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# Visualizing Everyday Life in the City: A Categorization System for Residential Wards in Tang Chang'an

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**A**lthough much has been written about the history and monuments of the Tang capital Chang'an, less effort has been devoted to the study of its everyday fabric, the residential wards that make up almost seven-eighths of its total area. To appreciate this setting, where most of the city's daily life took place, requires a good understanding of the physical characteristics of Chang'an's wards.

Chinese cities today are growing rapidly and transforming, processes that have disrupted their everyday fabric, and have affected the daily lives of citizens. These changes underscore the need to grasp fundamental issues in the making of a city, historical or otherwise. Although the state played a role in the making of a capital city in historical times that differed significantly from its role in contemporary practice, concerns such as land use, road network, land parcellation, residential density, and the like remain as relevant today as they were during the Tang period.

Typically in today's Chinese cities the historical urban grid and fine urban fabric have eroded, large city blocks prevail, big-footprint building as well as gated residential communities and administrative enclosures predominate, and as a consequence, the fine network of hierarchical streets has

been replaced by a coarse grid of broad avenues.<sup>1</sup> All these changes effectively limit accessibility, increase the distance from one location to another, and inconvenience the city's inhabitants.

Chang'an's historical residential wards manifest the same prevalence of gates—in that feature they resemble today's large city blocks and gated communities—and a large network of broad avenues. The similarities, however, stop there. Within the network of broad avenues and the confines of Chang'an's ward walls, an intricate web of streets, their hierarchy determined by their length and breadth, served a fine urban fabric of hundreds, if not thousands, of residential compounds. This fabric of streets and courtyard houses resulted from the prevailing practice of land parcellation; studying this practice reveals the nature of Chang'an's cityscape.

More than a decade ago I embarked on a research project to reconstruct digitally the cityscape of Tang period Chang'an to better appreciate its unprecedented scale and splendor.<sup>2</sup> In the process of reconstruction, I became increasingly convinced of the importance of the general urban fabric, from which the monuments of the city, by way of contrast, drew their magnificence, and the need to render them accurately despite the dearth of primary and secondary sources. My earlier research had established the structure of a typical ward and given me sufficient knowledge to explore and reconstruct the Yongning ward in the city. Because the scant evidence makes it impossible to study the characteristics of an individual ward

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in depth, I propose to categorize the residential wards in order to construct a framework to understand them better. Information on the different wards, when collected, examined, and systematized, can yield a broader understanding of the city. A carefully designed system of classification may reveal patterns that cannot be gleaned from the source fragments.

### Urban Paradigm of Chang'an

The magnificent capital city of the Tang Empire (618–907 CE), Chang'an, was built from scratch in the Sui period by the order of Sui Wendi in 582 CE. As the founder of the Sui Empire with the ambition of uniting China once again, Sui Wendi was not reconciled to an old capital city that had been established in 202 BCE by the Han dynasty and was falling apart. The new capital would have to match Sui Wendi's grand political vision of unifying China after the chaotic Northern and Southern dynasties.

Chang'an, covering an area of 9.7 by 8.6 kilometers, was immense, even by today's standards (Figure 1). It was the largest city ever built before the modern world. Its unprecedented urban scheme influenced the planning of many other Asian cities (Figure 2).<sup>3</sup> In an earlier study of the city's urban structure, I proposed the plan of Chang'an as a combination of two traditions of planning capital cities in Chinese history.<sup>4</sup> One tradition, which emphasized the central location of the palaces and the importance of having nine north-south and nine east-west streets in the capital, was advocated in *Kaogongji* 考工记 [Record of artificers].<sup>5</sup> The other tradition was that of the northern tribes, whose palace was located in the northern section of the city.

The gridiron plan of Chang'an ordered the city into functional zones. Fourteen latitudinal and eleven longitudinal streets divided the city into an axially symmetrical plan of, theoretically, 130 blocks, large and small. Sixteen blocks in the north-central part were occupied by the Palace City and Imperial City. Each of the two markets took up two blocks. Qujiang Lake 曲江 and Furong Garden 芙蓉园 at the southeastern corner of the city filled two blocks, leaving 108 blocks for residential purposes. Unlike its predecessor Han Chang'an, the Palace City of Tang Chang'an was strictly for the royal family, and the Imperial City was meant for the central government offices. The city's residents, whatever their social status, could live only in the residential wards.

### Study of Chang'an's Residential Wards

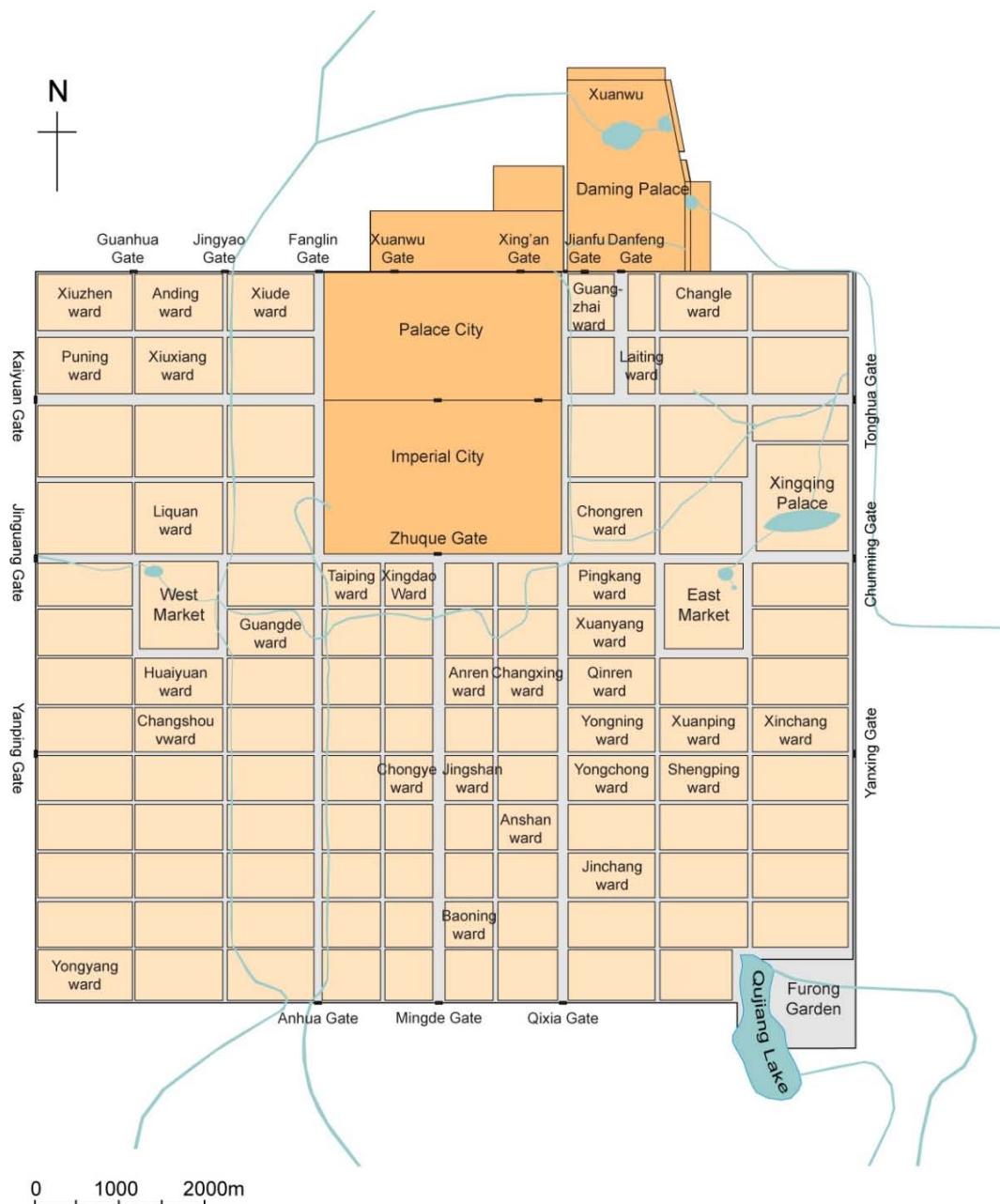
To unveil the long-lost urban landscape of Chang'an and comprehend Tang Chang'an from an architectural and

urban-historical point of view required an understanding of the residential wards that took up about seven-eighths of the city's area. These wards in Chang'an have drawn less archaeological attention than the palaces and markets.<sup>6</sup> Most archaeological excavations in the residential wards were core drillings or excavations of small areas, focusing primarily on particular remains—such as those of temples and workshops—inside the ward. From these, it is difficult to get a substantial picture of the internal structure of a ward that includes the pattern of streets, the parcellation of residential land, and the layout of houses. The rapid urbanization and development of Xi'an exacerbate the situation. Most of the Tang remains are now either underneath the modern city, damaged by construction, or forever lost because they were discarded as construction waste.

The study of Chang'an's residential wards also depends on historical records such as *Tang Huiyao* 唐会要 and the Tang dynastic histories, *The Book of Tang* 旧唐书 and *The New Book of Tang* 新唐书, compiled not long after the Tang period. There are also monographs about Chang'an such as *Liangjing xinji* 两京新记, *Chang'an zhi* 长安志, and *Tang liangjing chengfang kao* 唐两京城坊考. Most volumes of the five-volume book *Liangjing xinji*, by Wei Shu 韦述 (?–757 CE), were lost, except for a handwritten copy of the third volume, currently kept in Japan. It is the only surviving book from the Tang period that recorded the city's streets, wards, buildings, and gardens, as well as contemporary anecdotes about the city. *Chang'an zhi* was compiled in the Song period (960–1279 CE), based on *Liangjing xinji*; it kept most of the content of the Tang book and supplemented it with additional information. *Tang liangjing chengfang kao*, by Xu Song 徐松 (1781–1848), from the Qing period (1644–1911 CE) is a comprehensive expression of previous efforts to record the city's glory in the Tang dynasty.

The archaeological data available are far from sufficient, however, to render the landscape inside any particular ward in Chang'an. The books about Chang'an also provide few clues to the physical structure of the wards, such as the setting of the buildings, the road system, and the gate and ward walls. The list of buildings and institutions in the wards found in these books usually provides only the owners' names. Occasionally, the locations of buildings are mentioned, albeit mostly in an approximate manner such as "southeast corner," "west of the south gate," or "southwest junction." The size of only a few properties is indicated.

Archaeological findings and historical records show that the residential wards in Chang'an differed in dimensions, in structure, and in population. Moreover, diverse activities took place in these wards. Here I classify the wards according to form (including physical properties, such as the



**Figure 1** Plan of Chang'an (the wards mentioned in this article are marked)

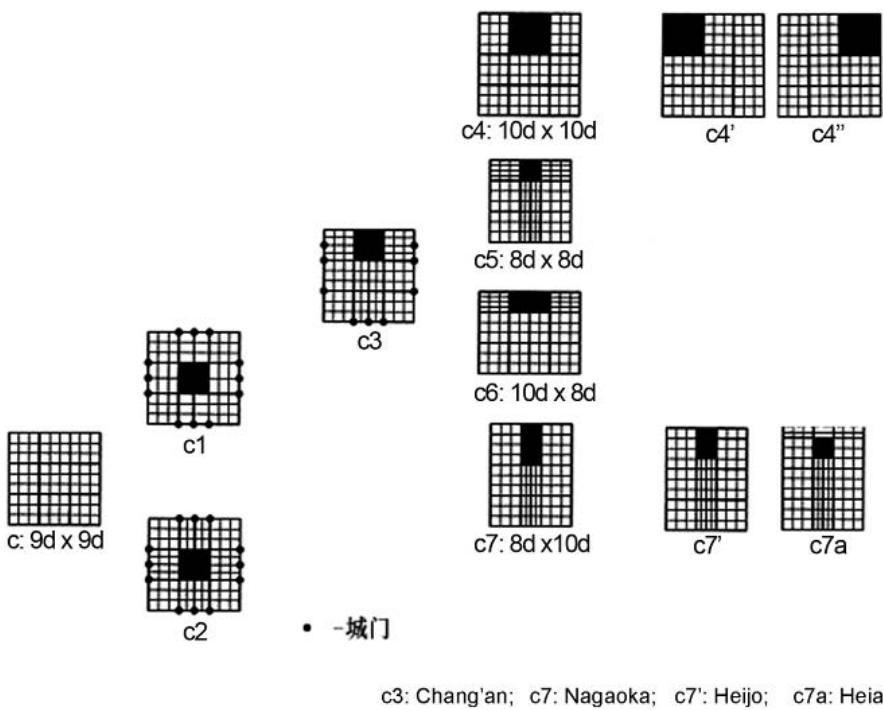
shape and dimensions of the wards and the structure of the road networks); size (comprehending the population and its density); and content (the use of the land and hence the activities, the buildings, and the institutions in the residential wards). Although the residential wards were occupied mainly by the dwellings of officials and ordinary citizens, within the ward walls there were also temples, government offices, entertainment areas, restaurants, and wine shops.

The classification that follows begins with the content of the wards. It maps mainly the nonresidential institutions

and establishments in the hopes of discovering patterns in the distribution of these components of the wards.

