


**The Reconstruction of Yongning ward**

Settings of Daily Life in Tang Chang'an Heng Chye Kiang, Chen Shuanglin National University of Singapore Paper presented at International Symposium on Landscape Architecture and Living Space in the Chinese Tradition, Kyoto, 9-10 June 2007

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***Introduction***

While much has been written about the glorious city of Tang period Chang'an ranging from the general to the specific, less attention has been paid to the study of its residential ward especially with regards to its structure, residential land parcellation, residential density and the layout of its houses, etc. In the last many years, I have been attempting to reconstruct digitally the cityscape of Tang period Chang'an and have produced a couple of versions since 1995. Although the reconstruction highlights important buildings, palaces, and monuments, it also includes the indispensable component of residential wards which accounts for about 80% of intramuros Chang'an's urban tissue. In fact it is this ubiquitous urban fabric that constitutes much of the setting of daily life in Tang period Chang'an.

Since 1999, I have been interested in the theoretical configuration that has led to the paradigmatic plan of Chang'an and its variations that have given rise to the plans of Luoyang, Heijo-kyo, Heian-kyo and Nagaoka-kyo. More recently, based on the study of the land parcellation system in these Japanese cities as well as that of the plan of the contemporaneous city of Bohai, I hypothesized on the land parcellation and road network of a typical ward in Chang'an. In this paper, my co-author and I will revisit the abovementioned work to provide the necessary background to investigate further the nature

of residential land parcellation in a typical ward in Tang period Chang'an. To illustrate the principles and methodology behind our investigation, we will use the example of Yongning ward located along the 6th row north of Mingde gate in the eastern half of the capital city. We will attempt to reconstruct a theoretical cityscape of the ward based on an estimated population size of the capital just before the An Lushan rebellion.

***Tang period Chang'an***

Founded in 581 during the Sui dynasty, Chang'an was larger than any other city before it. It measured 8.652 km by 9.721 km or about 84km$^2$ in area. When the Tang dynasty succeeded Sui, it continued to use Chang'an as its capital. Like many other Chinese cities, it is organized around a gridiron plan. This clear division of the city into distinct city blocks or wards was evident to its inhabitants and were referred to time and again. Modern scholarship characterizes it by saying that the checkerboard layout of Chang'an was formed by fourteen latitudinally E-W and eleven longitudinally N-S streets dividing the city into an axially symmetrical plan of, theoretically, 130 wards, large and small. The Palace City and the Imperial City, in the north centre, together occupied an area of some 16 blocks. The two markets each took up an area of 2 wards. At the southeastern corner, Qujiang Lake and its adjacent park took up an area of at least two other blocks, leaving the city with 108 blocks for residential purposes. Tree-lined avenues of considerable proportions separated these blocks. The layout of the city described above however, is unique in Chinese history. Prior to the founding of the capital, no other city in China had a similar plan or was as extensive.

***Inventing an Urban Paradigm***

I had hypothesized in an earlier writing that when Yu Wenkai planned Chang'an, he was trying to create a capital that was both expressive of Emperor Sui Wendi's ambition of unifying China as well as commensurate with the extent of the new empire that he had

[1]

in mind. When he planned Chang'an, he must have been aware of the long tradition of city planning that preceded the Sui period. He was also steeped in classical learning and hence was certainly aware of the prescription in Kaogongji or Record of Artificers that says:

'When the builder constructs the capital, the city should be a fang (4sided orthogonal shape) 9 li on each side with 3 gates each. Within the city are nine longitudinal and nine latitudinal streets, each of them 9 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.'

