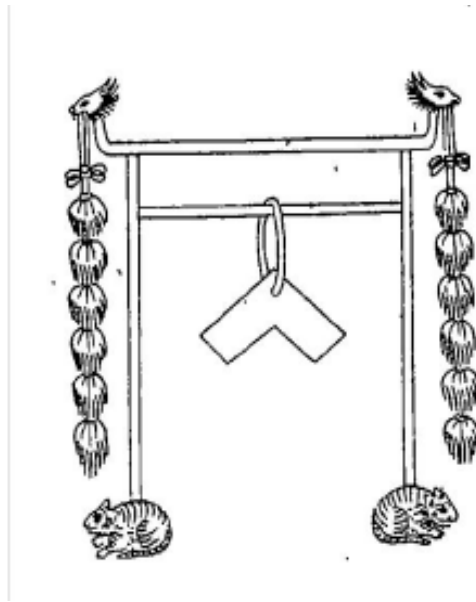


Figure 5.13: Single suspended lithophone (*texuanqing* 特縣磬) in the *Sanli tu*⁹⁸

In the illustration in the *Huangyou ji*, the lithophone is again presented as an analytic diagram with copious text (Figure 5.14). In comparison with the bell, fewer parts are identified and there are not lines connecting the names to the part in the *Huangyou ji* illustration; however, this can be explained because the lithophone parts are less numerous and allow the space to make the referents of the labels clear. The dimensions of each part are given in text in the image, even quoting the relevant *Rites of Zhou* passage in the smaller text size, appropriate for commentaries. In this case, there were no relevant archaeological finds that led to a reinterpretation of the lithophone, as happened with the bell. Instead, what seems to have changed is the conceptions

⁹⁸ *Sanli tu*, *SKQS* ed., 5.9r.

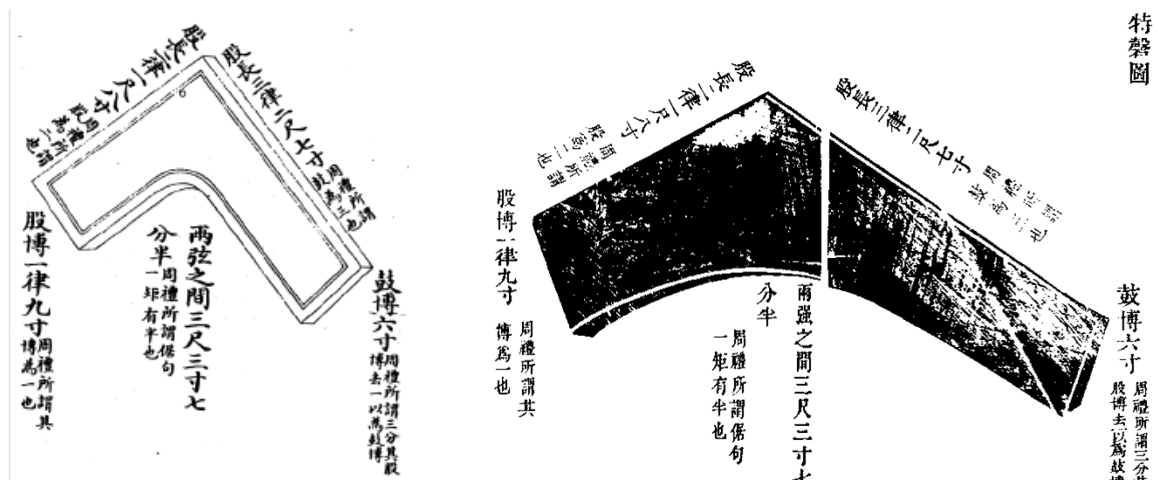


Figure 5.14: Analytic lithophone diagrams from two editions of the *Huangyou ji* (a) from the *SKQS* ed. (b) from the *Congshu jicheng* ed.⁹⁹

Unusually, the extant two versions of the *Huangyou ji*, from the *Siku quanshu* and the *Xuejin taoyuan*, have identical textual content placed in the same places, but the lithophone itself appears remarkably different in both construction and appearance. In the *Siku quanshu* version (Figure 5.14a), a ridge is clearly visible just inside the edges, while the interior area is entirely flat. The simplicity of the design is not unlike the image in the *Sanli tu*, although that image is even simpler since it does not even have a ridge. The two sides are of unequal length, as recommended by the text and distinct from the *Sanli tu* image, but the central angle is right, against what the text describes.

In the *Xuejin taoyuan* version (Figure 5.14b), however, there is no ridge, and the entire central section is raised in the woodblock, giving an effect like an untexted stele rubbing, unique among the illustrations in the work. Wu Hung has argued that the rubbing is the archetypal pre-modern visual form denoting an encounter with the

⁹⁹ (a) *Huangyou ji*, *SKQS* ed., 2.6r; (b) *Huangyou ji*, *Congshu jicheng* ed., 2.34v–35r.

vanished past, analogous to the ruins ubiquitous in European Romantic iconography.¹⁰⁰ This is entirely appropriate to the point the treatise makes about “correct” lithophones, which had vanished like the transient achievements recorded on a stele.¹⁰¹ As the treatise was not originally printed, the similarity to a rubbing, regardless of how compelling, is probably a coincidence, though perhaps one used consciously by the nineteenth-century engravers when they reproduced the work. The broader central angle and the changing thickness of the lithophone in this diagram do, however, better correspond with the descriptions given in the surrounding text as well as the text in the image itself, as explained below.