### The Content of Chang'an's Residential Wards

The daily life of Chang'an's residents took place in the residential wards. Seo Tatsuhiko mapped the abodes of aristocrats and officials in Chang'an's wards during the first half of the eighth century, basing the maps on the Tang record *Liangjing xinji* (Figure 3).<sup>7</sup> In this meticulous mapping, one can observe



**Figure 2** Chart of the Chang'an planning paradigm (c3) and modulus in contemporaneous Japanese cities of Nagaoka (c7), Heian (c7a), and Heijo (c7'), as well as Luoyang (c4')

an uneven distribution of these residences across the city, with the majority clustered around the East Market and immediately south of the Daming Palace. The rest are concentrated mainly in the wards west of the Palace and Imperial Cities as well as around the West Market. This pattern of distribution was due to the proximity of these wards to the main destinations of the aristocratic and official classes. Archaeological findings and historical records reveal that the wards of Chang'an included more than residential structures. Various activities must have taken place in these wards, because there were also nonresidential institutions and places among the homes of Chang'an's residents. Identifying the contents of the wards should help reimagine the daily routine within the wards and visualize the cityscape in which the routine took place. The different buildings and their functions can provide clues to the size and layout of individual building compounds as well as their spatial distribution inside the wards.

### The Spiritual Retreat

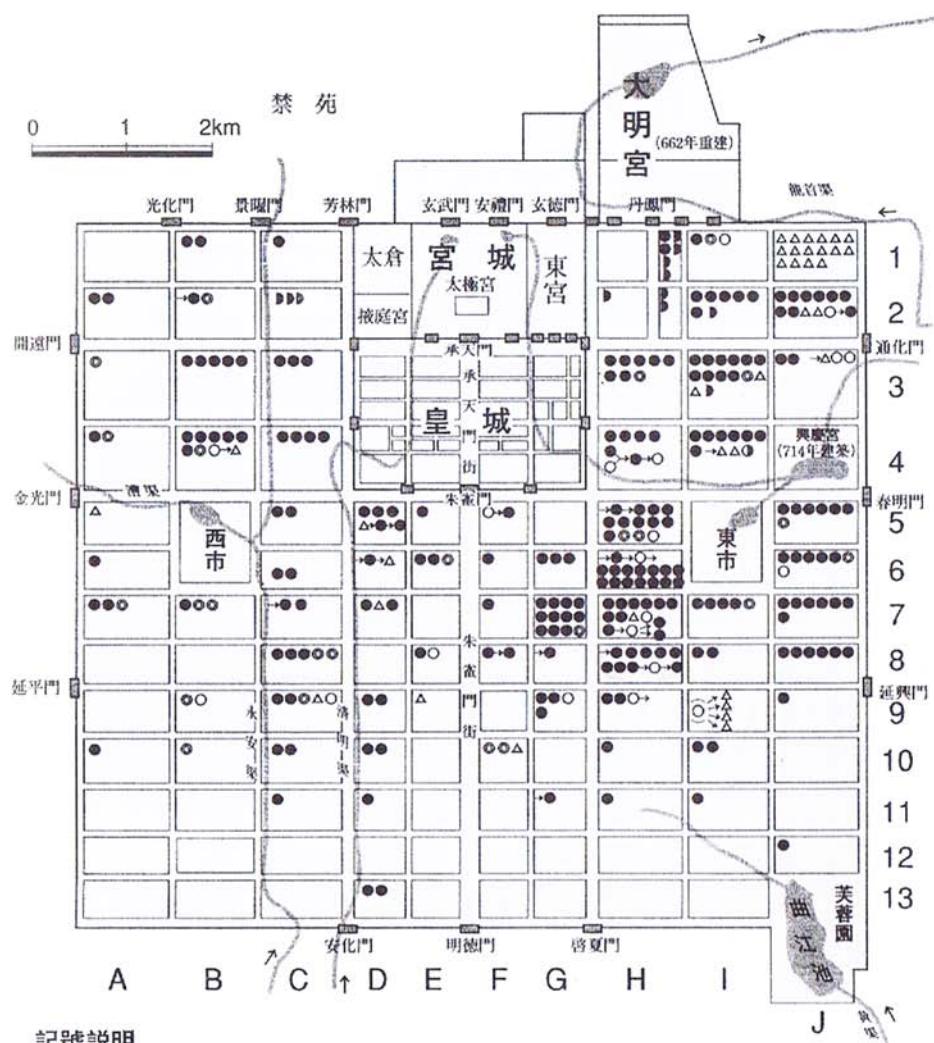
Chang'an was not only the political, cultural, and economic hub of the empire; it was also the center for various religions. Although in the Tang dynasty, Taoism was regarded as the "state religion," Chang'an, with its numerous temples, pagodas, and eminent monks, was also an important center for Buddhism.

The capital was well served by religious buildings. During the Tang period, some 192 temples were scattered

in the residential wards of Chang'an. There were Buddhist monasteries and nunneries, Taoist observatories, places of worship for Manichaean, Nestorian, and Zoroastrian faiths, as well as family shrines. According to the record *Liangjing Xinji*, there were 64 Buddhist monasteries, 27 nunneries, 10 Taoist observatories, 6 Taoist female observatories, 2 "Persian" temples, and 4 Zoroastrian temples in the city during the period 713–41. The later study *Tang liangjing chengfang kao* listed a total of 81 Buddhist monasteries, 26 Buddhist nunneries, and 30 Taoist observatories (Figure 4).<sup>8</sup> The larger ones among them occupied an entire ward while the smallest were no larger than some modest residences.

### Buddhist Monasteries

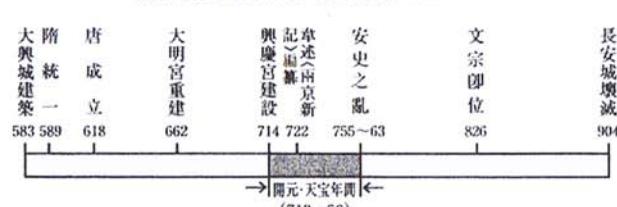
Buddhism flourished in the Tang dynasty—a peak period when numerous temples were constructed. At that time, many emperors, other royalty, and aristocrats supported the establishment of monasteries or even took the tonsure themselves, regarding such acts as a personal glory. Many temples were founded when aristocrats and officials donated their vast mansions for religious use. For example, the Zhanghuai 章怀 Prince Li Xian 李显 donated his house to be the Qianfu Monastery 千福寺; Princess Taiping 太平公主 set up the Wangji Monastery 网极寺 for her mother, Wu Zetian 武则天; the eunuch Gao Lishi 高力士 set up the Baoshou Monastery 保寿寺; Prime Minister Wang Jin 王缙 donated his house to the Baoying Monastery 保应寺, and so forth. According to



#### 記號說明

- 官人（流内9品）
- ◎ 官人之夫人
- △ 親王
- 公主・縣主・女官
- 宦官
- 宦官之夫人
- ① 貞擧（科擧）受驗生
- 同居
- 邸宅所有者的變化
- ←● 兩時期居住

#### 隋唐長安城史上的本圖對應時間

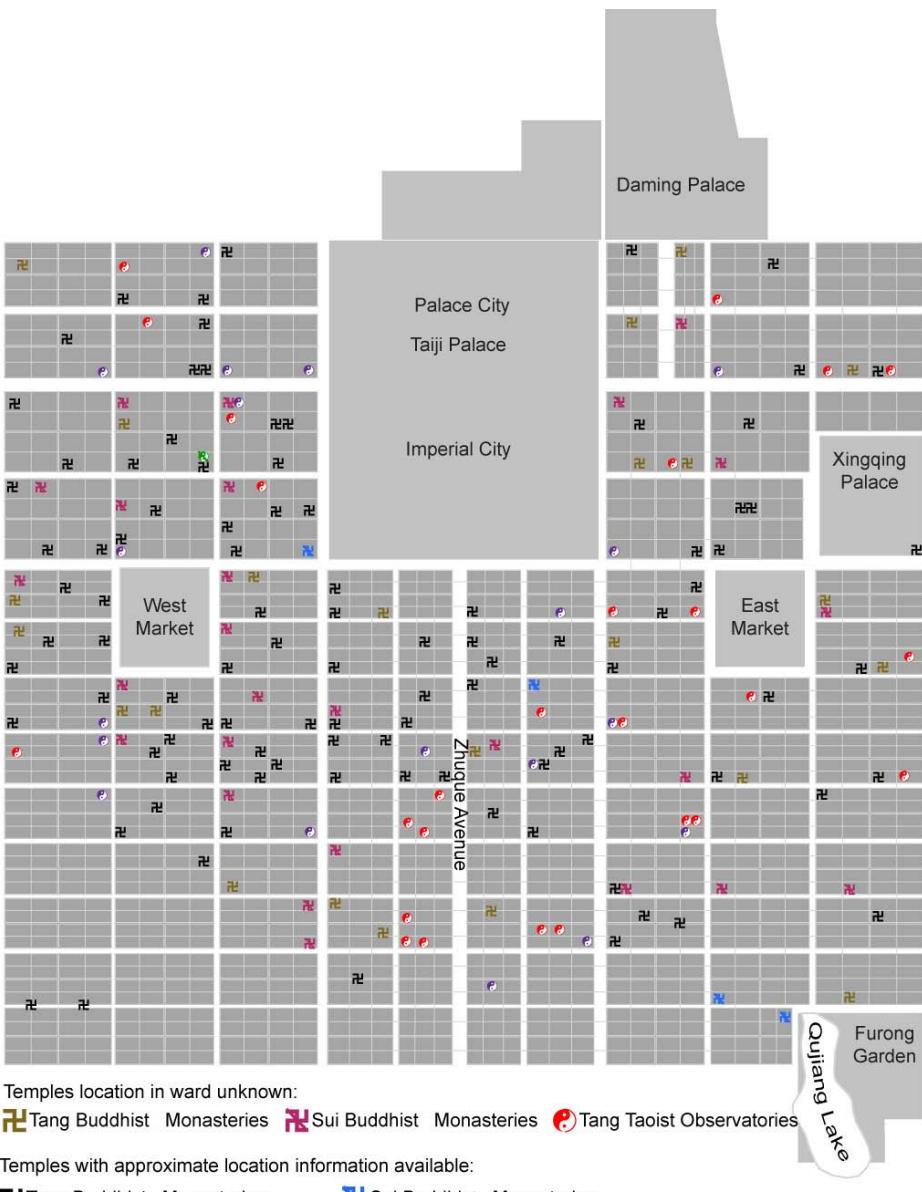


**Figure 3** Mapping of properties of high official and royal family members and the transfer of property ownership in Chang'an during Kaiyuan and Tianbao eras (713–56 CE) by Seo Tatsuhiko according to *Liangjing xinji* 两京新记 (see note 37)

Shu Yuanyu 舒元輿, during the mid-Tang period, “There would be a temple in a village of one hundred families and the community of ten clans,” indicating the high density of temples or monasteries in Chang’an.<sup>9</sup> The Japanese monk Ennin recorded in his diary during his visit to the city in the reign of Wuzong that “there were more than three hundred monasteries in the wards of Chang’an.”<sup>10</sup> The Japanese

Buddhist scholar Tsukamoto Yoshitaka 塚本善隆 listed 103 temples, according to the record of *Tang liangjing chengfang kao*.<sup>11</sup> Later, Sun Changwu 孙昌武 wrote that there should be more than two hundred temples of a certain scale in Chang’an and its suburbs. Besides these temples in Chang’an, there were many temples in the mountains and also residences for monks.<sup>12</sup>

**Figure 4** Buddhist monasteries and Taoist observatories in Chang'an



Some of these temples attained palatial proportions, with multistory buildings and pagodas. Their halls were magnificent both in size and in their details. For example, the eastern and western halves of Yongyang ward 永阳坊, located at the southwestern corner of Chang'an, were occupied by Da Zhuangyan Monastery 大庄严寺 and Da Zongchi Monastery 大总持寺, respectively. Da An'guo Monastery 大安国寺 took up almost half of Changle ward 长乐坊. Da Xingshan Monastery 大兴善寺 occupied the entirety of Jingshan ward 靖善坊. Da Jianfu Monastery 大荐福寺 took up the southern half of Kaihua ward 开化坊, whereas its pagoda courtyard—the Small Wild Goose Pagoda—occupied the northern half of An'ren ward 安仁坊 to the

south. Similarly, the eastern half of Jinchang ward 晋昌坊 was given to Da Ci'en Monastery 大慈恩寺, which had several multistoried halls and buildings, more than ten courtyards, and some 1,897 bays of construction.<sup>13</sup>

#### Taoist Observatories

Taoism was the second most influential religion in Chang'an, after Buddhism. Most of the Taoist observatories were located in the wards near the East and West Markets, or near the gates that served important avenues, and in the wards before the Daming Palace. These places had a larger residential population, convenient access to traffic routes, and prosperous commercial establishments. Many of the Taoist observatories

were set up by royalty and aristocrats. For instance, in the first year of the Xianqing reign 显庆元年 (656 CE), Emperor Gaozong 唐高宗 set up Haotian Observatory 天观 in Baoning ward 保宁坊 for his late father, Emperor Taizong 太宗. Many of the observatories were quite large: Haotian Observatory occupied the entirety of Baoning ward. Xuandu Observatory 玄都观 took up more than half of Chongye ward 崇业坊.

