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The Paradox of the Angled Bracket-arm and the Unorthodox "Speech Patterns" of Shanxi Regional Architecture

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Abstract: This paper challenges the traditional view of Chinese architecture as a building culture rooted solely in the idea of orthogonality (straightness, squareness) and the desire for normalization (regularity through conformity with government rules). After discussing if and how historical documents and/or their modern interpretation have codified these principles and created an official language for wood construction, the author identifies Shanxi regional architecture as a topolect, a traditional Chinese linguistic concept that identifies a local form of speech that is mutually intelligible with Standard Chinese (Mandarin). Just as with Chinese language, Chinese architecture took various forms that had shared characteristics with the mainstream form, but that varied just as topolects do, Besides taking on a local flavor in the form of dialects, "Shanxi Mandarin," as we might call it, shared a common set of "grammar" rules with the official "tongue" but modified its "vocabulary," and this included using unorthodox (slanting, sloping, curved) elements such as the angled bracket-arm. Making use of the analogy with Chinese language, this paper uses recent linguistic and architectural research to re-contextualize the linguistic metaphor that has been the basis of the formulation of Western architectural theory for the past two millennia and to elaborate on early-twentieth-century Chinese explanatory models (e.g., those of Liang Sicheng). This in turn proves helpful for explaining the (hitherto unsolved) complex relationship between the standard and its regional and local variations in the rhetoric of Chinese construction, and offers an alternative way of interpretation that eschews the negative connotation of socio-political caste mentality (native Han vs. alien, non-Han ethnicity).

Keywords: Angled bracket-arm, unorthodox construction, linguistic analogy, modalities of language formation, "grammar books" (*Yingzao fashi, Gongcheng zuofa zeli*), Shanxi Province, imperial China (eleventh to twentieth century)

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INTRODUCTION

From the early twentieth century onwards, two books — the *Yingzao fashi* 营造法式 (Building standards; Kaifeng, 1103; rev. rpt. Nanjing, 1145) by the Song-dynasty government official Li Jie 李诫, and the eighteenth-century *Gongcheng zuofa zeli* 工程做法则例 (Engineering manual; Beijing, 1734) by the Qing-dynasty Ministry of Works — have provided the architectural vocabulary for the modern discipline of architectural history in China. Liang Sicheng 梁思成 (1901–1972), a founding father of architectural history studies in China, famously claimed:

We are fortunate to have two important books left to us from two epochs of great building activities: the *Yingzao fashi* of the Song dynasty (960–1279) and the *Gongcheng zuofa zeli* of the Qing dynasty (1644–1912)—two "grammar books" on Chinese architecture, as we may call them. Both government manuals, they are of the greatest importance for the study of the technological aspects of Chinese architecture. We owe to them all the technical terms that we know and all the criteria that we employ today for the comparative study of the architecture of different periods. (Liang [1946] 2001e, 27; Fairbank 1984, 14)

However, neither of the two books mentions a highly idiosyncratic type of Chinese bracket set (*dougong* 斗栱), the so-called "fan-shaped" bracket set formed of timber bracket-arms placed at a 30-, 45-, or 60-degree angle to the wall plane (*xiegong* 斜栱) (Harrer 2010), visually mimicking the shape of

an open fan stripped of its covering material. (Fig. 1) The angled bracket set and its constituent parts, the angled bracket-arms, were excluded, according to Liang, because they ran counter to China's thousand-year-old "(native Han) culture of the orthogonal" (Liang [1946] 2001e, 77; Fairbank 1984, 62).¹ However, hundreds of actual examples clearly prove that the opposite is the case. From the eleventh century on, fan-shaped bracketing has been a regional trademark of the territory along and north of the Yellow River Valley, part of the historical heartland of the Chinese empire. Furthermore, the angled bracket-arm is a prominent feature of architecture in Shanxi Province, where seventy percent of premodern monumental timber architecture is preserved, regardless of the type of building or patron (Harrer 2010).

In this paper, I ask two main questions: What were the reasons for excluding Shanxi's angled bracket-arms when the court building standards were being compiled? And, how was it possible for such a bracketing system, one that seemingly fails to meet court standards, to continue to gain in importance over almost a thousand years? Investigation into the distribution of the angled bracket-arm across Shanxi Province serves to challenge our conception of government-sponsored and private-sponsored construction as two diametrically opposed building modes — official and unofficial styles — without cultural and technical commonalities. Examination of the physical evidence through the metaphor of language allows a more nuanced understanding of the rhetoric of construction across the Chinese empire.

¹ Liang made an indirect statement about this, stressing the preference of medieval Northern dynasties for "the diagonal *kung*" (employing here the Wade-Giles phonetic). Many studies highlight the concepts of orthogonality, squareness and alignment with the cardinal directions that are deeply ingrained in traditional Chinese thinking and rooted in the classical interpretation of the *kun* 坤 hexagram, a divinatory symbol in *Zhouyi* 周易 (Book of changes), the oldest of the Chinese classics that links the practice of siting to the need for rectification ("straightness," "orthogonality") and a particular advantageous effect (explained in *Zhouyi zhengyi* 周易正义 [Rectified connotation of Zhouyi, annotated by Wang Bi 王弼 and Kong Yingda 孔颖达], Biography of Qian, *juan* 1, translated by James Legge in *The I Ching* [rpt. New York: Dover 1993], 60).





Figure 1. Regular bracket set (left) and "fan-shaped" bracket set with angled bracketarms (right) (Photos by Alexandra Harrer). Left: Main hall of Chuzu'an at Shaolinsi, Henan Province, 1125, Song dynasty. Right: Hall of Heavenly Kings (Tianwangdian 天 王殿) at Longmensi in Pingshun country, Shanxi Province, Jin–Yuan dynasty

THE BRACKET SET AND THE LANGUAGE OF CHINESE ARCHITECTURE

In the West, the metaphor of language was a central reason for the formulation of architectural theory and one that has repeatedly caused a stir among critics ranging from Vitruvius to Renaissance humanists (Clarke and Crossley 2000, 1). However, broadly speaking, Chinese architecture, in contrast to European architecture, is not rooted in concept but in customs and practices that are imbued with history and meaning (such as tried and tested woodworking methods that have been handed down through the centuries). Any discussion of the language(s) of Chinese architecture must first consider the practical aspects of the application and rules of conduct established in the Chinese context of timber craftsmanship.

The practical importance of the bracket set stems from its original function in the multipartite frame structure of traditional Chinese timber buildings. Column-top bracket sets connected vertical columns with horizontal beams, provided an additional cushion by enlarging the load-bearing area, supported the projecting upturned roof eaves, and made the building more earthquake-resistant. Additionally, bracket sets and their constituent members were practical tools in terms of building design and safety. Beginning in the Northern and Southern Dynasties, a standardized modular system of timber-frame construction developed in which all building parts were generated as multiples of the basic module (Fu 2017, 138) — and one of these modules was the width of the bracket-arm (*cai* 材 in Song carpentry; *doukou* 斗口 in Qing carpentry); another was the interval between two bracket sets (*cuandang* 攒档 in Qing carpentry) (J. Li [1103; 1145] 1956, *juan* 4; Qing Gongbu [1734] 1995–1999, *juan* 28).