The *Yueshu* discussion of lithophones parallels its discussion of bells. The principal illustration of the singly suspended lithophone is quite similar to the *Huangyou ji* illustration (Figure 5.15), though more mechanically constructed and symmetrical. The two sides of the lithophone are of equal length even though the adjacent text specifies otherwise. There is also no hole at the apex for hanging, as appeared in the *Huangyou ji* (at least the *SKQS* edition; the other is perhaps obscured by the rubbing imagery) and every illustration in which they are hung.

¹⁰⁰ Wu Hung, *A Story of Ruins: Presence and Absence in Chinese Art and Visual Culture* (Princeton: Princeton University Press, 2012), 36 and 51.

¹⁰¹ Or, in Ouyang Xiu’s understanding, like the crumbling steles themselves. This view, however, postdates the *Huangyou ji*. Yun-Chiahn C. Sena, “Ouyang Xiu’s Conceptual Collection of Antiquity,” in *World Antiquarianism: Comparative Perspectives*, ed. Alain Schnapp (Los Angeles: Getty Publications, 2013), 212–29.

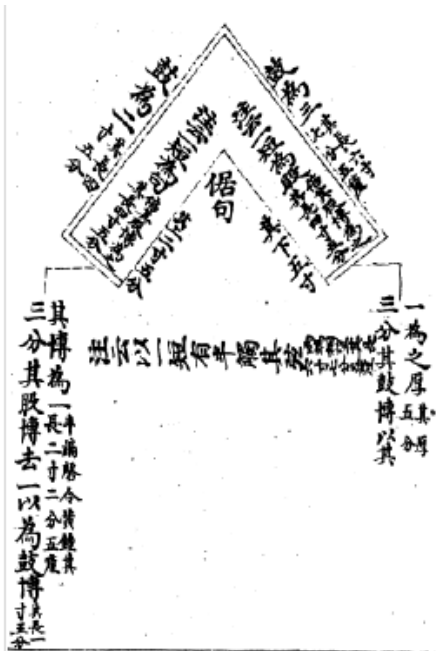


Figure 5.15: The lithophone in the *Yueshu*¹⁰²

Like in its discussion of bells, the *Yueshu* also follows the main, detailed diagram of the lithophone with three simpler (and nearly identical to one another) illustrations of different types of lithophones, ones made of stone and jade, and one for exiting (*liqing* 離磬, Figure 5.16a–c).¹⁰³ Once again, these illustrations seem to be based on the *Sanli tu* illustrations, just as the diagrammatic one was based on the *Huangyou ji*. The inclusion of these specific types of lithophones, as well as bells, is probably due to Chen’s intention of comprehensiveness. Similarly, the *Lishu* (Figure 5.17) again represents a compromise, with the simple symmetrical drawing with some explanatory text included.

¹⁰² *Yueshu*, SKQS ed., 112.2r.

¹⁰³ Of course, jade is a kind of stone, but traditional culture often placed it in separate categories. “Stone” lithophones were ordinarily made of limestone. Kin-Woon Tong, “Shang Musical Instruments: Part One,” *Asian Music* 14, no. 2 (1983): 97–100, <https://doi.org/10.2307/833936>.

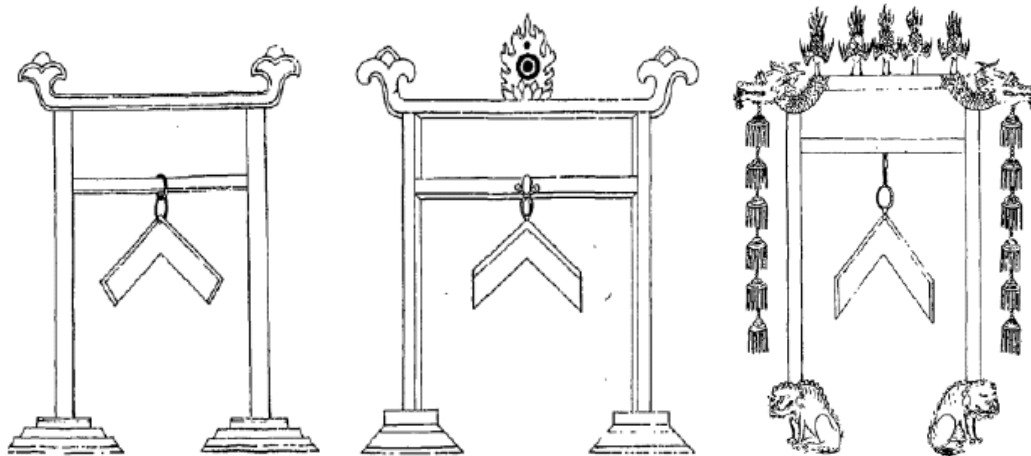


Figure 5.16: Three varieties of lithophone in the *Yueshu* (a) Stone lithophone (*shiqing* 石磬) (b) Jade lithophone (*yuqing* 玉磬) (c) exiting lithophone (*liqing* 離磬)¹⁰⁴



Figure 5.17: The Great Lithophone (*daqing* 大磬) in the *Lishu*¹⁰⁵

¹⁰⁴ *Yueshu*, SKQS ed., 112.4r, 6r, 9v.

¹⁰⁵ *Lishu*, SKQS ed., 120.1v.