### Other Religions

Many foreigners lived in Chang'an because of its political and cultural status and its location at the eastern end of the Silk Route. Along with exotic products, they brought with them their religions and practices from Central Asia. The

Tang government, tolerant and respectful of these religions, allowed them to build their temples and places of worship under the supervision of special institutions. These religions included Manicheanism, Nestorianism, Zoroastrianism, and Islam. Most of the buildings belonging to these religions were found in the western half of the city, particularly around the West Market (Figure 5).<sup>14</sup>

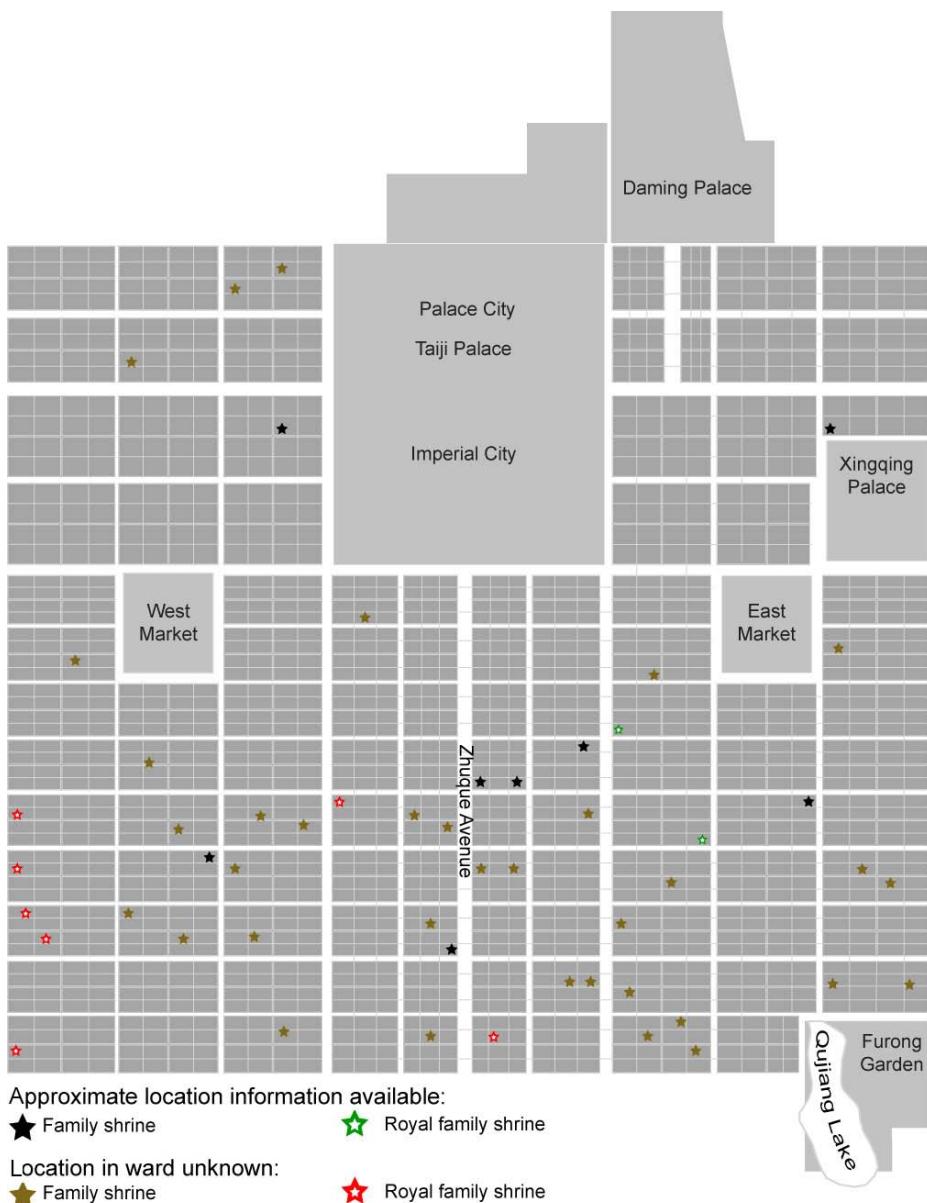
### Shrines

There were also many shrines dedicated to members of the royal family and the ancestors of officials of the fifth rank or above in the residential wards (Figure 6). The former were built by the state and the latter by the officials' own families. According to a decree published in 724 CE, officials of the



**Figure 5** Zoroastrian and Persian temples found in Chang'an

**Figure 6** Family shrines in Chang'an



fifth rank or above in the capitals were required to have family shrines to worship the ancestors.<sup>15</sup> Kan Huai-Chen, in a study of ancestor shrines of the Tang period, stated that a family shrine in the west capital was regarded as a symbol of high social status.<sup>16</sup>

The Tang family shrines differed from clan ancestral shrines in the later Ming or Qing periods because worship in Tang family shrines was strictly hosted by the heir, and only members of his patrilineal kin were worshipped.<sup>17</sup> Hence the Tang family shrine was an important part of a family's home. The shrines of governmental officials, however, were usually built separately, outside the family residences. In the

case of royal family shrines, only the deceased emperor and empress could be consecrated in the Imperial Ancestral Temple, or Taimiao 太庙, inside the Imperial City; other members of the family related to the throne were enshrined outside the palaces in the residential wards. Existing records reveal that most of the shrines in Chang'an were in the less crowded residential wards in the southern part of the city, especially during the middle to late Tang period when the city's population expanded and the shortage of land in the northern part of the city became more and more serious. During the reign of Wu Zong 武宗 (r. 841–46 CE), the emperor initially prohibited the building of family shrines

in the crowded wards, allowing them to be erected only in the three southernmost rows of wards. He subsequently banned them altogether in Chang'an. The maps suggest that the family shrines were concentrated in the five southernmost rows of wards, both because of the imperial decree and because they were supported by family (or clan) wealth and did not form part of Chang'an's citizens' daily lives. The places of worship for the ordinary citizens present a very different picture.

The mapping of the places of worship for Buddhists, Taoists, and those of Central Asian religions yields interesting data on their concentration and location in the city. Although the mappings may not be comprehensive, they provide a snapshot of the daily life and landscape of Chang'an's wards.<sup>18</sup> Most likely there were many more temples, monasteries, and other religious structures than those that are mapped. Even then, a typical 2-*li*-by-1-*li* ward could have as many as five or more Buddhist monasteries, not to mention the presence of Taoist observatories. This translates into one monastery for every 0.1 square kilometer in these wards. If they were equally distributed, then almost everyone living within the wards concerned would have been less than 200 meters from a monastery. That this was in fact the case in the most populous and popular wards around the West Market indicates not only the importance of religion in the daily life of the Chang'an residents but also the relation of the number of monasteries to population density. With as many as 2,400 or more families in Huaiyuan ward 怀远坊 or Changshou ward 长寿坊, where there were at least five monasteries (see Figure 4), there was approximately one monastery for every 480 families.<sup>19</sup>

## Government offices

In the Tang period, the empire was divided into several political districts, called Dao 道. The subordinate districts of each Dao were called Zhou 州 or Fu 府. Chang'an belonged to Jingzhao Fu 京兆府, Guannei Dao 关内道. Twenty-three counties, including Chang'an county 长安县 and Wannian county 万年县, were under the jurisdiction of Jingzhao Fu 京兆府. (In 733 CE Chang'an and the area nearby were divided from Guannei Dao and formed the new Jingji Dao 京畿道, meaning "the capital city and its environs" in Chinese.) Zhuque Avenue, along the north-south axis, divided the residential wards in Chang'an so that half were under Chang'an county while the other half belonged to Wannian county. The county offices of Wannian (Wannian Xian xie 万年县廨) and Chang'an (Chang'an Xian xie 长安县廨) were in Xuanyang 宣阳坊 and Changshou wards 长寿坊, respectively; the office of

Jingzhao Fu (Jingzhao Fu xie 京兆府廨) was located in Guangde ward 光德坊. Other local administrative institutions found in wards include Jifang 籍坊 (office of household registration) of Jingzhao Fu 京兆府 in Yongning ward 永宁坊 and the state-run school of Jingzhao Fu 京兆府 in Taiping ward 太平坊.<sup>20</sup>

Early writings about Tang Chang'an, such as *Tang liangjing chengfang kao*, reveal that in addition to the Imperial City offices, many offices of the central administration were also located in the residential wards (Figure 7). Examples include Zhuangzhai si 庄宅司 (Office of Estates and Residences) in Laiting ward 来庭坊, Lihui yuan 礼会院 (Court of Royal Marital Ceremonies) in Chongren ward 崇仁坊, Libin yuan 礼宾院 (Foreign Relations Office) in Changxing ward 长兴坊, and Queyan yuan 横盐院 (Monopoly Salt Bureau) in Xuanyang ward 宣阳坊; all four wards were located in the eastern part of the city, close to the Imperial City and East Market. Some wards had more than one government office. For example, Guangzhai ward 光宅坊, immediately south of Daming Palace, had four—Shilou yuan 侍漏院 (Waiting Hall for the Morning Court Audience), Taipu si che fang 太仆寺车坊 (Vehicle Office of the Court of the Imperial Stud), You Jiaofang 右教坊 (Right Music Office), and Jinwu pu 金吾铺 (Watch House of the Imperial Insignia Guard). Shilou yuan was where the court officials waited before court meetings. Taipu si che fang provided horses and vehicles for the imperial household and members of the central government. You Jiaofang was one of the music offices established in 714 CE (the Left Office was in Changle ward 长乐坊, later renamed Yanzheng ward 延政坊) to train court entertainers. Jinwu pu was the Watch House of the Imperial Insignia Guard, a distinguished unit of the imperial bodyguard.<sup>21</sup>

Along with the imperial guards, several military facilities, such as barracks and training fields, were situated in the wards of Chang'an. Unlike the governmental offices, they could be found throughout the city. Notable examples include those in Xiude ward 修德坊 and Xiuxiang ward 休祥坊. Anshan ward 安善坊 was wholly occupied by a crossbow training field (Jiaonu chang 教弩场) for the Army of Great Power 威远军 (see Figure 7).

In addition to the offices of the central and local governments in the residential wards, there were also capital liaison offices 进奏院, or *jinzou yuan*, which represented the interests of the different regions of the empire.<sup>22</sup> Each was headed by a capital liaison representative, these agencies also provided accommodations for the regional officials during their stay in the capital. Like most of the governmental offices, all the capital liaison offices recorded in *Tang liangjing chengfang kao* were located in the wards of the northeastern part of the city,



**Figure 7** Central government offices and military facilities in the residential wards

particularly Chongren ward 崇仁坊 and Pingkang ward 平康坊 (Figure 8).<sup>23</sup>

### Commercial Activities and Other Services

Although most commercial activities in Chang'an took place in the two markets, small businesses and entertainment quarters were scattered throughout the residential wards (Figure 9), particularly during the latter half of the Tang period, 766–907 CE. Hostels were located in a dozen wards, including Xingdao 兴道坊, Xinchang 新昌坊, Guangzhai 光宅坊, Changxing 长兴坊, Qinren 亲仁坊, Yongchong 永崇坊, and Xuanping 宣平(政)坊.<sup>24</sup> Like the capital liaison offices, they were found mostly in the eastern half, clustered

around the East Market and south of the Daming Palace, suggesting that they served mainly travelers who came to the capital for official business with the imperial court. Two hostels were found in Chongren ward, immediately northwest of the East Market, where there were twenty-three capital liaison offices! Perhaps to serve the upper classes outside the confines of the official market, there were also more restaurants, food stores, and wineshops in this part of the city, among them a teashop in Yongchang ward 永昌坊,<sup>25</sup> a Persian pastry shop, or *biluo dian* 毕罗店,<sup>26</sup> in Changxing ward 长兴坊, and a shop selling Turkish pastries (*hubing* 胡饼) in Shengping ward 升平坊.<sup>27</sup>

Chang'an's funeral parlors were important enough to figure in a Tang era story *Liwa Zhan* 李娃传.<sup>28</sup> They



**Figure 8** Jinzou yuan in Tang Chang'an; above each icon is the number of offices representing different regions of the empire that were present in the ward (red icons denote those offices whose location in the wards is unknown, and black icons denote those with proximate location information)

were organized into east or west shops depending on their location in relation to Zhuque Avenue in the capital.<sup>29</sup> They rented the things required for funeral services, including articles for funeral rites, carts, and even singers of elegies.

Archaeological excavations and probes uncovered a number of handicraft workshops in the residential wards, including pottery workshops (Liquan ward 醫泉坊 and Pingkang ward 平康坊) and brick kilns (Puning ward 普寧坊 and Jinchang ward 晉昌坊).<sup>30</sup> There were also cartwrights, whose shops were gathered near the Tonghua Gate 通化門.<sup>31</sup> Musical instrument manufacturers clustered in Chongren ward 崇仁坊, probably catering to the courtesans of the renowned brothel district in the adjacent Pingkang ward 平康坊.<sup>32</sup> This district is commonly known as the Sanqu 三曲,

or three alleyways, where smaller brothels were situated along the north alley, by the northern wall of the ward, while the larger and more luxurious ones occupied the middle and south alleys.<sup>33</sup>

Pingkang ward was located in a bustling area of Chang'an that was also its richest part. To its north was the thoroughfare connecting the two city gates, Jingguang Gate and Chunming Gate. It was adjacent to the East Market and immediately south of the Imperial City. It is plausible that government officials and traveling merchants made up a large segment of those who frequented the brothels there. Historians have speculated that Prime Minister Li Linfu was able, in his later years (he died in 752), to live a notoriously dissolute life because he lived in Pingkang ward, with its easy

**Figure 9** Food and beverage outlets in Tang Chang'an



access to courtesans.<sup>34</sup> Pingkang ward was popularized in the famous story of the courtesan Liwa 李娃, who lived in this ward, probably in the Sanqu area.<sup>35</sup>

### The Form of Chang'an's Residential Wards

Chang'an had 109 walled residential wards of various sizes arranged in a grid of rows and columns. They can be classified according to five categories (Figure 10), although archaeological records show variations within each category.<sup>36</sup> The smallest wards, whose dimensions were 350 by 350 paces (1 pace = 1.48m), were located on either side of the main Zhuque Avenue, or the Heavenly Street. The other two

columns south of the palaces had wards of 450 by 350 paces. Elsewhere in the section south of the Imperial City, the larger wards measured 650 by 350 paces. The largest wards, of which there were twelve, were located on either side of the Imperial City. They measured 650 by 550 paces. One of them was converted during the reign of Xuanzong 玄宗 (685–762 CE; r. 712–56 CE) into a palatial complex—Xingqing Gong. Slightly smaller were the twelve wards on either side of the Palace City that measured 650 by 400 paces. Two of these wards, however, were cut through by a broad avenue, Danfeng Men Street 丹凤门街, when the new palace, Daming Gong 大明宫, was built in 634, breaking the two wards into four smaller ones.