Still, all this would not be sufficient to explain the exceptional significance attached to the bracket set and bracket-arms if it were not for their symbolic roles. The Tang-dynasty building code *Yingshanling* 营善今 (Ordinances of construction and repair; effective during the Kaiyuan reign, 713-741), a short text antedating *Yingzao fashi* by two centuries, clearly relates bracket sets to social status, for example, forbidding the use by low-ranking officials of double-layered bracket-arms parallel to the wall plane (chonggong 重栱; the basic building block of the mature and complex bracket set in Tang-Song government architecture) (recorded in fragmentary form in *Tang liudian* 唐六典 [Six codes of the Tang], juan 23, compiled by Zhang Jiuling 张九龄 in 735 and annotated by Li Linfu 李林甫 in 762).² That is to say, Confucian hierarchy as a graded or ranked sequence is omnipresent in traditional Chinese architecture and regulates every aspect of construction according to the importance of the building and the patron's social status — ranging from the dimensions of the lumber permitted, as defined in Yingzao fashi (Eight grades for large-scale carpentry; J. Li [1103; 1145] 1956, juan 4) and Gongcheng zuofa zeli (Eleven grades; Qing Gongbu [1734] 1995-1999, juan 28) to the height of the stone podium on which the wooden hall then stands — but it is perhaps best symbolized by the idea of bracketing. Bracket sets transmit a precise message to the viewer through their design, and the more complex the design, the greater the social rank and symbolic meaning they confer — although the specifics of expression changed over the course of history from the complexity in size and structure of the single bracket set (second century BCE to thirteenth century) to the density of sets per bay (fourteenth to twentieth century). The ingenuity and craftsmanship of the skillful mounting and

² Li Linfu explains that only the Son of Heaven was entitled to use *chonggong* and domed coffered ceilings ("天子之宫殿 皆施重栱藻井") (*Tang liudian* [eighth century] 1983, 217–218).

magnificent carving of the interlocking brackets and load-bearing blocks evoked an elegant beauty that entranced the viewer — which also made the bracket set a bearer of Chinese aesthetics.³

And it is due to all this embedded symbolism,⁴ paired with practical functionality, that the bracket set, "seemingly no more than a structural component of the traditional timber-frame architecture" (Lin 2015, 328), has been able to achieve and — equally importantly — to maintain its historical and cultural significance as the embodiment of "eastern cultural quality" and "Chinese architectural spirit" for centuries, to this day (Han 2000, 14). Nancy Steinhardt suggests that the historicity of Chinese architecture originates from the interpretation of its roots through a handful of widely recognized and well-established elements (Steinhardt 2004, 229–230; 248). That is to say, from the early twentieth century onward, the establishment of the modern disciplines of architectural history and historiography in China marked the beginning of a new iconic language in Chinese-style design based on the bracket set. Liang and his colleagues at the Society for the Study of Chinese Architecture (Zhongguo Yingzao Xueshe 中国营造学社) placed so much emphasis on the importance of bracket sets that their office was informally known as the "Society of Bracket Sets"

4 Bracket sets are extremely rich in cultural connotations and are also regarded as symbols of Taoism and Buddhism. In the context of Taoist funerary art, the oversized block-bracket clusters of Han-period tombs served as a doorway to transcend to the heavenly realm; the association with immortal celestial beings and their ascending or descending through imagery like the cosmic axis or Mount Kunlun nourished the popularity and further development of the bracket set thereafter (Ji and Zhu 2008). Furthermore, in the centuries between the Han and Tang, in the initial phase of Buddhism, when a new architectural vocabulary was formulated to translate the foreign religion from India into native Han culture, bracket sets were one of the handful of elements that defined the image of China and were used to claim Buddhist territory on Chinese soil (Steinhardt 2001).

³ See for example the picturesque description by the Song government official Guo Maoqian 郭茂倩 (1041–1099) in his *Lefu shiji* 乐府诗集 (Anthology of *yuefu* [Music Bureau] poetry), *juan* 15, *Yanshe geci* 燕射歌辞 3, Gongtiaoqu poem five 宫调曲五首:

郁盘舒栋宇,峥嵘侔大壮。拱木诏林衡,全模征梓匠。千栌绮翼浮,百栱长虹抗。 (Curved beams stretching across buildings, strong and big like the dazhuang [hexagram]. The local forest officers are called upon to contribute logs, and large numbers of carpenters are recruited. Thousands of large bearing blocks enchantingly uphold the upturning [eaves] floating in the air; hundreds of brackets form [structural frames] shaped like rainbows.) (Guo Maoqian [second half eleventh century] 2004, 124)

(Dougong Xueshe 斗拱学社) (Lin 2015, 327), and from 1932 onwards, even the cover of the Society's bulletin sported an image of a wooden bracket set.

LIANG'S VOCABULARY FOR DESCRIBING PURE CHINESE-STYLE DESIGN

Liang's linguistic analogy, describing *Yingzao fashi* and *Gongcheng zuofa zeli* as providing a "grammar" that provided the set of rules to explain how individual elements were used in Song and Qing buildings, shows their significance in Chinese historical construction and at the same time leads us to ask about a corresponding vocabulary for those elements. Along with his study of grammar (*wenfa* 文法 or logical arrangement, structural principles) as codified in the two government manuals, Liang formulated a vocabulary of elements (*yuhui* 语汇 or building parts, features, and motifs) published as a set of catalogues entitled *Jianzhu sheji cankao tuji* 建筑设计参考图集 (Liang and Liu [1935] 2001; Lai 2009, 60). "Words" ranged from columns (*zhu* 柱), beams (*liang* 梁), and bracket sets to doors (*men* 门), roof ornaments (*zhengwen* 正吻; *qianshou* 战兽) and courtyards (*tingyuan* 庭院) and were drawn from the images the Society accumulated over the years. (Fig. 2)

HARRER, "PARADOX OF THE ANGLED BRACKET-ARM"



Figure 2. Original cover of part 4 (bracket sets) of Liang's vocabulary of architecture, published in *Jianzhu sheji cankao tuji* (Liang and Liu 1936)

Liang formulated his ideas against the background of his Beaux-Arts training at the University of Pennsylvania, where he studied at the beginning of his career (Cody et al. 2011). Liang's analogy of grammar and vocabulary used to describe architecture was inspired by Western neoclassical thought, which shaped the American curriculum in the 1920s and was modeled after Jean-Nicolas-Louis Durand's (1760–1834) theory of composition and elements, as elaborated by Julien Guadet (1834–1908) (Liang [1945] 2001a, [1954] 2001b, [1954] 2001c, [1954] 2001d; Lai 2014 and 2009).⁵ This theory refers to "a technique of progressive design elaboration that started with an idea and ended with a spatial form" — that is, through selection of elements and their spatial and causal relationships, a building gradually takes shape (van Zanten 2011, 23). And in fact, this is exactly what Liang wanted to achieve. He aimed for a modern *lingua franca* of traditional Chinese construction — a pure Chinese-style

⁵ Note that Liang usually refers to yuhui either as xibu 详部("detail") or as yaosu 要素 ("element").

language for designing modern architecture — intended as a tool to assist twentieth-century architects in their pursuit of modernization and the establishment of a national style embedded in China's thousand-year history (S. Li 2003).

