# Chinese Architecture and Metaphor

## Song Culture in the *Yingzao Fashi* Building Manual

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University of Hawai'i Press, Honolulu
Hong Kong University Press

香港大學出版社
HONG KONG UNIVERSITY PRESS


First published in North America by University of Hawai'i Press
ISBN 978-0-8248-3363-3

Published in China by Hong Kong University Press
ISBN 978-988-8139-01-9

Printed in Hong Kong, China
17 16 15 14 13 12 6 5 4 3 2 1

**Library of Congress Cataloging-in-Publication Data**
Feng, Jiren.
Chinese architecture and metaphor : Song culture in the Yingzao fashi building manual / Jiren Feng.
p. cm.—(Spatial habitus)
Includes bibliographical references and index.
ISBN 978-0-8248-3363-3 (hardcover : alk. paper)
1. Architectural writing—China—History. 2. Architecture—China—History—Song-Yuan dynasties, 960–1368. 3. Li, Jie, 1035–1110. Ying zao fa shi. 4. Architecture, Chinese—Early works to 1800.
I. Title. II. Series: Spatial habitus (Series)
NA2540.F38 2012
720.951—dc23
2011032949

Printed on acid-free paper and meets the guidelines for permanence and durability of the Council on Library Resources.

Designed by Carrie Yu

Printed and bound by Paramount Printing Co., Ltd., Hong Kong, China

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## Introduction

> Between the carpenter's weight strings and marking lines [is something] close to government order and enlightenment (繩墨之間鄰於政教).
>
> Li Hua, "Hanyuandian fu" [1]

When the Tang (618–907) scholar Li Hua 李華 (715–766) composed his poetic essay dedicated to the Enfolding-Vitality Hall (Hanyuandian 含元殿, built in 663), the most magnificent building in the imperial palace compound in Chang'an 長安 (modern Xi'an), he lent a special meaning to the construction of architecture. The hall was where the court handled state affairs and held grand ceremonies. While eulogizing the virtues and deeds of Emperor Gaozong (高宗 628–683, r. 649–683), the patron of the hall, Li Hua emphasized the importance of the "grand scope and magnitude" (宏模廓度) and "majestic structure" (壯麗棟宇)[2] for the imperial palaces because these concerned state policy and moral edification. Using two fundamental carpenter's tools, *sheng* 繩 (weight strings or plumb lines) and *mo* 墨 (ink-marking lines), to represent the process of the construction of buildings, he expressed a remarkable idea: that the activity of the carpenter was in some way parallel or relevant to ideals of government. Specifically, the craftsmen's regulating process could be seen as embodying government order and virtue.

This notion reflects, more generally, the way that ancient Chinese literati perceived architecture and the built environment. From early times, many Chinese writers sang the praises of the "imperial virtues" by describing the process of the construction and striking architectural features of the majestic buildings patronized by a king or an emperor, with the implication that the architecture itself proclaimed or symbolized the ruler's wisdom and virtue. Like Li Hua, Chinese men of letters recognized the construction of architecture as representing state politics, regulations, and indoctrination. Thus, they must have been concerned about how architecture should be properly designed and built in order to conform to the standards of government.

However, few Chinese literati during and before Li Hua's time wrote about detailed technical procedures for the construction of buildings, although such a book must have been in demand in building practice. In fact, in the long history of China, works on building methods and government standards for them were not produced until the Northern Song period (960–1127). During that period, practical knowledge of architectural technology was summed up in the form of specialized monographs or building manuals, and such knowledge became available to architectural professionals and learned society alike.

This book investigates the historical tradition of Chinese architectural writing from antiquity to the Song dynasty (960–1279), with a focus on the cultural connotations of the imperially commissioned Northern Song building manual *Yingzao fashi* 營造法式 (Building standards; hereafter *YZFS*), published in 1103. The *YZFS* was written by the imperial official in the Directorate of Construction Li Jie 李誡 (1035?–1110, courtesy name Mingzhong 明仲) as a handbook of government standards for building methods, materials, and manpower. Not only the earliest but also the most comprehensive Chinese treatise on architectural technology to survive in its entirety, the *YZFS* is the most important primary text for the study of ancient Chinese architecture.

Circulated to officials in charge of public construction projects around the empire, the *YZFS* was intended to provide them with authoritative guidelines for precise architectural procedures and effective budget management. As modern scholarship has recognized, the standards set out in it were meant by the central government to reduce waste in materials and expenses and prevent peculation in the construction practices of local administrations. But this was not the only objective of the *YZFS*. By providing officials professional knowledge, it was also intended to instruct

the craftsmen who worked under the supervision of officials. Li Jie recognized the age-old problems of even a skilled craftsman making mistakes in his work and a talented official applying outdated building technology and leading construction activity in a laggardly, inefficient way.[3] Thus, it was Li Jie's intention to disseminate correct, useful building knowledge to a targeted audience, the officials and craftsmen in the construction practice. Whether craftsmen themselves actually read this work or not, it must have been Li's expectation that, by being instructed in the detailed, official standards for their individual work, they would gain the necessary knowledge from their official superintendents. Beyond such a goal, Li systematized and set down in written form practical knowledge of architecture and made it accessible to the whole of society.

After being distributed nationwide, the *YZFS* was used as an authoritative reference in official building practice for at least twenty years before the Northern Song was overturned by the Jurchen,[4] a nomadic tribe in northern China. Song texts record that some local government administrators indeed referred to the standards in the *YZFS* in the construction of public buildings. The construction projects in the imperial palace city and in the state capital Bianliang 汴梁 (modern Kaifeng 開封) administered by the Directorate of Construction, including those supervised by Li Jie himself, must also have been carried out in line with the state standards set in the treatise.

Along with the demise of Northern Song power, the *YZFS* was lost for some time. When the Southern Song (1127–1279) court promoted a nationwide search for books of the previous emperors of the Song, a copy of the text was found, and based on this copy, the *YZFS* was republished at least twice during the Southern Song period, in 1145 and during the Shaoding 紹定 period (1228–1233). None of these three Song editions has survived, except for fragments of a repaired Shaoding edition of the Yuan period (1271–1368) that were found in the storehouse of the imperial Qing (1644–1911) in the twentieth century (figure I.1). Yet the complete text has been transmitted to us through handwritten copies from the late imperial period. Indeed, the *YZFS* established an authoritative and orthodox reference not only for contemporary construction practices but also for contemporary and later-period scholars who wrote about architecture or appreciated architectural tradition. Not only was it included in large-scale imperial compilations—the *Yongle dadian* 永樂大典 (Great encyclopedia of the Yongle period, 1403–1424) and the *Siku quanshu* 四庫全書 (Complete library in the four branches of literature, 1773–1782)—but private scholars and book collectors also treasured it and copied it by hand generation

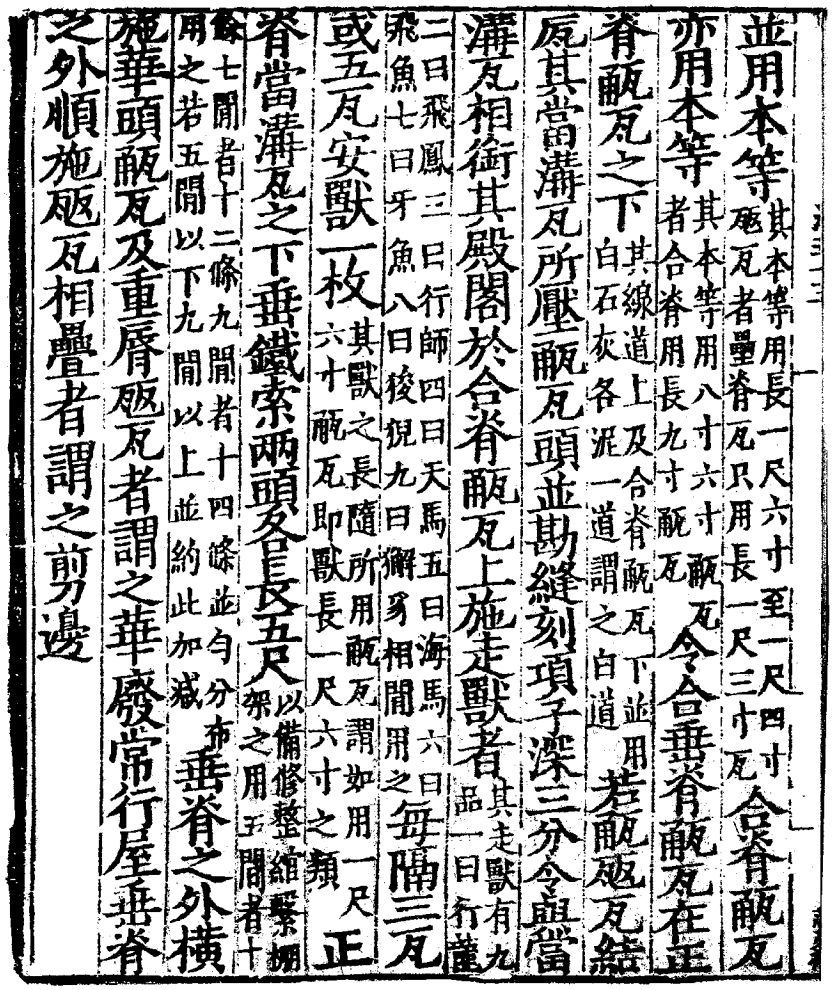

**FIGURE I.1.** Shaoding edition of the *YZFS* (*juan* 13:4b, "Tile System")

after generation. Nowadays it is recognized as the key to understanding the Chinese architectural tradition. Even more significantly, it has a special function as a cultural icon, and every scholar engaged with the history of architectural knowledge in China must reckon with it.

In thirty-four chapters, the *YZFS* records traditional and contemporary building principles and technologies, summarizing them into thirteen systems, including preliminary planning (orientation, leveling, and foundations), stonework (platforms and carving), structural construction (major carpentry), nonstructural features (minor carpentry), wood carving, wood turning, sawing, bamboo working, tile work, clay work,

polychrome-painting techniques, brickwork, and production of tiles and bricks (kilning). Among these systems, major carpentry is prominent in the promotion of architectural standardization, featuring a standard modular system based on the measurements of bracketing. The complex system of structural bracketing is one of the most distinctive traits of traditional Chinese architecture (figures I.2–I.3).

Following the standard methods of construction, the treatise stipulates standard amounts of materials, labor, and working time that are needed in executing the given construction tasks of all these building systems. The technical methods in the text involve all types of official and public buildings, from palaces, towers, and pavilions to official residential halls and governmental buildings, from city gates and walls to moats and fortifications, as well as monasteries, pagodas, and gardens. Various architectural elements and details are covered in the discourse of standard construction methods, from different kinds of tie beams and braces to every component of bracketing, from window lattices and individual elements of railings and ceilings to miniature structures inside a hall, such as revolving sutra libraries (*zhuanlunzang*轉輪藏) and wall sutra cabinets (*bizang* 壁藏). Even such architectural and technical details as water troughs under eaves (*shuicao* 水槽), aprons (*sanshui* 散水), and scaffolds (*yingjia* 鷹架) are discussed, as well as such seemingly trivial, small components as curtain-opening rods (*pilian'gan* 擗簾竿) and tree-protecting railings (*kelongzi* 棵籠子). Furthermore, six chapters of the treatise are devoted to line drawings, illustrating

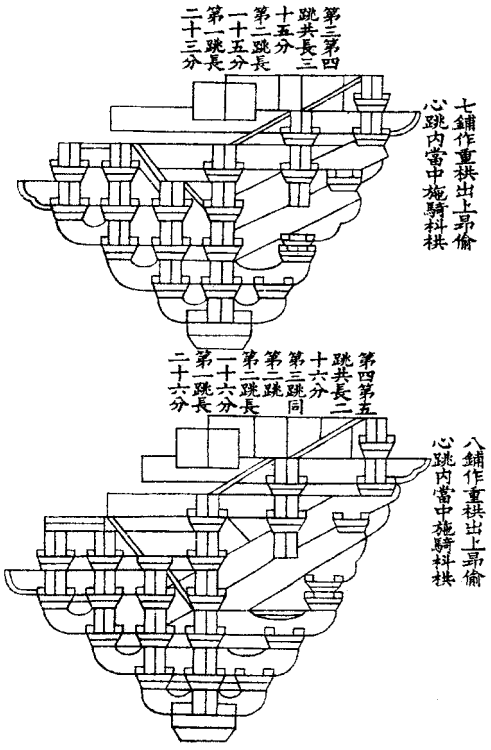


**FIGURE I.2.** *YZFS* illustration of bracketing (*juan* 30:7b, side view; 1925 edition [and hereafter])

**FIGURE I.3.** Bracketing of the Soul-Sleeping Hall (973) at the Shrine for the God of the Ji River in Jiyuan, Henan (featuring a corner bracket set, front and upward view; author photograph)

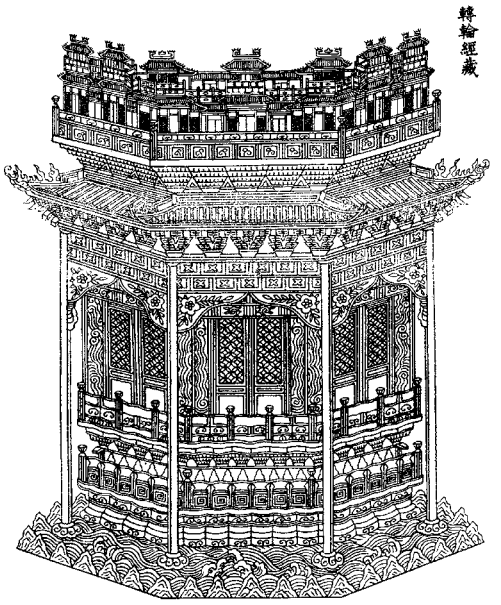


**FIGURE I.4.** *YZFS* illustration of a revolving sutra library (*juan* 32:21b)


**FIGURE I.5.** *YZFS* illustration of a carved stone platform (*juan* 29:7a)


**FIGURE I.6.** *YZFS* illustration of wood-carving motifs (*juan* 32:23a)

fundamental construction technologies and tools, major architectural components, structural methods, and decorative arts including carving, tile decorations, and color-painting motifs (figures I.4–I.7). Such a complete record of building technologies and construction methods, with rich illustrations, is unprecedented in the history of imperial China.

Modern architectural historians and sinologists have been studying the *YZFS* since the early twentieth century but have focused on its technical content (see appendix 1 for details). The scholarship initially dealt with the textual transmissions and authorship and then advanced to the structural system and building methods recorded in the text. The approach has been to compare the textual content with the wood-framed structures and

details of the few extant buildings from that period. Although the scholarship has greatly furthered our knowledge of Song building technology and the Chinese architectural system, little has been said about the broader cultural value or implications of the work. In general, the *YZFS* has been seen primarily as a work of a technical nature.

However, the *YZFS* is by no means a purely technical text. Behind the detailed technical methods and government rules are distinctive cultural factors of contemporary building practice. Uncovering these cultural elements in the *YZFS* requires a different way of reading it.

A court official in the Directorate of Construction, Li Jie was also an erudite scholar, a book collector, and a prolific writer as well as a talented calligrapher and painter. According to the inscription on his tomb tablet, which was written by the scholar Cheng Ju 程俱 (1078?–1144) on behalf of a subordinate official under Li,[5] Li produced books on diverse subjects, including geography, historical personages, paleography, musical instruments, horses, and board games. Notably, he studied some of the most influential classical works, including the *Shanhai jing* 山海經 (Classic of mountains and seas),[6] compiled between the fourth and first centuries B.C.E., and the *Shuowen jiezi* 說文解字 (Explanations of words) from the second century C.E. As a scholar oriented toward the classical tradition, he painstakingly searched for the norms and orthodoxy in the historical tradition when he was writing the *YZFS*. Despite the imperial order of producing a practical treatise, he engaged in a textual review of architectural

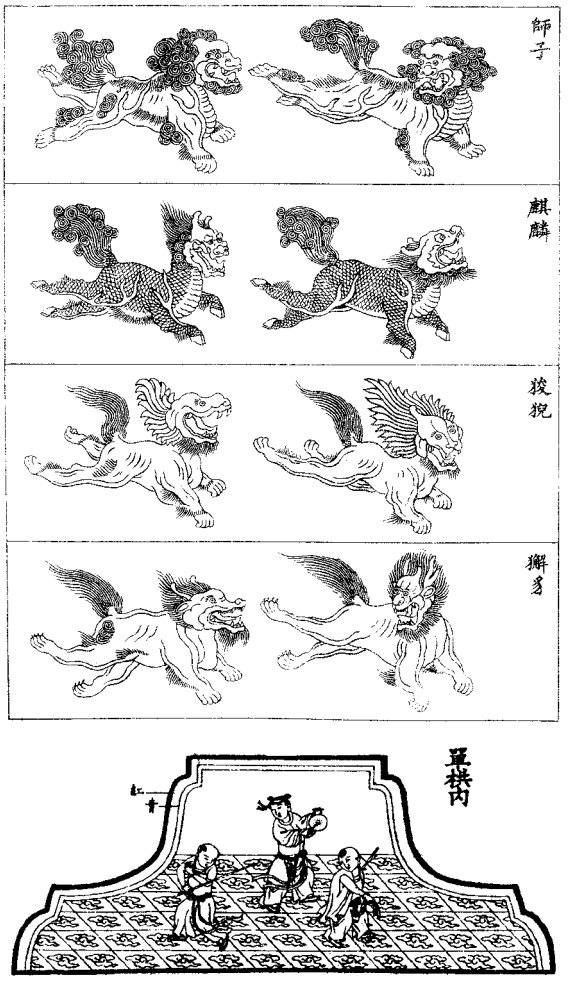


**FIGURE I.7.** *YZFS* illustrations of the color-painting system: (*top*) decorative motifs: auspicious beasts (*juan* 33:11b); (*above*) color painting on the filling board between two bracket sets, featuring frolicking boys (*juan* 34:4a)

tradition on fundamental principles, technologies, and terminology. By tracing contemporary building methods back to precedents in the classics and earlier authoritative texts, he claimed the legitimacy of the building standards he was presenting to the court and to all readers in society. This scholarship on classical architectural texts and terminology makes the *YZFS* a unique literary work on architecture.

In the quest for classical and orthodox roots for the dynasty's building standards, Li confronted the challenge of traditional sources coming into conflict with contemporary practical knowledge. Understanding Li's manner of handling such conflicts casts light on the Chinese literati's attitudes toward their cultural heritage and how they treated, absorbed, and carried it forward while introducing novel elements of their own times.

In formulating the state building standards, traditional texts were only one type of source for Li's work. As he indicates at the beginning of the *YZFS*, he organized useful building principles and specialized methods both by tracing the textual tradition in architecture and by "ordering" craftsmen to explain the technical methods and elements item by item. Among the total 3,555 entries of the text, 3,272 came from oral accounts of craftsmen while 283 entries were found in traditional texts. After setting down what craftsmen described and demonstrated to him, he consulted with his colleagues and subordinates, who were also scholars and must have had some experience of building construction just like himself.[7] So the material presented in this work is original: a combination of textual tradition, verbal accounts from craftsmen, and Li's own reexamination and synthesis of the material.

It is important to understand the relationship between Li and the craftsmen he conferred with. On the one hand, these craftsmen were working under Li's superintendence, receiving his instructions for the construction; on the other, those craftsmen played an important role in assisting Li's completion of the *YZFS*. According to Li's tomb tablet, he had been working in the Directorate of Construction for eight years when he received the imperial order to write the *YZFS* (in 1097): "The rules for examining a structure as sturdy or not, the methods of constructing buildings, and the application of a carpenter's weight strings and ink marks, all had been understood clearly [by him]" (堅窳之制、堂構之方、與繩墨之運、皆已了然於心).[8] It seems, then, that he was quite experienced in construction practices and knew a lot about architectural procedures. Nonetheless, he had craftsmen explain in detail what they knew and what they used in practice. Apparently, he found his own knowledge of

architecture insufficient and realized that he must turn to craftsmen for greater knowledge. Li organized, reexamined, and probably revised this professional knowledge and made it available to the whole country. As he intended the *YZFS* to be, this summarized knowledge in turn raised the level of building knowledge of court and local officials, men of letters, and craftsmen who read the *YZFS* or learned of its contents indirectly.

Li's acquisition of practical building knowledge from those who were constructing the buildings suggests a fascinating cultural phenomenon: there was active communication and cooperation between the two social classes of the literati and craftsmen, or the learned and the "unlearned" as commonly defined. One wonders if such communication was typical during the Song dynasty or in the entire premodern time. More generally, how did the different social groups interact with one another in the domain of architectural knowledge? Was it a unilateral communication in which scholars expanded their technical knowledge by conferring with craftsmen, as Li Jie did, or did craftsmen also consult with scholars about how to improve their work? Did scholars offer advice to craftsmen? And who was responsible for the invention of new knowledge? Did they share architectural knowledge and professional vocabulary in general? How did they depend upon and benefit from one another?

Since the technical methods in the *YZFS* are claimed to have come mostly from craftsmen's mouths, it is of interest to observe how the original practical knowledge of craftsmen was preserved in Li Jie's reworking of it. To what extent did the *YZFS* conserve popular customs and cultural elements transmitted by craftsmen and builders? For one thing, Li seems to have acquired from the craftsmen a system of specialized language: technical phrases and terminology. In the oral communication between craftsmen, it was such specialized language that was used to deliver technical substance. In the production of this language, the specific social and cultural environment to which it was exposed must have left a mark on it.

The craftsmen working under Li's supervision and serving imperial building projects must have been skilled ones recruited from different districts. Being mutually understandable among them and widely accepted in the profession, the specialized language must have had commonly recognized architectural concepts embedded in it, either traditional concepts or newly popular ones. These concepts were either expressed directly, in straightforward language, or made more complex with hidden meanings.

In particular, architectural terminology provides strong evidence of cultural encounter. When an architectural term or phrase came into being,

the words used in it—consisting usually of two or three characters, sometimes more or fewer—had to possess meanings that made sense architecturally. Specific words were chosen to describe specific building methods, structural forms, and individual elements. Sometimes the words represent structural functions or positions straightforwardly; but other times they denote structural and physical appearances metaphorically. The meanings of the words may be ambiguous, offering a challenge to later generations to interpret and understand them. In any case, naming a specific building method or element must have reflected how the technical feature was perceived. Analysis of the characters and words in the architectural terms can reveal ancient Chinese conceptions of architecture and the distinctive social and cultural settings behind them.

The professional terminology of the *YZFS* combines three kinds of language: (1) straightforward technical terms; (2) popular, sometimes vulgar, vocabulary; and (3) refined literary language. We must ask how the combination of different kinds of language developed and who were responsible for it. Did terms of vulgar language simply belong to builders and craftsmen while those of literary grace were produced by scholars or conceived by Li Jie? Did craftsmen and literati ever share this architectural vocabulary in their respective professions—the building trades and architectural scholarship? An inquiry into the semantic meaning of the words used in these terms will help trace their sources. Such an inquiry is needed to classify the technical terms and see if they were systematic, and if so, who created this systematic terminology and why.