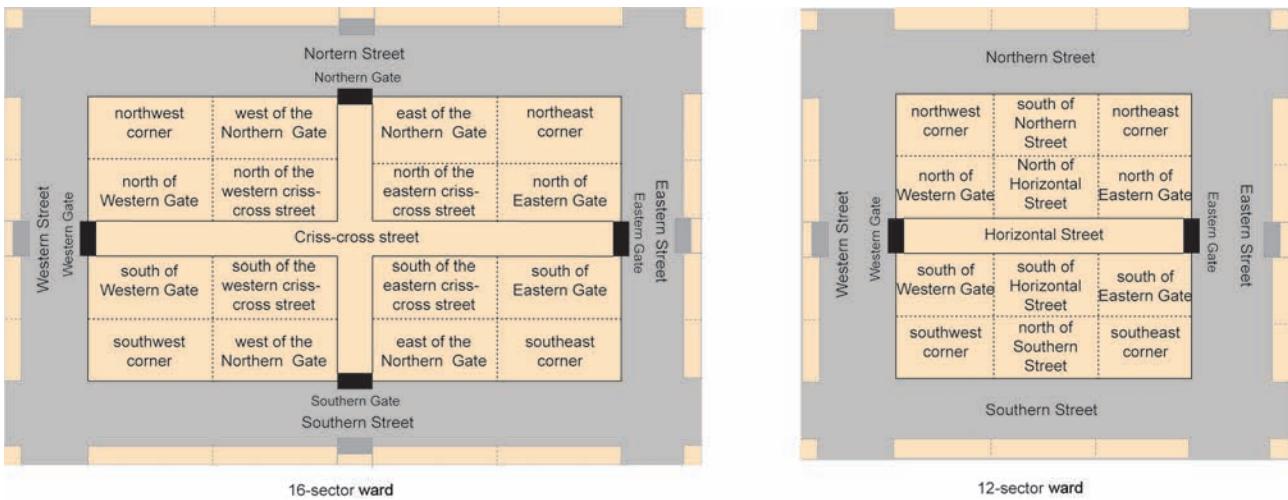
**Figure 10** Five different dimensions of residential wards in Chang'an and two types of internal road network structure in the wards

The classification of the wards by form is straightforward. In classifying them according to their road networks, at least two types of internal structure are discernible. Except for the four columns of wards located south of the Imperial City, each of which was divided into halves by a 15-meter-wide street running east to west and further subdivided into twelve sectors, all the wards were divided into quarters by two roads, about 5 to 6 meters wide, that crossed. These wards were further divided into sixteen sectors by *xiang* 巷, or alleys. Seo Tatsuhiko carefully examined the locations of buildings with respect to the roads (inside and outside the wards), ward gates, and ward corners in *Liangjing xinji* and *Chang'an zhi*.<sup>37</sup> The indicators of building locations can be grouped as follows:

1. northeast/northwest/southeast/southwest corner
2. north/south of the East/West Gate, east/west of the North/South Gate
3. northeast/northwest/southeast/southwest junction
4. northern/southern/eastern/western half of ward

5. entire ward
6. north/south of the East-West street and east/west of the North-South street. (The main roads along the outside ward walls were called East/West/North/South streets.)

According to *Chang'an zhi*, the four rows of wards south of the Imperial City had only two gates each, one at either end of its major east-west street, instead of the four gates typically found in the other wards.<sup>38</sup> One can deduce the road structure of the wards in these four rows because no indicators from the third category (northeast/northwest/southeast/southwest junction) were used to refer to buildings inside these wards. Seo, observing that the location indicators from the sixth category were used only in wards partitioned into twelve sectors but never in those partitioned into sixteen, pointed out that the four wards along Danfeng Men Street 丹凤门街, should also be partitioned into twelve sectors because of a notation found in *Chang'an zhi* about Guangzhai Temple 光宅寺 in Guangzhai ward 光宅坊, a ward west of Danfeng Men Street 丹凤门街. The description “north of



**Figure 11** Two types of ward with different internal road network structure

the horizontal street 橫街之北” in this notation belongs to the sixth category.

Following Seo's analysis, we can further sort the wards in Chang'an into two types according to their internal structure, those with sixteen sectors and those with twelve (Figures 11, 12). The categorization by internal road network structure is very general. For example, in a sixteen-sector ward with dimensions of 2 Tang *li* by 1 Tang *li* (1,064m by 532m), each sixteenth (measuring 266m by 133m) covered an area of 3.6 hectares. Such a large area must have been further subdivided into smaller land plots for the houses and fields of the ordinary citizens. Archaeological evidence showed that there were tertiary orthogonal networks of *xiang* 巷, or alleyways, and even narrower *qu* 曲, or lanes, in addition to the major and minor roads that divide a ward into either sixteen or twelve sectors. How these streets, alleyways, and lanes subdivided the large sectors into smaller parcels remains unclear in the absence of an extensive and in-depth archaeological survey.

A few studies examine the wards from the perspective of either architectural or urban design to better understand their internal structure. He Congrong based her attempt to uncover the land division and road network structure of Pingkang ward 平康坊 on both Chinese historical records and the residential land division of Heijo-kyo in Japan.<sup>39</sup> My earlier digital reconstruction of Chang'an's Yongning ward 永寧坊 re-creates its physical setting and illustrates its estimated density at the height of the Tang period. More important, this re-creation was based on the theoretical plan of a typical ward that I had derived from studies of the contemporaneous cities of Luoyang, Heian-kyo, Heijo-kyo, Nagaoka-kyo, and Longquan fu (capital of the Bohai kingdom),

as well as the later city of Yuan Dadu (and Qing Beijing), details of which are mentioned in the section that follows.<sup>40</sup> One could use the deductive approach by which Yongning's population density was determined to derive the population density of other wards, if not individually, at least in broad categories like location and proximity of the wards to specific economic and governmental functions, such as markets and palaces.

### The Population Size of Chang'an's Residential Wards

The city of Chang'an was not evenly populated. Historical records and archaeological evidence indicate that the western side (administered by Chang'an county) of the city was more heavily populated than the eastern side (administered by Wannian county), whereas the northern section of the city and the area around its two markets were more fully occupied than the southern section.<sup>41</sup>

The aristocracy, officials, and the upper classes lived mainly in the eastern part of the city. Their princely mansions took up much space in the wards. During the Kaiyuan era (713–41 CE) ranked officials working in Chang'an (*Jing guan* 京官, or officials in the capital) numbered about 2,620.<sup>42</sup> Ranked and unranked personnel together added up to more than thirty thousand people working in offices in the capital. The officials no doubt favored the wards close to the Imperial City. Among the ranked civilian officials (*Wen guan* 文官), those of the fifth rank and above had to attend the morning court meeting with the emperor that began at six o'clock.<sup>43</sup> These officials, about a thousand of them, would have wanted to live as close to the throne as possible.<sup>44</sup> The political



**Figure 12** Distribution of ward types in Tang Chang'an

center in Chang'an shifted in 663 CE from Taiji Palace 太极 to Daming Palace during the reign of Gaozong 高宗, from 649 to 683 CE, and moved again to Xingqing Palace 兴庆宫 when Xuanzong 玄宗 was in power, from 712 to 756 CE. The wards close to these administrative centers were especially sought after by high officials and were also popular among those related to the throne (see Figure 3).

From the reign of Zhongzong 中宗 (684–85 CE) onwards, the number of eunuchs increased significantly. During the period of Xuanzong 玄宗 there were more than four thousand eunuchs serving the inner court.<sup>45</sup> Some of them who were close to the emperor even held court posts and had property outside the imperial palaces.

Yang Kuan has examined Tang tomb inscriptions unearthed during archaeological excavations and has summarized the distribution of upper-class residents in Chang'an.<sup>46</sup>

The following wards in Wannian county were occupied by high officials: Yongxing ward 永兴坊 and Chongren ward 崇仁坊 (east of Imperial City), Yishan ward 翟善坊 and Yongchang ward 永昌坊 (immediately south of Daming Palace), as well as Shengye ward 胜业坊 (east of Xingqing Palace). The wards in Chang'an county favored by officials were Fuxing ward 辅兴坊, Banzheng ward 颁政坊, and Jincheng ward 金城坊 west of the Imperial City. Eunuchs lived primarily in wards close to Daming Palace, such as Yongxing 永兴坊, Yongchang 永昌坊, Laiting 来庭坊 and Daning ward 大宁坊 in Wannian county and Xiude ward 修德坊 in Chang'an county.

The western section of the city was both more populous and more international than the eastern section. In addition to foreigners, the western part of the city also housed more ordinary citizens. The most populous wards in the city were

those close to the two markets, especially the West Market, which was the origin of the famous Silk Route. The West Market had narrower streets and more shops than its eastern counterpart and was busier, as archaeological evidence has shown.<sup>47</sup> The northernmost gate in the western city wall, Kaiyuan Gate 开远门, was the portal through which travelers to and from Central Asia arrived in and departed the capital. The avenues that led to this gate, and some of the wards along them, were no doubt lively.<sup>48</sup> This area of Chang'an, with its large number of inhabitants, both local and foreign, had a social makeup similar to that of the area near the main railway stations of today's big cities.

Besides the demographic difference between the eastern and western parts of the city, the population distribution also varied from north and south. Unlike the heavily inhabited wards around the two markets, the four southernmost rows were sparsely inhabited.<sup>49</sup> As Su has pointed out, of the six major thoroughfares that connect city gates, the southernmost one, linking Yanping Gate 延平门 and Yanxing Gate 延兴门, was the narrowest, probably because it was closest to the four southern rows of sparsely populated wards. Very often in these southern wards, temples, shrines, gardens, military installations, or even farming took up all the land.<sup>50</sup> The eastern half of Yongyang ward 永阳坊, for example, was occupied by a Buddhist monastery with a wooden pagoda 97 meters high; another Buddhist monastery and two imperial family shrines took up most of the western half. Elsewhere, closer to the central axis, Anshan ward 安善坊 was at one time given over in its entirety to the military for crossbow training, as noted above. Similarly, four wards at the northwestern corner of the city were almost uninhabited, because they were the sites of gardens, monuments, and ruins from the Han period. Puning ward 普宁坊 just north of Kaiyuan Gate 开远门, for example, had the remains of the Han Imperial University 太学, Mingtang 明堂, and Piyyong 辟雍.

Given the incomplete data about Chang'an's population, it is impossible to know exactly the number of households or the size of the population in each of Chang'an's wards. Scholars have offered different estimates of the population, ranging from half a million to one million.<sup>51</sup> Seo Tatsuhiko reexamined earlier studies of Tang Chang'an's population and put forward a convincing estimate of 700,000 people in Chang'an in the first half of the eighth century (and the beginning of the ninth).<sup>52</sup> The area of Tang Chang'an was about 84.2 square kilometers. The area of Daming Palace, where the emperor and those related to him lived, was 3.6 square kilometers. With 700,000 residents in an area of about 88 square kilometers, the average density of Chang'an would have been 7,900 people per square kilometer, or about 1,580

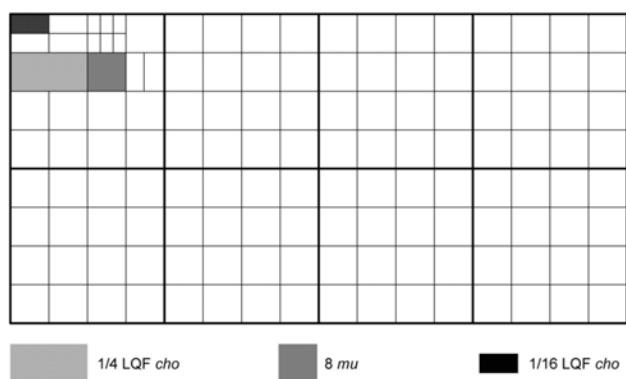
families (assuming an average household size of five people). Let this be the first scenario.

That the southern section of the city was sparsely populated—the southernmost four rows of wards had hardly any inhabitants—is understandable, given the size of Chang'an and the location of major activity centers in the northern section of the city. Omitting the southernmost four rows of largely vacant land—about 29 square kilometers—from the total area of 88 square kilometers, yields an area of 60 square kilometers. Let this reduced urban area be a second scenario.