While this classical text that gave rise to the orthodox tradition of imperial-city planning which places the palace in the centre of the city (thus reinforcing the centrality of the emperor in his microcosm of the cosmic realm) there was also in existence another tradition of capital-city layout (See Fig.102). The practice of having the palace and its associated functions located in the north section of the city too has a long history, especially in the states of the northern tribes. Yecheng from the Three Kingdoms period and to a certain extent, Northern Wei Luoyang, all had their palaces to the north.3 As we have discussed above, in the case of Chang'an, building the Palace City to the north centre had its symbolic and political meanings as well. In his quest to invent a paradigm for the impending unification of China, I submitted that Yu Wenkai had begun by reconciling the two great traditions of imperial-city planning'an act that was in itself symbolic of the unification of the physical realm.

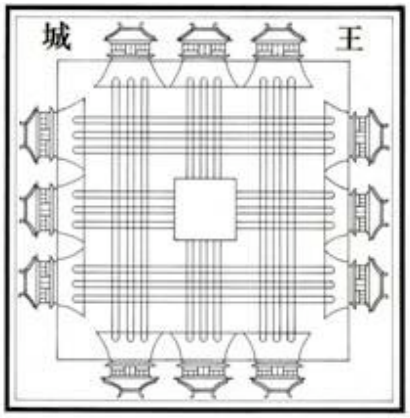



Figure 1: The layout of a city of prince as prescribed in Kaogongji

***Traditional City Planning***

Let us begin with the first tradition by reconstructing the layout that was prescribed earlier in *Kaogongji*. One could start with the most basic unit of land division practiced in the *jingtian* or well-field system. In this system, 8 families share a square of land 1 *li* on each side divided equally into 9 squares, resulting in a simple 9-square mandala or tic-tac-toe board. The sides of each of these squares are 100 paces long. The centre square where the well is located was state land, tilled by all the 8 families and the produce of which went to the state. By the same system one could construct a square 9 *li* on each side. The square configuration C would encompass 81 of these basic units. (See Fig. 2) This diagram once again gathers the basic units in groups of nine, each nested within a square of 3 *li*. In this manner there is once again a larger 9-square mandala. However, with this diagram, there are either eight or ten longitudinal and latitudinal streets depending on whether one counts the street along the periphery (usually along the city walls). In order to have the nine latitudinal and nine longitudinal streets as prescribed in the classical text, the diagram would have to be amended to resemble one of the two cases shown in Fig. 3 with the main gates, in both cases, located along the major N-S and E-W axes. In the first case, C1, the middle sections are divided into 2 rows in either direction and the peripheral streets (along the border which were usually city walls) are included in the numbering in order to account for the 9 streets. The second case, C2, however divides the middle sections into 4 rows and the peripheral streets are not included in the count. In either case though, there are 3 gates on each side as prescribed. Both cases, C1 and C2, are valid although historical evidence points to the preponderance of the second example, C2.

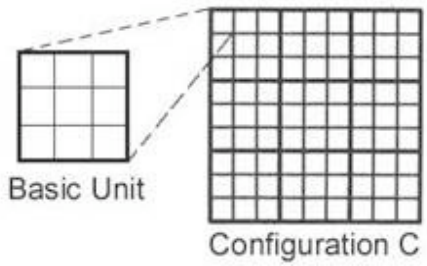



Figure 2: Basic unit and configuration C

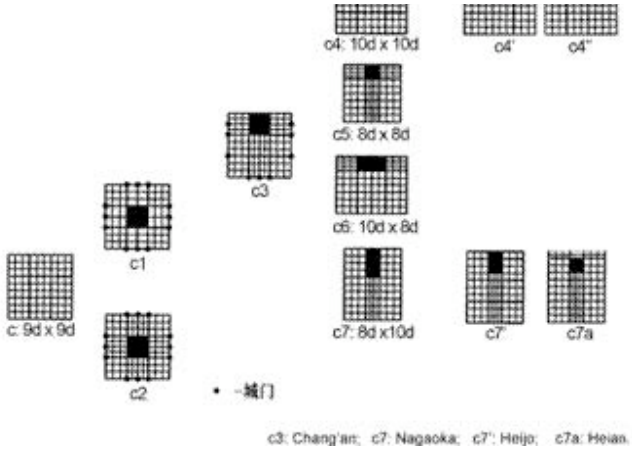



Figure 3. Chart of the Chang'an planning paradigm and modulus in contemporaneous Japanese cities of Nagaoka, Hiean and Heijo.