The central angle and ratio of sides of the lithophone was an important point in the *Huangyou ji* argument. In the list of three faults of the lithophones in the opening section of the treatise (following the list of seven faults of the bells), the writers invoke the *Artificer's Record* passage on lithophones, designated with the incipit *Qingshi wei qing* 磬氏爲磬 (“The House of Lithophones makes the lithophones”), corresponding to the locus cited in the bell section. According to this passage, the central angle (*jugou* 倨句) should be one and a half right angles (*yi ju you ban* 一秬有半), that is, 135°, and there should be a ratio of 1:2:3 between the width (*bo* 博), thigh (*gu* 股), and striking area (*gu* 鼓).¹⁰⁶ (The third flaw refers to the timbre of the bell, which cannot be represented in the illustration.) While the text included in the illustrations reflects these characteristics, in the *SKQS* version the central angle appears right in the and the two sides have the same width (though the text specifies otherwise). Still, the illustration is more faithful than the *Yueshu* and *Lishu* versions which have similar textual prescriptions.

The archaeological treatises represent the lithophones in completely contrasting ways, that make it difficult to compare as fluently as with the bells. For one thing, there are far fewer lithophones in either work, indicating that lithophones were more fragile and less likely to survive intact enough to be worth collecting, a scarcity that archaeologists today have also noted.¹⁰⁷ Moreover, unlike the bells, there are no lithophones in common between the two works; apparently the single lithophone in the

¹⁰⁶ In the illustrations of both editions of the *Huangyou ji*, there is a textual error in the image of the right side of the lithophone. The text reads “thigh,” though it is placed next to the striking area (and opposite the correctly labelled thigh). Since the terms are homophonous (even in tone) since Middle Chinese (given the *fanqie* 公戶切 in rime dictionaries), it would be an easy mistake to make.

¹⁰⁷ Falkenhausen, *Suspended Music*, 14n29.

Kaogu tu did not make its way into the imperial collection as many artifacts did in the late Northern Song.

The *Kaogutu* contains only one lithophone (Figure 5.18), reported as from the collection of Mr. Wang of Fufeng 扶風王氏. The lithophone is identified as the *zao(?) qing* 造磬 lithophone, after an obscure character in the inscription of uncertain pronunciation, though in the analysis by Li Xueqin 李学勤, the character is simply a variant of *zao* 造 “to make.”¹⁰⁸ Curiously, considering the usually meticulous treatment of artifacts in the *Kaogu tu*, there is no discussion of the artifact beyond the inscription, so its provenience, dimensions, and material are left unclear. In appearance, this lithophone is somewhat akin to the reconstructed ones, with geometrically straight lines. No explanation is given for this omission, although the previous item (two bells without inscription) is also missing the explanation page that follows nearly every other artifact in the work. The lithophone does not really conform to the expectations of earlier textual scholars, as its horizontal symmetry clearly differs from the 1:2:3 proportion described in the *Rites of Zhou*. Nonetheless, it has straight edges, a central angle of about 135 degrees, and has an obvious hole for hanging.

¹⁰⁸ In his interpretation of the inscription, Li identifies the lithophone by its apparent ancient owner as the Duchess Huai of Qin Lithophone (秦怀后磬 *Qin Huai Hou qing*). This lithophone also appears in *the Index of Inscriptions on Bronzes of Past Dynasties (Lidai zhongding yiqi kuanshi 歷代鐘鼎彝器款識法帖)* by Xue Shangong 薛尚功 (1144), a major Southern Song antiquities catalog, where it is identified as the *jiao qing* 窖磬, in a different simplification of the same character. Li Xueqin 李学勤, “Qin Huaihou Qing Yanjiu 秦怀后磬研究,” *Wenwu 文物*, no. 1 (2001): 53–55.

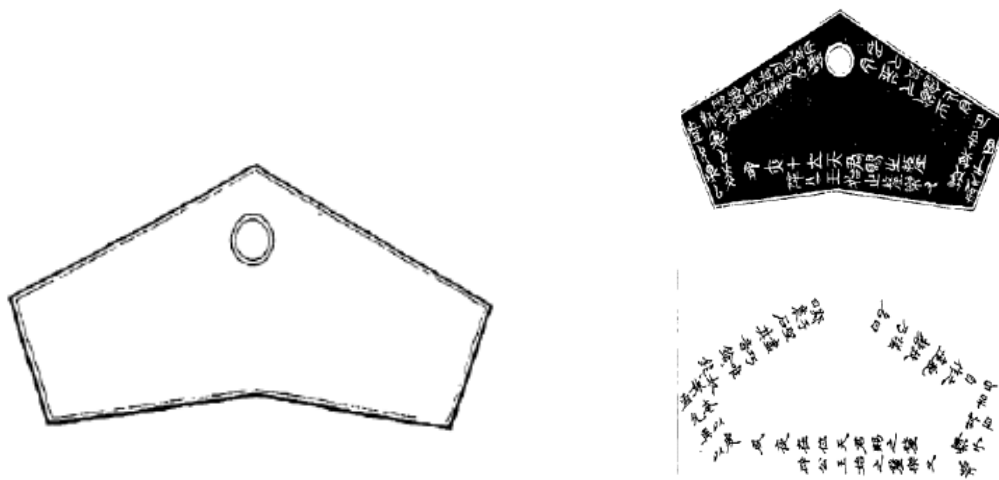


Figure 5.18: The *zao* (?) *qing* lithophone in the *Kaogutu* (a) external appearance (b) inscription, reproduced as rubbing and transcription into modern characters¹⁰⁹

The four lithophones included in the *Bogutu* are completely different in appearance. They are all made of metal and highly decorative, zoomorphic, and without any straight lines; two of them form a set (Figure 5.19). The source of the names, in the absence of inscriptions, comes from the decoration. The text itself is quite aware of the discrepancy between these objects and the lithophones described in the classics, to the point of wondering if they can be regarded as lithophones at all: “This lithophone, by contrast, is made of copper, can it be called a metal lithophone?” (是磬復以銅為，豈金

¹⁰⁹ *Kaogu tu*, SKQS ed., 7.16r–16v.