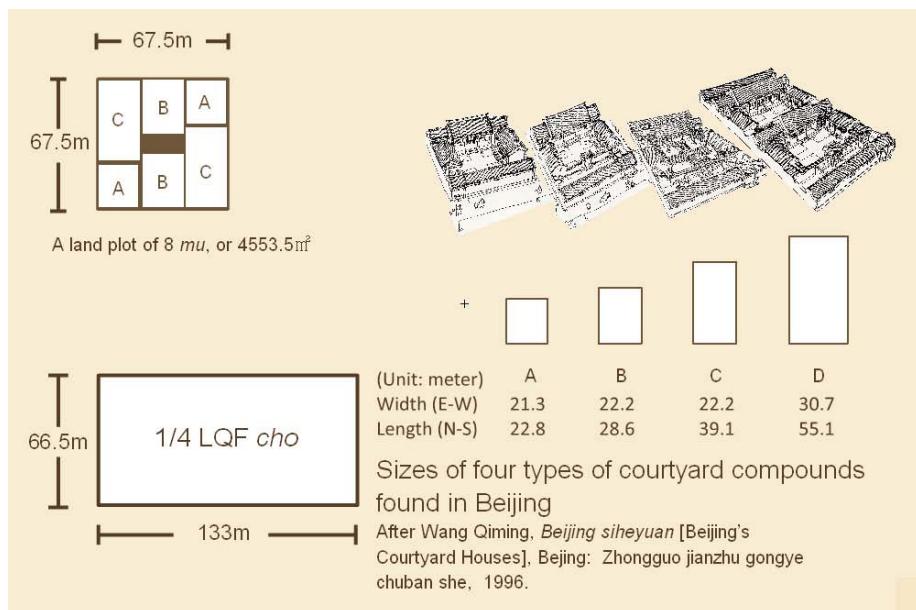
### Population Density of the Typical Wards

Of the 109 residential wards, 49, or about 45 percent, are of the 2-Tang-*li*-by-1-Tang-*li* category (size group C, see Figure 10). I elected to study the population density of Yongning ward as a typical Chang'an ward. It is two blocks south of the East Market. Based on the city's average density of 1,580 families per square kilometer, mentioned above, Yongning ward, which occupied an area of 0.5 square kilometers, would have been able to house within its walls 790 or more "families" or the equivalent—some 3,950 people in all.

In the theoretical plan of a ward of my earlier study,<sup>53</sup> based on a comparative analysis of Longquan fu (LQF), Heian-kyo, Heijo-kyo, and Nagaoka-kyo, as well as Dadu of the Yuan dynasty, I proposed a further subdivision of the typical sixteen-sector 2-*li*-by-1-*li* ward. Each of these sixteen sectors could be further subdivided into four, as was evident in the plan of Longquan fu. This is the unit I termed a one-quarter LQF *cho* (*cho*, or町, was a contemporaneous Japanese term for 1/16 of a ward) in the theoretical land parcellation plan (Figure 13). Not unexpectedly, this is about twice the size of an 8-*mu* plot of land, or about 4,553.5 square meters, commonly allocated to officials in Yuan Dadu. This 8-*mu* plot of land could be further subdivided for the homes and



**Figure 13** Theoretical land parcellation of a Tang Chang'an ward (see also Figure 14)



**Figure 14** Sizes of four types of courtyard compound found in Beijing; different combinations of types A, B, C, and D in land plots of 8 *mu* and 1/16 LQF *cho* are also shown (after Wang Qiming, *Beijing siheyuan* [Beijing's courtyard houses] [Beijing: Zhongguo jianzhu gongye chuban she, 1996])

fields of ordinary citizens. Using the size of the courtyard compounds in Qing period Beijing as a reference, the 8-*mu*, or about 67.5-meter-by-67.5-meter plot is sufficient to accommodate three typical courtyard houses with a width of 22.2 meters each, side by side. Lengthwise, it equals the combination of either two type B houses, or a combination of type A and C, or simply one type D (Figure 14). Dividing the 8 *mu* equally into six plots of 22 meters by 33 meters, each for a family, yields a theoretical plan to accommodate 768 families, a figure very close to my earlier estimate of 790 families.<sup>54</sup>

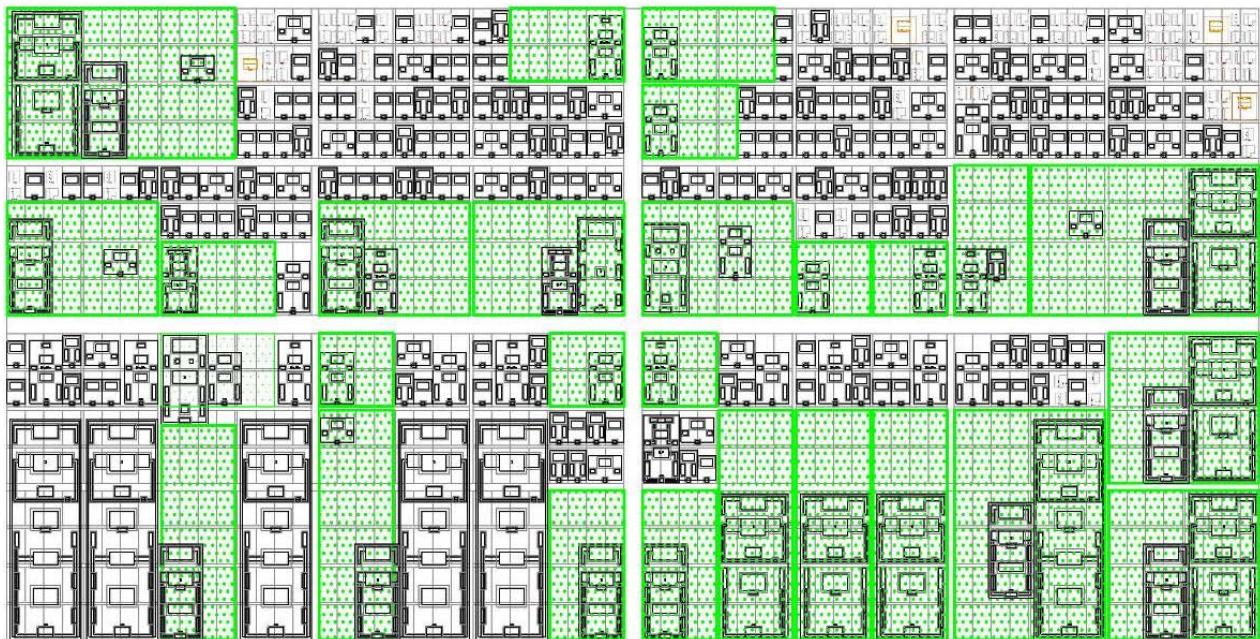
It is reasonable to assume, however, that Yongning, only two blocks from the busy East Market, was a ward with at least an above-average population size. In this case, according to the second scenario, of an urban area of 60 square kilometers (which does not take into account the southernmost four rows of meagerly populated wards), the population density would be about 11,500 people per square kilometer, or about 2,300 families. Given that Yongning ward is about 0.5 square kilometers, the ward could house about 1,150 families, or 5,750 people. It is reasonable to accept this as the density for Yongning ward because it represents an average of inhabited areas of the city as opposed to the general estimate of the first scenario.

In this second scenario, the number of families inhabiting the area of 8 *mu* would need to increase from 6 to 8 to achieve a theoretical ward plan with 1,024 plots of land, each measuring 15 by 30 meters, or about 450 square meters, served by a network of major and minor streets as well as lanes and alleyways of varying dimensions. This increase translates into a population of some 5,120 for the ward, about

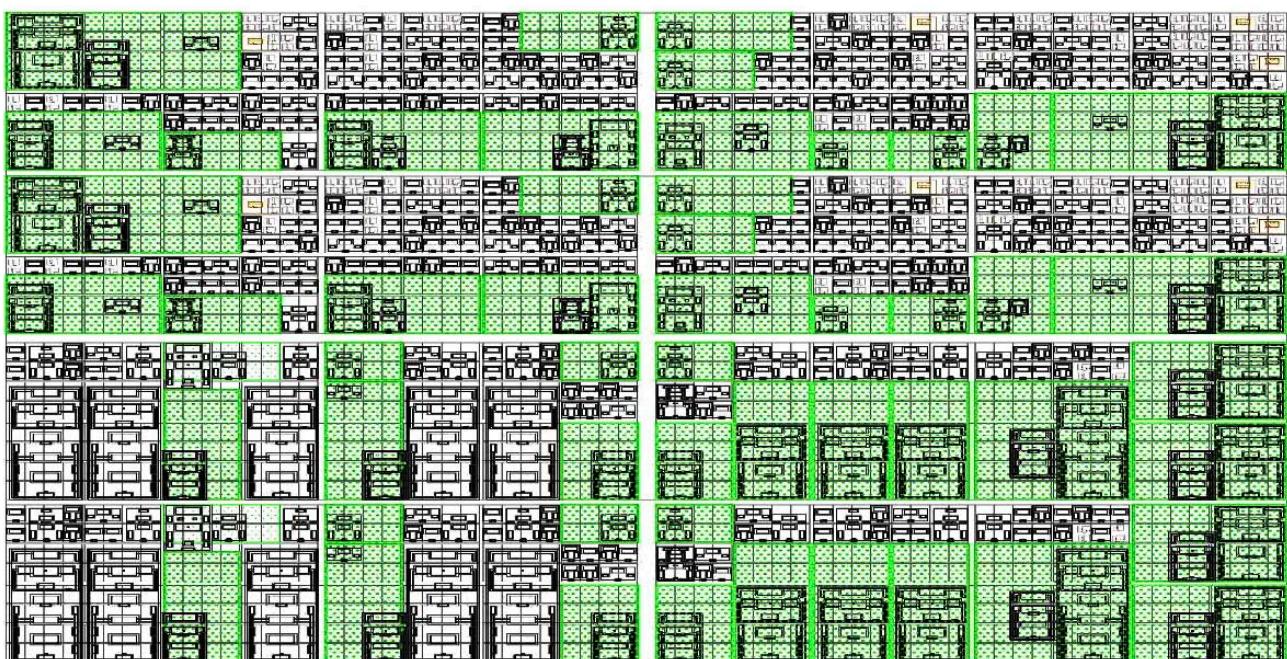
11 percent lower than the estimate in the preceding paragraph of 5,750 people. If the number of families inhabiting the area of 8 *mu* were increased from 6 to 10 instead, the theoretical plan would have 1,280 plots of land, each measuring about 13.5 by 30 meters, or about 405 square meters. In this case, Yongning ward could house a total of about 6,400 people, or about 11.3 percent higher than the earlier estimate of 5,750 people.

Given the close proximity of Yongning to the centers of activity—East Market and the two palace complexes, Taiji Palace 太极宫 and Xinqing Palace 兴庆宫—the population density estimate for the ward should be higher than the city's average. Because the division of the 8-*mu* plot of land into 8 or 10 smaller plots yields population densities that are both about 11 percent below or above the estimate yielded by the general method of calculating, it is likely that both conditions are possible for Yongning ward. My representation and reconstruction portrays Yongning with 1,024 parcellations, that is, with the subdivision of the 8-*mu* plot of land into eight smaller plots (Figure 15).

Another option for wards of even higher population density, would be to double the density and further subdivide the ward, into some 2,048 theoretical plots of land, each about 15 by 15 meters in size. In this case, a high-density ward would be able to house some 10,240 or more people. This density is possible, given the indication that the famous general Guo Ziyi's residence, which took up a quarter of Qinren ward, just north of Yongning ward, had some three thousand people living in it.<sup>55</sup> This is the equivalent of about six hundred families living in a quarter of the ward. Assuming that all other residential compounds in Qinren ward had



**Figure 15** Theoretical subdivision of Yongning ward into 1,024 plots of land, each 15m by 30m



**Figure 16** Theoretical subdivision of a typical ward into 2,048 plots of land, each 15m by 15m

the same residential density as Guo Ziyi's compound, the ward would have housed 2,400 families or about 12,000 people—a figure close to my earlier estimate of 10,240 people. Qinren ward, being immediately adjacent to the East Market, would have been a ward of high population density, and the equivalent of 2,400 families would probably have

represented the upper limit of population density for this part of the city. It is conceivable that the areas around the West Market were even more densely populated, given the greater popularity of that section of Chang'an. A simple simulation visualizes doubling the residential density of such a typical ward (Figure 16).

The approximate population density of Yongning ward, located near the East Market, has thus been established, as well as the approximate population of wards with higher residential densities, such as Qinren ward, in the busiest

sections of Chang'an. Being fully aware of the implications of such a range of residential densities, I have chosen to use the first estimate, of a residential population of about 5,120, to reconstruct the urbanscape of Yongning ward (Figure 17).