In Western scholarship on architectural nomenclature, Robert Willis commented on the workmen's natural tendency to name things metaphorically. He explained that "this practice is easily accounted for, since these men, being unlearned, have more acquaintance with things than with the combinations and derivations of words."[9] This explanation, however, does not always reflect historical reality, and it does not apply to some periods of ancient China, including the Song. In Chinese history, the Song dynasty was associated with an extraordinarily brilliant culture and unprecedented prosperity in literary, artistic, scientific, and technological creations. The court adopted new techniques of governance by vigorously developing culture and education while discontinuing military promotions. Such a national policy not only stimulated the literati's acquisition of greater learning but also encouraged the general population to become literate and obtain education. As a consequence, literature and poetry as well as art flourished as never before, and people of

all levels of social status enjoyed fine poetry, either as composers, readers, reciters, singers, or auditors.

When workmen and craftsmen in such a culturally brilliant society as Song China were brought up with a moderate knowledge of culture or a certain degree of literacy, it could make a difference in their practice of naming technical things. They were acquainted not just with things but also with the combinations and derivations of words, and they could employ refined and poetic language when identifying technical elements. The naming then became more sophisticated and had a greater potential to turn a set of technical nomenclature into a systematic one, bearing certain popular cultural concepts. Such a metaphorical system would not have been "easily accounted for," and those who invented or developed this system, be they craftsmen or scholars or both in cooperation, would have had more intellectual capacity than the "unlearned."

It is because of the superior place of the *YZFS* in the history of Chinese architecture and culture that I have undertaken this study. I have employed a philological approach to the subject in order to explore the abundant and unique cultural implications in the architectural terminology of the *YZFS*. I analyze Li Jie's textual strategy and examine the relationship between tradition and innovation. I argue that the *YZFS*, from its format to its content, represents both the absorption of tradition and an adjustment to contemporary needs as well as innovations in technical writing. Furthermore, I look at the semantic meanings of the architectural terms that appear in various chapters, mainly the terms for bracketing, from the major carpentry system, since this is the most striking feature of Chinese architecture of the period. I pay special attention to the cultural relevance underlying the technical nomenclature.

Investigating the origin of the bracketing terminology of the *YZFS*, I consider what kind of language was used and who employed the specific words for identifying its structural or physical features. In addition, I ask to what extent the terminology is systematic in relation to architectural procedures and if there are systematic patterns of meaning or intention. As this study will reveal, a remarkable number of terms for bracketing in the *YZFS* were drawn from botanical nomenclature, especially tree and flower terminology. These bracketing terms cover individual bracketing elements, composite units, and methods for combining individual elements. I have found a systematic architectural metaphor underlying this terminology: bracketing elements are frequently likened to flowers, petals, branches, sprays, and leaves, and a whole bracket set is likened to a cluster of flowers.

With the aid of contemporary literary texts, I propose that in tenth to twelfth century China, both craftsmen and literati perceived bracket sets as flowers and flowering trees. Evidently there was a prevailing notion at the time that pillars and brackets were arrayed like groves of trees bearing lush clusters of blossom. I trace the tradition of this botanical nomenclature of bracketing and this distinctive architectural conceptualization back to early China.

In addition to this specific architectural imagery, I discuss more generally the impact of literature and the arts on the creation of architectural terminology and the relationship between craftsmen and literati in this domain. In the *YZFS*, some terms use particular words that make sense architecturally only when related to the specific terms that were used in the practice of lyric-poem compositions during the tenth to twelfth centuries. Examples can also be found in the bracketing terminology. Inquiring into the interaction between learned society and craftsmen, I argue that craftsmen themselves also employed their literary knowledge in the naming of particular architectural elements such as bracketing. This reflects the exceptionally brilliant culture and prosperity of literary creation during the Song period. Moreover, some architectural terms in the *YZFS* borrow words for particular styles of art that were prevalent in contemporary painting and sculpture. All these phenomena indicate an active interplay of literature, arts, and craftsmanship in Song China. They also suggest cooperation between the learned and the "unlearned" and shared architectural vocabulary and building knowledge during this period. The interrelationships between craftsmen and scholars played an important role in the construction of the knowledge field of architecture in premodern China.

Chapter 1 of this work examines the historical tradition of architectural literature prior to the *YZFS*, with an emphasis on the pre-Qin and Han periods. Materials from this early period were given a preference over those of later times by Li Jie. Chapter 2 discusses the rise of practical building manuals at the beginning of the Northern Song and how architectural knowledge presented in writing became an ideal. It also treats the overall social, intellectual, and technological environment that nourished the Song production of widespread architectural knowledge—the *YZFS* in the end. Chapter 3 further discusses the imperial patronages and social setting of the compilation of the *YZFS* and how Li Jie sought classical and orthodox roots for the state building standards he was formulating. In addition, the faithfulness of written architectural knowledge to the reality is examined, which shows that Li's pursuit of the classical tradition was consistent with his examination of the legitimacy of the practical methods.

The rest of the book shows how the architectural knowledge Li Jie presented in the *YZFS* reflects distinctive cultural phenomena and popular architectural concepts shared by craftsmen and literati, and how practical knowledge of architecture and the literary tradition among the Chinese resonated in Song times. Chapter 4 collects architectural terms for bracketing in the *YZFS* that employ botanical nomenclature and identifies their meanings. These terms cover the most fundamental elements and construction features of a bracket set and form a powerful metaphorical system in which bracketing elements are analogized to flowers and trees. Turning to contemporary and earlier literary sources, this chapter reveals that the craftsmen and literati had the same perception of bracketing and that such a perception reflects a distinctive architectural conceptualization. Chapter 5 looks into some architectural terms that have a close connection with literature and arts, investigates scholars' architectural knowledge, and argues for Song craftsmen's literacy, showing the way that these two social groups cooperated in creating shared architectural vocabulary and knowledge.

## Conclusion

The powerful metaphorical system formed by the bracketing terminology in the *YZFS*—bracket sets likened to clusters of flowers and bracket elements likened to flowers, petals, branches, and leaves—and the marks that literature and the arts left on both bracketing terms and other architectural names indicate just a few of the many aspects of how Song architectural methods and technical features recorded in the *YZFS* were connected with contemporary literature and culture. These aspects reflect the engagement of learned and "unlearned" culture in Song times, suggesting an interplay of the two social groups—learned society and architectural professionals—in premodern China. These cultural connotations demonstrate why the *YZFS* should be seen as more than a mere technical manual. It presents a fusion of the practical and literary traditions. Probably no other text reflects such rich cultural factors affecting Song craftsmen's architectural design and construction as does this imperial building manual.

Examining the relationship between technology and culture, this research has attempted to open a new mode of understanding architecture and its distinctive culture in imperial China—technical nomenclature encounters culture. Technical terminology can be coherently systematic, bearing a certain culture-bound meaning. To uncover such cultural implications, we must study carefully how given terms make sense in relation to actual technical (in this case, architectural) procedures. More important, we must question whether such culture-bound systematic terminology is

related to any distinctive imagery or cultural concepts that reflect the specific intellectual and social phenomena of the relevant historical times.

Through this research, we are able to know that many distinctive cultural factors were embedded in Chinese building technology. This embedding is a key to understanding how the practical and the theoretical realms interacted and how Chinese culture shaped its material surroundings and developed its intellectual ideal—in short, how it built its specific architecture of knowledge. The abundant cultural implications of the architectural terminology of the *YZFS*—and the text as a whole—add to the value of the *YZFS* as a unique literary work and as a source for traditional and contemporary building culture and beyond, a reference for the distinctive Song social system pertinent to construction practices. If we read a Chinese building manual and any technical sources with such values in mind, we will obtain from their technical relevance more than just an understanding of the technical methods.

# Notes

## Introduction

1. Li Hua, "Hanyuandian fu" 含元殿賦 (Rhapsody on the Enfolding-Vitality Hall), author's preface, in Li Fang et al., *Wenyuan yinghua*, 1:215, *juan* 48, "Fu" 賦 (Rhapsodies), "Gongshi" 宮室 (Palaces), part 2.
2. Ibid.
3. Li Jie, "Jin xinxiu *Yingzao fashi* xu" 進新修營造法式序 (Preface to [my] presentation of the newly compiled *Building Standards*), *YZFS*, 1a. More detailed discussion can be found in chap. 2.
4. Jurchen (Nǔzhēn 女真), ancestors of the Manchus who ruled the Qing (1644–1911), established the Jin 金 dynasty (1115–1234) and overthrew the Northern Song in 1127, twenty-four years after the publication of the *YZFS*.
5. See Cheng Ju, *Beishan ji*, *juan* 33:16a–20a. The epitaph was written on behalf of Fu Chongyi 傅沖益 (1066–1118), who was a subordinate official under Li Jie. It is collected as an appendix in the 1925 edition of the *YZFS*, 1a–3b.
6. For an English translation of this work, see Strassberg, *Chinese Bestiary*.
7. For Li Jie's official career and experience in construction practice before and after serving in the Directorate of Construction, see Li Jie's epitaph, in the appendices of the 1925 edition of the *YZFS*, 1a–3b. Although most of the important imperial and public building projects that Li accomplished were done after he finished the *YZFS*, the epitaph tells us that he took charge of the construction of the magnificent Five Princes' Mansions (五王邸) while writing the *YZFS*.
8. Ibid., 1b.
9. Willis, *Architectural Nomenclature of the Middle Ages*, 21.

## Chapter 1: The Historical Tradition of Writing on Architecture

1. Li Jie, "Jin xinxiu *Yingzao fashi* xu" 進新修營造法式序 (Preface to [my] presentation of the newly compiled *Building Standards*), *YZFS*, 1a. In translating the text related to the *Classic of Changes* (*Yi*), I consulted Shaughnessy, *I Ching*, "Appended Statements" 繫辭, 205–207.

2. For the authorship, dating, contents, and transmission of these two texts, see Loewe, *Early Chinese Texts*, 216–223, also 24–31.
3. Sima Qian, *Shiji*, *juan* 6, *Qinshihuang benji* 秦始皇本紀 (Basic annals of the First Emperor of the Qin), 1:255. See also Nienhauser, *Grand Scribe's Records*, 1:147–148.
4. For the authorship, dating, contents, and transmission of the *Yili* and the other five texts that follow it, see Loewe, *Early Chinese Texts*, 67–73, 229–232, 234–241, 293–296, 376–383, 415–420. For some works, such as the *Liji*, the dates of compilation span from the Warring States period (475–221 B.C.E.) to Han times, but they are discussed in this section since most of the materials in them were written during the pre-Qin period.
5. Translations of the titles of the *Yili* sections follow Loewe, *Early Chinese Texts*, 235.
6. See Zhang Erqi, *Yili Zhengzhu judu*, *juan* 4:3a.
7. Ibid., *juan* 7:8b.
8. The dates for the Zhou kings follow Loewe, *Early Chinese Texts*, 509.
9. "Guming," *Shangshu*, in Cai Chen, *Shujing jizhuan*, *juan* 6: 125–126.
10. With minor modifications, the translation follows Legge, *Chinese Classics*, 551–555. Page 552 includes detailed explanations of *fuyi* 黼扆: the ax heads on the screen were emblematic of imperial determination. In addition, Cai Chen, *Shujing jizhuan*, 125–126 and Qian Zongwu and Jiang Hao, *Shangshu*, 486–489 explain *fuyi* as the king's screen painted with a hatchet motif.
11. For instance, the excavated remains of the early Zhou architectural complex at Fengchu 鳳雛, Qishan 岐山 County, Shaanxi, present an enclosed courtyard with a main hall at its center and a gatehouse in front (south) that includes a left lobby and a right one, although there are three stairs instead of two in front of the main hall. See Shanxi Zhouyuan Kaogudui, "Shanxi Qishan Fengchucun Xizhou jianzhu jizhi fajue jianbao." Earlier examples are the palatial remains at Erlitou 二里頭, Yanshi 偃師, Henan, which is probably the site of palaces of the Xia or early Shang.
12. James Legge translates Mingtang as Hall of Distinction or Brilliant Hall, while in James T. C. Liu's language, it is Hall of Enlightenment, and Michael Loewe translates it as Hall of Holiness; see Legge, *Li Chi*, 2:28–39; James Liu, "Sung Emperors and the Ming-t'ang"; Loewe, *Faith, Myth, and Reason in Han China*, 135. The variation in interpretation is associated with various commentaries on the history of the function of the Mingtang during the Zhou dynasty. I follow Legge's "Hall of Distinction" because of its definition in the *Liji*.
13. *Liji*, chap. 14, "Mingtang wei," in *Songben Liji Zhengzhu*, *juan* 9:411.
14. Ibid.
15. Ibid., 414.
16. The translation is based on Legge, *Li Chi*, 2:34. I have made some adjustments. According to Zheng Xuan's commentary (*Songben Liji Zhengzhu*, 414) and Legge's explanation (2:34n1), the Gao gate, Ku gate, Zhi gate, and Ying gate were four of the five gates (in the order of front to rear, followed by the Lu 路 gate at the end) of the royal palace during the Zhou period. Only a few primary sources explain the literal meanings of the names of the gates, which include Zheng Xuan's explanation of *gao* as "tall" (*Songben Liji Zhengzhu*, 414). The *Erya* 爾雅 (Approaching elegance; literary exposition), the earliest Chinese dictionary, in chap. 5, "Shigong" 釋宮 (Glosses on architecture), explains, "正門謂之應門" (The front gate is called the Ying gate); see *Songben Erya*, 41; Guo Pu 郭璞 (276–324) annotates, "朝門" (court gate or reception gate). I offer my translations of *ku* 庫 and *zhi* 雉 according to my best understanding of these characters.

17. James Legge translated *shanjie* as "the capitals of the pillars with hills carved on them"; see *Li Chi*, 2:34. Most other sources interpret it as brackets with mountains carved on them. I propose another possible meaning: mountain-shaped brackets, which is based on the actual style of bracketing during the Zhou period. A typical bracket in a pre-Qin palatial building, as suggested by the architectural images on contemporary bronzes and lacquerwork, is in the form of a single huge block on the column. Such a block has roughly the shape of a mountain turned upside down. *Shanjie* may also have meant *shan* 山 (mountain) character–shaped brackets, considering the form of a single-layer arm on the column bearing three small blocks above it, two at its ends and one in the center. This form was developed as one of the common styles of bracketing from the Zhou to Han periods.
18. Duke Zhou was the younger brother of King Wu 武王 (r. 1049/45–1043 B.C.E.) and regent for the minor King Cheng (r. 1042/35–1006 B.C.E.).
19. *Yi Zhoushu*, *juan* 5:8b–9a.
20. I translate this passage based on both Kong Chao's commentary (*Yi Zhoushu*, 9a) and Li Shujun *Zhongguo gudai jianzhu wenxian zhuyi yu lunshu*, 31n23. *Fandian* 反坫 is explained with two different meanings, designating either a clay stand for wine vessels in the ceremony, as is seen in the quotation of the *Liji*, or an eave bending upward. Here I select the second meaning in consideration of the order of appearance of the term in the architectural features described. The term is placed right after *si'e* 四阿 (hip roof), the first feature described, and before *chongkang* 重亢 (overlapped purlins), *chonglang* 重郎 (two-storied structure), and *changlei* 常累 (string net under the eaves). It seems that the descriptions are written in the order of roof style and upper beam structure first, followed by other structural features like bracketing and columns, and then interior displays, concluding with stairs and walls.
21. *YZFS*, *juan* 12, section on "Zhuzuo zhidu" 竹作制度 (System of bamboo work), entry for *hu dianyan queyanwang*. It is also called *hu diange yan zhuwang* 護殿閣簷竹網 (bamboo net protecting eaves of a hall).
22. In addition to the preface (see note 1), the *Zhouli* text is cited in the *YZFS*, "Kanxiang," 3b, entry for *quzheng* 取正 (determining the directions), *juan* 1, "Zongshi" (General explanations), 7a, entry for *quzheng*.
23. See Wang Anshi, *Zhouguan xinyi*, *juan* 1, "Tianguan" 天官 (Celestial offices), 1.
24. *Shijing*, *Yongfeng* 鄘風, "Ding zhi fangzhong," Mao no. 50, which includes, "定之方中、作于楚宮。揆之以日、作于楚室" (Determining the four cardinal directions / the Chu[qiu] [楚丘] palaces were built / Observing the cardinal directions by [measuring] the sunlight [at sunrise and sunset] / the Chu[qiu] houses were established). The poem eulogizes the deed of Duke Wen of Wei 衛文公, who built palaces in Chuqiu (modern Hua County 滑縣, Henan), reestablished the state, and made it strong and powerful during the Spring and Autumn period (770–476 B.C.E.).
25. *YZFS*, "Kanxiang," 3b, entry for *quzheng*; *juan* 1, "Zongshi," 1b, entry for *gong* 宮 (palaces); *juan* 1:7a, entry for *quzheng*. The historical commentaries on this *Shijing* text cited in the *YZFS* read as follows: "定、營室也。方中、昏、正四方也。揆、度也、度日出日入以知東西。南視定、北準極、以正南北" (*Ding* means constructing buildings. *Fangzhong* corresponds to [the time of] sunset [when the *ding* star appears right in the midst of the sky], meaning determining the four cardinal directions. *Kui* is to observe, measuring the sunlight at sunrise and at sunset in order to determine east and west. To be oriented to the south, observe the *ding* star; to be oriented to the north, observe the North Star, so as to determine south and north.).
26. More detailed information of the orientation-related technologies was made available in a technology document written around the Warring States period, which was the *Kaogongji* 考工記 (Records of artificers), discussed in the next section.

27. For the whole poem and a full translation, see Legge, *Chinese Classics*, 4:437–441; Mao number 237. The translation here basically follows Legge's, but I have made some modifications, such as translating *xue* 削 as "trim" instead of "pare."
28. *YZFS*, "Jin xinxiu *Yingzao fashi* xu," 1a.
29. *Mencius*, book VI, "Gaozi" 告子, part B: "舜發於畎畝之中、傅说举于版筑之间" (Shun [ancient king] rose from the fields; Fu Yue was raised to office from amongst the builders); see Lau, *Mencius*, 282–283. Here, Fu Yue 傅说 refers to the prime minister under King Wuding 武丁 (ca. 1250–ca. 1192 B.C.E.) of the Shang. King Wuding sought talent among the ordinary and found Fu, who was a builder.
30. For a more detailed explanation, see Legge, *Chinese Classics*, 4:439n.
31. For a few archaeological remains where fragments of rammed-earth walls are found, see Wen Renjun, *Kaogongji yizhu*, 96n14. The examples that Wen presents include the Wangchenggang 王城岗 remains at Gaocheng 告成, Dengfeng 登封, Henan, which is dated to the foundation of the Xia or earlier.
32. *YZFS*, *juan* 3, "Haozhai zhidu" 壕寨制度 (System of moats and fortifications), 3b–5a, entries for *zhuji* 筑基 (building a foundation), *cheng* 城 (city [walls]), *qiang* 牆 (walls), and *zhu linshuiji* 筑臨水基 (building a waterside foundation).
33. *YZFS*, "Kanxiang," 6b–7b, entry for *qiang* (walls); *juan* 1, "Zongshi," 5a–6b, entries for *cheng* (city [walls]) and *qiang* (walls).
34. *YZFS*, *juan* 3, "System of Moats and Fortifications," 3b, entry for *zhuji* (building a foundation). *Cun* 寸 is a measure of length.
35. Mao number 189.
36. The translation is based on Legge, *Chinese Classics*, 4:305, but I have made quite a few modifications. Legge translates *ru niao si ge* 如鳥斯革 as "like a bird which has changed its feathers," which I am afraid does not make sense architecturally. In Wang Rongpei and Ren Xiuhua, *Shijing*, it is translated as "as balanced as a bird hovering" (805). In Li Shujun, *Zhongguo gudai jianzhu wenxian*, 57n8 and 59, it is interpreted as (the eaves extending) as if a bird is unfolding its wings.
37. The translations of both the title of the rhapsody and this phrase follow Knechtges, *Wen xuan*, 2:279, 289; I made only a slight modification in the translation of the phrase. See also Xiao Tong *Wenxuan* (Hong Kong 1965), *juan* 11, "Gongdian" (Palaces), 240 (236–247 for the complete work).
38. *YZFS*, *juan* 1, "Zongshi," entry for *fei'ang*, 8b. See also *juan* 4, "Damuzuo zhidu" 大木作制度 (Major carpentry system), 4b–7a, entry for *fei'ang*.
39. Further discussion can be found in chap. 4.
40. *Mozi*, *juan* 14, "Bei chengmen," 122–128.
41. *Mozi*, *juan* 1:5. The phrase *heng yi shui* 衡以水 is missing from the received text but is preserved in the same text cited in the *YZFS*; see "Kanxiang," entry for *fang*, *yuan*, *ping*, *zhi* 方圜平直 (square, circle, evenness, straightness), 1b. In the cited text, the word *xuan* 縣 has been changed to *chui* 垂. As Liang Sicheng 梁思成 has pointed out, the change of *xuan* to *chui* in the *YZFS* was owing to the taboo of using the name of the first ancestor of the Song emperors, Xuanlang 玄朗. See Liang Sicheng, *Yingzao fashi zhushi*, "Kanxiang," 9n1.
42. The Chinese title is alternatively translated as "Records of the Scrutiny of Crafts" in modern scholarship. *Kao* 考, as in the title, can mean "examine" or "inspect" but can also mean "skilled," both meanings seen in pre-Qin and Han texts. Thus, *kaogong* 考工 may mean "scrutiny of crafts," or just "skilled craftsmen" or "artificers," Wen Renjun has suggested that the title, acquired during the Han period, most likely was related to the *Kaogongshi* 考工室 (section on *kaogong*) under "Shaofu" 少府 (Assisting prefecture), an administrative prefecture during the Western Han

period (206 B.C.E.–25 C.E.). See Wen Renjun, *Kaogongji yizhu*, 153, appendix 12, "*Kaogongji* de banben yuanliu" 《考工記》的版本源流 (The origin and evolution of the editions of the *Kaogongji*).