磬之謂歟?).¹¹⁰ In fact, there were some metal objects designated as lithophones made in post-classical dynasties, but these were apparently regarded suspiciously.¹¹¹

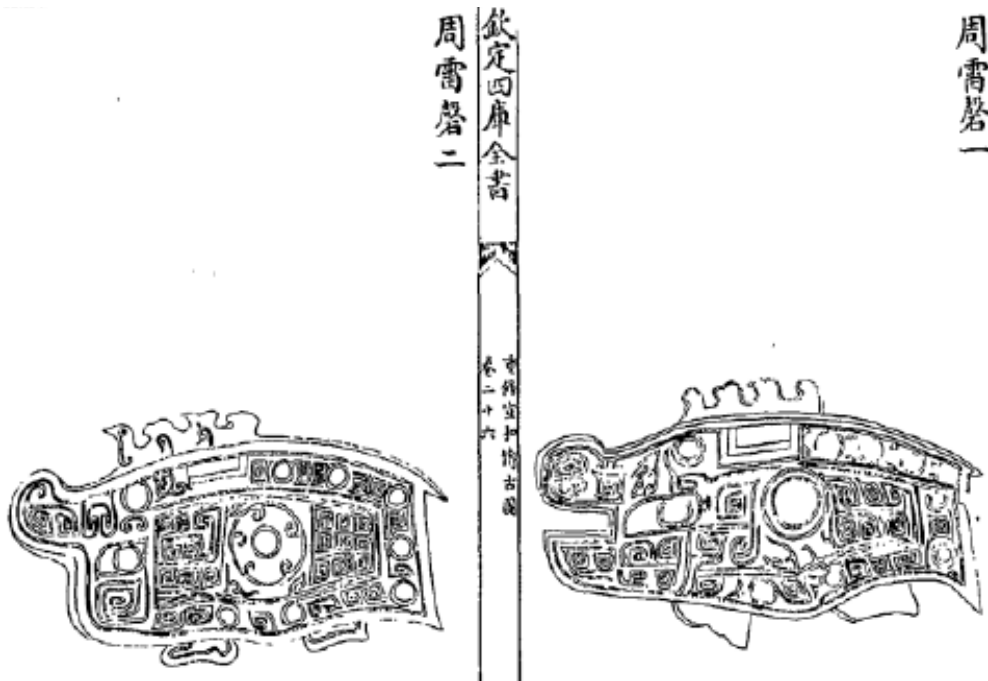


Figure 5.19: The two Zhou “thunder” lithophones (*Zhou lei qing* 周雷磬), from the *Bogutu*¹¹²

¹¹⁰ *Bogutu*, SKQS ed., 26.10v. For more discussion on how the treatise grapples with this contradiction and what purpose categorizing these as lithophones may have served, see Lars Christensen, “Ancient Lithophones in Northern Song China and the Perils of Text-Based Archaeology,” in *Studien Zur Musikarchäologie XI*, ed. Ricardo Eichmann, Fang Jianjun 方建軍, and Lars-Christian Koch (Rahden, Westfalia: Verlag Marie Leidorf, 2018).

¹¹¹ Such objects were mentioned by Du You 杜佑 in the compilation *Tongdian* 通典 (completed 801) as having been made during the Liang 梁 dynasty (502–557). Tong, “Shang Musical Instruments,” 113n12.

¹¹² *Bogutu*, SKQS ed., 26.7r–7v.

Chimed sets (bianzhong and bianqing)

I will examine the *bianzhong* and *bianqing* together, because they are consistently presented in corresponding illustrations in the treatise. In general, the illustrations include the rack that holds the instruments, and in some cases seem to have been included specifically to illustrate it. This rack (*sunju* 簏虞) composed of two upright sides (*ju* 虞) and two horizontal beams (*sun* 簏) from which the instruments were hung in equal numbers. The number of instruments in each set, whether twelve or sixteen, reflects the inclusion or absence of the four upper-octave pitches, which was a contentious point (see Chapter 3). The Chen brothers berate the practice in the accompanying text, so of course their illustrations in the *Lishu* and *Yueshu* consistently use twelve. The *Sanli tu* and *Huangyou ji* sets are arranged with sixteen bells and lithophones.

As far as can be determined of both ancient and reconstituted practice, similar racks were used for *bianzhong*, *bianqing*, and for various suspended drums. Because the racks were made of wood, they did not preserve well, and ancient versions are not recorded in the archaeological treatises. The *Bogutu* does, however, include full sets of illustrations for the sets believed to be *bianzhong*. The eight bells of the large *bianzhong* is the largest set included (on four sequential double-pages); however, since the bells are uninscribed it is not known how large the set was originally.¹¹³ The bells are presented similarly to those found individually; there is no special attempt to arrange them how

¹¹³ *SKQS* ed., 23.31r–34v.

they might have been performed originally. The *Kaogutu* also includes a set of matching bells, the aforementioned Baohe bells, though it only depicts one bell from the set.

The racks are always ornamented, but the details vary in the different illustrations. The principal textual source for the ornamentation is a sentence in the *Mingtangwei* 明堂位 (“Positions in the Hall of Brightness”) chapter of the *Record of Ritual* that describes the racks for the Three Dynasties (*sandai* 三代): “the dragon *sunju* of the Kings of Xia, the *chongya* of the Shang, the *bisha* of the Zhou” (夏后氏之龍龔虞，商之崇牙，周之璧鬯), where *sunju*, *chongya*, and *bisha* appear to mean racks in particular dynastic styles, though it is unclear how they differ from one another.¹¹⁴ Perhaps because of the central symbolic value of this instrument and its visibility in the ensemble, the ornament is described in the classic text; nearly all other interpretive reconstructions required substantial quotation from commentaries for any ornamental description.