Liang's compilation of a design vocabulary revolutionized the design logic of imperial China, which largely if not fully depends on the division of labor and specialization of crafts (e.g., wood carpentry, stone work, brick work), as outlined in the building method chapters of the government manuals. Liang reshuffles the elements as they are presented in the treatise and abandons their underlying logic of classification into types of work. What is more, Liang's concept of vocabulary was broader than that of imperial China, extending to include the constituent parts of design (elements) rather than confining the vocabulary to the more traditional meaning of "terms" (unlike the work of his lifelong assistant and colleague Chen Mingda 陈明达 (1914–1997), who continued the lexical tradition (Chen [posthumously published] 2010). The terminology sections of state building standards maintain this ancient tradition of studying terms and compiling glossaries that started more than two thousand years ago with lexicographical works such as *Erya* 尔雅 (Literary exposition; anonymous; Warring States to early Han, with Eastern-Jin commentary in Guo Pu's 郭璞 [276–324?]), *Shuowen jiezi* 说文解字 (Explanation of words; Xu Shen 许慎, ca. 55–149), and *Shiming* 释名 (Explanations of terms; Liu Xi 刘熙, fl. 200), where words were semantically or graphically arranged into categories and literally explained by collated classical texts related to the term (Feng 2012, 114–123).

This then results in a large amount of data that exceeds the scope of the government manuals because it includes unorthodox as well as late-imperial (after 1734) features. Liang's vocabulary comprises elements of varying artistry and significance, mainly from North China, as he acknowledges in the preface — albeit without indicating the points at which he describes an element *not* mentioned in the government manuals (Liang and Liu [1935] 2001, 236). Angled bracket-arms and their fanshaped arrangement are not described in the text but depicted on a photo in the illustrations section (main hall at Huayansi 下华萍 寺] [Lower Avataṃsaka Monastery] in Datong, Shanxi, Liao-Jin dynasty). This is an initial indication of how we can understand the angled bracket-arms — as part of the vocabulary, not the grammar, of Chinese construction.

Although Liang's explanatory model borrowed from Western ideas and methods, it built in fact on nationalism and promoted a uniform identity for Chinese architecture (Lai 2014, 59). Like the

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compilers of the Song and Qing government manuals, Liang looked for consensus but not for differences among building traditions, establishing a pool of universal but selective reference vocabulary for contemporary use that could be applied to buildings of any function.

Providing a much-needed theoretical framework, Liang's Beaux-Arts model offered a valuable approach for explaining the complex construct of Chinese architecture — as a language consisting of both a grammar and a vocabulary. However, pursuing the essence of architecture regardless of the social status of the owner, time period and region, Liang's Eurocentric model played down the diversity that existed and still exists in Chinese construction history — like the manifold varieties of Chinese language as explained by Jerry Norman: "A striking feature of spoken Chinese is the large number of diverse forms in which it manifests itself" (Norman and Coblin 1995, 576). Liang's likening of visual to verbal structural styles is valid today only if we use this premise as a springboard for further inquiry and incorporate into his approach modern linguistic theories and the latest research on China's regional and local building cultures, thus to explain the relationships of the diverse speech patterns of Chinese construction with one another and with the superordinate whole (the "official tongue" recorded in government manuals).

THE REGULATIVE BUT ADAPTIVE GRAMMAR OF CHINESE GOVERNMENT BUILDING MANUALS

The twelfth-century *Yingzao fashi* and the eighteenth-century *Gongcheng zuofa zeli* belong to a long Chinese tradition of architectural writing,⁶ and, as the only extant architectural monographs compiled under imperial court patronage prior to the twentieth century, are critical for any study of traditional Chinese architecture. But what were these manuals, actually? Research into their production and use shows the books were effectively supervision and accounting manuals intended to facilitate the

⁶ This includes imperial documents describing general methods or rules of construction, such as the Warring-State-Period *Kaogongji*考工记 (Artificer's record; 770–476 BCE) and *Yingshaling*; official documents on specific construction projects; unofficial treatises such as *Mujing* 木经 (Timberwork classic; Yu Hao 喻皓, fl. 965–989), *Lu Ban jing* 鲁斑经 (Classic of Lu Ban; compiled anonymously, fifteenth century), or *Yuanye* 园冶 (Craft of gardens; Ji Cheng 记成, 1582-?); and literary works such as encyclopaedias and rhapsodies.

process of government-sponsored construction and to contain costs (Feng 2012, 107).⁷ And they really were necessary. The *Songshi* 宋史 (History of the Song) outlines the necessity for preventing corruption and waste through quota control and prefabrication of material, as outlined by *Yingzao fashi*, which records many cases of overstated costs.⁸

The prefabrication of elements according to tried-and-tested, standardized methods developed over time had another advantage. It ensured the overall structural stability of a building as well as the smooth assemblage of components, both during construction and in subsequent repair and maintenance. Although not aimed at teaching officials how to become architects, the government manuals were intended as a practical, universally applicable reference work — one that allowed for adjustment to suit any specific situation, as Feng Jiren explains:⁹

While the [Song-period] treatise was oriented toward strict, official rules [in budget and material control], the regulations and standards [for building methods] were not intended to be followed at the expense of sacrificing or compromising artistic quality and criteria. (Feng 2012, 106)

初,太宗平河东,建塔于太原故城,塔毁,帝欲新之,遣内待经度,计工二百万。帝疑,命曙往, 减费十九。改内殿崇班。(In the first year, Emperor Taizong pacified the territory of the *hedong* [circuit], and built a pagoda in the old city of Taiyuan; the pagoda was destroyed; Emperor [Zhenzong, his son,] wished to build a new one, and sent the court eunuchs to take measurements, who estimated the costs to be 2,000,000. The emperor raised doubts and ordered [General Shi Qi]shu to go there; costs were reduced by 90%.)

⁷ Li Jie's vision was in fact even broader: one of his stated goals was to make *Yingzao fashi* accessible for common use (*haixing* 海行) to a broad audience ranging from court and local officials in charge of construction to educated private individuals and craftsmen (Li [1103; 1145] 1956, "zhazi").