43. The dating of the *Kaogongji* has been problematic since the Han dynasty. Among the most influential opinions of scholars in history, Zheng Xuan, the great Han-period commentator on the Confucian classics, maintained that the text was completed in its final form during the late Zhou dynasty. In modern scholarship, most scholars accept a date of the late Spring and Autumn or the early Warring States periods. For more discussions of dating, see Zhang Jingxian, "*Kaogongji*," 37–38, 48n1; Wen Renjun, *Kaogongji yizhu*, 144–153, appendix 11, "*Kaogongji* chengshu niandai xinkao" 《考工記》成書年代新考 (New research on the date of completion of the *Kaogongji*).
44. The earliest such identification is Lin Xiyi's 林希逸 (*jinshi* 進士 1235) *Juanzhai Kaogongji jie* 鬳齋考工記解 (Explanations of the *Kaogongji* written at Juanzhai). The identification was further acknowledged by Jiang Yong 江永 (1681–1762) in the Qing dynasty (1644–1911) and is generally accepted by scholars nowadays. See Zhang Jingxian, "*Kaogongji*," 48n1; Wen Renjun, *Kaogongji yizhu*, 138–139, appendixes 4 and 6.
45. Guo Moruo 郭沫若 (1892–1978) was one of the earliest scholars to propose this identification. See Guo, "*Kaogongji* de niandai yu guobie," 381–385. See also Wen Renjun, *Kaogongji yizhu*, 152–153, and "Preface," 1–2.
46. See Zhang Jingxian, "*Kaogongji*," 38, 47. Zhang exemplified the standards of the techniques and quality of production with the entry for *ziren wei yinqi* 梓人為飲器 (artisans specialized in ritual utensils make drinking utensils), which includes the *zishi*'s 梓師 (a master artisan specialized in ritual utensils) methods of examining the quality of the utensils (*shizi* 試梓 [testing the ritual-utensil artisan's product]) and the line *zishi zuizhi* 梓師罪之 (the master artisan will punish the ritual-utensil artisan for products of poor quality).
47. There remains an ongoing debate about whether or not and to what extent the work represented the actual technological systems of the Zhou dynasty. He Yeju has proposed that the urban planning theory in the *Kaogongji* represented the Zhou system of urban design and expressed an intention of the Qi to maintain the old systems of the Zhou; see He Yeju, *Kaogongji yingguo zhidu yanjiu*, 37. Shi Nianhai, in his "*Zhouli Kaogongji*," argues that the *Kaogongji* does not reflect the Zhou system (46–56). Sun Qingwei investigated excavated relics of the Zhou and found that most of them do not correspond to the descriptions of jade objects in the *Kaogongji*, and thus he proposes that the section on jade craftsmen was only an idealized description of the actual Zhou system; see Sun Qingwei, "*Kaogongji*,"115–139.
48. For the six government posts of the Zhou, see Loewe, *Early Chinese Texts*, 24.
49. Wang Anshi, "*Kaogongji* jie" 考工記解 (Explanations of the *Kaogongji*), in his *Zhouguan xinyi*, 239–265.
50. Further discussion can be found in chap. 3.
51. See Wen Renjun, *Kaogongji yizhu*, appendix 12, 154–155.
52. The other five categories are the work of managing metalwork (攻金之工), the work of managing leatherwork and armor (攻皮之工), the work of applying colors (設色之工), the work of scraping and milling (刮摩之工, including jade carving), and the work of making pottery (摶埴之工).
53. Some scholars also make use of other parts of the technologies in this text to obtain significant information related to the architecture of the pre-Qin period. For example, Yang Hongxun was able to discuss the development of the curved roof and eaves characteristic of Chinese architecture by referring to the regulation on the canopy of

a vehicle set forth under *lunren* 輪人 (wheelwrights); see Yang Hongxun, "Zhongguo gudian jianzhu aoqu wumian fashen fazhan wenti chutan," 1:7. Earlier, Lin Maozhang, in his "Zhongguo jianzhu yingzao fashi zhi yanjiu," also briefly discusses the *lunren* passage in his analysis of the methods of roof construction (49).

54. *Kaogongji*, in Wang Anshi, *Zhouguan xinyi*, appendix, part 2, 260.
55. In translating *shuidi yi xuan* 水地以縣, I consulted Li Shujun, *Zhongguo gudai jianzhu wenxian*, 15n1. In addition, Wen Renjun suggests a different interpretation of *shuidi* in his *Kaogongji yizhu*, 84–85n2. He discusses the *shuidi* 水地 (water ditch) method of finding level that emerged during the Shang period, in which water was poured into intercrossed ditches dug in the ground in order to determine level at a construction site. He interprets *shuidi yi xuan* in the *Kaogongji* as the *shuidi* method with the application of a weight rope hanging down, which, he suggests, might have been a primitive level-determining instrument with an intercrossed base that held water.
56. Wang Anshi, *Zhouguan xinyi*, *juan* 1, "Tianguan" (Celestial offices), 1.
57. *YZFS*, "Kanxiang," 3b–6b.
58. Ibid., 4a.
59. Ibid., 5b.
60. The same strategy is also used in the examination of traditional and practical methods for rammed walls and for determining the height of a roof, discussed later in this section.
61. *Kaogongji*, part 2, 260. *Li* 里 in the text is a measure of length, approximately fifteen hundred *chi* 尺. One *chi* is equal to ten *cun*. *Chi* occurs in the texts that follow and its value in ancient times is discussed in a subsequent note.
62. For a comprehensive study of the urban system of the *Kaogongji*, see He Yeju, *Kaogongji yingguo zhidu yanjiu*.
63. *Chi* 尺 is a basic unit of length of ancient China and its value varies depending on era. Thus far, no measuring instruments of the Zhou dynasty have been excavated, leaving the precise value of the Zhou *chi* unknown. During the Warring States period, it was approximately 23 cm. See Nienhauser, *Grand Scribe's Records*, 1:xxxi, "Weights and Measures"; Yin Falu and Xu Shu'an, *Zhongguo gudai wenhuashi*, 3:58, 66.
64. See Ledderose, *Ten Thousand Things*.
65. A detailed discussion of the *Mujing* can be found in chap. 2.
66. *YZFS*, *juan* 4, "Major Carpentry System," entry for *cai*, 1a–2a.
67. Tuotuo, *Songshi*, *juan* 101, *zhi* 志 (records) 54, *li* 禮 (rites) 4, *jili* 吉禮 (auspicious rites) 4, *mingtang*, 8:2472–2475. For a preliminary study and reconstruction drawings of the Mingtang patronized by Huizong, see Wang Shiren, "Mingtang meixue guan" 明堂美學觀 (The aesthetic concept of the Mingtang), in his *Lixing yu langman de jiaozhi*, 108–109.
68. *Kaogongji*, part 2, 261.
69. In translating these sentences, I consulted Wen Renjun, *Kaogongji yizhu*, 92, 95–96n13.
70. Zuoqiu Ming, *Chunqiu Zuozhuan*, 170. In translating this text, I consulted Du Yu 杜預 (222–284) and Kong Yingda's 孔穎達 (574–648) annotations and commentaries of the text; Shen Yucheng, *Zuozhuan yiwen*, 181; Li Shujun, *Zhongguo gudai jianzhu wenxian*, 78–79.
71. *YZFS*, *juan* 16–25.
72. *YZFS*, *juan* 26–28.
73. *YZFS*, "Kanxiang," 7b, entry for *qiang* (walls). In Song times, one *chi* was equal to 31.68 cm.

74. Ibid., 6b–7b: “今來筑牆制度、皆以高九尺厚三尺為祖……正與經傳相合。今謹按《周官．考工記》等群書修立下條。” (Today’s systems of building walls are all based on [the rate of] nine *chi* high and three *chi* wide . . . , [which] conforms precisely to [the records of] the classics and historical texts. Now [your subject] cautiously compiles the next item according to all books, including the “Kaogongji” of the *Zhouguan*). Wen Renjun has also pointed out the preservation in the *YZFS* of the proportion between the height of a wall and its width in the *Kaogongji*. See Wen Renjun, *Kaogongji yizhu*, 97n17.
75. *Kaogongji*, part 2, 261.
76. *YZFS*, *juan* 5, “Damuzuo zhidu” (Major carpentry system), part 2, entry for *juzhe*, 9b–11a; also “Kanxiang,” 7b–9b, entry for *juzhe*. For an illustrated explanation of the *juzhe* method, see Liang Sicheng, *Yingzao fashi zhushi*, 265.
77. *YZFS*, “Kanxiang,” 8a, entry for *juzhe*: “今來舉屋制度……雖殿閣與廳堂及廊屋之類略有增加、大抵皆以四分舉一為祖、正與經傳相合。今謹按《周官．考工記》修立下條” (Today’s systems of raising roofs . . . although [in the cases of] tower halls, residence halls, and such secondary buildings as corridors [the roof pitches are] slightly higher, [they] basically are all based on one-fourth, [which] conforms precisely to [the records of] the classics and historical texts. Now [your subject] cautiously compiles the next item according to the “Kaogongji” of the *Zhouguan*.).
78. For example, in the *Shiji* (Records from the Grand Scribe), amid the historical narrative are incidental references to architectural practices, such as the construction of the Imperial Shanglin Garden 上林苑 and the building of the mausoleum of the First Emperor of the Qin; see Sima Qian, *Shiji*, *juan* 6:256, 265; Nienhauser, *Grand Scribe’s Records*, 1:148–149, 155. In the *Huainanzi*, references to architecture occur in its critiques of contemporary social trends and morals; see Chen Guangzhong, *Huainanzi yizhu*, *juan* 9, “Zhushu xun” 主術訓 (Explanations of the arts of governing a state), 404–408. This work also includes a passage on the method of determining the four directions by observing the shadow of the sun, although the information is not accurate; see *juan* 3, “Tianwen xun” 天文訓 (Explanations of astronomy), 169–170.
79. *Zhoubi suanjing*, *juan* 1:30, *juan* 2:42.
80. *Jiuzhang suanshu*, *juan* 5:39–48, *juan* 9:86–92.
81. This dictionary was compiled on the basis of radicals. Many terms for wood-framed buildings can be found in the section under the radical *mu* 木 (wood or tree), as shown in the following: “枅、屋櫨也 。從木……古兮切” (*Ji* is a square timber block [on the capital] of a building. [It] belongs to [the radical of] wood . . . [Its] orthography is [*g* of] *gu* and [*i* of] *xi*); see Xu Shen, *Shuowen jiezi*, *juan* 6, part 1. Since Chinese architecture employed various materials, although mainly timber, architectural terms were designated by different radicals, including “earthen” (土), “stone or masonry” (石), and so on. In the compilation format of dictionaries like the *Shuowen jiezi*, these terms are not arranged in the same section as those words classified with the “wood” radical.
82. *Songben Erya*, chap. 5, 39–42. According to the definition of *gong* 宮 in the text and the whole content of the “Shigong,” I translate *gong* in the “Shigong” as “architecture” instead of “palaces.” A more detailed discussion is provided later in this section.
83. For example, in the definitions “室中謂之时、堂上謂之行、堂下謂之步、门外謂之趨、中庭謂之走、大路謂之奔” ([Walking but barely moving] inside a chamber is called *shi*; [walking slowly] in a hall is called *xing*; [marching] beside a hall is called *bu*; [hastening] outside a door is called *qu*; [walking] in the courtyard is called *zou*; [hurrying] on an avenue is called *ben*; see *Songben Erya*, 42), classical words for different

kinds of walking in different architectural settings are explained in contemporary popular language.

84. Ibid., 39.
85. Ibid., 41. In translating this sentence, I consulted Guo Pu's annotation of *wei* in the *Songben Erya*, 41.
86. In translating this sentence, I consulted Guo Pu's annotation in the *Songben Erya* (ibid.) and Hu Qiguang and Fang Huanhai, *Erya yizhu*, 211n4, 212, under entry 5.017 for *xiang* 衖 (lanes).
87. Lu Deming, *Jingdian shiwen*, *juan* 29, "*Erya yinyi*" 爾雅音義 (The pronunciations and meanings of [the words of] the *Erya*), 1626, part I, "Shigong."
88. *Songben Erya*, 39: "牖戶之間謂之扆、其內謂之家" ([The wall or the space] between the window and the door is called *yi*; the inside [space surrounded by the door and windows] is called *jia*).
89. Ibid., 40: "雞棲於弋為榤、鑿垣而棲為埘" (A roost on which a fowl rests is called *jie*; a roost made by digging a hole is called *shi*). In translating these sentences, I consulted Hu Qiguang and Fang Huanhai, *Erya yizhu*, 207–208.
90. *Songben Erya*, 41: "容謂之防" (The small curved screen [used in the rites of archery meets to protect one from arrows] is called *fang*). In translating this, I consulted Guo Pu's annotation.
91. Not to be confused with a term represented by the same character that designates structural beams or lintel beams over a door; see the two terms *liang* and *ji* that follow.
92. *Songben Eyra*, 42: "堤謂之梁、石杠謂之徛" (A bridge is called *liang*; stepping stones [placed in water for crossing a river] are called *ji*). In translating these terms, I consulted Guo Pu's annotations, in which sources for the relevant terms, such as the *Shijing*, are cited.
93. Ibid., 39–40.
94. Ibid., 39. Guo Pu annotates, "所以序別內外" (so as by which to properly distinguish the inside and the outside).
95. Ibid., 41.
96. Ibid.
97. Ibid.
98. Ibid.
99. Ibid., 40.
100. Ibid., 40–41.
101. In making my translation, I consulted Guo Pu's annotations under each definition and Hu Qiguang and Fang Huanhai, *Erya yizhu*, 208–209.
102. In the *YZFS*, the definitions of *yue* and *jiao* in the *Erya* are quoted in the "Zongshi" under the entry for *liangji* 兩際 (two side ends of a gable [or gable-hip] roof) and for *yangma* 陽馬 (corner beams), respectively; see *YZFS*, *juan* 2, "Zongshi," part 2, 2a, and *juan* 1, "Zongshi," part 1, 10b.
103. Tanaka, *Chūgoku kenchikushi no kenkyū*, chap. 2, 46–48. Tanaka's proposed reconstruction of the wood-framed structure of a pre-Qin palatial building is based on the *Erya* and other pre-Qin texts, including the *Yili* and the *Shijing*.
104. The Han-dynasty scholarship on the *Erya* was later collected from a variety of sources in which Han scholars' commentary was cited; see Zang Yongtang, *Erya Hanzhu*. During the early Northern Song period, Xing Bing 邢昺 (932–1010) and others completed a ten-chapter work on the *Erya* under the order of Emperor Zhenzong 真宗 (r. 998–1022); it was entitled *Erya zhushu* 爾雅注疏 (Commentary and annotations on the *Erya*). Other Song scholarship on the *Erya* includes Lu Dian's 陸佃 (1042–1102) twenty-chapter *Erya xinyi* 爾雅新義 (New explanation of the *Erya*), Zheng Qiao's

鄭樵 (1104–1162) three-chapter *Erya zhu* 爾雅注 (Commentary on the *Erya*), and Luo Yuan's 羅願 (1136–1184) thirty-two-chapter *Erya yi* 爾雅翼 (Supplement to the *Erya*).

105. On the authorship and editions of this work, see Loewe, *Early Chinese Texts*, 424–428.
106. Liu Xi, *Shiming*, *juan* 3 (chap. 9), section on "Shi zirong" 釋姿容 (Explanations of appearances), 36.
107. The twenty-seven chapters treat the following subjects: (1) the heavens and seasons, (2) geographical terms, (3) mountains, (4) rivers, (5) hills, (6) roads, (7) states, (8) the human body, (9) appearances and gestures, (10) terms for the older and the younger, (11) relatives, (12) languages, (13) food and drink, (14) colorful silks, (15) ornaments, (16) clothing, (17) architecture, (18) beds and canopies, (19) books and writing materials, (20) the arts (*dianyi* 典藝), (21) utensils, (22) musical instruments, (23) warriors, (24) vehicles, (25) boats, (26) diseases, (27) the burial system.
108. Liu Xi, *Shiming*, *juan* 5 (chap. 17), 84.
109. Ibid., 84–85. *She* 舍 is glossed as "於中舍息也" ([*She* is] to rest and live in it). This is one of the few examples in the "Shigongshi" in which no homophonic words are used to explain the meaning of a term.
110. Ibid.
111. Ibid.
112. Ibid.
113. Ibid., 87.
114. Ibid., 84.
115. Ibid., 87–89.
116. Ibid., 87: "斗在欒兩頭、如斗也" (*Dou* are [installed] on the two ends of a curved arm and are like a peck [measure]).
117. The author is also known as Zhaoming Taizi 昭明太子 (Crown Prince Zhaoming of the Liang [502–557]). The *Wenxuan* comprises more than thirty types of literary writings from the late Zhou to Liang periods. These writings include rhapsodies, poems, linked verse, laudatory writings, prefaces to literary works, imperial edicts, imperial orders, reports to the emperor, memorializing documents submitted to the emperor, official calls to arms, eulogies, discussions on histories, epigraphy, funeral eulogies, tomb memorial tablets, funeral orations, and so on. For a complete English translation, see Knechtges, *Wen xuan*.
118. These works include Sima Xiangru's 司馬相如 (ca. 180–117 B.C.E., courtesy name Changqing 長卿) "Shanglin fu" 上林賦 (Rhapsody on the Shanglin [Imperial Hunting Park]), which extols the Shanglin Park of Emperor Gaozu 高祖 (r. 206–195 B.C.E.) of the Han; Yang Xiong's 揚雄 (53 B.C.E.–18 C.E., courtesy name Ziyun 子雲) "Ganquan fu" 甘泉賦 (Rhapsody on the Ganquan [Palace]), which extols the Ganquan Palace built by Emperor Wu 武帝 (r. 140–87 B.C.E.); Ban Gu's 班固 (32–92, courtesy name Mengjian 孟堅) "Dongdu fu" 東都賦 (Rhapsody on the Eastern Capital) and "Xidu fu" 西都賦 (Rhapsody on the Western Capital); Zhang Heng's 張衡 (78–139, courtesy name Pingzi 平子) "Dongjing fu" 東京賦 (Rhapsody on the Eastern Capital) and "Xijing fu" 西京賦 (Rhapsody on the Western Capital); and Three Kingdoms–period Zuo Si's 左思 (ca. 250–ca. 306, courtesy name Taichong 太沖) "Sandu fu" 三都賦 (Rhapsody on the Three Capitals), which depicts architectural features of the capital cities of the Wei 魏 (220–265), the Shu 蜀 (221–263), and the Wu 吳 (222–280) kingdoms. See Xiao Tong, *Wenxuan* (Hong Kong 1965), *juan* 1–8 (1–170).
119. Ibid., *juan* 11 (230–236). As mentioned in my discussions on the *Shijing* poem "Sigan" in the section on "Incidental Evidence in Classics and Philosophy" of this chapter, the

*Jingfudian fu* depicts the imperial palace (built in 232) of Emperor Ming of the Wei (220–265) in Xuchang.

120. Ibid., 233. The translation is based on Knechtges, *Wen xuan*, 2:269–271. I have made some modifications.
121. In addition to the poems of the *Shijing*, works in the *Chuci* 楚辭 (Songs of Chu), an anthology of poems composed by poets of the south, also include incidental references to architecture. For instance, Qu Yuan's 屈原 (ca. 343–ca. 277 B.C.E.) "Zhaohun" 招魂 (Summoning the soul) includes depictions of architectural decorations of the imperial sacrificial hall; see Zhou Binggao, *Xinbian Chuci suoyin*, 57–61.
122. Cai Yong, *Mingtang yueling lun*.
123. See Cui Bao, *Gujinzhu*. *Duyi* is the second of a total of eight categories; specific architectural terms are glossed in this category. Also see Zhang Yi, *Guangya*, 81–84, *juan* 7.
124. On the *Wenxuan* anthology, see note 117.
125. See *Sanfu huangtu*, 1–29. Anonymous authors, but the original text had been cited in the works of several commentators from the Three Kingdoms and early Jin to Southern Dynasties (420–589) periods. The text was enlarged during the Tang period. See He Qinggu, *Sanfu huangtu jiaoshi*, "Preface," 1–5.
126. See Yang, Xuanzhi, *Luoyang qielan ji*, 1–52. "Qielan" in the title is alternatively pronounced "jialan" by modern scholars. For an English translation, see Yi-t'ung Wang, *Record of Buddhist Monasteries in Lo-yang*.
127. *Sanfu huangtu*, *juan* 3, section on "Weiyanggong" (Weiyang Palace).
128. Ibid., *juan* 2, section on "Hangong" 漢宮 (Han palaces).
129. Ibid., *juan* 1, section on "Qingong" 秦宮 (Qin palaces).
130. Ibid., *juan* 4, section on "Chizhao" 池沼 (large ponds).
131. Li Mi, *Mingtang zhidu lun*, 2899–2903.
132. Ibid., 2902.
133. See Wei Zheng et al., *Suishu*, 1588–1593, *juan* 68, "Liezhuan" 列傳 (Biographies) 33.
134. As summarized in Yuwen's presentation, the historical drawings available to him include two versions: those made by the Han and Jin scholars Liu Xi 劉熙 (fl. 200), Ruan Chen 阮諶, Liu Changzong 劉昌宗, and others, respectively, which, in Yuwen's view, are somewhat identical; and the one made in 54 C.E. under the patronage of Emperor Guangwu 光武帝 (r. 25–57) of the Eastern Han.
135. Wei Zheng, *Suishu*, 1593. For a proposed reconstruction drawing of Yuwen's wood model of the Mingtang, see Tanaka, *Chūgoku kenchikushi no kenkyū*, 240, fig. 78.
136. In Tanaka Tan's view, Yuwen's *Mingtang yibiao* is probably the earliest essay on architectural history known to date; see Tanaka, *Chūgoku kenchikushi no kenkyū*, 226. As mentioned, Han and Wei scholarship already included treatises on the Mingtang, and in particular, Li Mi's essay on the Mingtang examined the architectural system from the viewpoint of construction principles. These works should also be considered as research on architectural history.
137. See Du You, *Tongdian*, chap. 44, "Li" 禮 (Rites), "Taixiang mingtang" 太享明堂 (The Extreme-Enjoyment Hall of Distinction); Liu Xu et al., *Jiu Tangshu*, *juan* 22, "Liyi zhi" 禮儀志 (Record of rituals), 856–862.
138. For a proposed reconstruction drawing based on this record, see Wang Shiren, *Lixing yu langman de jiaozhi*, "Mingtang meixue guan," fig. 4 (between pp. 102 and 103); Tanaka Tan has also offered a reconstruction drawing of the plan of the Mingtang; see his *Chūgoku kenchikushi no kenkyū*, 237, fig. 75.