In the *Sanli tu* (Figure 5.20) and *Huangyou ji* (Figure 3.1), the rack has a dragon head at the end of each side of the top crossbeam and a tiger at the foot of each pole (the animal at the foot is unclear in the *Huangyou ji* images, but it seems likely a tiger was intended on the basis of the *Sanli tu* precedent). Hanging from the dragons’ mouths are decorative tassels, with a crossed ornament and six (in *Sanli tu*) or seven (in *Huangyou ji*) bobs descending. On top of the crossbeam are five decorative humps, in overlapping rows (in the *Sanli tu*) or in simple clusters (in *Huangyou ji*). This is a remarkably

¹¹⁴ CTP *liji/ming-tang-wei* 23. Although the textual reference is unambiguous, I was unable to find any artifacts from the ancient period that match the specific use of dragons in the racks of musical instruments from those mentioned in Falkenhausen or So, *Music in the Age of Confucius*. In any case, they must not have been particularly widespread. There are many excavated bell and drum stands that feature humans or birds.

consistent interpretation, which suggests three possibilities: One is that the classic reference and unambiguous mention of dragon led to consistent iconography. It is also plausible that the similarities reflect the transmission of practical knowledge and instruments that stayed in use. However, since the *Huangyou ji* several times cites the *Sanli tu* as precedent, the most likely cause is direct modeling upon the latter. The treatise is also cited in the introduction to the image and although there is no specific textual reference to how the image is drawn, the authors were probably thinking about it when designing their images. As for the instruments themselves, the arrangement is not mentioned in the *Sanli tu* nor specified in the image, since it is less concerned with the practical details of the process of music making and more concerned with the overall appearance. In the *Huangyou ji* the positions of each pitch are precisely labeled, which has the further effect of emphasizing the sixteen-pitch gamut.

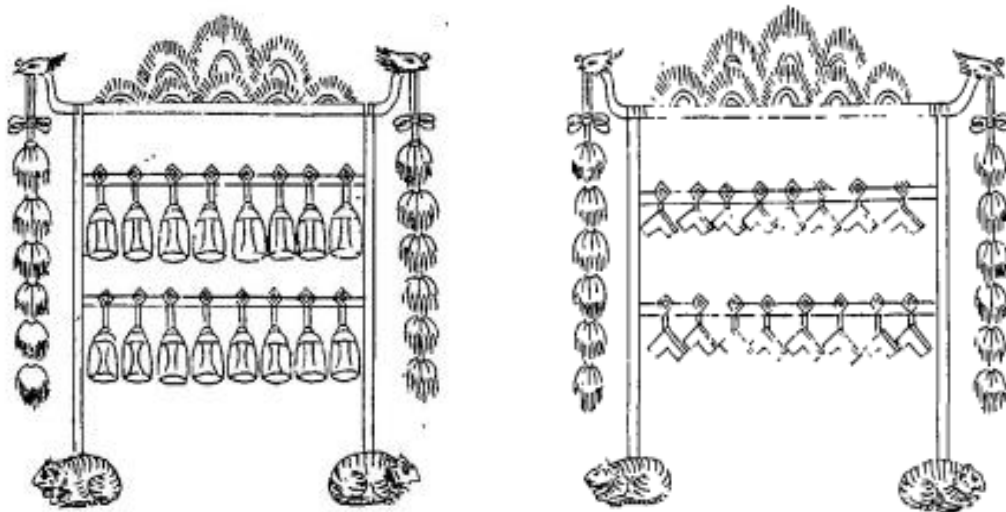


Figure 5.20: Chimed sets in the *Sanli tu* (a) *bianzhong* and (b) *bianqing*¹¹⁵

¹¹⁵ *Sanli tu*, SKQS ed., 5.11r and 12r.

The *Lishu* does not follow this precedent, though (Figure 5.21). In the sets depicted in it, the top of the crossbeam does not have dragon heads at the ends, but they do preserve the five humps. Moreover, in the decoration at the foot of each pole, the bell and lithophone sets are different; the bell rack has a mammal of some type at each foot while the lithophone rack has birds. The *Lishu* also features separate illustrations for the rack itself, which do not fully correspond to the illustrations of the rack with the instruments hung on it (Figure 5.22). In particular, the bobs hanging from the decorative tassels seem to vary arbitrarily between six and seven. An inscribed image is visible on the horizontal beams on the unloaded racks, though it is difficult to determine. I also do not know why an additional animal appears in front of the *bianzhong* rack and in no other illustrations.