⁸ For an early example that antedates *Yingzao fashi* by almost a century, see the biography of Shi Qishu 侍其曙 recorded in *Songshi* (Tuotuo 脱脱 [first half of the fourteenth century], 1977):

⁹ This was one reason why the 1091 manuscript of *Yingzao fashi* that recorded only "fixed methods" was never printed. Li Jie, who received an imperial order to revise the manuscript, in 1097 resolved this shortcoming by developing a comprehensive modular system, as explained in *Yingzao fashi* (Li [1103; 1145] 1956, "*kanxiang*" and "*zhazi*").

This left room for maneuver that was based on the Chinese approach towards design in general. For more than three thousand years, Chinese culture was rooted in ideas of mechanization and modularity. Successive dynasties developed institutional systems for organizing the workforce and controlling quality on such a methodical basis that they made possible the serial mass production of more than 7000 terracotta soldiers for the Tomb of the First Emperor of China (third century BCE), Xi'an, Shaanxi Province, and of more than 30,000 individually carved timbers for the Sakyamuni Pagoda 释迦塔 (known as Timber Pagoda [*Muta* 木塔]; eleventh century) in Ying county, Shanxi Province. (Fig. 3) Despite the high degree of uniformity, as Lothar Ledderrose aptly points out, it was still a creative way of (re)producing, allowing for variations and mutations that might result in entirely new shapes (Ledderose 2000). Just as the terracotta soldiers have a highly individual outward appearance and distinctive physiognomy, though based on a modular system, the four hundred bracket sets of the Timber Pagoda, grouped into fifty-four types, are generated by only two kinds of cantilevers (*ang* 昂), four kinds of bearing blocks (*dou* 斗), and five kinds of bracket arms (*gong* 栱), employed both at right and acute angles (Chen 2001). (Fig. 4)



Figure 3. Terracotta soldiers (left) at the Tomb of the First Emperor of China in Xi'an, Shaanxi Province, third century BCE, and close-up of a soldier's head (right) (Public domain works, www.commons.wikipedia.org)



Figure 4. Timber Pagoda (left) at Fogongsi 佛宫寺 in Ying county, Shanxi Province, 1056, Liao dynasty, and close-up of an intercolumnar bracket set with angled brackets at the ground floor (*fujie* 副阶) (right) (Photos by Alexandra Harrer)

That is to say, Chinese government manuals provided a regulative yet versatile building standard for architecture. And by this I mean not only explicit rules recorded in the historical texts, such as the margin of tolerance for adjusting the bay length of a hall,¹⁰ but also generative (and not enumerative) general rules governing the construction. For example, the *Yingzao fashi* provides a shape grammar for less eminent halls (*tingtang* 厅堂) that permits a flexible column grid through customized selection of varying beam-framework designs (J. Li [1103; 1145] 1956, *juan* 4; A. Li 2003; Stiny 1975). (Fig. 5) All this is made possible by a comprehensive modular system for design that (despite its century-long existence in a primitive form) now for the first time has been elaborated upon and expanded.

¹⁰ The standard bay width for eminent buildings in *Yingzao fashi* is set to 250 *fen* for one intercolumnar set, and in the case of two intercolumnar sets, to 375 *fen*. In both cases, there is a \pm 50-*fen* margin of tolerance (Li [1103; 1145] 1956, *juan* 4).



Figure 5. Shape grammar for less eminent halls (*tingtang*) in *Yingzao fashi* (Courtesy Fu Xinian)

The notion of creativity within a system of standardized methods also explains why no timber-frame building has survived that fully embodies the structural principles and technical regulations of the two official building standards manuals. Xu Yitao 徐怡涛 has argued that within roughly two decades after its publication in 1103, *Yingzao fashi* became the standard for the wood construction of temples in southeast Shanxi (Jindongnan 晋东南) (Y. Xu 2003, 124). Following this line of thought, Liu Yan and Meng Chao have demonstrated that although the three-by-three-bay, six-rafter-deep halls with hip-gable roof in southeast Shanxi dating from that period are in line with the basic principles of building a palatial-style structure (*diange* 殿阁) as described in the text, they are in simplified form, either omitting one layer in the consecutive mounting of transverse beams (*tailiang*) or substituting shorter segments for heavy, solid, end-to-end timbers in one piece (Liu and Meng 2008, 9). (Fig. 6)



Figure 6. Simplification of a palatial-style hall as described in *Yingzao fashi*; Treasure Hall of the Great Hero (Daxiongbaodian 大雄宝殿) at Kaihuasi 开化寺, Shanxi Province, 1073/1092–1096, Song dynasty (Courtesy Liu Yan)

In speaking of the same historically significant building — the Song-dynasty main hall (1125) of the Hermitage of the First Patriarch (Chuzu'an 初祖庵) at Shaolinsi 少林寺 (Monastery in the Forests of Shaoshi Mountain) on the central mountain of the Five Great Mountains of China (Mount Song) in neighboring Henan Province — Feng stresses the structural conformity with *Yingzao fashi* (shortly after its publication) of the architecture of the surrounding areas of the Northern-Song capital in Bianliang 汴梁 (now Kaifeng), as exemplified by this hall (Feng 2006, 170); whereas Tracy Miller points to the stylistic variations of this hall and explains the divergences in the use of bracket sets as the result of the increasing influence of the Wu-yue Kingdom 吴越国, an economically highly developed region in Jiangnan 江南 (parts of Anhui, Jiangsu, Jiangxi, and Zhejiang provinces), located around the city of Qiantang 钱塘 (now Hangzhou), that had grown since the end of the tenth century (Miller 2016, 49). Here it is clear that the degree of compliance is a matter of interpretation: certainly there can be different perceptions of a given situation, depending on the point of view and approach of the viewer. (Perhaps the very idea of compliance comes back to the question of whether the glass is half full or half empty).

Without denying the existence of a certain number of independent characteristics, the general trend towards complying with the rules combined with a certain degree of flexibility in terms

of interpreting the norms (which then form these characteristics) becomes visible and lays a further stone in the mosaic of the rhetoric of Chinese construction. This trend stands in sharp contrast to early-modern European books on the "grammar" of architecture written by private individuals. Although the latter, likewise, aimed to purify language as a direct response to an increasing complexity in construction (suggesting a need for rules) and a need for calculability (that is, for transparency) (Summerson 1966), Western treatises allowed architects to free themselves "from the tyranny of the common way (*comune strada*), that is, from the tyranny of the ancient models," and to formulate their own personal artisanal style by flouting the rules (Clarke and Crossley 2000, 121).