139. It was compiled by order of Emperor Yang 煬帝 (r. 604–617). Only the first two chapters have survived, in which the architectural section is included.
140. Du Gongzhan, *Bianzhu*, *juan* 2:1a, 2a, 4a–b, 6b.
141. Ouyang Xun et al., *Yiwen leiju*, *juan* 61–64, v. 2:1094–v. 3:1156, "Juchubu." The compilation was ordered by Emperor Gaozu 高祖 (r. 618–626).
142. Ibid., *juan* 38–39.
143. Xu Jian et al., *Chuxueji*, *juan* 24, "Juchubu," v. 3:1805–1826. This work was compiled under the order of Emperor Xuanzong 玄宗 (r. 712–756).
144. Ouyang Xun et al., *Yiwen leiju*, *juan* 65, v. 3:1159–1165, 1169–1170.
145. More details about this work can be found in chap. 2.
146. Bai Juyi, *Baishi liutie shileiji*, *juan* 3 and 11, v. 3:1967–1974, 2051–2055.
147. Xiao Yi, *Jinlouzi*, "Xingwang pian" 興王篇 (The rise of dynasties), *juan* 4 (2865).
148. Zhang Jiuling, *Tang liudian*, 217–218, *juan* 23, "Jiangzuo dushui jian" 將作都水監 (Directorates of Construction and of Waterways and Boats), 11b–12a.
149. A longer text is collected in Wang Pu 王溥 (922–982), *Tang huiyao* 唐會要 (Important institutional documents of the Tang dynasty), cited in Tao Zongyi, *Jigu dingzhi*, section on the rules for buildings in the Tang dynasty.
150. According to Charles O. Hucker, "consultants-in-ordinary," or *changcanguan* 常參官, is "a generic term for officials regularly expected to attend audiences," and refers, in the Tang period, to court officials of the fifth rank and higher. See Hucker, *Dictionary of Official Titles in Imperial China*, 116.
151. *Chouxinshe* 抽心舍 has no match in the *YZFS*. Tanaka Tan has pointed out that *chouxinshe* is a scribal error for *zhouxinshe* 軸心舍 (literally, "axle-center residences"), which refers to official residences taking the form of a "*gong* 工 character-shaped hall," a layout commonly used in government offices during the Tang and Song periods. Tanaka cites *juan* 20 of the Qing-period encyclopedic work *Gezhi jingyuan* 格致鏡原 (The origins of all things and principles, 1708), in which a passage in the *Shiwu yuanshi* 事物原始 (The origins of things) is cited: "抽心舍者乃穿廊也" (*Chouxishe* is a covered corridor). See Tanaka, *Chūgoku kenchiku-shi no kenkyū*, 118. Here, the source likely refers to Xu Ju's 徐炬 thirty-chapter *Xinjuan gujin shiwu yuanshi quanshu* 新鐫古今事物原始全書 (Newly engraved origins of things of ancient and present times) (unofficial printing of 1593). The layout of a "*gong*-shaped hall" is characterized by a compound in which main halls in the front and at the rear are connected by a corridor on the axis of the compound.
152. *YZFS*, *juan* 6, "Minor Carpentry System," entry for *wutoumen*, 3a–4b.
153. *YZFS*, *juan* 4, "Major Carpentry System," entry for *yangma* 陽馬 (corner beams).

## Chapter 2: From the *Mujing* to the *Yingzao Fashi*

1. Li Jie, "Jin xinxiu *Yingzao fashi* xu," 1a. Liang Sicheng has explained that *sangong* 三宮 here is a generic term for architecture; see Liang Sicheng, *Yingzao fashi zhushi*, 3.
2. Ouyang Xiu, *Guitianlu*, 83:428, *juan* 1:1a–1b: "世傳浩……撰成木經三卷、今行於世者、是也" (It is transmitted through generations that [Yu] Hao . . . wrote the *Mujing* [in] three chapters. Nowadays what is being practiced [in construction activities] is just this book). Shen Kuo, *Mengxi bitan*, 28:76, *juan* 18:1b, "Jiyi" 技藝 (Artistry): "營舍之法謂之木經。或云喻皓所撰" (Methods of building houses are called *Mujing*. Some say that [this book] was written by Yu Hao).
3. Ouyang Xiu, *Guitianlu*, 1.1a–1b: "開寶寺塔在京師諸塔中最高、而制度甚精。都料匠預浩所造也" (The pagoda of the Kaibao Monastery is the tallest among all pagodas in the capital and [its structural] system is quite excellent. [It was] built by the

architect Yu Hao). Other accounts include Yang Yi, *Yang Wengong tanyuan*, 107–108, entry for *Yu Hao zao ta* 喻皓造塔 (Yu Hao made a pagoda).

4. See Yang Yi, *Yang Wengong tanyuan*, 107–108; also Monk Wenying, *Yuhu qinghua*, *juan* 2:21.
5. Shen Kuo, *Mengxi bitan*, 28:80, *juan* 18:9a: "錢氏據兩浙時、於杭州梵天寺建一木塔……密使其妻見喻皓之妻、賂以金釵、問塔動之因" (When Master Qian [Chu] governed the two Zhejiang provinces, he authorized the construction of a wooden pagoda at the Fantian [Brahma-Heaven] Monastery in Hangzhou . . . [The craftsman] privately sent his wife to see Yu Hao's wife with a present of golden hairpins and enquired about the cause of the motion of the pagoda). With some modifications, the translation follows Needham, *Science and Civilisation in China*, 141. From the context of this account, it must have been the craftsman (rather than Qian Chu himself) who "privately sent his wife to see Yu Hao's wife" and consulted Yu Hao.
6. Needham, *Science and Civilisation in China*, 141, dates the event that occurred in this account incorrectly, saying that it was some ten years later than the establishment of the Kaibao Pagoda (989). On the contrary, it was some ten years earlier.
7. See Wu Renchen, *Shiguo chunqiu*, *juan* 88, section on Wuyue, biographies, entry for Yu Hao. This text considers Yu Hao as a subject of the Wuyue.
8. Yang's oral account was recorded by Huang Jian 黃鑑 (a contemporary of Yang's) and edited by Song Xiang 宋庠 (996–1066).
9. See Shen Kuo, *Mengxi bitan*, in note 2.
10. Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," 74.
11. Shen Kuo, *Mengxi bitan*, 76–77, *juan* 18:1b–2a.
12. Xia Nai suggested that Shen might have added words to or deleted words from the original text; see Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," 75.
13. Ouyang Xiu, *Guitianlu*, *juan* 1:1a–1b (83:428). I discuss this account in detail later in this chapter.
14. Xia Nai suggested that in all extant editions of the *Mengxi bitan*, the words *cuideng* 榱等 are scribal errors for *dengcui* 等衰, which means here that measurements increase or decrease progressively according to a fixed ratio; see Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," 75. According to Chen Fuhua, *Gudai Hanyu cidian*, 259, *cui* 榱 and *cui* 衰 are interchangeable when they designate "place in a series, grade," or "class." Thus, in the *Mujing* text, the same word *cui* is used in two meanings: the above one and as "rafters" in the compound *cuijue* 榱桷.
15. Xia Nai suggested that the phrase *ting fa tang* 廳法堂 is an erroneous transcription of *tingtang fa* 廳堂法; see Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," 75. Both variants could make sense in terms of the actual architectural technology during the Five Dynasties and early Song periods; I discuss these terms below.
16. For my translation, I consulted Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," and Needham, *Science and Civilisation in China*, 82, 84. While I tried to follow Needham's translation as closely as possible, I have made many modifications. As Xia pointed out (75), Needham's translations of *ji* 極 as "the uppermost crossbeams" and of the phrase *yiwei cuideng* 以為榱等 as "as well as the rafters, etc." are incorrect.
17. Both Needham and Xia Nai explained that the "middle unit" includes those above "the ground floor" and that the platform belongs to the "lower unit," even though the text about the "middle unit" indeed mentions the principle of determining the dimension of the base according to that of the columns. It seems to me that the division of the three "units" in the *Mujing* possesses a textual coherence, in which each unit treats the relationship between measurements of elements that belong to the same unit. Its definition of the "middle unit" is "above the ground" (地以上), and its discussion of

this unit includes the platform. Moreover, its discussion of the "lower unit" does not mention "platform" at all, but instead it treats only gradients of the *jieji* 階級 (stairs).

18. See Needham, *Science and Civilisation in China*, 82: "This (2.28) is the Upper Unit."
19. Refer to note 15.
20. In Needham's translation (*Science and Civilisation in China*, 82), the dimensions of all components in the middle unit, including corbelled brackets and rafters, follow this ratio (2.44).
21. As Xia Nai pointed out ("*Mengxi bitan* zhong de Yu Hao *Mujing*," 75), this part in the text treats the methods for determining the dimensions of rafters, and there is no reason that the dimensions of rafters are determined by both the length of the beam and the height of the column, as seen in Needham's translation of "以為榱(衰)等" in both the upper and middle units.
22. For a detailed discussion and illustrations of these gradients, see Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," 76–78.
23. Needham provided a ratio for each of the three gradients, and they are 1:3.35 (steep), 1:2.18 (intermediate), and 1:1.38 (easy or gentle); but he did not explain how these data were deduced, although he referred to the proportions of the human body given in the *Huangdi neijing taisu* 黃帝內經太素 (The Yellow Emperor's Inner Canon: The Great Blank [completed about 678]). He admitted that "to determine the absolute gradients it would be necessary to know the lengths of the standard litters, but we have not gone into this." See Needham, *Science and Civilisation in China*, 82, note (e) and translation. Xia Nai ("*Mengxi bitan* zhong de Yu Hao *Mujing*," 77–78) deduced entirely different ratios: 1:2 (steep), 1:4 (medium), and 1:7.8 (gentle). He deduced the length of an imperial carriage by measuring one that is depicted in a Southern Song painting and by referring to the *YZFS* method related to stone stairs. But he did not give any source for the height (6.7 *chi*) where the leading bearers of the carriage stand, an important factor in his deduction.
24. *YZFS*, *juan* 3, "Shizuo zhidu" 石作制度 (System of stonework), entry for *tadao*.
25. Xia Nai proposed that in addition to the proportions between two elements or two parts of a building, the "unit" in the *Mujing* might also stand for a ratio of the height to the width of a certain component (see "*Mengxi bitan* zhong de Yu Hao *Mujing*," 78). However, such a ratio is not suggested by the extant *Mujing* text.
26. See Feng Jiren, "Riben Jiuzhou Daxue cang Dunhuang wenshu suo ji kuyan de fuyuan yu fenxi."
27. Among extant Tang wood-framed structures, the Great Hall of the Foguang Monastery 佛光寺 (built 857) presents a beam structure of the tower type, while the rest of them clearly present a beam structure of the *tingtang* type.
28. *YZFS*, *juan* 5, "Major Carpentry System," entry for *juzhe* (raise and break of roofs).
29. Xia Nai suspected that the height of the ridge purlin, "3.5 *chi*," is probably a scribal error for "2.5 *chi*" ("*Mengxi bitan* zhong de Yu Hao *Mujing*," 75–76).
30. See Feng Jiren, "Zhongguo gudai mugou jianzhu de kaoguxue duandai," 55, 57. The Great Hall of the Hualin Monastery at Fuzhou, Fujian Province 福建福州華林寺大殿 (built in 964 under the Wuyue regime [904–978]), is an example of a residential hall built in a mixed style of the tower type and the residential-hall type.
31. Joseph Needham translated this phrase as "(the proportions are maintained) in larger and smaller halls." He seemed to distinguish *ting* and *tang* as "larger halls" and "smaller halls." Xia Nai argued that *tingtang* should be understood as medium-size residential halls based on the *YZFS*, "Major Carpentry System," entry for *cai*, in which *diange* and *tingtang* represent two types of buildings; see Xia Nai, "*Mengxi bitan* zhong de Yu Hao *Mujing*," 76.

32. For instance, see the entries for *cai* and *juzhe*.
33. *YZFS*, *juan* 13, "Tile System," entry for *lei wuji* 壘屋脊 (build ridges of a hall [by piling up tiles]).
34. Ibid.
35. This is the opposite of Needham's translation (see note 31).
36. Ouyang Xiu, *Guitian lu*, *juan* 1:1b.
37. Ibid., *juan* 2:16a; an anecdote under "治平二年" records that the capital city was flooded overnight after heavy rains and that Emperor Yingzong asked court officials for proposals to deal with the situation.
38. See Ji Yun 紀昀 et al., *Qinding siku quanshu zongmu* 欽定四庫全書總目 (A general list of all books in the four collections under imperial order), "Guitianlu tiyao" 歸田錄提要 (Summary of the *Guitianlu*); cited in Ouyang Xiu, *Guitianlu*, appendix, 1a–2a.
39. See Chen Zhensun, *Zhizhai shulu jieti*.
40. *Guitianlu*, *juan* 2, 10a.
41. Ouyang Xiu, *Guitianlu*, *juan* 2:11b.
42. Ibid., *juan* 1:1b.
43. Shen Kuo, *Mengxi bitan* (28:77), *juan* 18:2a.
44. With a few modifications, my English translation follows Needham, *Science and Civilisation in China*, 84.
45. Nie Chongyi, *Xinding Sanlitu*, 57–74, *juan* 4. The Northern Song edition was lost in 1127, but a copy that was published in Sichuan was recovered during the early Southern Song. The 1175 edition is the earliest extant edition and, because of the complete preservation of its content, is probably the best edition available today. See the Southern Song postscript by Chen Boguang 陳伯廣 (fl. 1174–1189) and the postface by Shanghai Guji Chubanshe (272, 276).
46. Ibid., 3–4. Dou indicated that he was in charge of the compilation of a comprehensive work on rituals entitled *Gujin tongli* 古今通禮 (General rituals of ancient and present times) upon imperial orders (most likely of Emperor Taizu 太祖 [r. 960–976]), and thus he added the *Xinding Sanlitu* to that book.
47. Ibid., 3: "周世宗暨今皇帝恢堯舜之典則、總夏商之禮文、思隆大猷、崇正舊物儀形、作範旁詔四方" (Both Emperor Shizong of the [Later] Zhou and today's Emperor [Taizu] restore the institutions and laws of [the Founding Emperors] Yao 堯 and Shun 舜 and gather the ritual documents of the Xia and the Shang. The thought is lofty and the plan great. [They] promote the correction of rites and forms of old [ritual] objects, make standards [of them], and issue edicts throughout the world).
48. Ibid., 74: "此秦制、改周法為九室三十六戶、七十二牖、十二階、今以月令是秦法、故存其制、圖之於後" (This [Mingtang] is the Qin-period system. [It] changed the Zhou system into [one that had] nine chambers, thirty-six doors, seventy-two windows, and twelve stairs. Now, because the "Yueling" [of the *Liji*] is of the Qin system, so [I] keep its system and illustrate it at the last).
49. Ibid., 4, Dou Yan's preface: "博採三禮舊圖、凡得六本、大同小異……吾誰適從之嘆" ([Nie] widely collected old illustrations of the *Zhouli*, the *Liji*, and the *Yili* and acquired in all six copies [of illustrations]. [These old illustrations] were similar with minor differences . . . [And then, Nie] sighed about which he ought to follow). The six versions of illustrations that Nie acquired included those made by the great Han-period commentator on the classics Zheng Xuan, the Jin-period (265–420) scholar Ruan Chen 阮諶, a Sui-period scholar called Kaihuangguan 開皇官 (official of the Kaihuang 開皇 [581–600]), and the Tang scholar Zhang Yi 張鎰 (fl. 760–784). See the postface by Shanghai Guji Chubanshe, 275; also see Zhongguo Wenhua Yanjiusuo et al., *Zhongwen dacidian*, 1:278, entry for *Sanlitu*.

50. Fragments of some of these pre-Song illustrations were reconstructed during the Qing period. For example, Ma Guohan reconstructed the *Sanlitu* by Zhang Yi and that by Liang Zheng 梁正, both of which are only one chapter long, compared to Nie's twenty-chapter illustrations of various aspects of the Zhou ritual system. See Ma Guohan, *Zhangshi Sanlitu*.
51. See Dou's preface (in Nie Chongyi, *Xinding Sanlitu*, 4): "遂鑽研尋繹、推較詳求原始以要……躬命繢素、不差毫釐" (Therefore, [Nie] scrutinized intensively [the classics] and investigated the reasons [for the differences between those old images], examined and compared [the classics and old illustrations] and sought in detail the original reasons [for the differences] and essentials [of the classics] . . . [he] painted [those pictures] on silk himself, [trying hard] not to make the least bit of difference [from the classics]).
52. The illustrations in this edition present a much better quality than those in the Mongolian edition (1247 or 1248), which is the second-earliest known to date.
53. Song scholarship on classical ritual architecture also includes Wang Anshi's commentarial study of the *Zhouli* (which includes two chapters on the *Kaogongji*), Lin Xiyi's 林希逸 (*jinshi* 1235) *Juanzhai Kaogongji jie* 鬳齋考工記解 (Explanations of the *Kaogongji* written at Juanzhai), and Li Rugui's 李如圭 (*jinshi* 1133; fl. 1117–1195) *Yili shigong* 儀禮釋宮 (Explanations of the palaces in the *Yili* [Rites and ceremonies]).
54. For example, in 1199, Pu Shuxian 蒲叔獻 (fl. 12th c.) wrote in his preface to the *Taiping yulan*: "太宗皇帝……四方既平、修文止戈、收天下圖書典籍、聚之昭文、集賢等四庫" (Emperor Taizong . . . , [because] the empire was at peace, engaged in developing culture and education while sheathing the sword, collecting books and classics from the whole nation, gathering them in the four treasuries such as the Zhaowen and the Jixian). See Li Fang et al., *Taiping yulan*, 1:1.
55. Ibid., 1:3, *Guochao huiyao* 國朝會要 (Record of essential affairs of our state [i.e., the *Song huiyao* 宋會要 (Record of essential affairs of the Song)]): "先是、帝閱前代類書、門目紛雜、失其倫次、遂詔修此書" (Earlier, the emperor [Taizong] read through reference works of preceding dynasties. [Because] the categories and sections were numerous and complicated as well as disorganized, lacking coherence, therefore, [the emperor] ordered that this book be compiled).
56. As Pu Shuxian commented, this book included the "principles of the ten thousand things in the universe, origins of politics, education, laws and moral standards, causes of administrative disorder and the fall and rise of all dynasties, as well as profoundness in meanings of ethics and life" (備天地萬物之理、政教法度之原、理亂廢興之由、道德性命之奧). See Li Fang et al., *Taiping yulan*, 1:1.
57. Ibid., *juan* 173–197, 2:973–1080.
58. See chap. 1, "Architectural Literature from the Jin to the Tang," section c.
59. Li Fang et al., *Taiping yulan*, *juan* 196, 2: 1073–1076.
60. Exceptions to this arrangement exist. For instance, in the entry for *chiwei*, the citation of the fourth and last text, the *Tang huiyao* (Record of essential affairs of the Tang), is accidentally mixed with that of the third text, the *Chenshu* 陳書 (Book on the [history of] Chen [557–589]). The end of the line of the *Chenshu* citation has a one-character space, which is filled by the *tang* of *Tang huiyao*, and *huiyao* occurs at the beginning of the next line. See Li Fang et al., *Taiping yulan*, *juan* 188, 2:1041. This kind of exception is most likely the result of mistakes made in the process of hand copying the text.
61. These hand-copied fragments were discovered in the Stone Study of Cave No. 288 at Dunhuang in the early twentieth century and, because of the special forms and writing styles of some characters in them, the copying was dated to the Tang period. Modern scholars have identified the text of these fragments as either the *Xiuwendian yulan* or

the imperially patronized Liang-period reference work *Hualin bianlue* 華林遍略 (An extensive browsing [from the books] at the Imperial Academy [completed 523]). The compilation of the *Xiuwendian yulan* was based significantly on that of the *Hualin bianlue*. See Hu Daojing, *Zhongguo gudai de leishu*, 45–54. A photocopy of a part of these fragments can be seen on the first flyleaf of this source.

62. See Li Fang et al., *Taiping yulan*, 1:3, *Guochao huiyao* 國朝會要 (Record of essential affairs of our state): "以前代《修文御覽》、《藝文類聚》、《文思博要》及諸書參詳條次、分定門目" ([Under the emperor's order, the compilers of the *Taiping yulan*] consulted [reference works of] preceding dynasties [including] the *Xiuwen [dian] yulan*, the *Yiwen leiju*, the *Wensi boyao* [Tang imperial reference book, completed in 641, lost after the Northern Song], and others to make the entries and classify the categories).
63. See Hu Daojing, *Zhongguo gudai de leishu*, 119–121.
64. Thus far, according to the earliest editions (Song to Ming editions or copies) available of the major Sui-Tang reference works, the previously mentioned mixed format was still dominant.
65. Guo Pu, *Erya zhushu*, "Preface," 1a–1b. In this preface, Xing states that they believed that Guo's scholarship on the classics was the best of all commentators: "惟東晉郭景純……學者祖焉、最為稱首" ([Among those who commented on the *Erya*,] only Guo Jingchun [Guo Pu] of the Eastern Jin period [well comprehended the essence of the classics] . . . [and therefore,] scholars followed his [scholarship], and [his scholarship] was the best of all [commentators]).
66. Regarding *wulou*, Guo comments: "《詩》曰：'尚不媿於屋漏。'其義未詳" (In the *Shi[jing],* it is written, "[you ought to be] still free from shame by *wulou*." Its [*wulou*] meaning is unknown). Regarding *yi*, Guo's commentary reads as follows: "宧見《禮》、亦未詳" (*Yi* is seen in the *Li[ji],* [whose meaning] also is unknown). See *YZFS*, *juan* 1, "Zongshi," 2a.
67. See Guo Pu, *Erya zhushu*, *juan* 5:1b. After quoting the explanations of *wulou* by Zheng Xuan and Sun Yan 孫炎 (Han-period commentators), Xing Bing and his cocompilers comment, "郭云'其義未詳'者、以孫、鄭之說皆無所據、故不取也" (That Guo says "its meanings are unknown" is because the explanations of Sun and Zheng all have no grounds, and therefore [these explanations are] not accepted). Similarly, after quoting the Han-period commentaries on *yi*, Xing also indicates the reason Guo disagreed and thus asserts "also unknown" (亦未詳).
68. This early-Tang official geomancy book was commissioned by Taizong (627–649) and completed in 641. It was distributed throughout the state and became popular thereafter. See Wang Zhu, "*Dili xinshu* xu" 地理新書序 (Preface to the *New Book on Geomancy*), in Wang Zhu et al., *Chongjiaozheng Dili xinshu*, 10–11. The book is now lost.
69. Wang Zhu, "*Dili xinshu* xu," 11–15.
70. More regarding the compilation of the *YZFS* is discussed later in this chapter.
71. The one-chapter illustration was said by Wang Zhu to be included in the Song edition of this work; see Wang Zhu, "*Dili xinshu* xu," 13–14. The Song edition has not survived. The Jin-period hand-copied editions include fifteen chapters, each containing one to seven essays. Many essays are illustrated with figures, which were added to the book by Jin-period scholars, including Bi Lüdao 畢履道 (fl. 12th c.) and Zhang Qian, who commented on the work.
72. Ibid., 6–9. The authors cite classics such as the *Yijing*, the *Shijing*, and the *Zhouli* that record early Chinese kings building capitals and residential districts in accordance with geomantic principles; these constructions, as the authors conclude, bore a common

feature: "代皆相其吉兇然後居之" (In each historical period, [these kings] all observed and judged the auspicious and ominous [omens of the construction sites] and after that resided in these [auspicious locations]).