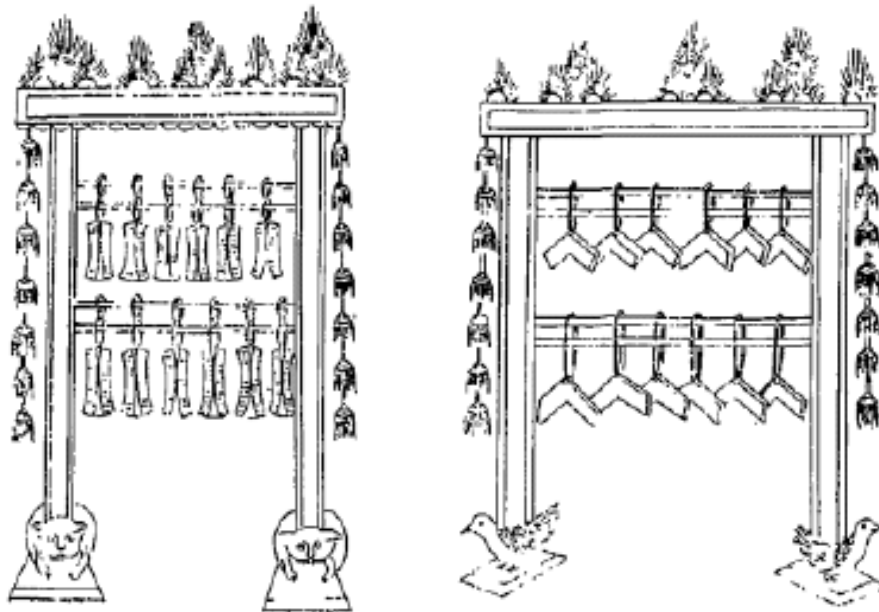


Figure 5.21: Chimed sets on their racks in the *Lishu* (a) *bianzhong* (b) *bianqing*¹¹⁶

¹¹⁶ *Lishu*, SKQS ed., 120.2r, 2v.

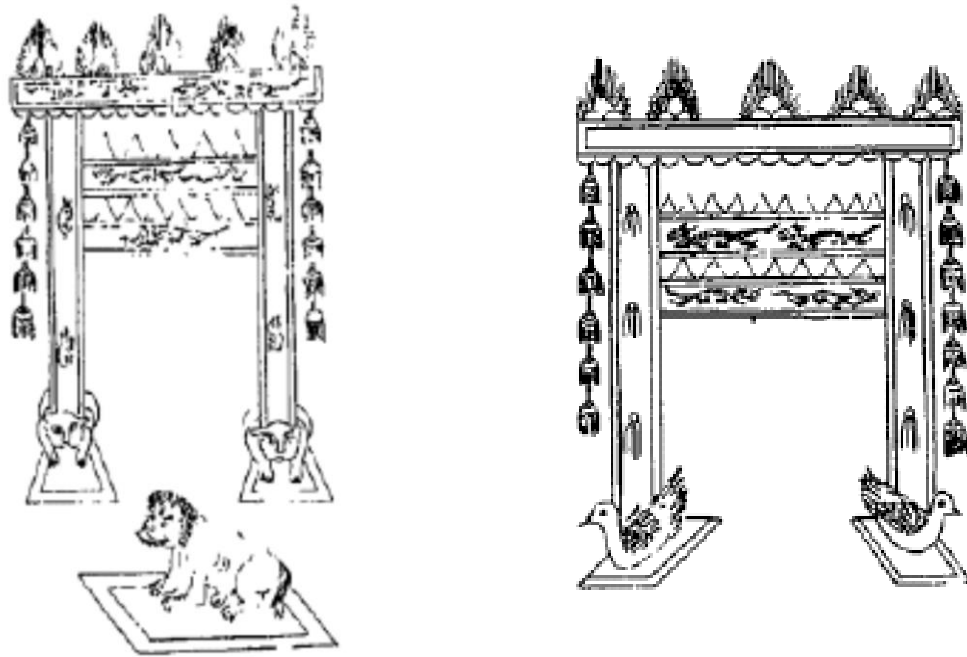


Figure 5.22 Racks for the chimed sets without instruments (a) *bianzhong* rack (*zhongju* 鐘虞) (b) *bianqing* rack (*qingju* 磬虞)¹¹⁷

The illustrations in the *Yueshu* stand out from each of these, because the racks for the *bianzhong* and *bianqing* are so different from each other (Figure 5.23). The *bianzhong* rack is similar to those in the *Lishu*, without the dragon motif but with the decorative humps on the upper rack, the seven bobs in the tassels on either side, and animals at the base of the poles. However, the *bianqing* rack features the dragon iconography without decorative humps or any bobs in the tassels, and with small stylized human figures at the base of the upright poles. This distinction is less obvious in the original treatise, since they are much further apart in pages than the corresponding illustrations of any of these other treatises, but it is nonetheless unusual. These surprising

¹¹⁷ *Lishu*, SKQS ed., 119.1v, 2r.

features of the rack are matched by the instruments themselves. In the previous treatises, the instruments themselves appear rather differently, but in general match the contrasting treatment of the bells and lithophones as depicted singly. Here, however, the bells are much more simply drawn than even the *Sanli tu*, and fully round unlike those of the *Lishu*, which more closely resemble the shape of the single bell in the *Yueshu*. Meanwhile, the lithophones are hung by three strings and not simply the hole at the central angle, and seem to have something else drooping down from both edges.