THE MECHANISM OF HISTORICAL LANGUAGE FORMATION — OFFICIAL DYNASTIC STYLE AND THE IMPACT OF REGIONAL BUILDING SYSTEMS

The metaphor of language is useful in understanding the complexity of traditional Chinese architecture. Language grows and diversifies, and is subject to cultural influences. The official language of dynastic building style had a special status conferred upon it by the court, and it became institutionalized through the construction of government offices and by being formalized in written form." Variations from this standard were perceived as being socially subordinate and, deemed as regionalism, are excluded from the "official language" by the imperial authority (for government-sponsored projects). Alternatively, if it serves a recognized purpose, these varieties become absorbed and adopted as part of the standard (entered into the top-down control). This is the mechanism of language formation in traditional Chinese architecture, as demonstrated by Fu Xinian, one of the foremost scholars of the second generation of Chinese architectural historians after Liang (Fu 2017, 250). It is interesting to pursue this thought further. As suggested above, twentieth-century nationalism greatly affected the interpretation of non-orthogonal design in modern China. Moreover,

¹¹ Unfortunately, most of the official construction rules did not survive — which does not mean that they were never established. An early example from the Three Kingdoms period that antedates the Tang code by several centuries is the set of rules stipulated by Cao Cao 曹操 (155–220), King of Wei 魏王 and founder of the (Cao) Wei state (220–265) (Feng 2012, 54).

the legacy of Liang and his colleagues at the Society might still color our interpretation of the reason for not including angled bracket-arms in court manuals (in the form of overemphasis on orthodox culture and government-sponsored, dynastic style regarded as being representative of the whole of Chinese construction).

However, regional traditions continued to exist and develop next to the official language at a local level. Fu explains the nature of the mutual influence on one another of the official tongue of a dynasty and regional speech patterns. He describes the way in which outward-spreading "official style improves the degree of standardization in local building cultures, and at the same time, regional-style building enriches the vocabulary of official style [in the capital]" (Fu 2017, 235).

Regionalism was a driving force behind the development of a dynasty's official construction language, but only certain regions influenced that language. In particular, the area south of the Yangtze River (Jiangnan) influenced the formation of dynastic building traditions in certain periods (Zhang 2003). After the political unification of China in the Sui (581–619) and early Tang (618–907) dynasties, the Northern Song dynasty, and the Ming dynasty (1368–1644), the technologically more advanced architecture of China's increasingly prosperous southeast spread in three waves to the Central Plain, where it merged with indigenous northern traditions prevailing in the imperial capital(s).

We find evidence of southern origins in both government manuals.¹² Absorbed by Northern-Song official style and recorded in *Yingzao fashi* are, for example, crescent-shaped curved beams (*yueliang* 月梁) supported by bracket-arms inserted into the column shaft (*dingtougong* 丁头栱); and, most interestingly, "shrimp antennae brackets" (*xiaxugong* 虾须栱), a certain type of horizontally slanting timber that was found in the building's interior only under very specific conditions: the prime example of this building component is preserved in the main hall of Baoguosi

¹² The south is in fact not a uniform whole and generalizations cannot be made. Not incorporated into *Yingzao fashi* are, for example, two regional characteristics of Fujian architecture: the *minban* 皿版, an additional plate below the cap-block, and cantilever-tips and beam-heads with a double-curve profile. Fu gives economic reasons for this (Fu 2017, 294): although Fujian's economy flourished in the tenth century, it could not match the prosperous Wu-yue kingdom in neighboring Jiangsu and Zhejiang provinces.

保国寺 (Monastery of Protecting the Country) in Ningbo, Zhejiang Province (built in 1013, with later repairs made in 1078). (Fig. 7)



Figure 7. "Shrimp antennae brackets" (*xiaxugong*) at the main hall of Baoguosi in Ningbo, Zhejiang Province, 1013 and 1078, Wu-yue kingdom (Modified after Dongnan daxue yanjiusuo 东南大学研究所 2012. *Ningbo Baoguosi dadian — kance fenxi yu jichu yanjiu* 宁波保国寺大殿 — 勘测分析与基础研究 [The main hall at Baoguosi in Ningbo — Survey analysis and basic research], Nanjing: South East University Press, Figures 1–10)

Knowledge travelled via craftsmen to the capital. Groups of craftsmen from each region were on a "tour of duty" annually, being relieved upon the expiration of their term of office (D. Liu 1992, 208). The legendary master-carpenter Yu Hao 喻浩 (fl. 965–989), who worked for the royal family of the Wu-yue Kingdom, was engaged in official building projects in the Northern Song capital in Bianliang. This was part of Emperor Taizong's (r. 976–997) strategy to legitimate his imperial authority through the incorporation of the latest scientific knowledge from the south and to "remake himself into a different, more spiritually powerful, and more progressive ruler" (Miller 2016, 44). In Bianliang, Yu Hao is said to have written *Mujing* 木经 (Timberwork classic 梦溪笔谈; **Second** half of the tenth century; lost, recorded in Shen Kuo 沈括 [1031–1095], *Mengxi bitan* [Dream pool jottings], *juan* 18) with the goal of recording practical methods as a standard for common craftsmen. This hands-on manual "was well received and, beyond that, esteemed as a 'classic of timberwork' by Northern Song craftsmen" even after its content had lost its currency (Feng 2012, 74). Among the large number and variety of local traditions that had evolved and entered the Northern Song capital in the late-eleventh century (end of the "one-hundred-year influence" of *Mujing*), Li Jie selected those that both had practical value for contemporary construction (interviewing palace craftsmen so that they could explain item by item) and could be traced back to classical and early literature, to determine the orthodox and the norm (J. Li [1103; 1145] 1956, "kanxiang," "zhazi"; Feng 2012, 109).

The angled bracket-arm installed on the façade of the building in the shape of a fan was not mentioned in those texts, which might be one of the reasons for its exclusion from the vocabulary of the official building language. Another reason was the geopolitical situation of the time. Although it was part of the five-capital system of the northern alien conquest dynasties, Shanxi Province (still known by its historical name of Jin \mathbb{H}) was not home to the political center of the dynasty that commissioned a building standard — in contrast to neighboring Henan and Hebei provinces, where the local building cultures of the Northern Song capital of Bianliang and the Ming-Qing capital of Beijing did contribute to the formation of dynastic styles.

Comparably to the case of spoken Chinese, many other "dialects" of architecture existed in imperial China, but only two of these were written down and survived in the form of imperially commissioned building standards. The official style of a dynasty built on the cultural exchange between the center and areas outside the capital, to a certain extent incorporated regional building traditions both conceptually (grammar) and practically (vocabulary). Despite its locally rooted flourishing economy, Shanxi could not match the more prosperous and politically stable South China that developed innovative technologies and modes of expression that gained recognition by the government — nor could it match the socio-political and spiritual power of the south (preserving moral and ethical values/traditions, safeguarding native Han culture, and promoting Buddhism of Chinese origin) that reinvigorated the north after each round of threat and defeat by northern alien peoples and "shifted the perceptions of authentic Chinese culture from north to south and from west to east," for example in the early Song period (mid-tenth century) (Miller 2016, 48). Yet this cannot explain the intricate relationship that exists between the official architectural language and the seemingly unorthodox angular brackets of Shanxi regional architecture.