73. Ibid., 10, 14.
74. See Feng Jiren, "Lun yinyang kanyu dui Bei Song huangling de quanmian yingxiang."
75. See Wang Zhu et al., *Chongjiaozheng Dili xinshu*, *juan* 1:25–26; *YZFS*, "Kanxiang," 3b, entry for *quzheng*, 5a, entry for *dingping*.
76. Bi Lüdao produced illustrations of these technologies in the 1192 edition of the *Dili xinshu*. Refer to his "Tujie jiaozheng *Dili xinshu* xu" 圖解校正地理新書序 (Preface to the collated *Dili xinshu* with illustrations), in Wang Zhu et al., *Chongjiaozheng Dili xinshu*.
77. See Zeng Gongliang et al., *Wujing zongyao* (*qianji*), 493, "Preface": "朕聞天道尚武……深惟帥領之重、恐鮮古今之學、命天章閣待制曾公亮等同加編定" (I heard that the heavenly law is to esteem martial qualities . . . [I] deeply consider the importance of the commanders in chief and generals. Afraid that [the generals] had little knowledge of ancient and present-day [military strategies], [I] ordered the Heavenly Composition Office's advisor Zeng Gongliang, along with others, to compile [this book on the military]).
78. Ibid., 611, *juan* 11:1a–b.
79. Li Quan, *Shenji zhidi taibai yinjing*, 44, *juan* 4, essay 37, "Shuigongju" 水攻具 (Tools for attacking with water). See also Zhang Wencai and Wang Long, *Taibai yinjing quanjie*, 208–209.
80. The 1488–1522 edition follows the format of the 1231 edition.
81. For a comparative study of the instruments as recorded in the *Taibai yinjing* and in the *YZFS*, see *YZFS*, "Kanxiang," entry for *dingping*, 6a; *juan* 3, "Haozhai zhidu," entry for *dingping*, 3a; see also Beijing Kexue Chubanshe, *Zhongguo gudai jianzhu jishushi*, 3:896–898. The latter source points out some mistakes in the illustrations of leveling technology in the Ming and Qing editions of the text and offers a new illustration (p. 897); it modifies the form of the reflecting board held in the hand of the soldier in the Ming illustration.
82. In the *Wujing zongyao* illustration, two additional vertical stakes are depicted on the sides of the central stake. These two stakes are shorter than the central one and are not connected to the upper horizontal trough. No explanation of these two stakes is offered in the text.
83. Zeng Gongliang et al., *Wujing zongyao* (*qianji*), 611, *juan* 11:3a: "以水注之、三池浮木齊起、眇目視之、三齒齊平、則為天下準" (Pour water into it [the groove]. The wood blocks of the three water cases all float up. With one eye closed, observe them. If the three alveoli [on the floating wood blocks] are even, [the instrument] then becomes the leveling instrument of the world). See also Li Quan, *Shenji zhidi taibai yinjing*, 44.
84. See *YZFS*, "Kanxiang," entry for *dingping*, 6a; *juan* 3, "Haozhai zhidu," entry for *dingping*, 3a.
85. Ibid., "望兩頭水浮子之首、遙對立表處、於表身內畫記、即知地之高下" (Observe the tops of the floating wood blocks at the two ends, facing the standing poles from a distance; mark [the heights observed through the water-level instrument] on the body of the poles, then one knows the differences in heights of the earth). Here, Li Jie is talking about the case of two water "ponds" in the instrument, but in a few annotations he also includes the case of three water "ponds." Thus, we can deduce that the method would involve "observing the tops of the floating wood blocks at the two ends and in the center."

86. *YZFS*, "Kanxiang," entry for *dingping*, 5b–6a.
87. The following passage from the *Wujing zongyao* provides important details about the methods and tools for accurately surveying the terrain of distant locations: "度竿長二丈、刻作二百寸、二千分、每寸內小刻其分、隨其分向遠近高下、其竿以照版映之、眇目視三浮木齒及照版、以度竿上尺寸為高下、遞而往視、尺寸相乘、山崗溝澗水之高下淺深、皆可以分寸度之" (A measuring pole is two *zhang* [one *zhang* is equal to ten *chi*] long, marked in two hundred *cun* [one *chi* is equal to ten *cun*], two thousand *fen* [one *cun* is equal to ten *fen*]; within each *cun*, [the pole is] further marked in [the unit of] *fen*. As the poles are distributed to [different locations that are] distant or close, [whose terrains are] high or low, these poles are reflected with [and then in] the reflecting board. Observe with one eye closed the alveoli on the three floating wood blocks [on the water-level instrument] and the reflecting board, use the measurements of the [reflected] measuring poles as the differences in the heights [of the terrains], successively observe the other [poles], and count these measurements, [by doing so,] the differences in heights and depths of hills, gullies, and rivers can all be measured [as precisely as] in *fen* and *cun*). See Zeng Gongliang et al., *Wujing zongyao* (*qianji*), 1:3b (p. 612). This passage was also transmitted from Li Quan's *Taibai yinjing*, but there are variations in some words and phrases.
88. Zeng Gongliang et al., *Wujing zongyao* (*qianji*), 622, *juan* 12:1b, entry for *shoucheng* 守城 (defending a city).
89. Ibid., 623–628, *juan* 12:2a–13a.
90. See *YZFS*, *juan* 1, "System of Moats and Fortifications," entry for *cheng*, 4a.
91. Ibid.
92. Zeng Gongliang et al., *Wujing zongyao* (*qianji*), 623, *juan* 12:2a–3a, entry for *shoucheng*.
93. Chen Zhensun, *Zhizhai shulu jieti*, 507, *juan* 7:35a, section on "Faling lei" 法令類 (Category of laws), entry on "修城法式條約二卷" (The *Xiucheng fashi tiaoyue*, two *juan*): "判軍器監沈括、知監丞吕和卿等所修敵樓、馬面、團敵式樣、并申明條約、熙寧八年上" ([It was] compiled by the director of the Office for the Supervision of Ordnance (Production), Shen Kuo, assistant officer of the Office of Intelligence, Lü Heqing, and others and [was about] forms of defense towers, "horse face" protruding walls, and round-cornered defense towers. [They] also clearly explained the regulations [concerned]. [It was] presented to the court in the eighth year [1075] of the Xining [1068–1077] period).
94. Ibid. Also, in Ma Duanlin, *Wenxian tongkao*, *juan* 221, bibliography of the *Zhizhai shulu jieti*, the book listed right after the *YZFS* is the *Xiucheng fashi tiaoyue*, but there is no indication of whether or not it was approved by the court and issued.
95. See Xu Song, *Song huiyao jigao*, 15:7442, "Fangyu" 方域 (Local areas), section 8, "Xiucheng: zhucheng xiu, gai, yi bingshang" 修城：諸城修、改、移並上 (Construction of city walls: all matters related to construction, repair, and relocation of city walls are included in this section), 4a–4b.
96. Ibid.
97. Ibid., 15:7441–7442.
98. Ibid., 7443, "Fangyu," section 8, "Xiucheng," 5a–6a.
99. Ibid.

## Chapter 3: The *Yingzao Fashi*

1. *YZFS*, "Zhazi," 1a.
2. For Li Jie's biography, learning, and experience of supervising imperial building

projects, see his tomb tablet included in Cheng Ju, *Beishanji*, *juan* 33:16a–20a; *YZFS*, appendices; Liang Sicheng, *Yingzao fashi zhushi*, "Preface," 6–7.

3. Liang Sicheng thought that it was Emperor Huizong who ordered Li Jie to recompile the *YZFS*, and Liang explained that because of Huizong's artistic attainments and excessive demands related to the design of buildings, he was not satisfied with the former *YZFS*, which presented "rules for materials only." See Liang Sicheng, *Yingzao fashi zhushi*, 6, "Preface." Liang confused Huizong with Zhezong, who ordered the recompilation in 1097 because he assessed the former *YZFS* as containing nothing but "rules for materials only," as Li Jie stated; see *YZFS*, "Zhazi" 劄子 (Prefatory document [dated 1103]), 1a. Liang's mistake remains in many works by other scholars as well.
4. See Cheng Ju, *Beishanji*, *juan* 33:16a–20a, "Inscription on Li Jie's Tomb Tablet."
5. See *YZFS*, appendices, "Inscription on Li Jie's Tomb Tablet," 1b. Cheng dates all of Li's merits related to compiling the *YZFS* to the time when Li finished the Five Princes' Mansions project during the Yuanfu 元符 period (1098–1100); these merits include Li's receipt of the imperial order to compile the *YZFS*, his accomplishment of it, and its issue under imperial orders. This record is not accurate according to the "Zhazi" of the *YZFS*—Li's memorandum to Emperor Huizong about previous imperial orders for compiling the *YZFS* and its completion as well as his request for its distribution. What the "Five Princes' Mansions" refers to is unclear. It might refer to a large palatial compound dedicated to the five younger brothers of Emperor Zhezong, the sixth son of Shenzong. Shenzong had fourteen sons, eight of whom died young, including the first five, the seventh, eighth, and tenth. Li Jie supervised the Five Princes' Mansions project during the reign of Zhezong, who had no sons. It is most likely that the mansions of this magnificent compound were for the other five brothers of Zhezong, including Zhao Ji, later Emperor Huizong, who was the eleventh son of Shenzong. Another possibility is that this compound served as a memorial to Zhezong's five brothers who died young.
6. *YZFS*, "Zhazi," 1a. The "Zhazi" does not clarify which emperor gave this order.
7. For example, see Li Tao 李燾 (1115–1184), *Xu Zizhi tongjian changbian* 續資治通鑑長編 (Continuation of the first draft of the *Zizhi tongjian* [History as a mirror; by Sima Guang 司馬光 (1019–1086)]), *juan* 471. In modern scholarship, Liang Sicheng also believed that the former *YZFS* was issued in 1091; see Liang Sicheng, *Yingzao fashi zhushi*, 6. Else Glahn believed that the former *YZFS* "was never printed"; see Glahn, "On the Transmission of the *Ying-tsao Fa-shih*," 237.
8. *YZFS*, "Kanxiang," entry for *zong zhuzuo kanxiang* 總諸作看詳 (general comments in detail on all systems), 12a.
9. *YZFS*, "Zhazi," 1a.
10. Ibid., 1b.
11. *YZFS*, "Jin xinxiu *Yingzao fashi* xu," 1a.
12. Liang Sicheng, in his *Yingzao fashi zhushi* (p. 4), corrects his earlier wrong interpretation of this sentence, which was interpreted as "[they] did not know either that the multiple of the measurement of the block should be used to determine the dimensions of the building and elements" in his "Song '*Yingzao fashi*' zhushi xuanlu," 2:1–2.
13. *YZFS*, "Jin xinxiu *Yingzao fashi* xu," 1b.
14. Ibid.
15. *YZFS*, *juan* 12, "Sawing System," 6b, entry for *yong caizhi* 用材植 (employment of timbers).
16. Ibid., 6b–7a, entry for *pengmo* 抨墨 (applying carpenter's marks).
17. Ibid., 7a, entry for *jiu yucai* 就餘材 (proper use of remainder materials).
18. See Wang Caizhong, "Song Shenzong yu Wang Anshi bianfa," 29.
19. See Glahn, "Chinese Building Standards in the 12th Century," 166–169; Li Zhizhong,

"Yingyin Songben *Yingzao fashi* shuoming," 4; Guo Qinghua, *Structure of Chinese Timber Architecture*, 66–67.

20. See Deng Guangming, *Wang Anshi*; Qi Xia, *Wang Anshi bianfa*, 237–254.
21. For a well-written English explanation of this law, see Glahn, "Chinese Building Standards in the 12th Century," 165–166.
22. For further discussion of Huizong's rule, see Ebrey and Bickford, *Emperor Huizong and Late Northern Song China*. For Huizong's political concerns with regard to many construction activities, see also Kuhn, *Tragedy of a Gardening Passion*; Jiren Feng, "Emperor as an Unconventional Artist."
23. *YZFS*, "Kanxiang," entry for *zong zhuzuo kanxiang*, 12a.
24. Cited in Chen Zhongchi, "*Yingzao fashi* chutan," 13. Chao was a governor of the prefecture 縣尉 of Chenliu 陳留 (in Henan).
25. Cited in Chen Zhongchi, "*Yingzao fashi* chutan," 13. Zhuang was formerly an official in Shunchang 順昌 (modern Fuyang 阜陽, Anhui 安徽) and other prefectures.
26. See Chen Zhongchi, "*Yingzao fashi* chutan," 12. The Song Directorate of Construction exercised control over ten units, one of which was the Dongxi Bazuosi 東西八作司 (Office of Eight Workshops in the East and in the West), which included the following workshops: major carpentry 大木作, timber-sawing craftsmanship 鋸匠作, minor carpentry 小木作, leatherwork 皮作, large furnaces 大爐作, small furnaces 小爐作, hemp work 蘇作, stonework 石作, brickwork 塼作, clay work 泥作, well work 井作, red-and-white (polychrome painting?) work 赤白作, barrel work 桶作, tile work 瓦作, bamboo work 竹作, strong-flame oil work 猛火油作, nails and hinges work 釘鉸作, gunpowder work 火藥作, and so on.
27. *YZFS*, "Kanxiang," entry for *zong zhuzuo kanxiang*, 12b.
28. Ibid.
29. Ibid.
30. Ibid.
31. See Chen Zhongchi, "*Yingzao fashi* chutan," 16–17.
32. According to Chen Zhongchi, the entire fifth leaf of chapter 8 was found together with the first half of the first leaf of the same chapter in 1920. Liang Sicheng mentions only the discovery of the first leaf, which he and many other scholars of his time presumed to be of the 1103 edition. See Liang Sicheng, *Yingzao fashi zhushi*, 8. The fifth leaf of chapter 8 is not included in the photo-offset copy of the Shaoding edition of 1992.
33. Li Jie, *Yingzao fashi*.
34. See Chen Zhongchi, "*Yingzao fashi* chutan," 16–17.
35. Liang Sicheng (*Yingzao fashi zhushi*, 8) believed that there were only two Song-period editions of this text, 1103 and 1145, and he provided a photocopy of these "1103" and "1145" editions in the appendix (pp. 335–336). This mistake has been modified by Fu Xinian in the reprint of Liang's work; see Liang Sicheng, *Liang Sicheng quanji*, 7:9n1. Takeshima Takuichi offered a detailed discussion of the transmission of this text, but he was not aware of the discovery of those fragments in 1956 and not aware of Chen Zhongchi's article either; thus, he also thought that there were only two editions during the Song period. See Takeshima, *Eizō hōshiki no kenkyū*, 1:17–23. Else Glahn, in her review of the transmission of the text, gave credit to Chen's scholarship, but she did not seem to be aware of Chen's conclusion that these fragments were of the Shaoding edition instead of the 1145; see Glahn, "On the Transmission of the *Ying-tsao Fa-shih*," 264.
36. See Chen Zhongchi, "*Yingzao fashi* chutan," 16–17; Li Zhizhong, "Yingyin Songben *Yingzao fashi* shuoming," 9–10.
37. See illustrations in Li Jie, *YZFS* (1925 ed.). Here, new drawings were added that were supposed to reconstruct the Song style but did not reflect it. This edition also includes

a photocopy of what was then believed to be an 1103 edition fragment—the first half of the first leaf of chapter 8—in its appendix.

38. See Yetts, "Note on the '*Ying Tsao Fa Shih*.'"
39. See Needham, *Science and Civilisation in China*, 107.
40. See Liang Sicheng, *Yingzao fashi zhushi*, 11, "Preface."
41. Ibid., 6, 11.
42. Paul Demiéville saw no relationship but rather a significant distance between Li's architectural principles and the classics cited in the "Kanxiang." See Demiéville, "Che-yin Song Li Ming-tchong *Ying tsao fa che*," 11–12. This view is also maintained in Takeshima, *Eizō hōshiki no kenkyū*, 1:23.
43. As mentioned in chapter 1, these instances are seen in the four entries on orientation (取正), leveling (定平), principles of building walls, and "raise and break" (舉折, method of determining the height of a roof and individual purlins so as to make a curved roof). See *YZFS*, "Kanxiang," 3b–9b.
44. See chap. 1, "Pre-Qin and Han Architectural Literature," section (b).
45. See *YZFS*, *juan* 1, "Zongshi," 5a, entry for *cheng*.
46. *YZFS*, "Kanxiang," 2a, entry for *fang yuan ping zhi*.
47. Ibid.
48. Paul Demiéville suggested that the *Yixun* might have been written by a contemporary of Li Jie's or someone active during a period close to Li's time. He proposed that Dou Yan 竇儼 (10th c.), of the early Northern Song period, could have been the writer, as suggested in the "Jingji zhi" 經籍誌 (Record of books) of the *Songshi*. See Demiéville, "Che-yin Song Li Ming-tchong *Ying tsao fa che*," 13.
49. *YZFS*, *juan* 2, "Zongshi," part 2, 11b.
50. *YZFS*, *juan* 1, "Zongshi," part 1, 2a.
51. Ibid., 6a.
52. *YZFS*, *juan* 1, "Zongshi," part 1, 11a.
53. *YZFS*, *juan* 2, "Zongshi," part 2, 7a.
54. For example, the architecture category in the *Taiping yulan* encyclopedia includes twenty-two texts under the entry for *que* (gate towers), but only three of them are included in the *YZFS*, allowing for some variations in the quotations. The three extracts are from the *Zhouli* classic and the *Shiming* and *Gujinzhu* dictionaries, which were recognized as the most reliable etymological studies in the early period. Similarly, only the first four of thirty-eight sources in the entry for *lou* in the *Taiping yulan* are cited in the *YZFS*. They are the *Erya*, *Shuowen*, *Shiming*, and the *Shiji* (Records from the Grand Scribe).
55. Xu Shen, *Shuowen jiezi*, 120, *juan* 6, part 1: "枅、屋櫨也" (The *ji* [bracket] is a *lu* of a building). The connection of a bracket and a cap block in the *Shuowen jiezi* reflects a factual interrelationship between these two elements in the primitive stage of the development of bracketing. In addition to a big cap block as the simplest form of bracketing, a simple, horizontal timber (square or curved) installed exactly or almost in the same position as the large cap block, i.e., directly on the head of a column, is another simple form of bracketing at this stage. Such a horizontal bracket arm indeed functioned, was positioned, and looked almost the same as (at least extremely similar to) a big cap block when either of them solely formed the bracketing on top of a column. This situation must be taken into consideration in order to understand why *ji*, a bracket, and *lu*, a cap block, are connected in the *Shuowen jiezi*.
56. In commenting on the meaning of *lu* in the "Lu Lingguangdian fu," Li Shan quoted a so-called *Shuowen jiezi* gloss on *bo* 槫 (wall brackets or columns): "《説文》曰：槫櫨、柱上枅" (The *Shuowen* [*jiezi*] says: "[*Bo*, as in] *bolu*, is a bracket on top of a column")

and then explained *lu* to be the same as "brackets": "然枅櫨為一、此重言之、蓋有曲直之殊爾" (However, *ji* [bracket arms] and *lu* are the same thing. This [*Shuowen jiezi* gloss] is redundant [using terms for the same element to explain each other]. Probably there was a distinction [between *ji* and *lu*] in a curved one [*ji*] and a straight one [*lu*]); see Xiao Tong, *Wenxuan* (Shanghai 1935), 153, *juan* 11. In commenting on He Yan's 何晏 (190–249) "Jingfudian fu" 景福殿賦 (Rhapsody on the Hall of Great Blessings), Li provided another variant quotation of the *Shuowen jiezi* gloss of *lu*: "說文曰：櫨、柱上枅也" (The *Shuowen* [*jiezi*] says, *lu* is a bracket on top of a column); see ibid., 158, *juan* 11. Else Glahn pointed out that Li Shan, in his commentary on the "Lu Lingguangdian fu," confused *lu* with the compound *bolu* 槫櫨 ("brackets and blocks," i.e., in Glahn's language, bracket construction); see Glahn, "Some Chou and Han Architectural Terms," 107. Similarly, in the *YZFS*, the *Yupian* text "槫櫨、枅也" (*Bolu* is *ji* [brackets]) was also excluded. See Gu Yewang, *Yupian*, *juan* 12:14a, entry for *bo*.

57. The *YZFS* recognizes historical texts that regard *bo* and *ji* as "bracket arms" (*juan* 1, "Zongshi," part 1, 8a) and puts *bolu* under the entry for *puzuo*, i.e., bracket sets or combinations of all bracketing members (9a).
58. For a *wan*-character motif mentioned in the systems of stonework and color painting, see the notes that follow. For this motif mentioned in the minor carpentry and the wood-carving systems, see *YZFS*, *juan* 8, "Minor Carpentry System," entry for *goulan* 鉤闌 (balustrades), 6b–8b; *juan* 21, "Work Limits of Minor Carpentry System," entry for *goulan*, 11b; *juan* 24, "Zhuzuo gongxian" 諸作功限 (Work limits of all systems), entry for *diaomuzuo* 雕木作 (wood-carving system), 5a.
59. *YZFS*, *juan* 14, "System of Color Painting," entry for *wucai bianzhuang* 五彩遍裝 (five-colored fully decorated pattern), 4b, section on "Suowen" 瑣文 (Linked patterns): "瑣文有六品……六曰曲水[註：或作王字及萬字、或……宜於普拍方內外用之" (Linked patterns have six types . . . The sixth is winding water [annotation: either in the form of the *wang* [王] character and the *wan* character, or . . . [It] should be used in the inside and outside [front and back] of a *pupaifang*]).
60. *YZFS*, *juan* 3, "System of Stonework," entry for *chongtai goulan*, 8b: "萬字版、長隨蜀柱內……[(註)：重臺鉤闌不用]" (A *wan*-character board: its length is within two neighboring dwarf posts . . . [annotation: not used in a double-layered balustrade]).
61. Ibid., 7b: "單鉤闌……其盆唇、地栿之內作萬字[(註)：或透空、或不透空]" (For a single-layer balustrade . . . a *wan*-character [board] is made between its *penchun* [盆唇, long horizontal element above the board] and *difu* [地栿, ground beam; horizontal element at the bottom of a balustrade]. [Annotation: either hollowed out or not]).
62. The Ji River, Yangtze River, Huai River, and Yellow River have been esteemed as the Four Great Rivers and worshiped by Chinese rulers since the pre-Qin period. Among many sources that record this is the *Erya*, in the section on "Shishui" 釋水 (Gloss on rivers): "江、淮、河、濟為四瀆。" (The Yangtze River, Huai River, Yellow River, and Ji River are the Four Great Rivers).
63. For a brief introduction to this hall and other extant buildings at this shrine, see Cao Xiuji, "Jidumiao"; Tanaka, *Chūgoku kenchikushi no kenkyū*, 114–115.
64. Regarding the period style of Song architecture, see Feng Jiren, "Zhongguo gudai mugou jianzhu de kaoguxue duandai," 57–64.
65. See Alexandra Harrer, "Fan-shaped Bracket Sets," Ph.D. diss., University of Pennsylvania, 2010.
66. The earliest extant examples of angled protruding arms are seen in the following Liao architecture: the Guanyin Pavilion 觀音閣 (984) and Gate of Dule Monastery 獨樂寺 (Jixian 薊縣, Tianjin 天津), the Three-Bodhisattvas Hall 三大士殿 (1025) of Guangji Monastery 廣濟寺 (Baodi 寶坻, Tianjin), and the Bojiajiaozang Hall 薄伽教藏殿

(1038) of Lower Huayan Monastery 下華嚴寺 (Datong 大同, Shanxi). See Feng Jiren, "Zhongguo gudai mugou jianzhu de kaoguxue duandai," 61.