In order to reconcile the *Kaogongji* tradition with the other tradition of having the palace in the north centre, Yuwen Kai must have shifted the centre square i.e., the palace, together with the middle sections in both the longitudinal and latitudinal directions northwards as shown in configuration C3 (See Fig.3).

I had shown that the *Kaogongji* stipulation could have given rise to the configurations C1 and C2. In order to reconcile the *Kaogongji* tradition with the other tradition of having the palace in the north centre, Yuwen Kai must have shifted the centre square i.e., the palace, together with the middle sections in both the longitudinal and latitudinal directions northwards as shown in configuration C3. I had also introduced three assumptions in order to explain first, the planning of Sui Chang'an and especially of the contemporary Japanese capitals of Heijo-kyo, Nagaoka-kyo and Heian-kyo.

The first assumption contends that the early Chinese notion of fang was a 4-sided orthogonal shape. The second assumption concerns the primordial importance of the nine N-E and nine E-W streets and the near immutability of this attribute in an imperial capital city. The third assumption is that the planning of Chinese city was, modular in nature. With these assumptions in place, the configuration C3 could be rationalized to produce other possible variations ranging from C4 to C7.

Sui Chang'an is essentially derived from the configuration C3 albeit with some inconsistencies. Discounting the River Luo, the plan of the eastern capital Luoyang (founded in 596) could have been generated by the configuration C4'. The Japanese capitals of Heijo-kyo (or Nara, 710-84), Nagaoka-kyo (784-94), and Heian-kyo (built in 794), the plans of all of which were inspired largely by Chang'an, were derived from C7 C7'or C7a, one of the theoretical configurations and its variants. Assigning the value of 1 Tang li or 532 m to the module 'd' would give us almost the exact dimensions of the 3

[2]

Japanese cities.

I had further hypothesized in the article that Yuwen Kai had conceived of a new urban paradigm that was susceptible to theoretical manipulations based on certain priorities related to imperial symbolism and practical realities of modular planning. The paradigm developed was used in the first instance for the planning of the Sui capital of Chang'an and quickly became the model for other East

Asian cities. More than 100 years later and with further rationalization, at least three Japanese capitals used it together with the larger dimension of the Tang *li* of 532 meters as the basic module for its city blocks or *bo*.

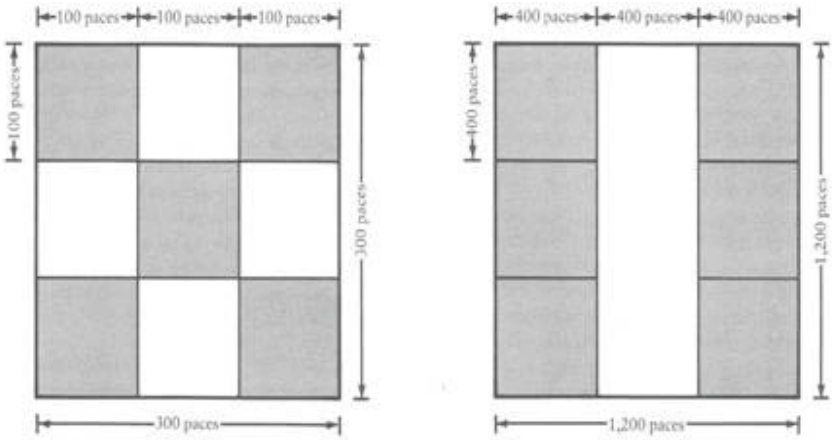
***The 9-Square Mandala***

However, there are doubts expressed as to whether this form of manipulation of the diagram was actually conceivable during the Sui period. While it seems logical and straightforward to a modern person to shift the central row northwards while retaining the integrity of the rest of the configuration, early Chinese minds might not reason in the same manner. Research, however, shows that similar modes of thinking were in fact quite common in early Chinese military strategies and formations. Tai Gong's training array and Li Jing's Six-Flower Formation were based on the 9-square mandala and the