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THE RHETORIC OF CHINESE CONSTRUCTION: OFFICIAL LANGUAGE, TOPOLECT, AND DIALECT

To solve this riddle, it is worth developing the linguistic analogy further and challenging our understanding of the Chinese language of construction.¹³ Since the early twentieth century, the officially designated national language of China is Modern Standard Mandarin (MSM), which originated from Mandarin, the late-imperial language of officials (*guanyu* 官语, "official speech") and more precisely, from northeastern Mandarin with Bejing pronunciation (Francis 1984; Mair 1991 and 2013). But "Mandarin is not synonymous with 'the Chinese language'" as Victor Mair explains, because (Modern Standard) Mandarin neither is nor has been the only "Chinese language" (Mair 2013, 12–13). Following Mair's formulation, I would like to suggest six principles of the rhetoric of Chinese wood construction that serve to explain mainstream and unconventional styles of monumental timber architecture (going from the general to the specific):¹⁴ (Figs. 8, 9)

¹³ One of the obstacles is that we lack written sources documenting the principles and procedures of genesis and usage of spoken "Chinese" both literally (linguistics) and figuratively (architecture), which is yet another good reason to borrow ideas from the field of Chinese linguistics.

¹⁴ Unreferenced statements in this section are taken from the works cited in the bibliography.



Figure 8. Mair's explanation model of "the Chinese language" (Drawing by Alexandra Harrer)



Figure 9. Chinese language of construction exemplified by Shanxi topolect and dialect (Drawing by Alexandra Harrer)

LANGUAGE PARENT GROUP

In general terms, Chinese wood construction, like the Sinitic group of the Sino-Tibetan language family, is best understood as comparable to a language group and not a language.

LANGUAGE BRANCH

Like Mandarin, the northern architectural system was a "language" branch within the parent group of wood construction.

LINGUA FRANCA

Similarly to MSM, the official style of a dynasty that focused on the tectonics of timber architecture was the national language and, moreover, the *lingua franca* of the empire — a common tongue among peoples of diverse speech that facilitated communication between ethnic minorities as well as the unification of disparate geo-political groups. Bracket sets as a symbol of the social stratification in Confucian-oriented Chinese society were a key part of the official tongue. Steinhardt demonstrates that stereotypical Chinese features are used as a marker of native Han culture within the ancestral homeland and the larger area under China's political, cultural, and religious influence "to enhance the process of empire formation at China's borders" (Steinhardt 2004, 231). From Central Asia and Inner Mongolia in the west, to Korea (Goguryeo Kingdom, first century BCE–seventh century) and Japan in the east, underground tombs and aboveground halls feature Chinese bracketing irrespective of whether the building is made of wood, made of bricks and carved stone, worked in metal, or even two-dimensionally painted on plaster (wood mimicry, a phenomenon known as *fangmugou* (方木构, literally "imitating wooden structure" or more broadly "imitating the mode of building with wood") (Harrer 2015).

DISTINCT LANGUAGES

Like Cantonese, Hakka, Hainanese, and Taiwanese, certain regional construction systems of the south are distinct languages within the linguistic family of Chinese architecture. Liang admits that variants of the official tongue exist in Chinese construction, but he neither elaborates this idea nor distinguishes between language and topolect (Liang [1954] 2001c, 193). This paper suggests that each variant is a fully fledged language, because each developed its own structural rules (grammar) and elements (vocabulary) and thus, basically, they are mutually unintelligible. For example, for more than 800 years, the Hakka people built, in southern Fujian, Jiangxi, and Guangdong provinces, fortified multi-story enclosures (*tulou* 土楼) that are circular in ground plan and can accommodate several hundred people. (Fig. 10) Consisting of thick, load-bearing rammed-earth walls, they use a different construction system than the official "tongue" that promotes the use of a certain type of timber framing with the bracket set as its backbone. Strictly speaking, "Hakka" is part of a different language group, assuming that Chinese masonry construction constitutes a separate parent group similar to that of wood construction.



Figure 10. Chengqilou 承启楼, one of the Hakka houses in Gaobei village, Yongding county, Longyan prefecture, Fujian Province, 1709, Qing dynasty (Photo by Zhang Xian)

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Moreover, even within the theoretical framework of wood construction, Chinese architecture speaks different languages. One prominent example is the southern Chinese column-and-tie-beam style (*chuandou* 穿斗) that builds on a different structural logic (grammar) than the official tongue, using small-dimension lumber similar to that used in North American light-frame construction to achieve stability. (Fig. 11) Here, tie-beams penetrate the column shafts and render bracket sets useless as connectors of columns with beams and as a cushion to enlarge the load-bearing area. However, the official tongue of Chinese wood construction sometimes incorporates a "word" taken from one of the regional languages and partly naturalizes it — in this case, the tie-beam installed between columns in the same direction as the principal beam above (known as *shunfuchuan* 顺秋串, *suiliangfang* 随梁枋 [following-the-beam tie-beam], or *kuakongfang* 跨空枋) [spanning-the-empty-space tie-beam], a Jiangsu-Zhejiang characteristic that became dominant in Ming-Qing official-style building of North China. (Fig. 12) The column-and-tie-beam style is part of the southern branch of wood construction.



Figure 11. Southern Chinese column-and-tie-beam style (*chuandou*) in the Dong minority region of Guizhou (Photo by Liu Yan)

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Figure 12. Tie-beam installed between columns in the same direction as the principal beam above (*shunfuchuan*) (Courtesy Fu Xinian). Top: Main hall of Yanfusi, Wuyi, Zhejiang Province, 1317. Middle: Main hall of Zhenrusi, Shanghai, 1320. Bottom: Main hall of Xifangsi, Yangzhou, Jiangsu Province, 1372

Even a single branch of wood construction, the northern branch, comprises several separate languages. One of them is the language for building traditional log cabins (*jinggan* #∓) in northeast China, in the Changbai Mountain Range, where tree trunks or bulky pieces trimmed to a round, rectangular, or octagonal form are stacked up in dense layers and form strong corners at the points of intersection. With horizontally laid logs that are load bearing, the solid log construction differs fundamentally from the official language for standard timber framing. (Fig. 13)

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Figure 13. Traditional log cabins (jinggan) (Photo by Zhuge Jing)

TOPOLECTS

The speech form of Shanxi Province is a topolect (*fangyan* 方言; "the speech form of a place") that belongs to the larger context of spoken Jin (Jinyu 晋语), prevailing in most of Shanxi and parts of Inner Mongolia, Hebei, Henan, and Shaanxi provinces (R. Li 1985 and 2012; Hou 1999). (Fig. 14) It is a mutually intelligible form of Mandarin (hereafter referred to as Shanxi Mandarin) rather than a separate language. In other words, Shanxi Mandarin complies with the official building standards (official language; Mandarin) to a large extent, especially with regard to grammatical rules such as the way of mounting brackets in a bracket set. It tailors grammar and vocabulary slightly to regional conditions but without distorting the overall picture of dynastic style beyond recognition (Hou 1999, 8).