67. *YZFS*, *juan* 12, "Diaozuo zhidu" 雕作制度 (System of [wood] carving), 3a, entry for *qitu juanyehua* 起突卷葉華 (raised leaf-scrolled flowers).
68. Takeshima, *Eizō hōshiki no kenkyū*, 3, chap. 7, 16–39. For the *YZFS* illustrations, see *juan* 32, "Diaomuzuo tuyang san" 雕木作圖樣三 (Third plate of the wood-carving system), 24a.
69. *YZFS*, *juan* 3, "System of Stonework," entry for *zaozuo cixu* 造作次序 (process of stonework), 5a–5b.
70. See Liang Sicheng, *Yingzao fashi zhushi*, 44n5.
71. *YZFS*, *juan* 12, "Diaozuo zhidu" (System of wood carving), entry for *qitu juanyehua*, 3a.
72. *YZFS*, *juan* 3, "System of Stonework," entry for *zaozuo cixu* 造作次序 (process of stonework), 5a. The pronunciation of *sa* in *jiandi pingsa* is alternatively *se*; see Chen Fuhua, *Gudai Hanyu cidian*, 1341.
73. See the explanation of this carving method in Liang Sicheng, *Yingzao fashi zhushi*, 44n5.
74. *YZFS*, "Kanxiang," entry for *zong zhuzuo kanxiang*, 12b.

## Chapter 4: The *Yingzao Fashi* Architectural Terminology (I)

1. *YZFS*, "Kanxiang," 10a, entry for *zhuzuo yiming* 諸作異名 (variant terms in all systems).
2. For these scholars' studies on the *YZFS*, see Demiéville, "Che-yin Song Li Ming-tchong *Ying tsao fa che*"; Takeshima, *Eizō hōshiki no kenkyū*; Liang Sicheng, *Yingzao fashi zhushi*, v. 1 (as a posthumous work, it reflects scholarship that had been completed before Liang's death in 1972); Chen Mingda, *Yingzao fashi damuzuo yanjiu*.
3. Glahn, "Some Chou and Han Architectural Terms," 105: "The bracket arms at right angles to and protruding from the wall were called hua-kung, flower arms."
4. Steinhardt, "Bracketing System of the Song Dynasty," 123.
5. Xu Bo'an and Guo Daiheng, "Song '*Yingzao fashi*' shuyu huishi," 38, entry for *huagong*. According to the authors' note, this work was revised from a draft written during 1960s.
6. See *Songben Erya*, 83–84, section 13, "Shicao" 釋草 (Explanation of vegetation): "華、荂也。華、荂、榮也。木謂之華、草謂之榮" (*Hua* is *fu* [flowers]. *Hua* and *fu* are [the same as] *rong* [blossom]. A tree [blossoming] is called *hua*; an herb [coming into bloom] is called *rong*). Xu Shen, *Shuowen jiezi*, *juan* 6, part 2, leaf 3, p. 128: "華、榮也。從艸從𠷎" (*Hua* is *rong* [blossom]; [the character] from the grass radical and [the character] *yu* [flowers]).
7. For a few examples in early-period literature, see *Liji* 禮記 (Record of rites), "Yueling" 月令 ([Ritual orders of] lunar months): "桃始華" (Peach trees began blossoming) and "桐始華" (Parasol trees began blossoming); see *Reiki Son chū*, chap. 6, leaves 5, 7. Sima Xiangru, "Shanglin fu" 上林賦 (A rhapsody on the Shanglin [Imperial Hunting Park]): "發紅華、垂朱榮" (red flowers are out, and red blossoms droop [from trees]); see Tian Zhaomin, *Lidai mingfu yishi*, 107.
8. See Duan Yucai, *Shuowen jiezi zhu*, 6:11, sixth *pian* 篇 (essay), part 2, entry for "華": "俗作花、其字起於北朝" (popularly written as *huā* [花], this character emerged in the Northern Dynasties). Another Qing-period etymologist, Gao Xianglin 高翔麟 (*jinshi* 1808), suggested that there had never been a character 花 before the Han and Wei 魏 (220–264) period and that from the Jin (265–420), it began to be used in books; see Ding Fubao, *Shuowen jiezi gulin*, 2698.

9. Gu Yewang, *Yupian*, part 2, *juan* 13:23b, entry for *huā* 花.
10. Chen Pengnian et al., *Guangyun*, 166, *juan* 2:18b, subentry on *hua* 花 under the entry for *hua* 華 (flowers): "俗。今通用" ([花 is] a popular character [for 華]. Nowadays [the two characters are] interchangeable.)
11. For the Chinese text, see Lü Qingfei, *Wang Anshi*, in *Sanwen Tang Song badajia xinshang* 11, part 2, 359.
12. Ibid., 361.
13. In general, architectural elements ornamented with carving are not common in wood-framed Chinese architecture. In particular, carved elements in pre-Song wood structures are not as common as those in buildings of the Ming and Qing periods.
14. *YZFS*, *juan* 4, "Damuzuo zhidu" (Major carpentry system), part 1, 9a, entry for *zong puzuo cixu* 總鋪作次序 (general order of bracket sets): "當心間須用補間鋪作兩朵、次間及梢間各用一朵" (In the central bay, [it is] necessary to use two *duo* of intermediate bracket sets, and one *duo* in the second bay and in the end bay, respectively). Also, in *juan* 18, "Damuzuo gongxian" 大木作功限 (Work limits of major carpentry system), part 2, 1a: "每轉角鋪作一朵用栱、昂等數" (number of arms, cantilevers, and others needed for each *duo* of corner bracket sets); 4b–5a: "每轉角鋪作一朵用枓、栱等數" (number of square blocks, arms, and others needed for each *duo* of corner bracket sets); 10a: "每鋪作枓栱一朵" (for each *duo* of bracket sets). Clearly, *duo* is used to count a whole bracket set, regardless of its structural location.
15. Xu Kai, *Shuowen xizhuan*, 126, entry for *duo*. Xu's definition of *duo* as a measure for flowers was written as his commentary to the *Shuowen jiezi*, in which *duo* is explained to be "樹木垂朵朵也" (trees whose flowers [or leaves] hang down, or tree flowers in clusters) (*Shuowen jiezi*, 119). Duan Yucai, *Shuowen jiezi zhu*, 6:48, sixth *pian* (essay), part 1: "凡枝葉華實之垂者皆曰朵朵" (Every spray, leaf, flower, and fruit that hangs down is called *duo duo* [clusters and clusters]).
16. For examples, Yuan Zhen's 元稹 (779–831) poem "Baiyishang" 白衣裳 (literally, "white clothes," metaphorically referring to the blossoms of pear trees) includes the line "一朵梨華壓象床" (a pear-tree blossom is superior to an ivory bed); his poem "Yingtaohua" 櫻桃華 (Cherry blossoms) includes the line "一枝兩枝千萬朵" (spray after spray, thousands of clusters of flowers); see Si Dai et al., *Yong hua shi xuan*, 63, 72. Du Mu's 杜牧 (803–ca. 852) poem entitled "Qiangweihua" 薔薇華 (Rose blossoms) includes the line "朵朵精神葉葉柔" (every single flower is vigorous and every single leaf is delicate); see Hu Guangzhou et al., *Zhongguo lidai mingshi fenlei dadian*, 1:617. Lu Chang's 陸暢 (fl. 7th–9th c.) "Qiangweihua" includes the line "錦窠華朵燈叢醉" (splendid flowers, like a clump of lanterns, are intoxicating); see Si Dai et al., *Yong hua shi xuan*, 195.
17. *YZFS*, *juan* 17, "Damuzuo gongxian" 大木作功限 (Work limits of major carpentry system), part 1, 2b–3a, entry for *diange waiyan bujian puzuo yong gong*, *dou deng shu* 殿閣外檐補間鋪作用栱、枓等數 (number of arms, blocks, and others needed for an intermediate bracket set on outward eaves of halls and towers): "自八鋪作至四鋪作……每補間鋪作一朵用栱、昂等數、下項" (From eight *puzuo* [i.e., a bracket set that includes five flower arms] to four *puzuo* [i.e., a bracket set including one flower arm] . . . the number of arms, cantilevers, and others needed for each *duo* of intermediate sets is the next item). Many entries in *juan* 17 include formulae that read like this one. See also note 14.
18. *YZFS*, *juan* 17, "Damuzuo gongxian," part 1, 9b, entry for *doukoutiao mei feng yong gong*, *dou deng shu* 枓口跳每縫用栱、枓等數 (number of arms, blocks, and others for each set of *doukoutiao*).

19. Ibid., 9b, entry for *batou jiaoxiangzuo mei feng yong gong*, *dou deng shu* 把頭絞項作每縫用栱、枓等數 (number of arms, blocks, and others for *batou jiaoxiangzuo*): "把頭絞項作、每柱頭用栱、枓等下項" (Next item [is the number of] arms, blocks, and others used on *batou jiaoxiangzuo* on each capital).
20. See Takeshima, *Eizō hōshiki no kenkyū*, 1:251.
21. See Xu Bo'an and Guo Daiheng, "Song '*Yingzao fashi*' shuyu huishi," 49, entry for *miao*.
22. See Chen Mingda, "'Chao'? 'Miao'?" 197–198.
23. *Shuowen jiezi*, 119: "杪：木標末也。" (*Miao* are the ends of tree branches). Zhu Junsheng, a Qing-period scholar, commented: "按高遠之木枝曰標、曰杪" (Note: tall and far tree branches are called *biao*, and *miao*); see Zhu Junsheng, *Shuowen tongxun dingsheng*, 271, entry for *miao*.
24. See Li Fang et al., *Wenyuan yinghua*, *juan* 176, "Shi" 詩 (Poetry), 26, "Yingzhi" 應制 (Works composed under the order of emperors), 9(2:856).
25. Ibid., *juan* 236, "Shi" (poetry), 86, "Siyuan" 寺院 (Monasteries), 4 (2:1189).
26. See Zhao Chongzuo, *Huajianji*, 263, "Bomingnü" 薄命女 (Lady born unlucky).
27. Li Gefei, *Luoyang mingyuan ji*, 2, entry for *fuzheng gongyuan* 富鄭公園 (the park of the rich Mr. Zheng).
28. Lu Dian, *Piya*, *juan* 6, "Shiniao" 釋鳥 (Explanations of birds), 131, entry for *que* 鵲 (magpie).
29. *YZFS*, *juan* 4, "Damuzuo zhidu," part 1, 9b, section on "Zong puzuo cixu" 總鋪作次序 (General order of bracket sets, or General order of putting together bracketing components).
30. "Nanzhong" 南中 in the text historically denotes the regions of southern China or, specifically, the regions in the south of the central base of the Shu 蜀 of the Three Kingdoms period, which covers the southern area of modern Sichuan and the areas of modern Yunnan and Guizhou; see Wang Jianyin 王劍引 et al., *Guhanyu dacidian*, 139, entry for Nanzhong. Also, Takeshima, *Eizō hōshiki no kenkyū*, 3:3, section on glossary and explanations, entry for "一枝" (*isshi*, a branch), explains this term as "dialect of south-central China corresponding to 'a jump,'" thus, in Takeshima's view, "Nanzhong" represents the south-central China, although he does not give the sources on which his interpretation is based.
31. Chen Mingda pointed out sharply that Xu Bo'an and Guo Daiheng fabricated the term *chumiao* 出杪 (extending a twig); see Chen Mingda, "'Chao'? 'Miao'?" 197; see also Xu Bo'an and Guo Daiheng, "Song '*Yingzao fashi*' shuyu huishi," 49, entry for *miao*: "《營造法式》中……把華栱出跳叫做出杪" (In the *YZFS* . . . a *huagong* jump is called *chumiao*). Indeed, no such term is found in the *YZFS*. However, the term *chuyizhi* 出一枝 (extending a branch) is indeed included, which supports the conclusion that *miao* is the correct term for protruding arms. Both Chen and Xu and Guo in the 1980s neglected the material in the above annotation in the text that could have been turned to good account.
32. Although "一枝" is included in Takeshima's glossary of *YZFS* terminology, he does not relate this term to the *miao* of *miaogong*, ignoring all other relevant terms, including *ye*, *zhuanye*, and *hua* of *huagong*. In Xu and Guo's glossary of *YZFS* terminology, *zhuanye* and *buzhuanye* are explained only as the equivalents of *jixin* and *touxin* (Xu Bo'an and Guo Daiheng, "Song '*Yingzao fashi*' shuyu huishi," 25, 50), without any interpretation of *ye* itself.
33. Guo Daiheng, *Zhongguo gudai jianzhushi*, 636. Unlike her previous scholarship on the *YZFS*, which did not explain the semantic meanings of *ye*, *zhuanye*, and *zhi*, in this work Guo briefly explains the dialect terms *zhi* and *zhuanye*.

34. I interpreted the *ye* of *zhuanye* as "leaves" and introduced this "branches" and "leaves" metaphor to the staff of the Bureau of Culture at Putian 莆田, Fujian, in the spring of 1995, when I was invited by the bureau to join a team of cultural relics specialists to inspect the historic remains there. I presented this metaphor at a graduate seminar offered by Professor Nancy Steinhardt at the University of Pennsylvania (fall 1995). I later wrote about it in an independent study paper entitled "The Flower-Tree Based Architectural Terminology in the *YZFS*" for Professor Maggie Bickford at Brown University (spring 1998). In the spring of 2001, I sent Professor Su Bai 宿白, at Peking University, a manuscript entitled "*YZFS* dougong shuyu de huamu yinyu" 營造法式枓栱術語的花木隱喻 (Architectural metaphors of bracketing as flowers and trees in the *YZFS* terminology), and a few months later, I spoke with him in person and tried to convince him of the validity of this metaphor. He suggested that I study Han-period architectural terminology in my research, which is offered later in this chapter.
35. Refer to notes 6, 7.
36. For instance, Yu Xin's 庾信 (513–581) poem "Xinghua" 杏華 (Apricot blossoms) includes the line "枝枝綻翠英" (Every branch bursts into greenish flowers), in Hu Guangzhou et al., *Zhongguo lidai mingshi fenlei dadian*, 2:54; also see Yuan Zhen's (779–831) line "一枝兩枝千萬朵" in note 16; Cen Shen's 岑參 (715–770) "Jiangxing yu meihua zhi zuo" 江行遇梅花之作 (Composed upon coming across blossoming plums while walking along the river) includes the line "摘得一枝在手中" (Pluck a spray [and hold it] in the hand); Yu Jingxiu's 庾敬休 (dates unknown) "Chunxue ying zaomei" 春雪映早梅 (Spring snows set off early blossoming plums) includes the line "隱映幾枝開" (Indistinctly setting off the sprays that are in blossom), in Deng Guoguang et al., *Zhongguo huahui shici quanji*, 10, 16. In addition, Bai Minzhong's 白敏中 (fl. 821–824) "Taohua" 桃花 (Peach blossoms) poem includes "一枝枝綴亂雲霞" (Spray after spray [of blossoms] droop disorderly like variegated red clouds), in Si Dai et al., *Yonghua shixuan*, 56. For two examples in Song poetry, see the monk-poet Wang Zhu's 汪洙 (dates unknown) poem "Lihua" 梨華 (Pear blossoms), which includes "一枝輕帶雨" (A spray lightly bears raindrops), in Si Dai et al., *Yonghua shixuan*, 69. A poem by Huang Tingjian 黃庭堅 (1045–1105) has "水仙華五十枝" (fifty sprays of narcissus) in its title (王充道送水仙華五十枝、欣然會心、為之作詠 Wang Chongdao presented [me] with fifty sprays of narcissus; with pleasure, [I] compose this poem for him), in Wu Zaiqing, *Xinbian Songshi sanbai shou*, 420.
37. For example, Guo Ruoxu, *Tuhua jianwen zhi*, *juan* 6, "Jinshi" 近事 (Anecdotes of recent times), section on "Shuhua" 術畫 (Mystery paintings), 1:94: "每畫華一枝、張于壁間。則遊蜂立至" (Whenever [the Daoist adept] painted a single spray of blossoms, [he] stretched [his painting] out on a wall, and then wandering bees would alight on it). With minor modifications, the English translation follows Soper, *Kuo Jo-Hsu's Experiences in Painting*, 104.
38. Tang-period examples include Wei Yingwu's 韋應物 (737–after 786) line "飛去華枝猶裊裊" (While [the bird] hovered away from the flower sprays, [the cry of it] still is sweet and melodious) and Li Shangyin's 李商隱 (813–858) line "鳳城何處有華枝" (In Fengcheng where are there flower sprays?), in Yang Rufu et al., *Yong niao shi xuan*, 375, "Ting ying qu" 聽鶯曲 (Listening to the voice of the warbler), and 378, "Liuying" 流鶯 (Wandering warblers). For Song-period examples, a *ci* poem in the style of a folk song written by Ouyang Xiu (1007–1072) entitled "Changxiangsi" 長相思 (Having been languishing with lovesickness for long) frequently uses *huazhi*: "深華枝、淺華枝、深淺華枝相並時、華枝難似伊" (Sprays of dark flowers, sprays of light flowers / [those] sprays of dark and light flowers are merged together and at that moment / [those] flower sprays hardly are [as pretty] as that person [whom I love]),

in Zeng Zao, *Yuefu yaci*, *juan* 2:47. Also, Zheng Gangzhong wrote, "人愁春去少華枝" (Man is anxious about spring's going and flower sprays becoming rare); see Zheng Gangzhong, *Beishan wenji*, *juan* 11:153, "Sanyue wuri puzhong" 三月五日圃中 (In the garden on the fifth day of the third lunar month).

39. See He Baomin, *Zhongguo shici qufu cidian*, 1584, entry for *yizhihua* (a spray of flowers).
40. *YZFS*, *juan* 24, "Zhuzuo gongxian" 諸作功限 (Work limits for all systems), part 1, 3a, entry for *diaomuzuo* 雕木作 (system of wood carving).
41. See Hu Guangzhou et al., *Zhongguo lidai mingshi fenlei dadian*, 2:110, "Yong binglang" 詠檳榔 (A song on the betel palm).
42. For example, Shi Dazu's 史達祖 (fl. 1195) *ci* "Shuangshuang yan" 雙雙燕 (Swallows in pairs) includes the line "飄然快拂華梢" (Waving to and fro and whisking on the tips of sprays), in Yang Rufu et al., *Yong niao shi xuan*, 19.
43. *Erya*, 81, "Shicao": "Tu wei ye" 蓷(荼)萎葉 (Leaves of the rose-leaf raspberry are withered). Taiwan Shangwu Yinshuguan Bianshenbu, *Ciyuan*, 1279, entry for *ye* 葉 (leaves), explains that *wei ye* 萎葉 means "fallen petals" and that petals also are called *ye*.
44. Shen Yue, *Songshu*, *juan* 29, "Zhi" 志 (Records), 19, "Furui" 符瑞 (Auspicious omens), part 2, 3:873.
45. Su E, *Sushi yanyi*, *juan* 2:26.
46. See Si Dai et al., *Yong hua shi xuan*, 210, "Zhaochang shaoyao" 趙昌芍藥 (Herbaceous peony at Zhaochang). Si Dai notes, "千葉: 千瓣" (thousands of *ye* means thousands of petals).
47. Yang Yi, *Yang Wengong tanyuan*, 116.
48. Li Fang is the Song scholar who was in charge of the compilation of the official anthology *Wenyuan yinghua* under the order of Emperor Taizong 太宗 (r. 976–997).
49. Song Qi, *Yibu fangwu lueji*, 8, entry for *chongye haitang*.
50. *YZFS*, *juan* 4, "Damuzuo zhidu," part 1, 8a, entry for *dou* 枓 (block).
51. Ibid.
52. *YZFS*, *juan* 30, "Damuzuo zhidu tuyang" 大木作制度圖樣 (Illustrations of the major carpentry system), part 1, 16b, "Jiaoge puzuo gong, ang, dou deng suoyong maokou diwu" 絞割鋪作栱、昂、枓等所用卯口第五 (The fifth illustration: the openings and mortises applicable to arms, cantilevers, blocks, and others of a bracket set that intertwine and interpenetrate each other). In this illustration, the captions of the three images of the *qixindou* specify that the *qixindou* is used on the *nidaogong* 泥道栱 (mud-line arm, the lowest cross arm on the center of a set) and the *linggong* 令栱 (medium-size arms, commonly installed on the last protruding arm or, in the case of "single-tier-arm construction" [單栱造], on the heads of all protruding arms), respectively.
53. Xu Shen, *Shuowen jiezi*, 120.
54. Many pre-Song texts that mention or explain *lu* have been excerpted in the entries for *gong* 栱 (arms), *fei'ang* 飛昂 (flying cantilevers), *dou* 枓 (blocks), and *puzuo* 鋪作 (bracket sets) in the terminology section of the *YZFS*, *juan* 1, "Zongshi" (General explanations), part 1, 8a–9b. For English translations of those texts in the first three entries, see Glahn, "Some Chou and Han Architectural Terms," 106–111, although one should be careful about the incorrect characters and missing words in the handwritten Chinese characters provided on pp. 116–117. Glahn overstates in claiming that the line "層櫨磔俄以岌峩" (layered bearing blocks are precipitously piled, precariously positioned) from the Han-period "Lu Lingguangdian fu" 魯靈光殿賦 (Rhapsody on the Hall of Numinous Brilliance in Lu; by Wang Yanshou 王延壽 [ca. 124–ca. 148]) quoted in the *YZFS* "does not add anything to our knowledge about it [*lu*]" because of

Tang-period Li Shan's 李善 (ca. 630–689) misinterpretation of *lu* (109). In fact, this text, which was written slightly later than the *Shuowen jiezi* dictionary, serves in the *YZFS* as an early-period usage of *lu* meaning "bearing blocks." The English translation of Wang's line follows Knechtges, *Wen xuan*, 2:271.