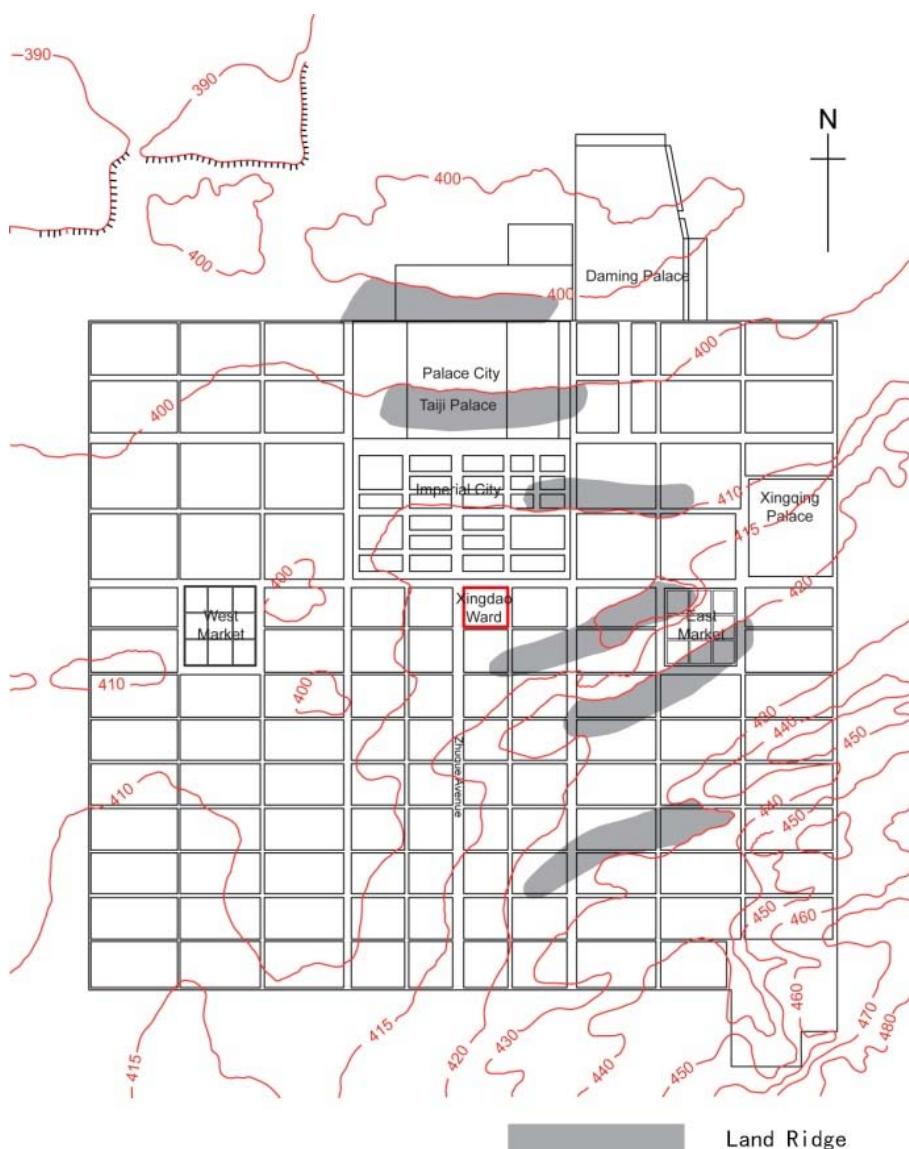
**Figure 17** Rendering of Yongning ward with an estimated population of 5,120

## Xingdao Ward

The record of a flood in Xingdao ward 兴道坊 found in *Tang liangjing chengfang kao* provides one more specific figure to use in calculating the number of households in a ward. After a heavy rain in 721 CE, Xingdao ward was inundated. The homes of five hundred families in the ward were flooded.<sup>56</sup> Xingdao ward, immediately south of the Imperial City, was located in the lowest-lying area in Chang'an, between two of the six land ridges that traversed the city (Figure 18). Two readings are possible: that the entire ward was flooded after the heavy rain or that only part of the ward was flooded and five hundred families were affected. Although there is no evidence about how large an area in the

ward was flooded, it is possible to make and test some assumptions, first, that the entire ward was inundated and that five hundred was the total number of families inside the ward in 721 CE.

According to the archaeological record, the area of Xingdao ward measured about 562 by 500 meters, or about 0.28 square kilometers.<sup>57</sup> Calculating a density of 1,785 households per square kilometer, or 8,925 persons, yields a density higher than the city's average and a little lower than Yongning's. On the assumption that the entire ward, made up of five hundred households, was inundated, 1,785 households per square kilometer can be considered the lower limit for Xingdao ward's density. If the number of households in Xingdao is calculated according to Yongning's density of



**Figure 18** Chang'an's terrain with Xingdao ward highlighted (unit: meter)

2,048 households per square kilometer, Xingdao ward could accommodate some 573.

The convenient location of Xingdao ward would probably have made it a popular residential area of Chang'an, especially for officials working in the Imperial City. Given its location, it is likely that the actual density of Xingdao ward was higher than the average density of wards in Chang'an and was probably either the same as, or higher than, that of Yongning ward, especially before Chang'an's political center shifted from Taiji Palace in the north-central part of the city to Daming Palace in the northeast. Most of its official class would have followed and moved to the east side to stay close to the throne. These deductions are corroborated by the few available mentions of population size in other wards, such as Qinren and Xingdao.

### Population Density Groups of Chang'an's Residential Wards

The analysis above makes possible the following observations about population densities in the three wards mentioned in the preceding section:

1. The average population density of the city is 1,580 households per square kilometer.
2. Xingdao ward's density, at about 1,785 households per square kilometer, is higher than the city's average.
3. Yongning ward's density, at about 2,048 households per square kilometer, is higher than that of Xingdao ward.
4. Qinren ward's density, at 4,800 households per square kilometer, is higher than that of Yongning ward.

The three wards, Yongning, Qinren, and Xingdao, all had population densities higher than the city's average, owing to their convenient location. *Tang liangjing chengfang kao* states that the southernmost four rows of wards had large garden tracts and empty land and was scarcely populated. Their population density is thus much lower than the city's average. Hence, the wards fall into one of three broad groups of population density, high, medium, and low (Figure 19). The high-density group includes the wards in the four middle rows around the two markets. In some of these wards, the population density may be even higher than 2,050 households per square kilometer; some of them could be as high as 4,800.<sup>58</sup> The southernmost four rows of wards, along with Xiuzhen ward 修真坊, Anding ward 安定坊, Xiude ward 修德坊 and Puning ward 普宁坊 in the northwest corner of the city, belong to the low-density group. These four wards were occupied mainly by the architectural remains and ruins of Han Chang'an, hence their lower

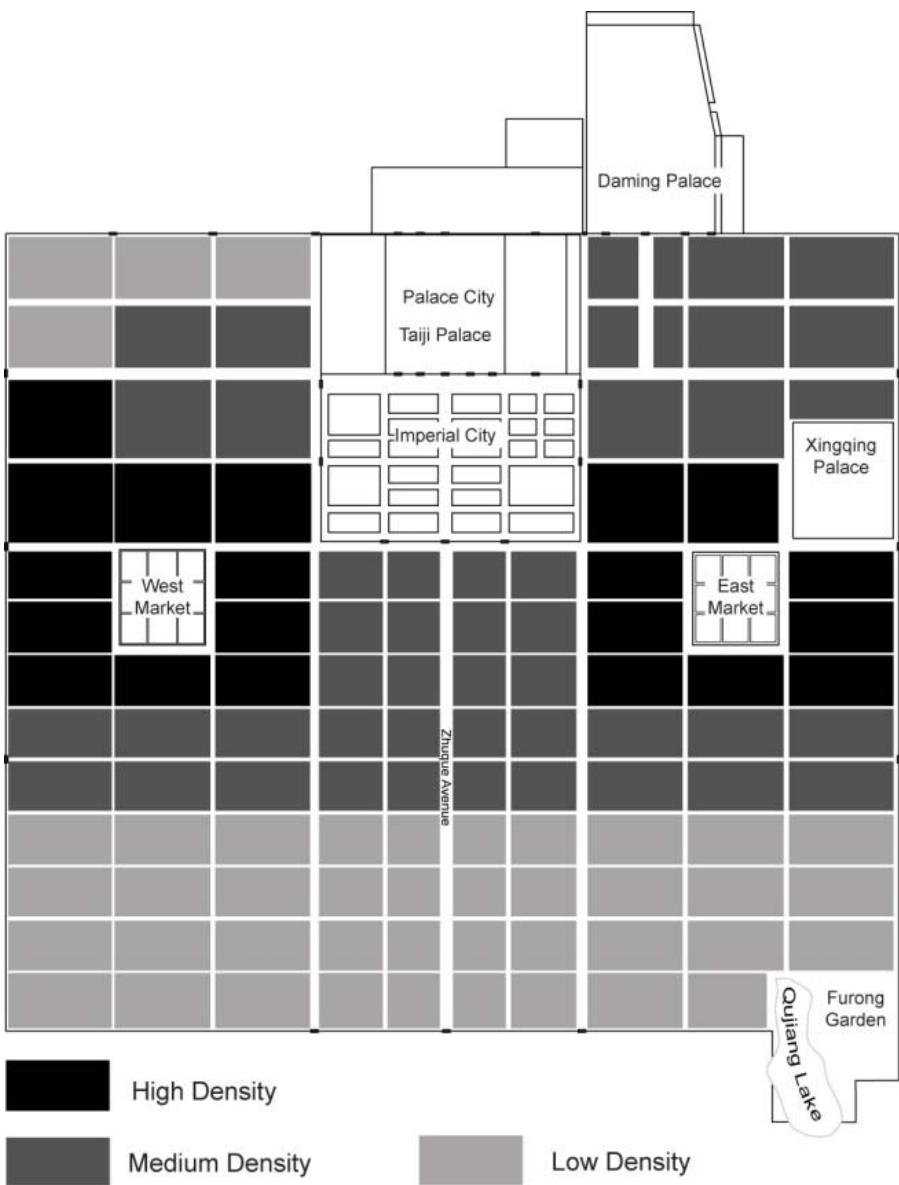
residential density. The population density of many of the wards in this group must be much lower than the city average of about 1,600 households per square kilometer. The rest of the wards were in the medium-density group, with estimated densities between 1,600 and 2,050 households per square kilometer.

Rough though it is, this simple framework for calculating the population density of the wards provides a basis for further study of the structure of wards, their land parcellation, and other characteristics. The density groups are based on an estimated population of 700,000 at the peak of Tang period Chang'an. Certainly the population of Tang Chang'an and consequently its cityscape would have varied during the long duration of the Tang dynasty. This framework, however, provides a theoretical basis and produces a snapshot of Chang'an's urbanscape, its urban texture and grain. This framework also enables the reconstruction of the cityscape of some of Chang'an's wards and an appreciation of the physical landscape within which daily life in the wards took place.

### Reconstruction of Typical Wards

Using the systematic categorization of wards as a basis, I have chosen three wards for digital reconstruction: Pingkang ward 平康坊, for its unique record as an entertainment area and its concentration of large properties owned by court officials; Taiping ward 太平坊, as the only ward of the three with a twelve-sector structure and medium population density; Liquan ward 醫泉坊, as physically one of the largest wards, whose convenient location adjacent to the West Market made it one of the most densely populated wards with an international population and places of worship for various religions. As I did with Yongning ward, I subdivided these wards into small plots of land according to their estimated population density, as discussed earlier (Figures 20, 21). Using such land parcellations based on population density, I populated the wards with courtyard compounds, large and small (Figures 22, 23). Contemporary Japanese court orders provided clues to the relation between the size of residential lands and the owner's official rank in court (Figure 24).<sup>59</sup>

Land allocations in Chang'an, however, were certainly smaller than those in the Japanese records, given Chang'an's large population. Bai Juyi, an official of the fifth rank, wrote a poem about his property in Luoyang, which covered a total of 17 *mu* of land, one-third of it allocated for his residence, one-fifth for a pond, and one-ninth for a bamboo grove. In essence, he dedicated two-thirds of his land to his garden, which included the pond and the bamboo grove. Seventeen Tang *mu* is equivalent to about 8,875 square meters, or a



**Figure 19** Population density groups in Chang'an

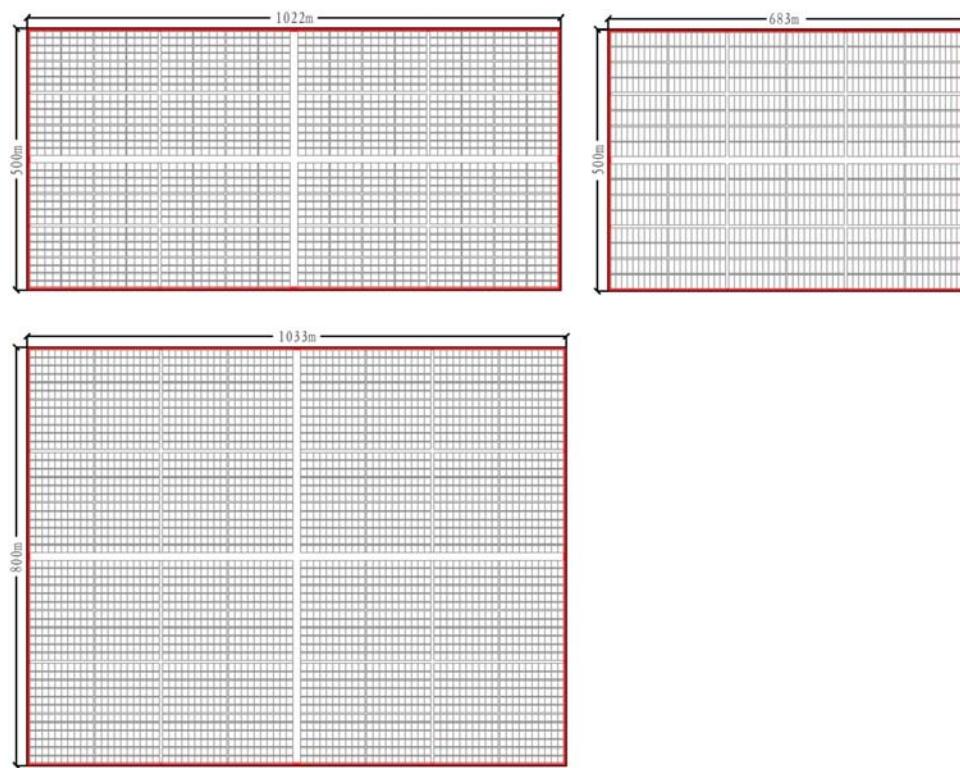
stretch of land about 133.5 by 66.5 meters, or almost exactly twice the “one-quarter LQF *cho*” mentioned earlier (see Figure 13).

Bai Juyi’s property, though located in Luoyang, indicates the size of the residential compound an official of the fifth rank was able to afford. The task that remains involves the creation of residential compounds of different types and sizes. Because no examples exist from the Tang period, anyone wanting to reconstruct a residential layout, whether a simple single courtyard house compound or a dwelling with multiple courtyards and axes, must depend on funerary objects, paintings, murals, and textual descriptions. Like the house Bai Juyi designed in Luoyang, the larger properties could be provided with pleasure gardens, fields, and stables.<sup>60</sup>

## Conclusion

With the above analysis of the form, population size, and content of Chang’an’s residential wards, it is possible to establish a framework for a more systematic understanding of the city and its wards. Mapping the contents of the wards reveals subtle differences in the distribution of activities, amenities, and institutions in the city. The distribution of places of worship, the concentration of official bureaus and commercial activities, and other information on structures and activities provide insight into the physical and social constitution of Chang’an.