Figure 14. Spoken Jin (Jinyu) prevailing in Shanxi and parts of Inner Mongolia, Hebei, Henan, and Shaanxi provinces (Hou 1999, 42–43)

Thus, we can understand angled and orthodox bracket-arms as synonymous in their original meaning, and angled (fan-shaped) bracket sets as a regional variant of the standard form (regular orthogonal bracket set). As a matter of fact, *Yingzao fashi* lists the above-mentioned "shrimp antennae bracket" (*xiaxugong*) under the entry for *huagong* 华栱 (in English sometimes called "flower-arm"), the transversal bracket-arm projecting at a right angle to the wall plane — which demonstrates the hierarchical whole-part/parent-child relationship (J. Li [1103; 1145] 1956, *juan* 4). Furthermore, fanshaped bracketing underwent the same chronological development as regular bracketing without angled bracket-arms, which reinforces this theory. It likewise incorporated certain building traditions prevalent in a specific period, such as the advancement from stolen-heart (*touxin* m) to filled-heart

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(*jixin* 计心) construction — a terminology that describes whether or not every bearing block atop a transversal bracketing member contains ("is filled with") a parallel bracket (*guazigong* 瓜子栱 ["melon-seed bracket"]; *mangong* 慢栱 ["vine bracket"]; or *linggong* 令栱 ["zero-additions bracket"]). The earliest example of fan-shaped bracketing in the former Song territory, at the main hall at Nanjixiangsi 南吉祥寺 (South Monastery of Propitiousness; 1030), illustrates the first stage of technical development, with five-*puzuo* units in which only the uppermost transversal member supports a bracket-arm parallel to the wall (stolen-heart construction); whereas those at the intercolumnar position of the front façade at Three Sages Hall (Sanshengdian 三圣殿; Liao-Jin dynasty) at Shanhuasi 善化寺 (Monastery of Enlightening People) use fully functional, parallel timbers that uphold the next level of bracketing (filled-heart construction). (Fig. 15)



Figure 15. Advancement from stolen-heart or *touxin* (left) to filled-heart or *jixin* (right) (Photos by Alexandra Harrer). Left: Main hall at Nanjixiangsi, Shanxi Province, 1030, Song dynasty. Right: San**Sheng**dian of Shanhuasi, Shanxi Province, Liao–Jin dynasty.

LOCAL DIALECTS

The local speech patterns (building styles) within Shanxi Province form a group of dialects. The relationship between Shanxi topolect and these dialects is similar to that of parent and child (Hou 1999). (Fig. 16) They can be understood as mutually intelligible varieties of the topolect, sharing the same grammar with both the topolect (Shanxi Mandarin) and the official tongue (Mandarin) for the most part. (Fig. 17) They are distinguished by vocabulary, idiom, or pronunciation. That is to say,

vocabulary may be borrowed freely by one dialect from another but "spoken" differently, resulting in astonishingly different artistic expressions (i.e., pronunciation). Assuming that the angled bracketarm is a variation of the vocabulary of the official tongue (the regular bracket-arm) the metaphor of language then serves to explain the diverse artistic impulses and various sub-forms of fan-shaped bracketing in the province (i.e., within the Shanxi Mandarin topolect).



Figure 16. Dialects of Shanxi topolect (Hou 1999, 73)



Figure 17. Relationship between the official language of construction and Shanxi topolect and dialect(s) (Drawing by Alexandra Harrer)

Its strategically important position within the empire made Shanxi — a territory that consists of a series of valleys in the center of the province forming a main north-south thoroughfare leading directly into the capital of the former Northern-Song empire — a popular goal for military campaigns and a battleground with rapidly changing military powers. Because Shanxi was regularly torn apart and allocated to different dynasties and administrative districts and thus continuously stimulated by external elements, the cultural driving force in Shanxi regional architecture was probably not so much an affiliation with a political system but rather an identification with a geographic region.¹⁵ Miller suggests that the patrons of eleventh-century Buddhist monasteries in southeastern The Shanxi

¹⁵ The civilization of modern Shanxi Province is the product of a multi-ethnic society that was continuously stimulated by external elements. From the traditional angle of political historiography, the north of the province was mainly influenced by the culture of North China (*beifang wenhua* 北方文化), and the central and the southern parts by the culture of the Central Plains (*zhongyuan wenhua* 中原文化). However, from a more recent perspective, the north, central part, southeast, and southwest of Shanxi produced distinct regional cultures and local traditions which are not fully described by the general terms *beifang wenhua* and *zhongyuan wenhua*. For more on the cultural melting pot of Shanxi and the strong influence of regional traditions on architectural style between the tenth and thirteenth centuries, see the excellent survey by Li (2004a, 2004b).

population, for example, defined themselves as people of the Shangdang region (corresponding to present-day Changzhi prefecture) rather than as "subjects of the Song dynasty [...] with dynastic identity occurring only secondarily" (Miller 2009, 36). Thus, Shanxi's cultural districts were geographically defined — in very broad terms, the north, the central part, the southeast and southwest — building on natural boundaries and topographical features; they reflect not only the administrative districts in early-modern China but also the sub-divisions of Shanxi Mandarin (i.e., dialects).¹⁶ The construction business and the specific skills and knowledge of the local craftsmen continued to flourish in each region of Shanxi beyond the institutional changes of global politics, developing into locally distinct architectural dialects that are part of Shanxi's living heritage.

Like the standard bracket sets without angled bracket-arms, the individual design pattern of fan-shaped bracket sets incorporated certain local traditions prevalent in a specific district. In this respect, the great monasteries in the northernmost part of Shanxi reflect the dialect of north Shanxi, exemplified by Amitābha Hall (Mituodian 弥陀殿; 1143; Jin) at Chongfusi 崇福寺 (Monastery of Exalted Happiness) in urban Shuozhou. (Fig. 18, left) The seven-by-four-bay wide and eight-rafter deep, hip-and-gable-roofed monumental building of 41.32 by 22.7 m (Chai 1996, 140) is impressive for the massive size of its load-bearing blocks and brackets and the complexity of its nine fan-shaped bracket sets. As part of the former Khitan territory (Liao dynasty), where the craftsmen had cherished

¹⁶ Strictly speaking, Hou distinguishes between seven subdivisions: among them, Shangdang, spoken in southeastern Shanxi, and Yunzhong, in northernmost Shanxi (Hou 1999, 72).