55. *YZFS*, *juan* 1, "Zongshi," part 1, 9a: "說文：櫨、柱上枓也。栭、枅上標也" (The *Shuowen* [*jiezi*] [says]: "*Lu* is a *fu* on top of a column"; [it also says] "*Er* [small block] is a *biao* [uppermost member; more literally, "end of a twig"] on top of a bracket arm"). As Glahn pointed out, this quotation distinguishes between the two kinds of blocks, the cap block and the small blocks on top of a bracket arm (Glahn, "Some Chou and Han Architectural Terms," 109). For *ludou* as an official Northern Song architectural term for cap block, see *YZFS*, *juan* 4, "Damuzuo zhidu," part 1, 7b, and *juan* 30, illustrations, 2b.
56. Lu Chen's 呂忱 (fl. 266) *Zilin* has been lost since the Song and Yuan periods but was reconstructed by Ren Dachun 任大椿 (1738–1789) during the Qing. See Ren Dachun, *Zilin kaoyi*, *juan* 4:6b: "櫨、柱上枓也。" Regarding the significant place of the *Zilin* in history, Ren wrote, "《唐六典》載：書學博士以石經、《說文》、《字林》教士。《字林》之學閱、魏、晉、陳、隋至唐極盛……今字書傳世者、莫古於《說文》、《玉篇》、而《字林》實承《說文》之緒、開《玉篇》之先" (The *Tang liudian* [Six Codes of the Tang] records that the court academicians taught scholars with the [traditional Confucian] classics inscribed on stone [under imperial orders], the *Shuowen* [*jiezi*] and the *Zilin*. Study and examination of the *Zilin* was extremely common during the Wei [220–265], Jin [265–420], Chen [557–589], Sui [581–618], and Tang periods . . . Today, among those works on characters propagated in the world, none is older than the *Shuowen* [*jiezi*] and the *Yupian*. Nevertheless, the *Zilin* actually served as a continuation of the *Shuowen* [*jiezi*] and a forerunner of the *Yupian*); see ibid., *juan* 1, "Preface," 1a. In addition, Sun Mian 孫愐 (fl. 8th c.), in the preface to his rhyming manual *Tangyun* 唐韻 (Rhymes of the Tang; lost but largely preserved in the content of the Northern Song *Guangyun*), regarded the *Cangjie pian* 蒼頡篇 (Contents of the characters created by Cangjie; by Li Si 李斯 [ca. 280–208 B.C.E.], lost), the *Erya*, the *Shijing* (Classic of odes), and the *Zilin* as outstanding traditional works treating characters and their meanings.
57. See Gu Yewang, *Yupian*, part 2, *juan* 12:13b: "櫨……柱上枓也" (*Lu* . . . is a *fu* on top of a column).
58. Lu Deming, *Jingdian shiwen*, *juan* 29, "*Erya* yinyi," part 2, section on "Shigong" 釋宮 (Explanation of architecture), 1628: "櫨……《字林》云：柱上枓也" (*Lu* . . . The *Zilin* says: [*Lu* is] a *fu* on top of a column). This source serves as additional evidence of the *Zilin*'s gloss of *lu* (see note 56). As discussed in chapter 1, *gong* 宮 (commonly corresponding to "palaces") in the *Erya* generally refers to architecture.
59. Xu Kai, *Shuowen xizhuan*, 18: "櫨、柱上枓也。"
60. Wang Zhu et al., *Leipian*, *juan* 16, leaf 6, entry for *lü*, *lu* 櫚、櫨：《說文》：柱上枓" (In the *Shuowen* [*jiezi*], [*lu* is explained as] a *fu* on top of a column). The character *lü* preceding *lu* must have been a popular form of *lu* before or during the Song dynasty since the *Leipian* glosses synonymous words together in each entry.
61. Xu Kai, *Shuowen xizhuan*, 18. Xu's commentary is faithfully quoted in the *Kangxi zidian*, 1272, entry for *lu*; here, *dougong* 枓栱 is written as 斗栱, a later form. In a Qing-period reprint of Huang Gongshao and Xiong Zhong's *Gujin yunhui juyao*, Xu's commentary is cited, but one word is missing at the end of the quotation, which reads "ji jin zhi dou ye" 即今之斗也 (that is today's blocks). See *Gujin yunhui juyao*, *juan* 3:36a, entry for *lu*. Comparing these texts, the *Gujin yunhui juyao* likely provided a quotation with a scribal error or attempted to modify the last part of this text. In any

case, neither version of Xu's commentary affects the fact that the entire bracket set supported by a cap block was considered to resemble a flower.

62. For example, *Shanhaijing*, *juan* 5, "Zhongshan jing" 中山經 (Canon of the Middle Mountain), 70: "狀如葵而赤華、莢實白柎" ([Its] appearance is like a sunflower while [its] flower is red, and [it is of] double fruits and a white ovary); *juan* 2, "Xishan jing" 西山經 (Canon of the Western Mountain), 24: "黃華而赤拊(柎)" (yellow flower and red ovary). Here, *fu* 拊 with the "carrying hand" radical is used as a variable form of *fu* 柎, with the "tree" radical; refer to note 63. "Middle Mountain" and "Western Mountain" refer to Boshan 薄山 (Bo Mountain, Shanxi) and its environs and to Huashan 華山 (Hua Mountain, Shaanxi) and its environs.
63. In his annotations to the *Shanhaijing*, Guo Pu wrote: "今江東人呼草木子房為拊、音府；一曰：拊、華下鄂（萼）、音丈夫字、或作柎、音符" (Nowadays people in the eastern reaches of the Yangtze River call the ovary of vegetation a *fu* 拊, pronounced *fu*. Alternative definition: *fu* 拊 is the calyx at the bottom of a flower, pronounced the same as the character *fu* as in *zhangfu* [husband], alternatively written as *fu* 柎, pronounced *fu*); see *juan* 2, "Xishan jing," 24, under "員（圓）葉而白拊" (round leaves and white ovary). Also, Gu Yewang, *Yupian*, *juan* 12:18a, entry for *fu* 柎: "華萼足也" ([*Fu*] is the foot of the calyx of a flower).
64. Ding Du et al., *Jiyun*, 166, *juan* 2, entry for *fu*, *fu*, *fu*, *fu* (柎、䒪、不、扶): "草木房為柎；一曰華下萼" (The ovary of vegetation is fu. Alternative definition: [*fu* is] the calyx under a flower); 167, entry for *fu*, *fu* (䒪、柎): "草木華房, 或作柎" ([The former *fu* is] the flower ovary of vegetation, which alternatively is written as [the latter] *fu*). *Leipian*, *juan* 16, leaf 6, entries for *fu* 柎 and *fu*, *fu* (䒪、扶) contain the same explanations as the *Jiyun*.
65. Else Glahn suggested that the shape of a cap block in the earliest texts must have been round ("Some Chou and Han Architectural Terms," 110). I disagree. Based on the *Lunyu* 論語 (Analects [of Confucius]) phrase *shanjie zaozhuo* 山節藻棁 (mountain capitals and pond-weed king posts) and the *Shiming* 釋名 (Explanations of terms) phrase "都盧、負屋之重也；枓在欒兩頭、如斗" ([a *lu* cap block is like] a [climber from] Dulu, carrying the weight of a building; a *dou* [block] is situated at both ends of a curved bracket arm, and it looks like a peck) as quoted in the *YZFS*, *juan* 1:9a (translations basically follow Glahn, "Some Chou and Han Architectural Terms," 108–109), Glahn proposed that the cap block "looks like a peck measure, a mountain or a climber on a pole, which suggests that it must have been round." I do not think that these texts give strong evidence of round cap blocks. That a cap block is compared to a climber on a pole does not necessarily indicate a round capital or block, since a round column or post can easily be topped with a square capital or cap block. A peck measure is not exclusively round; it can be square as well. The text about a peck-shaped bearing block on bracket arms describes the appearance of a bearing block, round or square, as wider in the upper part and narrower in the lower part. Square peck-shaped blocks are commonplace in Chinese architecture of all periods. Likewise, *shanjie* 山節 (mountain capitals) does not necessarily suggest a round shape of the capital or cap block. It could mean "as big as a mountain," "many layers stacked up like a mountain," or "carved with images of mountains," which, along with "king posts carved or painted with pond weed" describes luxurious buildings. Even if *shan* 山 here meant "mountain shaped," its structural feature must have been an inverted mountain, wider in the upper part and narrower in the lower part, as almost all archaeological materials depicting bracketing in early-period Chinese architecture (some are illustrated in Glahn, "Some Chou and Han Architectural Terms," 120–124) show us.

66. The neglect of Xu's comment on *lu* in the *YZFS* may have resulted from Li's systematic treatment of a variety of traditional texts. As discussed, Li Jie imposes a sharp distinction between *lu* (to be regarded exclusively as "blocks") and any other terms for "brackets." He excluded all pre-Song texts that might confuse the meaning of *lu*. Xu Kai's commentary on *lu* might have fallen victim to Li's purposeful screening of earlier texts. In addition, Li faced variant explanations of *fu* 柎 from the Han to Tang periods; either it was associated with "column footing" or it was taken as "a cross timber on bearing blocks"; see *YZFS*, *juan* 1, "Zongshi," part 1, 6b, entry for *zhuchu* 柱礎 (base of a column): "說文：櫝、柎也。柎、闌足也" (The *Shuowen* [*jiezi*] says: "*Zhi* is a *fu*." [It also says] "*Fu* is the foot of a door palisade"); in *juan* 2, "Zongshi," part 2, 2b, entry for *fu*, he quotes the Han-period rhapsody "Lu Lingguangdian fu" line that uses *fu* and Tang-period Li Zhouhan's 李周翰 (fl. 718) commentary on it: "柎、枓上橫木、刻狡兔形致木於背也" (*Fu* is a cross timber on top of a block, [in which] the shape of a wily hare is carved [as if] putting the timber on its back). In the *YZFS*, Li Jie chooses *fu* as a term for the cushion timber between a purlin and brackets. Because of the confusing meanings of *fu*, plus Xu Kai's explanation of *fu* as a flower ovary in the same passage in which Xu takes *lu* as "brackets" in contravention of Li's rigid distinction, Xu's observation was pushed aside by the serious yet confused compiler.
67. See note 62, the *Shanhaijing* texts that describe the calyxes of flowers.
68. See note 6 for the *Shuowen jiezi*'s gloss of *hua*, which indicates that *hua* comes from the grass radical and the character *yu* 𦰩 (flowers). In this dictionary, *yu* is indicated to be from the character *shui* 𠂤 , which means "flowers and leaves," and which resembles the form of flower petals and leaves; see *Shuowen jiezi*, 128, entry for *yu*: "艸木華也。從𠂤" ([*Yu*] means flowers of vegetation; [it] is from [the character] *shui* [flowers and leaves]); entry for *shui*: "艸木華葉、𠂤象形" ([*Shui*] means flowers and leaves of vegetation; [the form of this character] *shui* resembles the shape [of flowers and leaves]). Accordingly, the upper part of *hua* resembles the shape of flowers and leaves. *Kangxi zidian*, 2312, entry for *hua* 花, cites a commentary on the character *yu* as seen in the *Shuowen jiezi* text, which reads as follows: "鄭氏曰：𠂤象華葉垂敷之形、亏象蒂萼也" (Mr. Zheng commented: *Shui* [the upper part of the character *yu*] resembles the shape of flowers and leaves drooping and spreading, and *yu* [the lower part of yu] resembles the [flower] base and calyx). This source does not specify the given name of the commentator "Mr. Zheng."
69. *Shijing*, "Xiaoya" 小雅 (Minor odes), "Luming zhi shi" 鹿鳴之什 (Decade of *Luming* [The deer calling to one another]), "Changdi" 常棣 (also pronounced *tangdi*) (Mao number 164): "常棣之華。鄂（萼）不（柎）韡韡。凡今之人、莫如兄弟" (The flowers of the cherry tree / Their calyxes and ovaries are shining / Of all the men in the world / There are none equal to brothers). See Legge, *Chinese Classics*, 250. I have modified the translation of the second line. In history, ever since Mao Heng 毛亨 (2nd c. B.C.E.) and Zheng Xuan, the question of how to interpret the second line has been controversial. Most scholars, including Kong Yingda 孔穎達 (574–648) of the Tang period and many Qing-period scholars, agree with Zheng Xuan that the word *fu* 不 here, which, in Mao's interpretation, meant "not true if not," was an alternative form of *fu* 柎, meaning "base of the calyx." See Kong Yingda, *Maoshi zhengyi*, *juan* 9:144; Duan Yucai, *Shuowen jiezi zhu*, *juan* 12, annotations for chap. 6 of the *Shuowen jiezi*, part 1, leaf 14: "鄂、承華者也、柎又在鄂之下、以承華與鄂、喻兄弟相依" (*E* [calyx] is what supports a flower, and *fu* [ovary] in turn is beneath the calyx in order to support the flower and the calyx. [This is] a metaphor for the interconnection of brothers). Refer to my note 64 for "不" as *fu* in the *Jiyun*.

70. For an example, see Tang scholar-official Gao Gai's 高蓋 (dates unknown), "Hua'elou fu" 華萼樓賦 (Rhapsody on the Flower-Calyx Tower), in *Wenyuan yinghua*, *juan* 49, "Fu" 賦 (Rhapsodies), 49, "Gongshi" 宮室 (Palaces), 3 (1:220), which includes the following lines: "開元中歲、天子筑宮于長安東郭。有以眷夫代邸之義。舊者中宮起樓、臨瞰于外、乃以'華萼相輝'為名、蓋所以敦友悌之義也。睦親又比乎棠棣之華、裂土茆茅以表慶、錫珪分瑞以聯華、信可以受無窮之祉、而保乂我皇家者哉" (During the mid-Kaiyuan [713–741] period, the Son of Heaven built palaces in the eastern outer city of Chang'an. [Patronizing this construction, the emperor] had a desire to express solicitude for the nobles and use [the structures] as [their] dwellings. At that time the tower was constructed in the middle part of the palace compounds, overlooking the outside [scenery]. Then [the emperor] named [it] "Mutual Radiance of Flower and Calyx," a meaning that was probably to stress fraternal love and the obedience of younger brothers to the elder. Close relatives were also compared to the flower of the bush cherry. By conferring territories upon [the princes] as praise and reward, and by bestowing jade tablets and auspicious jades [to them] so as to share the eminence, it is certain that [the princes] could enjoy endless happiness, and thus protect the affairs of our imperial family!)
71. See Deng Guoguang et al., *Zhongguo huahui shici quanji*, 1:9.
72. See Zhang Jiuling's "Tingmei yong" 庭梅詠 (A poem on the blossoming plum in the hall), in Deng Guoguang et al., *Zhongguo huahui shici quanji*, 8. For another example of the popular concept of a flower and its calyx in Tang poems, see Si Dai et al., *Yonghua shixuan*, 28, Bai Juyi's (772–846) "Wan yingchunhua zeng Yang Langzhong" 玩迎春華贈楊郎中 (Appreciation of spring-greeting flowers with which to present to Langzhong [an official title for emperor's servants of] Yang), which includes the line "金英翠萼帶春寒" (Gold flowers and greenish calyxes carry the chill of spring). Also see Song Qi's text describing the calyxes of flowers, note 49 above.
73. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1, "Xulun" 敘論 (General discussion), entry for *xu zhizuo kaimo* 敘製作楷模 (on the models [to be followed] in working), 1:6: "畫花果草木、自有四時景候、陰陽向背、筍條老嫩、苞萼後先。逮諸園蔬野草、咸有出土體性" (In painting flowers, fruits, grasses, or trees, naturally [one has to consider] seasonal [changes], the weather, sunlight and shade, three dimensionality, the age or youth of shoots and stems, and the order of appearance of buds and calyxes. Everything down to garden vegetables and wild grasses has its own form and nature in emerging from the ground). With minor modifications, the English translation follows Soper, *Kuo Jo-Hsu's Experiences in Painting*, 12. Here, the order of appearance of *bao* 苞 (bud) and *e* 萼 (calyx) is emphasized as one of the fundamental botanical facts that a painter must know. Botanically, the calyx grows to protect the bud as its outer covering; when the bud has opened, the calyx becomes the bottom support of the flower.
74. *YZFS*, *juan* 12, "Diaozuo zhidu" 雕作制度 (System of [wood] carving), 2b, entry for *diaocha xieshenghua* 雕插寫生華 (carved and inserted lifelike flowers).
75. *YZFS*, *juan* 14, "Caihuazuo zhidu" 彩畫作制度 (System of color painting), 4a, entry for *wucai bianzhuang* 五彩遍裝 (five-colored fully decorated pattern).
76. *YZFS*, *juan* 12, "Diaozuo zhidu," 3a, entry for *qitu juanyehua* 起突卷葉華 (raised scrolled-leaf flowers): "凡彫剔地起突華 . . . 葉內翻卷、令表裏分明" ([For] all carved raised scrolled-leaf flowers . . . [carve and make] the leaves turned inward and rolled, and make their exteriors and interiors distinct).
77. Ibid.: "每一葉之上、三卷者為上、兩卷者次之、一卷者又次之" (On each leaf, the one having three scrolls is superior [in quality], the one with two scrolls takes second place, and that with one scroll is even more inferior).

78. *YZFS*, *juan* 12, "Diaozuo zhidu," 3b, entry for *tidi wayehua* 剔地窪葉華 (Background-indented concave-leaf flowers). *Wayehua* 窪葉華 (concave-leaf flowers) is a carving style in which flower petals are made concave to the background. It includes various forms of flowers, including "lifelike flowers" and "scrolled-leaf flowers." There is a need to specify the carving styles of these flowers under this category of *wayehua*. Thus, the term *juantou huicao* (scrolled-head fairy orchid) in the fifth class uses *juantou* to specify that the orchid is of the "scrolled-head" type, not the "lifelike" or another kind.
79. Yang Wanli 楊萬里 (1127–1206), "Yong bajiao" 詠芭蕉 ([A poem] on the palm tree); see Si Dai et al., *Yonghua shixuan*, 390.
80. Wu Fu 吳芾 (fl. 12th–13th c.) poem on crab-apple blossoms titled "He Chen Ziliang *Haitang*" 和陳子良海棠 (Composed in reply to Chen Ziliang's *Crab Apple*); see Deng Guoguang et al., *Zhongguo huahui shici quanji*, 1005.
81. *YZFS*, *juan* 12, "Diaozuo zhidu," 3b, entry for *tidi wayehua*.
82. *YZFS*, *juan* 33, illustrations of the "System of Color Painting," part 1, 4b, section on "Wucai zahua" 五彩雜華 (Five-colored variety of flowers).
83. *YZFS*, *juan* 28, "Zhuzuo yong ding liaoli" 諸作用釘料例 (Standard requirements for nails for various systems), entry for *yongding liaoli* 用釘料例 (standard requirements for nails), 2a–b, *wazuo* 瓦作 (tile system).
84. *YZFS*, *juan* 28, "Zhuzuo yong ding liaoli," entry for *yong ding shu* 用釘數 (number of needed nails), 5b, annotation under *huaban* 華版 (decorative roof plates) of *diaomuzuo* 雕木作 (wood carving).
85. Xu Bo'an and Guo Daiheng suggested that an exact term for this element should be *mohai huagong* 抹頦華栱 (chin-erased flowering arm); see Xu Bo'an and Guo Daiheng, "Song '*Yingzao fashi*' shuyu huishi," 10.
86. Han Hong 韓翃 (*jinshi* 754, fl. 766–780), "Yulinji" 羽林騎 (Imperial guard cavalry), in *Quan Tangshi*, *juan* 245, 8:2757.
87. *YZFS*, "Kanxiang," entry for *zhuzuo yiming* 諸作異名 (alternative names [of some elements] of all systems), 10b: "飛昂：其名有五：櫼、飛昂、英昂、斜角、下昂" ([For *fei'ang*, its names include [the following] five: *jian*, *fei'ang*, *ying'ang*, *xiejiao* [slanted horn], [and] *xia'ang* [downward cantilever]). *Jian* 櫼 is also a term that was transmitted from Han-period literature. The meaning of *jian* includes "filling timber" and "firlike tree," which I discuss later in this chapter.
88. See *YZFS*, *juan* 1, "Zongshi," part 1, 8b, entry for *fei'ang*. This entry quotes a verse by He Yan, "Jingfudian fu": "Fei'ang niao yong, shuangyuan shi he" 飛昂鳥踊、雙轅是荷 (Flying cantilevers flitting like birds / Paired shafts as their support); this entry also quotes a commentary by Li Shan of the Tang period: "飛昂之形、類鳥之飛" (The appearance of a flying cantilever resembles a bird flying). With minor modifications, the translation of He's lines follows Knechtges, *Wen xuan*, 2:289.
89. The *Qiju* belongs to *qi* 七 (seven), a genre of rhapsody created during the Western Han period, with seven sets of refined verses in each work. The *Qiju* has not survived intact, but parts of it were collected in later historical and literary texts. A modern source reconstructs Liu's *Qiju*; see Fei Zhen'gang et al., *Quan Hanfu*, 543–545.
90. See *YZFS*, *juan* 1, "Zongshi," part 1, 8b, entry for *fei'ang*. The same text is also quoted in Li Shan's commentary on the "Jingfudian fu," in *Liuchen zhu Wenxuan*, *juan* 11, 1:224, under the verses gathered under "Fei'ang niao yong" 飛昂鳥踊.
91. See Li Shan's commentary, in Xiao Tong, *Wenxuan*, 158, *juan* 11, Li's comment on the "Jingfudian fu," under the verses grouped under "Fei'ang niao yong."
92. Refer to note 88 for the use of *he* as "support" in He Yan's "Jingfudian fu."
93. For instance, *dangong* 單栱 (single-layer arms) and *chonggong* 重栱 (double-layer arms) are composed of straightforward words to describe the structural property of the

elements; *xiaxugong* 蝦須栱 (literally, "shrimp feeler arms") is a figurative term for the arms of a corner set in which only half the body protrudes along different axes while the other half "disappears" through insertion into the column. *Yuanyang jiaoshou gong* 鴛鴦交首（手）栱 (literally, "mandarin duck crossing heads" or "crossing-wing arms"), also abridged as *yuanyanggong* 鴛鴦栱 (mandarin-duck arms, or birds-in-pairs arms), is a term for two cross arms on the same level whose ends are connected by sharing a block. This term is commonly considered to refer to their resemblance to birds in pairs. In Chinese literature, we also see the imagery in which flowers blooming in pairs are compared to birds in pairs and named *yuanyang* 鴛鴦 (mandarin ducks, or birds in pairs). Take two examples from the Song-Yuan period: Song Qi's *Yibu fangwu lueji* (p. 10) includes an entry for *yuanyang cao* 鴛鴦草 (mandarin-duck grass): "翠蔓對生、甚似匹鳥。" (Greenish flowers grow in pairs, looking extremely like birds in pairs). A poem on *yuanyang mei* 鴛鴦梅 (mandarin-duck blossoming plum) by Xie Zongke 謝宗可 (a Yuan poet, dates unknown) likens the flowers in pairs to mandarin ducks that cross heads at the ends of the sprays: "枝頭交頸栖香暖、華底同心結子肥" (On the ends of sprays, [the flowers are like birds in pairs] crossing heads, staying fragrant and warm / The bottoms of the flowers share one [flower] heart and form plump seeds); see Si Dai et al., *Yong hua shi xuan*, 20.