Categorizing the form and population of the wards furnishes a better perception of the city’s urban intensity and an



**Figure 20** Land parcellations for Pingkang ward (top left), Taiping ward (top right), and Liquan ward (bottom left), based on estimated population density

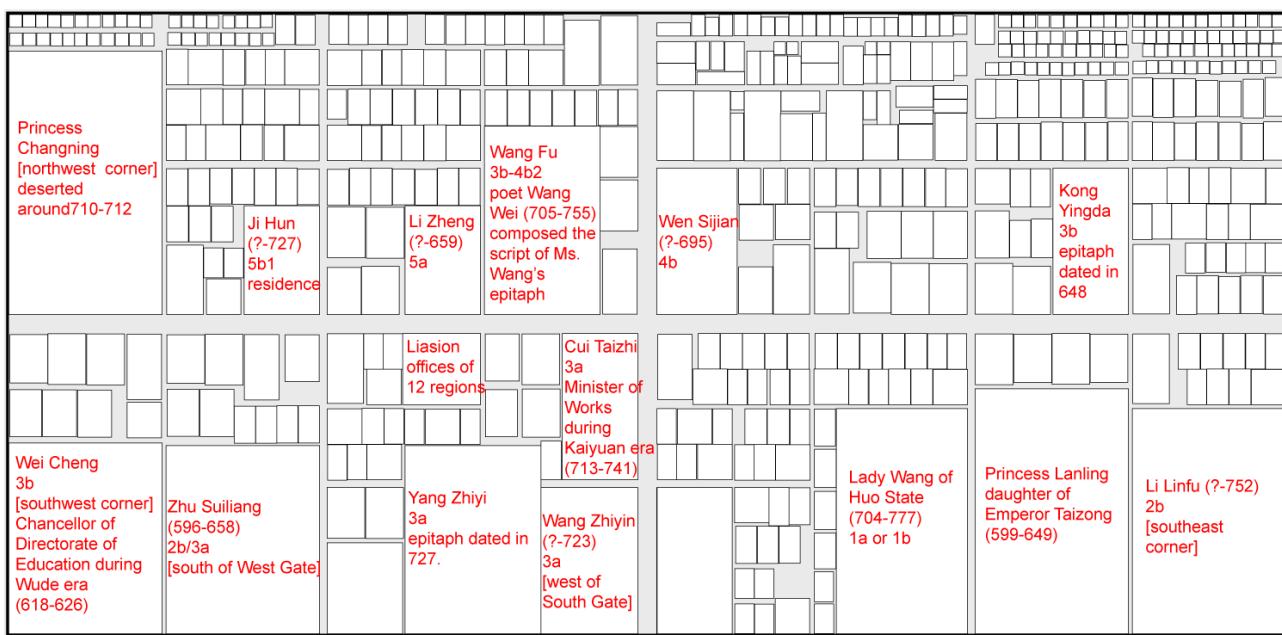
Ward	Pingkang	Taiping	Liquan
Dimension (archaeological record) Unit: meter	1022 x 500	683 x 500	1033 x 800
Dimension (historical record) Unit: pace	650 x 350	450 x 350	650 x 550
Number of smallest land plots (one household per plot)	2048	960	3850
Dimension of smallest land plots Unit: meter	15 x 12.7	10.9 x 27.3	14 x 12.3
Population density group	High	Medium	High
Population density Unit: households/km <sup>2</sup>	4007	2811	4647

**Figure 21** Dimension and population density of Pingkang, Taiping, and Liquan wards

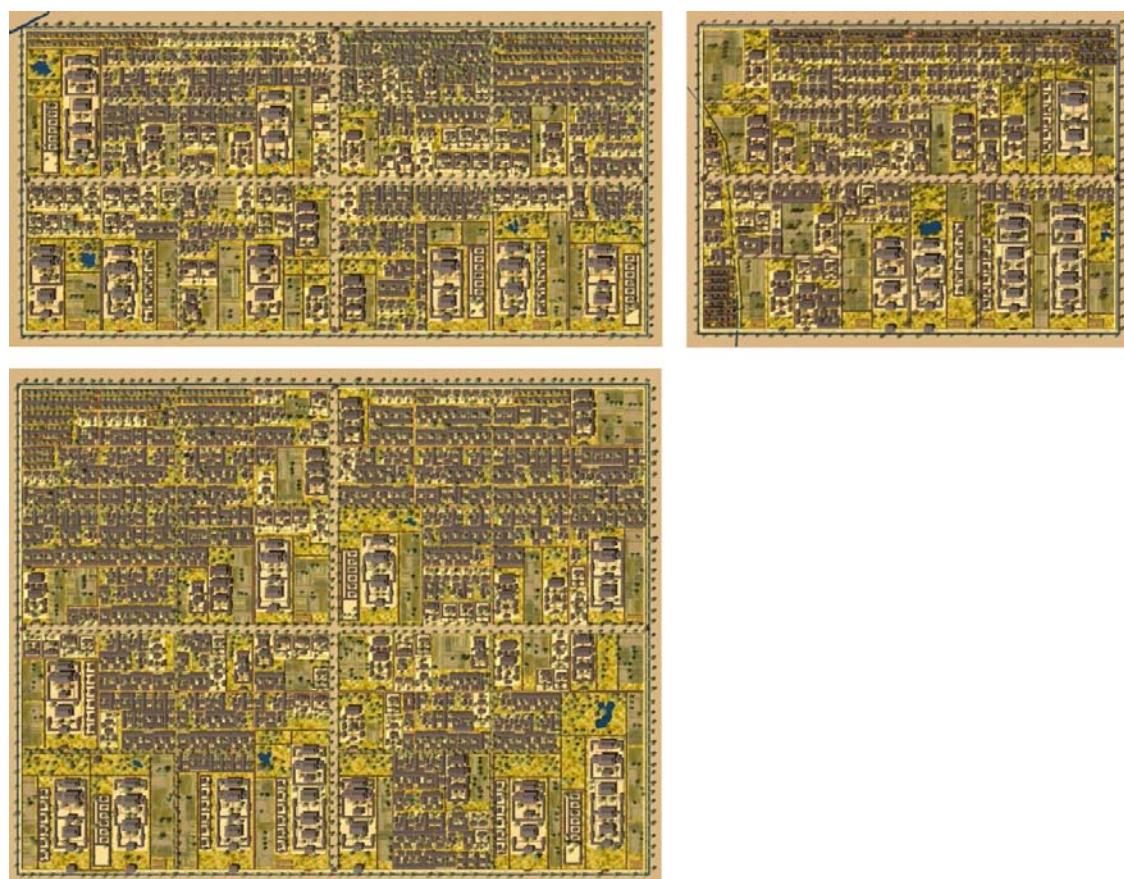
idea of its physical texture. Theoretical bases for both a ward structure beyond the twelve- or sixteen-sector division and a land parcellation scheme are essential to understanding the physical and spatial environment in which the daily life of Chang'an's residents took place. With this understanding, we can visualize and reconstruct the fine-grained physical setting of the wards and appreciate the characteristics of Chang'an's cityscape.

Given the paucity of historical and archaeological resources, establishing a theoretical framework for Chang'an's cityscape and a systematic understanding of the residential

wards that constitute the most of the capital's urban fabric can advance both knowledge and discourse about Chang'an. New findings, when available, can be incorporated into or used to refine this framework. With this framework and systematic approach, a theoretical urban model of Chang'an could be digitally reconstructed and serve as a platform for discussion and exchange for scholars. In time it could lead to new possibilities for research on Chang'an city (and even on historical events that affected the city during its existence) using digital simulation: of floods in the wards and their effects, of visual connections between important locations



**Figure 22** Pingkang ward, with courtyards of various sizes. Big properties are marked with the owner's name, birth and death years (in parentheses), official ranking (3b, 2b, etc.), and approximate location in the ward (in square brackets)



**Figure 23** Renderings of the chosen residential wards based on estimated population density, showing the distribution of residential compounds and the network of streets and alleys: Pingkang ward (top left), Taiping ward (top right), and Liquan ward (bottom left)

Rank	3 and above	4-5	6	6-7	7	7-8	8	No rank
Residential land size (m <sup>2</sup> )	67,000	16,000	8,000	4,000	2,000	1,000	500	250
Equal to Tang mu (亩)	128.3	30.7	15.3	7.7	3.8	1.9	0.96	0.48

(note: 1 Tang mu = 240 pace<sup>2</sup> = 522 m<sup>2</sup>, 1 pace = 1.475 m)

**Figure 24** Size of residential lands for ranked officials and nonranked residents in Heijo-kyo (Nara National Cultural Properties Research Institute 1989)

within the city, and of the results of providing a certain minimal infrastructure, to give several examples.

Understanding the historical urban structure and how it solved the challenges of urban design may help us examine contemporary urban planning and design practices and even inspire solutions to problems in the contemporary world, helping to improve the well-being of the modern urban dweller while ensuring that the present retains its cultural continuity with the past.

### Notes

1. This paper was written with the research assistance of Ms. Wang Yang. Figures not otherwise credited were prepared by the author. See Renee Chow's article "In a Field of Party Walls: Drawing Shanghai's *Lilong*," in this issue, for a formal analysis of the changes in the relation between the building scale and urban scale.
2. See Heng Chye Kiang, "Digital Reconstruction of Medieval Chinese Cities," in *Sixth International Conference on Computer-Aided Architectural Design Futures* (Singapore, 1995), 529–40; Heng Chye Kiang, "A Multimedia Package on Tang Period Chang'an," in *Cultural Heritage Informatics: Selected Papers from ICHIM 1999, Archives and Museum Informatics* (Pittsburgh, 1999), 79–82; and Heng Chye Kiang, *A Digital Reconstruction of Tang Chang'an* [in English and Chinese] (Beijing: Zhongguo Jianzhu Gongye Chubanshe, 2006).
3. The chart of configurations in Figure 2 was published in Heng Chye Kiang, "Settings of Daily Life in Tang Chang'an," a paper presented at the International Symposium on Landscape Architecture and Living Space in the Chinese Tradition, Kyoto, Japan, 2007; and Heng Chye Kiang, "A Digital Reconstruction of Tang Period Chang'an with Particular Emphasis on Its Wards," in 都市と環境の歴史学:5年間の成果 [Urban and environmental history: Research results in the past five years], ed. Seo Tatsuhiko 妹尾達彦, Chuo University, Tokyo, 2009.
4. Heng Chye Kiang, *A Digital Reconstruction of Tang Chang'an*, 109–29. The theoretical work on inventing Chang'an's planning paradigm was published in Heng Chye Kiang, "Modulus in the Planning of Chang'an and Its Influence on Heijo (Nara), Nagaoka, and Heian," in *World Architecture* (世界建築) 151 (2003), 101–7.
5. *Kaogongji* 考工記 [Record of artificers], chap. 2, records the following stipulation on building the principal city: "When the builder constructs the capital, the city should be a square nine *li* on each side, with three gates on each side. Within the city are nine longitudinal and nine latitudinal streets[,] each of them nine carriages wide. On the left (i.e., east) is the Ancestral Temple, on the right (west) are the Altars of Soil and Grain, in front is the Hall of Audience[,] and behind, the markets." Translation from Heng Chye Kiang, *Cities of Aristocrats and Bureaucrats: The Development of Medieval Chinese Cityscapes* (Singapore: Singapore University Press, National University of Singapore, 1999), xvii.
6. Examples of excavation reports on archaeological explorations of Chang'an residential wards include the following:
- Ma Dezhī 马得志, "Tang Chang'an cheng Anding fang fajue" 唐长安城安定坊发掘记 [Record of the excavation of Anding ward of Tang period Chang'an], *Kaogu* 考古 [Archaeology], no. 4 (1989), 319–23.
- Shaanxi Museum 陕西省博物馆, Excavation Team of Shaanxi Cultural Relics Management Committee 陕西省文管会钻探组, "Tang Chang'an cheng Xinghua fang yizhi zuantan jianbao" 唐长安城兴化坊遗址钻探简报 [Brief report on the excavation of Xinghua ward of Tang period Chang'an], *Wenwu* 文物 [Cultural relics], no. 1 (1972), 43–46.
- Center for Research on Cultural Heritage and Archaeology, Xibei (North-west) University 西北大学文化遗产与考古学研究中心, "Tang Chang'an cheng Chonghua fang yizhi fajue jianbao" 唐长安城崇化坊遗址发掘简报 [Brief report on the excavation of Xinghua ward of Tang period Chang'an], *Wenwu* 文物 [Cultural relics], no. 9 (2006), 45–51.
7. Seo Tatsuhiko 妹尾達彦, "Weishu de Liangjing xinji yu ba shiji qianye de Chang'an" 韦述的《两京新记》与八世纪前叶的长安 [Wei Shu's Liangjing Xinji and Chang'an city in the early eighth century], in *Tang Yanjiu* 唐研究 [Research on the Tang dynasty], ed. Rong Xinjiang 荣新江 (Beijing: Peking University Press, 2003), 9–52.
8. Xu Song 徐松 (1781–1848), *Tang liangjing chengfang kao* 唐两京城坊考 [Study of the walls and wards of the two Tang capitals], henceforth abbreviated as *TLJCFK* (1848; repr., Beijing: Zhonghua Shuju, 1985), 104–16.
9. See "Tang E'zhou Yongxing xian Chongyan si beiming" 唐鄂州永兴县重崖寺碑铭 [Stele Inscription of Tang E'zhou Yongxing county Chongya Temple], *Quan Tang Wen* 全唐文 (Beijing: Zhonghua shuju, 1983), 27:7498.
10. See "Ru Tang giufa xunli xingji" 入唐求法巡礼行记 [Travel notes on a trip to the Tang Empire in search of culture and sutra], ed. Gu Chengfu 顾成福 (Shanghai: Shanghai Guji Chubanshe, 1986), 4:186. Assuming that Ennin's record of three hundred monasteries is accurate, Chang'an, with a population of 700,000, would have had an average of one monastery for every 466 families.
11. See Tsukamoto Yoshitaka 塚本善隆, "Research on the history of the Chinese Jintu denomination of Buddhism," *Tsukamoto Yoshitaka Publications* (1976) 4:234.
12. Sun Changwu 孙昌武, "Tang Chang'an fosi kao" 唐长安佛寺考 [Research on Buddhist Monasteries in Tang Chang'an], *Tang Studies*, ed. Rong Xingjiang (Beijing: Beijing University Publication House, 1996), 2:1–40.
13. See Li Fang 李昉 (925–96), *Taiping guangji* 太平广记 [Extensive records of the Great Tranquillity period], henceforth *TPGJ*, chap. 243 "Dou Yi" 窦义, 1877; chap. 220 "Wang Bu" 王布, (Beijing: Zhonghua Shuju, 1961), 1691–92.
14. *TLJCFK*, 117.
15. Wang Pu 王溥 (922–982), *Tang buiyao* 唐会要 [Important documents of the Tang period] (Shanghai: Shanghai Guji Chubanshe, 1991), chap. 19, 449.
16. Kan Huai-Chen 甘怀真, *Tangdai jiamiao lizhi yanjiu* 唐代家庙礼制研究 [Research on Tang Period Family Shrines] (Taiwan: Taiwan Commercial Press 台湾商务印书馆, 1991), 103.