transformations of the formations were fluid.[3] (See Fig. 4) The flexibility of switching front and back and moving the middle sections are demonstrated among other things by

this conversation recorded between Tang Taizong and Li Jing (571-649)[4] regarding Cao Cao's strategy: 'According to Hsin shu: 'Fighting cavalry occupy the front, attack cavalry occupy the middle, and roving cavalry occupy the rear.'. . . According to Duke T'sao, the cavalry in the front, rear, and middle are divided into three covering forces, but he did not speak about the two wings, so he was only discussing one aspect of the tactics . . . if you turn the formation about, then the roving cavalry occupy the fore, the fighting cavalry the rear and the attack cavalry respond to the changes of the moment, to

split off'.[5] Figure 4: Configuration of Tai Gong's training array and Li Jing's training grounds




Having shown that it is conceivable for a person of the Sui period to conceive of transformations in a formal diagram and hence produce a configuration C3 in an attempt to reconcile the two existing traditions of imperial-city planning, it is necessary to introduce three other assumptions in order to explain first, the planning of Sui Chang'an and especially of Heijo, Nagaoka and Heian.

***Necessary Assumptions***

Firstly, it is my contention that to the early Chinese the notion of fang or 4-sided orthogonal shape encompassed both the square (*zheng fang*) and the rectangle (*chang fang*). This hypothesis is supported by the many examples of cities that are rectangular in shape but still cited as fang or irregular in shape but depicted as regular rectangles. With this hypothesis in place, we would then not

find it a contradiction for the planners of early Chinese and Japanese cities to design cities that were rectangular in shape despite *Kaogongji*'s prescription that the capital city 'should be a fang 9 *li* on each side'.

The second assumption concerns the primordial importance of the nine N-E and nine E-W streets and the near immutability of this attribute in an imperial capital city. The symbolic significance of the number 9 especially in its association with imperial presence and power is rendered even more important by the stipulated symmetry in the number of roads in both directions. I would argue that this condition coupled with the first hypothesis that the city need not necessarily be a square would render the stipulation of '9 *li* on each side' less important and dispensable. A city that needed to be bigger or smaller for reasons of projected population size or imperial ambition would adjust its physical dimensions accordingly. This being said, the planning of the city is, however, modular in nature '' the premise of the third assumption. Chinese planning, whether in architecture or city building, usually uses a module and/or simple multiples of such a module. It is assumed that in the invention of the new paradigm, a module and simple multiples of this module were employed.

Let us now return to the configuration C3 described above in which the middle sections are divided into 4 columns and 4 rows. The longitudinal middle section has 4 columns with widths different from the rest of the other 6 columns. Let us assign d as the module for the width of each of the six columns. The width of each of the 4 columns in the middle section is thus 'd. However, since one of our premises assumes that the planning is based on simple multiples of a module, the width of each of these 4 columns could either be expanded to become d or reduced to become 'd. The same can be done with the 4 rows adjacent to the palace, resulting in the first instance, in the configuration C4 of a square 10d by 10d. In the second case of configuration C5, the total dimension of the square is 8d by 8d. There are also two other possibilities: C6 in which the city is 10d in width and 8d in length and C7 in which the city is 8d in width and 10d in length. (See Fig. 3)

In each of these configurations, the palace would occupy an area equivalent to 9d2 in C3, 16d2 in C4, 4d2 in C5 and 8d2 in both C6 and C7. However, should the palace city be smaller as is shown in the configuration C7a we will find a row of city blocks (or at

times half a row) north of the palace.[6] All these configurations still have a basic structure composed of a total of nine longitudinal and nine latitudinal streets. This attribute, I have argued earlier, is of utmost importance.