The Qin dynasty codified the multi-level administrative system that was basically followed until the Tang dynasty. The Northern Song dynasty reformed the Tang's government system, centralizing political power and undermining the longstanding influence of aristocratic lineages in civil service and the impact of military governors and campaign commanders that had fostered the rise to power of regional warlords during the Five Dynasties and Ten Kingdoms period. They divided the Chinese realm into 15 circuits (*lu* 路), and the south, central part, and a fraction of today's northerm Shanxi — including Mount Wutai and parts of the neighboring provinces — became *hedonglu* 河东路. The succeeding Jin dynasty split the newly unified territory of Shanxi into three circuits: one in the far north around Datong (*xijinglu* 西京 路), one centered around Taiyuan (*hedongbeilu* 河东北路), and one in the southeast (*hedongnanlu* 河东南路), but maintained the native Han model for local government in the former Song territory. In very broad terms, this division was continued through late-imperial times until the twentieth century (Twitchett and Loewe 1987, 45, 54–55, 470–478; Twitchett and Franke 1994, 270; Twitchett and Smith 2009, 12, 231–233).

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the building traditions of the glorious Tang dynasty (Steinhardt 1994, 29), it exhibits traces of typical Tang building techniques and uses archaic methods to stagger angled bracket-arms along the horizontal and vertical axis, for example by incorporating structural ("true") descending cantilevers (*xia'ang* 下昂) with lever effect at the column-top position and short, artistically carved boards (*vixinggong* 翼形栱, "wing-shaped bracket") to save space within a compact bracketing unit. By contrast, the small timber halls with angled bracket-arms in the southeast, such as the three-by-three-bay wide, six-rafter deep, and hip-and-gable-roofed main hall (undated; probably late-eleventh century; Song) at the Temple of the Two Transcendents (Erxianmiao 二仙庙) outside Xiaohui village, tell a story of pared-down construction that suits the more modest needs of local patrons in the secluded areas of Jindongnan, present-day Changzhi and Jincheng prefectures (H. Li 2004a, 2004b; Liu and Meng 2008). (Fig. 18, right) A single fan-shaped bracket set crowns the front façade of the modest, almost square structure measuring only 7.7 by 7.63 m (Wang 2011, 348–65). Like the northern example, it conveys the same message of creative interpretation of the norm (orthogonal bracket-arm) that gives Shanxi topolect its character — but it plays with the words and syntactic groupings of this vocabulary, which results in a simple and austere beauty reduced to the basics.

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Figure 18. Local dialects: Monumental bracketing in northernmost Shanxi (left) and pared-down construction in southeastern Shanxi (right) (Photos by Alexandra Harrer). Left: Amitābha Hall at Chongfusi in Shuozhou, Shanxi Province, 1143, Jin dynasty. Right: Main hall at Xiaohui Erxianmiao, Shanxi Province, undated (probably late-eleventh century) Song dynasty

CONCLUSIONS: A TECHNO-CULTURAL COMPROMISE

In 1985, Xu Bo'an 徐伯安, a former student of Liang Sicheng, noted that the architecture at Longxingsi 隆兴寺 (Monastery of the Rising Dragon) in Zhengding, Hebei Province — showcase of the dynastic style of the Song, the dynasty that would five decades later publish one of the two seminal works on Chinese construction — had erroneously been associated with the Jurchen tribes (Jin dynasty) because of its fan-shaped bracket sets (Manichaen Hall [Monidian 摩尼殿]; 1052) (B. Xu 1995, 27). He further suggested that such angular bracketing might not be a characteristic of foreign culture and the dynamic building traditions of Northern alien conquest dynasties. Three decades later, by means of almost ten years of visual and textual study, and particularly through on-site field work in Shanxi Province, I have collected quantitative and qualitative data to show that fan-shaped bracketing was not restricted to a particular period in history, nor could the mere application of angled bracket-arms symbolize a specific dynasty.

The key challenge of this paper was to see beyond the persistent stereotypes in Chinese architectural history studies that originated from an overemphasis being placed on "orthodox" (orthogonal) government-sponsored construction, which did not permit full acknowledgment of the wide range of angular design and the importance of such seeming "non-conformity" that was deemed regionalism. Court-enforced building standards contain no reference to fan-shaped bracketing; however, this still did not diminish its success. We might rephrase the first question posed in the introduction and — instead of inquiring about reasons for exclusion — ask rather if it was even necessary to specifically mention (Shanxi's) unusual bracketing in these "grammar books" in order to include them. What I am suggesting here is that, speaking allegorically, angled bracket-arms and their fan-shaped arrangement represent not the "grammar" of Chinese construction but rather its "words" and "syntax."

By borrowing some of our premises from the field of Chinese linguistics — elaborating Liang's explanatory model of composition (grammar) and elements (vocabulary) through Mair's linguistic theories and Fu's research on regional building systems — we can understand the complex construct of Chinese construction history as a group of languages similar to the Sinitic parent group, and the official style of a dynasty as one of these languages that was standardized, systematized and thus promoted to the status of an official language similar to Mandarin. Shanxi regional architecture then becomes a topolect (*fangyan*), a regional variant of the official tongue but one that is mutually intelligible with the standard. This Shanxi Mandarin is not a distinct fully fledged language; rather, it shares with the official tongue the adaptive grammar of the two government manuals but modifies their vocabulary (angular instead of orthogonal bracketing): the new words are themselves subjects of artistic interpretation (pronunciation) in local dialects.

The success of the timber-frame architecture of China lies in its talent for cultural adaptation. Angled bracket-arms conform to the pillars of traditional Chinese culture, which are deeply rooted in ancient thought of moral rectification, balanced harmony, and social hierarchy: they (mostly) follow

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the four cardinal directions and their four sub-directions that define the square Chinese universe. And since they come in pairs if viewed frontally, the fan-shaped arrangement appears perfectly symmetrical, balanced, and consistent in itself: despite their acute angle, they can still be easily mounted on top of each other, placed at increasingly higher but parallel levels that correspond harmoniously to the lower and higher layers of Confucian society.

The answer to the second question posed at the beginning lies in the cultural adaptability of the angled bracket-arm, which explains its continued popularity over almost a thousand years, to the present day. Yet, the angular arrangements often surpassed the standard arrangements on top of columns in terms of complexity of design and space consumption through their dispersing fan-out — a single fan-shaped bracket set was equal in size to two regular corbelled clusters per bay without angled bracket-arms. Thus they lend themselves ideally to an accentuated and yet subtly discreet expression of yielding to authority by following the grammar of the official building language, yet exploiting the room for maneuver by means of development within the system (new vocabulary and local pronunciation). This expansion in a horizontal direction represents a creative cultural compromise between the practical need for conformity with the norm documented in the court standards manuals and the artistic self-expression of increasingly self-confident local communities.

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