94. *YZFS*, *juan* 1, "Zongshi," part 1, entries for *gong*, *fei'ang*, *dou*, and *puzuo*, 8a–9b.
95. For the English translations and Latin terms for these trees, I consulted John DeFrancis, ed., *ABC Chinese-English Comprehensive Dictionary* (Honolulu: University of Hawai`i Press, 2003); Beijing Waiguoyu Daxue Yingyuxi 北京外國語大學英語系 (English Department of Beijing Foreign Studies University), *Hanying cidian* 漢英詞典/A Chinese-English Dictionary, rev. ed. (Beijing: Foreign Language Teaching and Research Press, 1995); Du Yaquan et al., *Zhiwuxue dacidian*; Herbert A. Giles, *A Chinese-English Dictionary*, 2nd ed. (Taipei: Literature House, 1964).
96. For example, *Shanhaijing*, *juan* 15, "Dahuangnan jing" 大荒南經 (Canon of the south of the vast tracts of wasteland) (p. 109): "有雲雨之山、有木名曰欒。禹攻雲雨、有赤石焉生欒。黃本、赤枝、青葉、群帝焉取藥" (There was a mountain [called] Yunyu [Clouds and rains], [where] there was [a kind of] tree whose name was *luan*. [Once, King] Yu [ordered to] fell [the trees on] Yunyu [mountain]; there were red stones that grew *luan*. [*Luan* was of] yellow stems, red branches, and green leaves. All kings acquired [fairy] medicines from it [the *luan* tree]). The fantasticality featured in this text lies in the fact that *luan* trees grew on red stones, not in the *luan* tree itself.
97. This Confucian text, titled "Li" 禮 (Rites), is quoted in the *Shuowen jiezi* (p. 117, chap. 6, part 1, 6). This "Li" text does not exist in the *Liji* 禮記 or the *Yili* 儀禮 (Rites and ceremonies) but derives from the *Liwei* 禮緯 (Esoteric meanings of the [*Classic of*] *Li*), one of the commentaries on the classics written by Han Confucian scholars; see Ding Fubao, *Shuowen jiezi gulin*, 2424a.
98. *Shuowen jiezi*, chap. 6, part 1, 6 (p. 117): "欒: 木、似欄" (*Luan*: a tree, like *lian* [chinaberry]). Post-Han scholarship either explains the word "欄" here as *lan* 蘭 or *mulan* 木蘭 (magnolia) or considers it as a variant form of *lian* 楝 (chinaberry); see Xu Kai, *Shuowen xizhuan*, *juan* 11:303; Ding Fubao, *Shuowen jiezi gulin*, 2424a–b, 2425a. Chen Fuhua, *Gudai Hanyu cidian*, 931, entry for *lan* 欄, explains that this character, when referring to a tree, is a variant form of *lian* 楝 and is also pronounced as such. *Lian* 欄 as a tree appears as early as in the *Kaogongji* 考工記 (Records of artificers); see *Jiao Song* "*Zhouli*" *Zhengzhu*, 787, *juan* 11, "Kaogongji," part 2, 27a.
99. Du Yaquan, *Zhiwuxue dacidian*, 1179–1180, entry for *lian* 楝 (chinaberry, *Melia japonica* Don), explains that chinaberry is timber for architecture and implements. Zhongguo Dabaike Quanshu Zong Bianji Weiyuanhui et al., *Zhongguo dabaike*

*quanshu*, 2:865–866, entry for *lianke* 楝科 (Meliaceae), also indicates that many kinds of trees of the Meliaceae family contain fine wood with good hardness. For *mulan* 木蘭 (magnolia) used as a building material in history, see the records from the *Sanfu huangtu*, including "use magnolia to make rafters for the double-layered roof," "use magnolia to make beams," and "[ordered that] rudders be made from magnolia" (chap. 1, notes 128–130 above).

100. Li Shizhen, *Bencao gangmu*, 2:2002, entry for *lian* 楝 (chinaberry).
101. See Du Yaquan, *Zhiwuxue dacidian*, 1567, entry for *luanshushu* 欒樹屬 (*Koelreuteria*), i.e., the *luan*-tree genus. See also Zhongguo Dabaike Quanshu Zong Bianji Weiyuanhui et al., *Zhongguo dabaike quanshu*, 3:1760, entry for *wuhuanzi ke* 無患子科 (Sapindaceae).
102. See Chen Guiting, *Bencao gangmu tongshi*, 1664–1665. See also Zhongguo Dabaike Quanshu Zong Bianji Weiyuanhui et al., *Zhongguo dabaike quanshu*, 3:1760, entry for *wuhuanzi ke*.
103. *Shuowen jiezi*, 121, *juan* 6, part 1, 14: "檥：楔也。" (*Jian* is *xie*); "楔：檥也。" (*Xie* is *jian*).
104. For example, Zhu Junsheng, *Shuowen tongxun dingsheng*, 87, entry for *jian*: "凡木工于鑿枘相入處、有不固、則斫木札楔入固之" (In all cases that a carpenter [sees] a [lack of] solidity in the joint of mortises, [he] then cuts [and makes] a timber wedge to consolidate it). For modern scholarship, see Glahn, "Some Chou and Han Architectural Terms," 111; Knechtges, *Wen xuan*, 2:288, L. 164n.
105. See Li Shan's commentary, in Xiao Tong, *Wenxuan*, 57, *juan* 4.
106. Ibid., 58. In addition, Guhanyu Changyongzi Zidian Bianxiezu, *Guhanyu changyongzi zidian*, 463, entry for *xie*, offers three meanings of *xie*, the first of which is a "pinelike, thorny arbor." A variant gloss of *xie* is seen in the *Erya*: "楔、荊桃"; see Songben *Erya*, 85, section 14, "Shimu" 釋木 (Explanation of trees); Guo Pu notes that *jingtao* 荊桃 is "cherry tree."
107. Guo Zhongshu, *Peixi*, 32, *juan* 2.
108. *Guangyun*, 229, *juan* 2:50a, entry for *jian*. Also, *Leipian*, 20, *juan* 16, 木 (tree) radical, entry for *jian* 檥: "又 . . . 木名" (also . . . a name for "tree").
109. See *Songben Erya*, 84, section 14, "Shimu" (Explanations of trees).
110. Du Yaquan, *Zhiwuxue dacidian*, 454–455, entry for *shan* (*Cryptomeria japonica* Don).
111. See *Shuowen jiezi*, 120, *juan* 6, "tree" radical, 12, entry for *lu*.
112. "Hongnong Mountain" likely refers to a large mountain in the prefecture of Hongnong 弘農, corresponding roughly to the areas covering east of modern Luoyang and its environs and the west of modern Shangxian 商縣 County, Shaanxi; see Zhongguo Wenhua Yanjiusuo et al., *Zhongwen dacidian*, 12:118–119, entry for *hongnong*.
113. See Gu Yewang, *Yupian*, part 2, *juan* 12:13b; Guo Zhongshu, *Peixi*, 28, *juan* 2; Chen Pengnian et al., *Guangyun*, 84, *juan* 1:38b; Ding Du et al., *Jiyun*, *juan* 2:187, entry for *lu*.
114. See Li Shan's commentary, in Xiao Tong, *Wenxuan*, 109, *juan* 8; 51, *juan* 4.
115. Du Yaquan et al., *Zhiwuxue dacidian*, 1149, entry for *huanglu* 黃櫨, explains that *lu* is, namely, *huanglu*, which belongs to *qishuke* 漆樹科 (Anacardiaceae family), and *qishushu* (漆樹屬 *Rhus* genus); p. 1255, entry for *qishu* (sumac, or *Rhus vernicifera* DC), explains that this kind of tree produces good-quality wood for implements; also, p. 1255, entry for *qishuke*, indicates that the botanical characteristics of trees of the *Rhus* genus are similar to those of the Meliaceae family, which have fine wood with good hardness (refer to note 99, *Zhongguo dabaike quanshu*, entry for *lianke* [Meliaceae]).
116. Bao Ding, Liu Dunzhen, and Liang Sicheng, "Handai jianzhu shiyang yu zhuangshi,"14, suggest that the long, curved bracket arms depicted in the pictorial

stones of Liangchengshan 兩城山 (Liangchengzhen 兩城鎮 in some sources), Shandong, indicate the use of naturally curved timbers in the making of bracket arms in ancient China. But they think that those swelling, curved arms seen in both the pictorial stones and stone gateway markers of the Han period were purely decorative depictions and could not possibly have been the real form in building practice. Glahn, "Some Chou and Han Architectural Terms," 112, cites this work but further deduces that those swelling, curved arms, as also seen in the Jin-period mural of the tomb at Zhaotong 昭通, Yunnan, "may originally have been naturally curved tree branches." Both articles include some images of curved bracket arms of the period.

117. Zhongshanwang 中山王 [Liu Sheng], "Wenmu fu" 文木賦 (Rhapsody on the figured wood), in Liu Xin and Ge Hong, *Xijing zaji*, *juan* 6; see Xiang Xinyang 嚮新陽 et al., collators, *Xijing zaji jiaozhu* 西京雜記校註 (Collated and annotated *Jottings on the Western Capital*) (Shanghai: Shanghai guji chubanshe, 1991), 253. This rhapsody describes how the writer's brother, Liu Yu 劉餘, Prince of Gong of the Lu 魯恭王, ordered highly skilled craftsmen to fell an old tree on a high cliff, who discovered a wonderful wood grain in it, and how these craftsmen made various kinds of implements (musical instruments, screens, small desks, canes, pillows, and utensils) from the timber by properly taking advantage of its varying lengths, thicknesses, and forms as well as the grain.
118. Zhang Qiao, *Guwenyuan*, 216, *juan* 3:11–12.
119. For instance, in a rhapsody entitled "Lin cengtai fu" 臨層臺賦 (Rhapsody on an outlook on storied terraces), Emperor Taizong 太宗 (r. 627–649) of the Tang wrote: "鑒前王之御世、亦因機而化之。換卑宮于穴處、改巢樹于茅茨" (I can only reflect on the reigns of former kings, who altered accommodations as conditions dictated—abandoning caves for simply constructed palaces, abandoning tree nests for domiciles with thatched roofs); see Li Fang et al., *Wenyuan yinghua*, *juan* 58, "Fu" 賦 (Rhapsodies) 58, "Xingxing" 行幸 (Conducting an imperial progress), 1; the English translation was offered by Professor Richard L. Davis in his comments on my dissertation in spring 2003. Although his purpose was to legitimize his own construction of magnificent palaces, the emperor's references to the caves and tree nests of "former kings" reflect this profound concept of history.
120. See Li Shan's commentary, in Xiao Tong, *Wenxuan*, 158, *juan* 11. This text is also quoted in *YZFS*, *juan* 1, "Zongshi," part 1, 9b, entry for *puzuo*.
121. See Taiwan Shangwu Yinshuguan Bianshenbu, *Ciyuan*, 389, entry for *yaojiao*. This source offers three meanings of *yaojiao*, the first of which refers to the curvedness of tree branches. The other two meanings are "an appearance of protrusion," and "consecutive extensions."
122. See Fei Zhen'gang et al., *Quan Hanfu*, 65.
123. Xiao Tong, *Wenxuan*, *juan* 6, section on "Gongdian" 宮殿 (Palaces); see *Yingyin Songben wuchen jizhu Wenxuan*, 4:8a. The translation is based on Knechtges, *Wen xuan*, 2:269–271. I have made some modifications.
124. See Xiao Tong, *Wenxuan* (*Yingyin Songben wuchen jizhu Wenxuan*), 4:8a.
125. Ibid., 7b–8a. Also refer to Knechtges, *Wen xuan*, 2:268, L.79n.
126. See Xiao Tong, *Wenxuan* (*Yingyin Songben wuchen jizhu Wenxuan*), 4:15b. The translation follows Knechtges, *Wen xuan*, 2:299–301.
127. See Xiao Tong, *Wenxuan* (*Yingyin Songben wuchen jizhu Wenxuan*), 4:15b.
128. Li Fang et al., *Wenyuan yinghua*, *juan* 822, "Ji" 記 (Records), 26, section on "Guan" 觀 (Monasteries), "Jingzhou Dachongfuguan ji" 荊州大崇福觀記 (Record of the Great Chongfu Monastery in Jingzhou).

129. See the "Lu Lingguangdian fu" for the lines "飛梁偃蹇以虹指," as shown in the above, and "浮柱岧嶢以星懸" (Floating posts, sublimely soaring, suspended like stars); see Xiao Tong, *Wenxuan* (*Yingyin Songben wuchen jizhu Wenxuan*), 4:8a.

## Chapter 5: The *Yingzao Fashi* Architectural Terminology (II)

1. Xu Bo'an and Guo Daiheng, "Song '*Yingzao fashi*' shuyu huishi," 33.
2. *YZFS*, *juan* 4, "Damuzuo zhidu" (Major carpentry system), entry for *gong* 栱 (arms), 3b: "[令栱]施之於裏外跳頭之上（[註]外在撩檐方之下、內在算桯方之下）、與耍頭相交（[註]亦有不用耍頭者）、及屋內槫縫之下" ([A *linggong*] is installed on top of protruding arms inside and outside the eaves. [Author's annotation: on the outside, (it is) under the eave purlin; on the inside, under the ceiling tie beam.] [It] intersects with the *shuatou* [耍頭, a protruding element on top of the uppermost protruding arm]. [Author's annotation: There are also occasions where a *shuatou* is not used.] [It] also [is used] under the joining point of [two neighboring] purlins inside a hall).
3. *YZFS*, *juan* 17, "Damuzuo gongxian" 大木作功限 (Work limits of major carpentry system), 12a.
4. *YZFS*, *juan* 4, "Damuzuo zhidu," entry for *gong* (arms), 3a–3b.
5. Ibid., entry for *zong puzuo cixu* (general order of bracket sets), 9a: "自四鋪作至八鋪作、皆於上跳之上橫施令栱、與耍頭相交、以承撩檐方" (From a four-*puzuo* set to an eight-*puzuo* set, all have a *linggong* installed on the uppermost protruding arm transversely [perpendicularly to the protruding arm], intersecting with the *shuatou*, so as to support the eave purlin).
6. Ibid., entry for *gong*, 3a.
7. Ibid., 3a–3b. In the *YZFS*, a *fen* is one-tenth the width of a modular unit—namely a *cai* 材. Recall that a *cai* designates the section of a bracket arm.
8. Ibid., entry for *zong puzuo cixu*, 10a–10b.
9. Ibid., entry for *gong*, 3a–3b.
10. Ibid., 3b: "四曰令栱（或謂之單栱）" (The fourth [type of arms] is called *linggong* [(annotation) also called "single-level arms"]); "五曰慢栱（或謂之腎栱）" (The fifth [type] is called *mangong* [(annotation) also called "kidney arms"]). The paragraph on *mangong* in *juan* 4 of the *YZFS* is missing from all surviving editions except for the hand-copied palace edition discovered in the Forbidden City in 1932.
11. In modern scholarship, *nidaogong* is sometimes translated as "wall arm." However, it seems to me that "wall arm" is a more precise translation of *fubigong* 扶壁栱 (literally, "wall-supporting arm"). The *fubigong* includes any cross arms installed above the *nidaogong* (such as a *mangong*) and extending along the wall plane, even if these arms are partially shaped and merged into the timber lintels of a standard cross-section that, of course, also extend along the wall plane. The *nidaogong* is the bottommost "wall arm."
12. Qing-dynasty architectural terminology no longer differentiates between a *nidaogong* and a *guazigong*. Instead, both are called *guagong* 瓜栱 (melon arms), although the Song *nidaogong* is now called *zhengxin guagong* 正心瓜栱 (melon arms in correct center). Part of the reason for the change is the obsolescence of Song mud walls between bracket sets and their substitution with a timber board during the Qing period.
13. Monk Huilin, *Yiqiejing yinyi*, 836, entry for *fahao shiling* 發號施令 (issuing orders), quotes the *Guangya* 廣雅 (Extended *Erya*): "令，教也" (*ling* is "instructing"). In modern scholarship, Glahn translates *linggong* as "order arm."
14. *Shuowen jiezi*, 220, explains *man* as *duo* 惰 (lazy).

15. Chen Pengnian et al., *Guangyun*, 405: "慢：怠也、倨也、易也" (*Man* is idle, or arrogant, or easy).
16. *YZFS*, "Kanxiang," entry for *juzhe* 舉折 (raise and break of roofs), 8b; repeated in *juan* 5, "Damuzuo zhidu," entry for *juzhe*, 9b.
17. *YZFS*, *juan* 3, "Shizuo zhidu" 石作制度 (System of stonework), entry for *chongtai goulan* 重臺鉤欄 (double-support balustrades), 7b; *juan* 8, "Xiaomuzuo zhidu" (Minor carpentry system), entry for *goulan* 鉤欄 (balustrades), 6b; *juan* 15, "Zhuanzuo zhidu" 磚作制度 (System of masonry), entry for *mandao*, 3b–4a; *juan* 27, "Zhuzuo liaoli" 諸作料例 (Convention on materials of various systems) 2, entry for *zhuanzuo* 磚作 (masonry work), 8a.
18. *YZFS*, *juan* 16, "Haozhai gongxian" 壕寨功限 (Work limits of moats and fortifications), entry for *banyungong* 般運功 (transport work), 5a.
19. Wen Ruxian, *Cipai huishi*, 94, entries for *mulanhua man* 木蘭華慢 (long tune of "Blossoms of Lily Magnolia") and *mulanhua ling* 木蘭華令 (short tune of "Blossoms of Lily Magnolia"); p. 93, entry for *mulanhua* 木蘭華.
20. See Tang Guizhang, *Songci sanbai shou jianzhu*, 13.
21. Ibid., 233.
22. Yu Chaogang et al., *Zhongguo gudai shige cidian*, 646, entry for *ling*, *yin*, *jin*, *man* 令、引、近、慢 (*ling*, *yin*, *jin*, *man* [four types of lyric poems]). In addition to *ling* and *man* being used to designate the length of a lyric poem, *yin* and *jin* are used to designate poems of lengths in between a *lingci* and a *manci*.
23. Yang Haiming, *Tang Song cishi*, 281.
24. Wu Chucai 吳楚材 (b. 1655) and Wu Diaohou 吳調侯, eds., *Guwen guanzhi* 古文觀止 (Gems from classical Chinese writings, 1694), (repr., Beijing: Zhonghua shuju, 2007), *juan* 7.
25. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1, section on "Xu zhizuo kaimo" 敘製作楷模 (On the models [to be followed] in working); English translation follows Soper, *Kuo Jo-Hsu's Experiences in Painting*, 13.
26. See Soper, *Kuo Jo-Hsu's Experiences in Painting*, 123n141.
27. The *YZFS* does not explain *boshui*. Soper offers this meaning (*Kuo Jo-Hsu's Experiences in Painting*, 124n153), which I think is correct.
28. Translations of *pupaifang*, *boshui*, *bofeng*, *huafei*, and *danggou* follow Soper, ibid., 123–124nn150–156.
29. Ibid., 123n143.
30. The word *shu* 蜀 in ancient Chinese means a moth larva or refers to the region of the *Shu* 蜀 (part of modern Sichuan). It thus can represent "small," as in the compound *shuting* 蜀艇 (small boats) as seen in the *Huainanzi*; see Chen Fuhua, *Gudai Hanyu cidian*, 1459.
31. *YZFS*, "Kanxiang," entry for *zhuzuo yiming*, 11b; *juan* 5, "Damuzuo zhidu," entry for *zhuruzhu*, 6a.
32. *YZFS*, *juan* 4, "Major Carpentry System," entry for *cai*.
33. Ibid. For further details and illustrations of the use of *anzhi*, see Liang Sicheng, *Yingzao fashi zhushi*, 240, 253; Glahn, "Chinese Building Standards in the 12th Century," 172.
34. See Yang Haiming, *Tang Song cishi*, 59.
35. Ibid., 60–61.
36. *YZFS*, *juan* 5, "Major Carpentry System," entry for *yangma* 陽馬 (corner beams): "凡造四阿殿閣……（註）俗謂之吳殿、亦曰五脊殿" (Whenever building a four-slope tower-type hall . . . [Li Jie's annotation:] it is popularly called "Wu hall" or called "five-ridge hall").

37. Ibid.
38. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1, entry for *xu zhizuo kaimo*. Refer to Soper, *Kuo Jo-Hsu's Experiences in Painting*, 13. Soper has pointed out that the "Han" and "Wu" halls are equated in the *YZFS* to the "nine-ridge" and "five-ridge" halls, respectively; see Soper, *Kuo Jo-Hsu's Experiences in Painting*, 122n138.
39. Yu Zhuoyun, "Wudianding," 48.
40. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1, entry for *lun Cao Wu tifa* 論曹吳體法 (On the styles and methods of Cao and Wu). English translation follows Soper, *Kuo Jo-Hsu's Experiences in Painting*, 16–17.
41. Ibid. (both sources).
42. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1, entry for *lun Wusheng shese* 論吳生設色 (On Master Wu's use of colors). English translation follows Soper, *Kuo Jo-Hsu's Experiences in Painting*, 17.
43. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1. I made a minor modification of the English translation by Soper (*Kuo Jo-Hsu's Experiences in Painting*, 17).
44. Guo Ruoxu, *Tuhua jianwenzhi*, *juan* 1.
45. Ibid., entry for *lun Wusheng shese*.
46. Ibid. In an annotation, Guo states, "彫塑之像亦有吳裝" (The same name is applied in sculpture as well).
47. Ibid.
48. For more details, see Henansheng Wenwu Yanjiusuo et al., "Song Taizong Yuande Lihou Ling fajue baogao."
49. For more details, see Henansheng Wenwu Kaogu Yanjiusuo, *Bei Song huangling*, 164.
50. *YZFS*, *juan* 14, "Caihuazuo zhidu," entry for *wucai bianzhuang*.
51. *YZFS*, *juan* 12, "Diaozuo zhidu," entry for *tidi wayehua* 剔地窪葉華 (background-indented concave-leaf flowers).
52. See Ma Chengyuan, *Wenwu jianshang zhinan*, 137–138.
53. It is said that the Wu's style was a combination of the style of the central plain and that of the western region. See ibid., 138.
54. Monk Wenying, *Yuhu qinghua*, 21, *juan* 2.
55. See *Yongle dadian* 永樂大典 (Great encyclopedia of the Yongle period, 1403–1424), *juan* 2281, "Hu" 湖, "Huzhoufu" 湖州府 (Prefecture of Huzhou), 7, 9b, section on "Miao" 廟 (Shrines).
56. Su Shi, "Zesheng ting ming" 擇勝亭銘 (Epitaph of the Zesheng Pavilion), in *Su Dongpo quanji* 蘇東坡全集 (A complete collection of Su Dongpo's essays) (1986; repr., Beijing: Zhongguo shudian, 1996).
57. Tuotuo, *Songshi*, *juan* 338, "Biography," 97, "Su Shi zhuan" 蘇軾傳 (Biography of Su Shi).
58. Su Shi, *Sizhi lun* 思治論 (On some thoughts of management), cited in Chen Menglei et al., *Gujin tushu jicheng*, "Jingji huibian" 經濟彙編, "Kaogong dian" 考工典, "Kaogongbu zalu" 考工部雜錄 (Miscellaneous records in the category of crafts).
59. Shen Kuo, *Mengxi bitan*, *juan* 9.
60. *YZFS*, "Zhazi" (Prefatory document), 1a.
61. *YZFS*, *juan* 1, "Zongshi" (General explanations), part 1, 10b–11a, 8b.
62. Translation based on Hardie, *Craft of Gardens*, 39, but I have made some modifications.
63. See Zheng Yuanxun's foreword in Ji Cheng, *Yuanye*. Translation basically follows Hardie, *Craft of Gardens*.
64. Li Yu, *Xianqing ouji*, 145, *juan* 4, "Jushibu" 居室部 (Section on architecture), "Fangshe" 房舍 (Buildings).

65. Ibid., 151, “Chuanglan” 窗欄 (Window lattices).
66. For a recent study of this text, see Clunas, *Superfluous Things*.
67. This text is included as a chapter in Li Dou, *Yangzhou huafang lu*, *juan* 17:399.

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## About the Author

Jiren Feng, who received his Ph.D. in History of Art and Architecture at Brown University in 2006, trained as an architectural historian at Tsinghua University in China and at the University of Pennsylvania and Brown University in the United States. He has taught at Peking University, Brown University, Technical University of Berlin, and Victoria University of Wellington, New Zealand, and was a postdoctoral research fellow at the Max Planck Institute for the History of Science in Berlin from 2006 to 2008. Currently he is assistant professor of Chinese at the University of Hawai‘i at Hilo.