- 17.** Ibid., 85.
- 18.** The institutions and activities in Chang'an in Figures 4 to 9 are mapped according to Li Jianchao 李健超, *Zengding Tang liangjing chengfang kao* 增订唐两京城坊考 [Study of the walls and wards of the two Tang capitals], enl. ed. (Xi'an: Sanqin Press 三秦出版社, 2006).
- 19.** This is very close to the earlier estimate of one monastery for 466 families based on Ennin's record of three hundred monasteries in Chang'an at a peak population of 700,000. See n. 10 above.
- 20.** Li Jianchao 李健超, *Zengding Tang liangjing chengfang kao* 增订唐两京城坊考, 174.
- 21.** The two Duting yi 都亭驿 (capital postal relay stations), in Dunhua ward 敦化坊 and Zhiye ward 殖业坊, were the largest top-tier post houses in the country.
- 22.** These capital liaison offices were previously known as Liuhou yuan 留后院 or Diyuan 邸院; the name was changed to Jinzhou yuan in 777 CE.
- 23.** Liu Yanjie 刘艳杰, "Tangdai jinzou yuan xiaokao" 唐代进奏院小考 [A brief study on capital liaison offices in the Tang period], *Xiamen daxue xuebao (zhe she ban)* 厦门大学学报(哲社版) [Journal of Xiamen University (Philosophy and Social Science)], no. 4 (1997), 14–17.
- 24.** For the hostel in Xinchang ward 新昌坊, see Yang Hongnian 杨鸿年, *Sui Tang liangjing fangli pu* 隋唐两京坊里谱 [A list of wards in the two capitals of the Sui Tang period] (Shanghai: Shanghai Guji Press 上海古籍出版社, 1999), 355–56. For the hostel in Chongren ward 崇仁坊, see *TLJCFK*, chap. 3, 54; for that in Changxing ward 长兴坊, see *TLJCFK*, chap. 2, 194; for that in Daozheng ward 道政坊, see *TLJCFK*, chap. 3, 84; and for that in Buzheng ward 布政坊, see *TLJCFK*, chap. 4, 106.
- 25.** *TLJCFK*, chap. 3, 51.
- 26.** Ibid., chap. 3, 43.
- 27.** Shen Jiji 沈即济 (ca. 750–800), "Renshi zhuan" 任氏传, in *Zhongguo gudian xiaoshuo jianshang cidian* 中国古典小说鉴赏辞典 [Dictionary of Chinese classical stories] (Beijing: Zhongguo Zhanwang Chubanshe 中国展望出版社, 1989), 253.
- 28.** Bai Xingjian 白行简 (775–826), "Liwa Zhuan" 李娃传 [The Story of Liwa], in *Zhongguo gudian xiaoshuo jianshang cidian*, ibid., 289–95.
- 29.** The funeral shops were clustered in Fengyi ward 丰邑坊, west of Zhuque Avenue.
- 30.** Archaeological reports on pottery and brick kilns in Tang Chang'an's residential wards include the following:
- Liquan ward 醍泉坊: See Jiang Jie 姜捷, "Tang Chang'an Liquan fang de bianqian yu sancai yaozhi" 唐长安醴泉坊的变迁与三彩窑址 [Changes of the Liquan Lane and the three-color kiln in Tang Chang'an city], *Kaogu yu wenwu* 考古与文物 [Archaeology and cultural relics], no. 1 (2005), 65–72. See also Zhangguozhu 张国柱, Li Li 李力, "Xi'an faxian sancai yaozhi" 西安发现唐三彩窑址 [A three-color pottery kiln site was found in Xi'an], *Wenbo* 文博 [Cultural relics and museology], no. 3 (1999), 49–57.
- Pingkang ward 平康坊: See Wang Changqi 王长启, Zhang Guozhu 张国柱, and Wang Weihua 王蔚华, "Yuan Tang Chang'an cheng Pingkang fang xin faxian taoyao yizhi" 原唐长安城平康坊新发现陶窑遗址 [Site of a pottery kiln discovered in the Pingkang fang in the original Chang'an city of Tang dynasty], *Kaogu yu wenwu* 考古与文物 [Archaeology and cultural relics], no. 6 (2006), 51–57.
- Puning ward 普宁坊: See Tang Jinyu 唐金裕, "Xi'an shi xijiao tangdai zhuangwa yaozhi" 西安市西郊唐代砖瓦窑址 [Tang period brick and tile kiln site in west suburban area of Xi'an], *Kaogu* 考古 [Archaeology], no. 9 (1961), 491–92.
- Jinchang ward 晋昌坊: See Han Baoquan 韩保全, "Xi'an Ci'en si nei de tangdai zhuangwa yaozhi" 西安慈恩寺内的唐代砖瓦窑址 [Tang period brick and tile kiln site in Ci'en Temple of Xi'an], *Kaogu yu wenwu* 考古与文物 [Archaeology and cultural relics], no. 1 (1986), 58–60.
- 31.** *TPGJ*, chap. 84, "Xile shan" 翼乐山.
- 32.** See the work by the Tang period music theorist Duan Anjie 段安节, "Yuefu zalu" 乐府杂录 [A miscellaneous collection of the Music Bureau], written in 894 CE, section "Pipa" 琵琶, *Wenyuan ge siku quanshu dianziban* 文渊阁四库全书电子版 [Wenyuan ge complete library of the Four Treasures (e-book)], www.sikuquanshu.com.
- 33.** *TLJCFK*, chap. 3, 57.
- 34.** He Congrong 贺从容, "Tang Chang'an Pingkang fangnei gezhai zhi tuice" 唐长安平康坊内割宅之推测 [Research of the land division in Pingkang fang of Tang Chang'an], *Jianzhu shi* 建筑师 [Architect] no. 2 (2007), 59–67. See also Liu Xu 刘昫 (887–946), ed., *Jiu Tang shu* 旧唐书 [Book of Tang] (Beijing: Zhonghua Shuju, 1975), chap. 160.
- 35.** See n. 27 above.
- 36.** Ma Dezhi 马得志, "Tangdai Chang'an Cheng Kaogu Jilue" 唐代长安城考古纪略 [Brief report on the archaeological studies of Tang period Chang'an], *Kaogu* 考古 [Archaeology], no. 11 (1963), 595–611.
- 37.** See Seo Tatsuhiko 妹尾達彦, "Weishu De Liangjing xinji yu ba shiji qianye de Chang'an" 韦述的《两京新记》与八世纪前叶的长安 [Wei Shu's Liangjing Xinji and Chang'an city in the early eighth century], in *Tang Yanjiu* 唐研究 [Research on Tang dynasty], ed. Rong Xinjiang 荣新江 (Beijing: Peking University Press, 2003).
- 38.** According to *Chang'an zhi*, the special configuration of these wards followed the wishes of Emperor Sui Wendi 隋文帝 to prevent the *qi* 气, or vital energy, of these wards from rushing out through the major north-south streets and gates, to clash with the Imperial and Palace Cities to the north. See Song Minqiu 宋敏求 (1019–1079), *Chang'an zhi* 长安志 [Record of Chang'an], chap. 7. www.sikuquanshu.com.
- 39.** He Congrong 贺从容, "Research of the land division in Pingkang fang of Tang Chang'an," *Architect*, no. 2 (2007), 59–67.
- 40.** The theoretical basis for the reconstruction, including discussion of the urban paradigm, land parcellation, population density, and so forth, is provided in Heng Chye Kiang, "Settings of Daily Life in Tang Chang'an," and Heng Chye-Kiang, "A Digital Reconstruction of Tang Period Chang'an with Particular Emphasis on Its Wards."
- 41.** Divided by Zhuque Avenue 朱雀大街, the residential wards to the east belonged to Wannian county 万年县 and those to the west, to Chang'an county 长安县. There were more registered households in Chang'an county than in Wannian county. See *Chang'an zhi*, chap. 8, www.sikuquanshu.com.
- 42.** Du You 杜佑 (735–812), *Tong Dian* 通典 [Comprehensive manual], vol. 19, www.sikuquanshu.com.
- 43.** These officials were called *Chang can guan* 常参官, that is, officials who attend court meetings regularly. See Ou Yangxiu 欧阳修 (1007–1073), ed., *Xin Tang shu* 新唐书 [New book of Tang], chap. 48, www.sikuquanshu.com.
- 44.** Fan Chao 范超, "Tangdai Chang'an gongxinzu de jiling gousui" 唐代长安工薪族的鸡零狗碎 [Miscellanies of the salary earners in Tang period Chang'an], *Dangan guanli* 档案管理 [Archive management], no. 6 (2007), 94–95.
- 45.** Wang Shounan 王壽南, *Tangdai de huanguan* 唐代的宦官 [Eunuchs in the Tang dynasty] (Taiwan Commercial Press 台湾商务印书馆, 2004), 19.
- 46.** Yang Kuan 杨宽, *Zhongguo gudai ducheng zhidu yanjiu* 中国古代都城制度研究 [Studies of the traditional Chinese capital system] (Shanghai: Shanghai Guji Chubanshe, 1993), 249.
- 47.** Su Bai 宿白, "Sui-Tang Chang'an cheng he Luoyang cheng" 隋唐长安城和洛阳城 [Sui-Tang Chang'an and Luoyang], *Kaogu* 考古 [Archaeology], no. 6 (1978), 409–25.

48. *TLJCFK*, chap. 3, 103.
49. Ibid., chap. 2, 39.
50. See n. 9.
51. Zhang Tianhong 张天虹, “Zailun Tangdai Chang'an renkou de shuliang wenti—Jianping jin shiwu nianlai youguan Tang Chang'an renkou yanjiu” 再论唐代长安人口的数量问题—兼评近 15 年来有关唐长安人口研究 [On the population of Chang'an in the Tang dynasty—concurrently commenting on studies of the population of Chang'an in the Tang dynasty during the past fifteen years], *Tangdu xuekan* 唐都学刊 [Tangdu journal], no. 3 (2008), 11–14.
52. Seo Tatsuhiko 妹尾达彦, “Tangdu Chang'an cheng de renkoushu yu chengnei renkou fenbu” [唐都长安城的人口数与城内人口分布 [Population and population distribution in the Tang capital city Chang'an], in *Zhongguo gudu yanjiu* 中国古都研究 [Studies on the traditional Chinese capitals], edited by Society of the Traditional Chinese Capitals (Taiyuan: Shanxi Renmin Chubanshe, 1994).
53. See n. 40.
54. The difference between the two estimates is only about 2.8 percent. Given the two different methods of deduction, these corroborative results increase confidence in the reliability of the estimates of average urban population density. For types and sizes of courtyard compounds in Beijing, see Lu Xiang 陆翔 and Wang Qiming 王其明, *Beijing sibeyuan* 北京四合院 [Beijing's courtyard houses] (Beijing: Beijing Jianzhu Gongye Chubanse, 1996).
55. *TLJCFK*, chap. 3, 65–66.
56. *TLJCFK*, chap. 2, 35: 開元八年, 京興道坊一夜陷為池, 没五百家 (In the eighth year of Kaiyuan, Xingdao ward in the capital became a pond overnight; five hundred houses were inundated).
57. Ma Dezhī 马得志, “Tangdai Chang'an cheng kaogu jilüe” 唐代长安城考古纪略 [Brief archaeological report on Tang Chang'an], *Kaogu* 考古, no. 11 (1963), 595–611.
58. This density is calculated from the record of residents in General Guo Ziyi's property, mentioned earlier.
59. Nara National Cultural Properties Research Institute [奈良国立文化財研究所], *Heijo-Kyo: Reconstruction of Nara City* [平城京展: 再現された奈良の都], exhibition catalogue, edited by the Asahi Shimbun Osaka Head Planning Department 朝日新聞大阪本社企画部, 1989.
60. For details regarding the digital reconstruction of Yongning ward, see Heng Chye Kiang, “A Digital Reconstruction of Tang Period Chang'an with Particular Emphasis on Its Wards.”