Sui Chang'an is essentially derived from the configuration C3, the diagram invented in the attempt to reconcile two existing traditions of imperial-city planning. The magnitude of the capital that Yuwen Kai was designing called for a city larger than a square of 9 li on each side. Hence, I believe that instead of using 1 li as the standard dimension for each of the squares, he used a module of 2 *li*. As a result, the total width of

the city was 18 *li*.[7] In general the layout and overall measurements of Chang'an

conform quite well with the configuration C3 with d being 2 *li* or about 1,064m.[8] There are, however, a few inconsistencies, the first being the length of the city that appears to fall short of the 18 *li* which would otherwise have rendered the city into a square. However, should one consider the southern limit of the city to be the wall enclosing Furong Garden at the southeastern quarter of the city, then indeed the length of the capital would be very close to the anticipated 18 *li*, rendering the city conceptually into a

square.[9] The other inconsistency, less easily explained away, is the creation of twelve latitudinal streets instead of nine. This is the result of Yuwen Kai's use of half modules (1 *li*) to regulate the length of most of the city wards instead of the full modules (d = 2 *li*)

he used to control the width of most of them with.[10] As a result the city is 9 modules in width but only 7'd in length from the northern wall to the main southern wall. On the other hand, the 9 longitudinal streets that were created in Chang'an were readily perceived by the city dwellers and often appeared in Tang poems. Bai Juyi, for instance wrote 'Returning on horse, multitudes fill Nine Avenues; letting out court, for three days

muddy roads. . . .'[11]

The hypothetical process described above is able to account for a number of characteristics of the Sui-Tang capital of Chang'an. The inconsistencies were probably due to a number of reasons, among which the practical constraints of urban administration. By using a module of 2 *li* the city would have been very large (i.e. the square form of configuration C3 being retained). This would have made urban management difficult. Even as it was, the four southernmost rows of wards were sparsely inhabited throughout the Tang period. Yuwen Kai must have planned a square city but given in to the

constraints and finally compromised by having it only 'conceptually' square.[12] In order to reduce the length of the city he had to use half the standard module for the length of the wards to render them more manageable. By so doing, he had shortened the length of the city by 1' modules or half the dimension of a large unit that makes up the

large 9-square mandala.[13] (See Fig. 5) The markets, however, retained the modular measure of 2 *li* for both their length and width. When Yuwen Kai designed the eastern capital Luoyang about 15 years later in 605, he had learnt from his Chang'an experience and adopted the module of 1 li for all its wards.