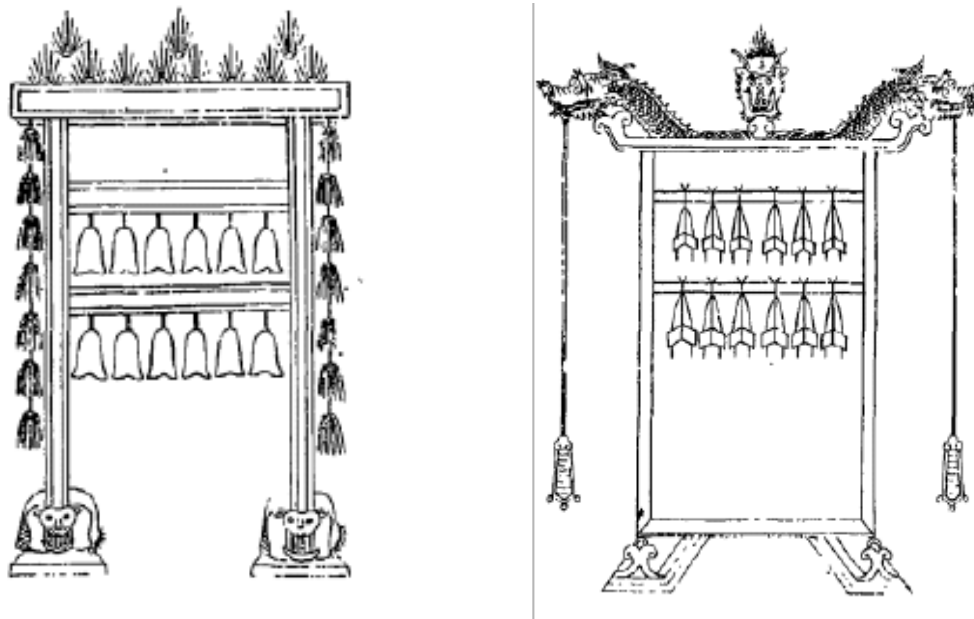


Figure 5.23: Chimed sets in the *Yueshu* (a) *bianzhong* (b) *bianqing*¹¹⁸

There are two observations true of all of these illustrations of instruments suspended from the rack that are worth noting in light of later archaeological discoveries. First, in all cases the bells and lithophones appear to be hanging freely, while excavated

¹¹⁸ *Yueshu*, *SKQS* ed., 110.2r and 112.9r.

bells, such as the remarkable set found in the excavation of the grave of Marquis Yi of Zeng in 1978 and now found at the Hubei Provincial Museum, hang at a visible tilt.¹¹⁹ Since none of the illustrations indicate much understanding of the suspension device (for instance, the suspension rings *wo* are far too large in the most precisely rendered illustrations, that of the *Huangyou ji* and *Yueshu* single bells, and are perpendicular to those that appear on excavated ancient bells), they cannot be hung in the same tight manner.

Second, in none of the image do the sizes of the bells or lithophones reflect their pitch. Although their pitches span nearly an octave or more (depending on whether the full complement is twelve or sixteen), each of the bells or lithophones appear identical in size and shape. This consistency is in sharp contrast to what had been ancient practice, which is documented in the measurements included in both archaeological treatises. Falkenhausen noted that in early China, the wall thickness of bells was held constant while the overall size varied, giving the full set a consistent timbre, whereas later sets have bells identical in size and shape but contrasting in wall thickness to yield the different pitches and inconsistent timbre.¹²⁰

In the *Sanli tu*, the identical sizes of the bells seems to be a shortcoming of the image; the text itself says that “each [bell] is sized according to its pitch” (*yi lü ge beiban er wei* 以律各倍半而爲), a quote ascribed to the *Treatise on Measurement and*

¹¹⁹ This manner of suspension suggests a basis for the term *heng* 衡, which means “steelyard arm.” Since the *heng* is the very top of the shaft of the bell, it would serve as a counterbalance to the weight of the body of the bell if hung obliquely. That they were apparently not hung this way suggests that this lexical connection was not recognized.

¹²⁰ Falkenhausen, *Suspended Music*, 95–96.

Calendrics of the *Book of Han*. It is possible also that his illustration (Figure 5.20) is not intended to be fully to scale but more representative of the orderliness of the bell set, although this explanation seems unlikely given that Chinese illustrative practice tends to make particular note of differences of size.¹²¹ More likely, it relates to the general characteristics of the *Sanli tu*, in which some depictions utterly lack a sense of scale, and hardly any ask to illustrations to be metrologically precise, as was presupposed to a certain extent in the other treatises examined here.

In contrast, the *Huangyou ji* argues that the word “each” (*ge* 各) was an error by Nie Chongyi, and the bells of each row should be identically sized for more harmony.¹²² Fittingly, then, the bells in their illustration (Figure 3.1) are identically sized. The pedantic labeling of the pitches may even serve to emphasize this point. Since both of the models for the *Lishu* and *Yueshu* depict evenly sized bells, their illustrations naturally follow suit. However, one wonders if the strict consistency that is not only possible but more easily rendered in illustrations contributed to this ideology.

¹²¹ An interesting illustration of this phenomenon is in the *Huangyou ji* depictions of tripods, where the three tripods (for cow, sheep, and pig), which are indeed supposed to be of different dimensions, are depicted as different absolute sizes on the page, even though they appear on non-adjacent pages. In other artistic traditions, it may be more typical to render them all the same size if they would not be viewed as part of the same scene. *SKQS* ed., 3.4r, 5r, 6r.

¹²² In this passage, the writers seem to be invoking a sense of harmony that considers visual factors. It seems likely they also are basing this interpretation on their own experience, as Falkenhausen states that post-Zhou bells were generally identically sized. Falkenhausen, *Suspended Music*, 95–96. However, why they did not use their apparent knowledge of the *Baohu* bells, discovered before the *Huangyou ji*, for which the measurements given in the *Bogutu* suggest that the size difference between bells of about ten percent would have been apparent to even a casual observer, is unclear.

Conclusion

As can be seen, this type of illustration served as a technology to convey a specialist knowledge, whether that was that of one well-versed in ritual canons or one dedicated to the study of material remains, and thus fits neatly within Bray's second category. However, some general differences are apparent between the sources that are worth remarking upon, both in the way they approach representation and how they also indirectly depict time.

Not surprisingly, the archaeological treatises were the most realistically drawn, since they were based on physical objects that could be examined carefully. Though a considerable degree of perspective is apparent in the illustrations in all of these treatises, in the archaeological ones it is most coherently realized, particularly with the bosses on the bells, which are rendered much more clearly and informatively than in the analytic diagrams.¹²³ Despite the ideological difference between the *Kaogutu* and the *Bogutu*, salient in the organization and textual descriptions, the illustrations themselves are generally quite similar, except in the case of the lithophones where they must represent entirely contrasting objects.

Such detail was invaluable to the artisans of the Huizong's court, who were tasked with deciding how to recreate the ancient ritual instruments effectively. Since they no longer were limited to the bafflingly contradictory specifics of the singular bell design

¹²³ Moser notes that the perspective in these treatises is not strictly photorealistic, but serves to convey information. Moser, "Why Cauldrons Come First: Taxonomic Transparency in the Earliest Chinese Antiquarian Catalogues," 13. A parallel example of twisted perspective toward such ends appears with the front finial of the Qin inscribed meritorious bell in the *Kaogutu* (Figure 5.12a).

transmitted in the classics, they could choose something that would be auspicious in the present context while within the bounds of the variety the sages had admitted. The result was the *Dashengyue* instruments, the most tangible result of the bridges forged between the musics of the past and present in the Song and representative of Huizong's performance of the role of emperor.¹²⁴

On the other hand, following Moser's understanding of Lü Dalin's ethical project, the *Kaogutu* has a rather different relationship to time.¹²⁵ It seems that these artifacts, drawn as realistically and informatively as possible, could fulfill Lü's moral mission and connect sensitive viewers with the unmediated understandings of the sages. In this way, the bells do not form a performative bridge to the past, but an edifying one, in which an appropriately prepared scholar could, by immersing himself in their design, absorb the patterns of thought known to the sages in antiquity. These patterns were themselves timeless, but because they were impossible to transmit verbally, they had declined in the intervening centuries.

On the other end of the scale of detail and precision, the *Sanli tu* illustrations are almost always the simplest among these treatises. Perhaps they had been rendered as something of a least common denominator between the different sets of illustrations Nie Chongyi had access to. Since these illustrations came from different time periods, a

¹²⁴ On the significance of Huizong taking decisive measures to recreate past music as part of his imperial persona, see Lam, "Huizong's *Dashengyue*." On the importance of auspicious imagery in the performance of emperorship, see Maggie Bickford, "Huizong's Paintings: Art and the Art of Emperorship," in *Emperor Huizong and Late Northern Song China: The Politics of Culture and the Culture of Politics*, ed. Patricia Buckley Ebrey and Maggie Bickford (Cambridge, MA and London: Harvard University Asia Center, 2006), 453–513.

¹²⁵ Moser, "The Ethics of Immutable Things."

collation emphasizing the features they had in common could certainly result in visually uncomplicated images that often contradict the textual precedents that are quoted right next to them. The *Sanli tu* is an attempt to synthesize and preserve the visual information scholars had provided over the preceding millennium, but seldom attempts to challenge them by considering new sources or reinterpreting the text.

Because they did not base their work on a visual tradition, the *Huangyou ji* writers were the most meticulous in creating illustrations that carefully depicted all of the features they considered normative. Moreover, because of the extensive use of textual labels indicating both prescriptions and the sources thereof, the illustrations can function by themselves as the entire argument for music rectification.¹²⁶ The illustrations themselves, if not the work as a whole, are the most prescriptive of any of these treatises. Although the writers clearly consulted the *Sanli tu* carefully, the *Huangyou ji* is an attempt to use the texts that precede any of Nie's visual sources as a way to access the past as it was before any surviving visual artifact. The *Huangyou ji* images convey a sense of historical distance by rejecting tradition in favor of imagining how an idealized past would be structured in its own terms. The authors attempt to circumvent the complexities of the lineage transmission and return to the root, to invoke a venerable Chinese metaphor prioritizing origins.¹²⁷ At the same time, the authors are not averse to drawing on new sources of information in developing their interpretations; their

¹²⁶ Clunas states that in some cases detailed illustrations could function as an entire argument unto themselves. This is certainly the case with the *Huangyou ji* illustrations and their embedded appeal to authority. Clunas, *Pictures and Visuality in Early Modern China*, 105.

¹²⁷ See the discussion of metaphors that shaped early Chinese philosophical discourse, particularly the tree metaphor, in Brashier, *Ancestral Memory*, 21–33.

understanding of bell design was clearly influenced by a thorough examination of the newly-discovered Baohe bells. However, while such artifacts may help understand the texts, it is still the texts that set the transcendent standards that need to be matched, in both illustrative blueprint and (eventually) reconstructed object.

The *Lishu* and *Yueshu* illustrations show the most diversity in illustrative style, perhaps because of the authors' aim to be comprehensive and draw on a variety of precedents; the style then follows the sources that they are using. Particularly where other precedents were unavailable, for instance as with the specialized types of bells and lithophones uniquely included in the works in an attempt to be comprehensive (Figure 5.7), the illustrations tend to be in the straightforward *Sanli tu* style. However, the illustrations that appear to be based on the *Huangyou ji* include correspondingly far more detail and description in the illustration. The *Yueshu* is especially diverse, given its inclusion of theoretical chapters, in which some of the diagrams fall into the style of the School of Images and Number (Figure 5.2). In each case, the *Yueshu* is more detailed than the *Lishu*, although both works seem to be aware of that the context for studies of ritual reenactment has changed in the century since the *Sanli tu*, and they must provide better justification for their views than the authority of traditional illustrations.

Despite the diversity of goals and strategies of these works and the works of the School of Images and Number, in each case the technology of illustration allowed a kind of connection with the ancient musical instruments or cosmic resonance that surpassed the power of plain text to instruct, demonstrate, argue, or edify. This power fed on itself to yield the increasing quantity and diversity of new ways of thinking about things, even very old things or things that transcend categories like age entirely.

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