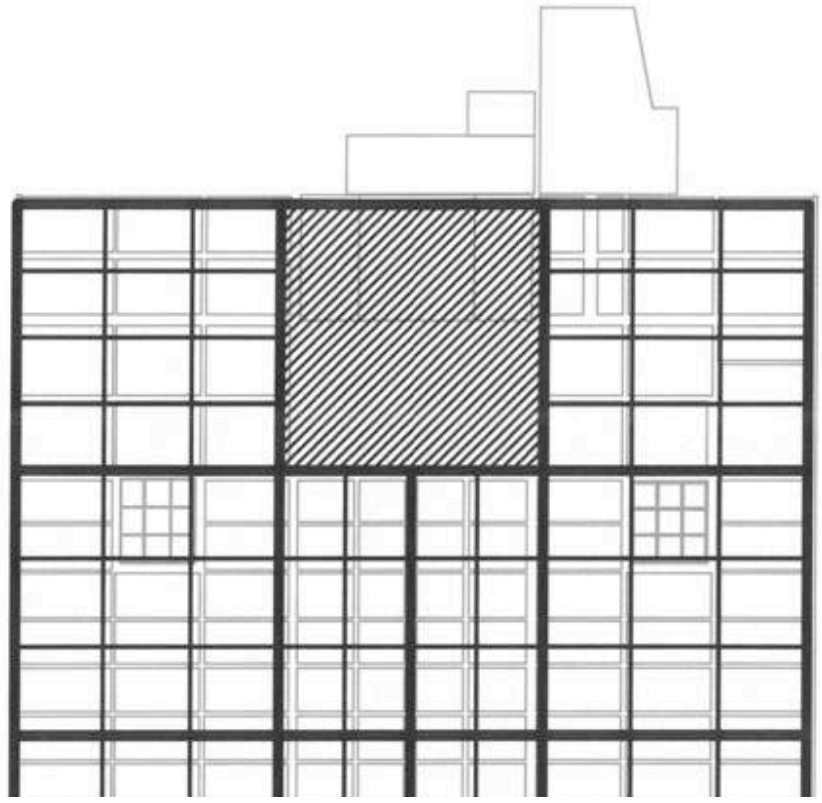


Figure 5: Configuration C3 superimposed on the plan of Chang'an

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[1]
Heng Chye Kiang, *A Digital Reconstruction of Tang Chang'an,* China Construction and Building Press. 2006: 109-129. The theoretical work on inventing Chang'an's planning paradigm was earlier published as Heng Chye Kiang, 'Modulus in the planning of Chang'an and its influence on Heijo (Nara), Nagaoka,

and Heian" in *World Architecture* (世界建筑), 151 (2003): 101-107.

[2]
In the case of Heian, it is necessary to add the total width of the 9 E-W streets and 9 N-S streets to the total dimension of the configuration in order to arrive at the city's physical measurements.

[3]
Tai Gong lived during the Zhou period and was active in the battle at Muye that overthrew the Shang and brought the Zhou to power, i.e. around 1045 BCE.

[4]
Li Jing first served the Sui Dynasty as one of its military personnel. He later joined the Tang forces and became one of early-Tang period's greatest generals and strategists.

[5]
When working out the process of planning Chang'an, Nara, Nagaoka and Heian while I was at the Kyoto Institute for Research in Humanities from Nov 99 to Feb 2000 sponsored by a Japan Foundation grant, I discussed this issue with Tanaka Tan. He expressed doubts of this mode of thinking in pre-modern China. Thanks to his caution, I did further research and found similar modes of thinking in early Chinese military strategies and formations, already in practice during the Three Kingdoms Period (CE 220'266), at the latest. In fact, in the same conversation between Tang Taizong and Li Jing was this passage that merits being quoted in full to show the similarity between military strategies and city planning and the fluidity of the thinking and transformations that were possible. Notice also the mention of the well-field distribution system mentioned in an earlier section as an introduction to the formulation of the classical stipulation of *Kaogongji*.考工记:

> 'The T'ai tsung said: 'The numbers begin with 5 and end with 8, so if they were not set up as images, then they are really ancient formations. Would you please explain for me?'
>
> 'Li Ching said: 'I observe that the Yellow Emperor governed the army according to the methods by which he first established the 'village and well' system. Thus the 'well' was divided by 4 roads, and 8 families occupied it. Its shape was that of the Chinese character for 'well', so 9 squares were opened therein. 5 were used for formations, 4 were empty. This is what is meant by 'the numbers beginning with 5'
>
> 'The middle was left vacant to be occupied by the commanding general, while around the four sides the various companies were interconnected, so this is what is meant by 'ending with 8.'
>
> 'As for the changes and transformations to control the enemy: Intermixed and turbulent, their fighting [appeared] chaotic, but their methods were not disordered. Nebulous and varying, their deployment was circular, but their strategic power [shih] was not dispersed. This is what is meant by 'they disperse and become 8, re-unite and again become 1'' See Ralph D Sawyer, The Seven Military Classics of Ancient China. Westview Press, 1993, pp. 326'328; esp. pp. 342'345.

[6]
In most cases, as we shall see in the subsequent examples of Heijo, Nagaoka and Heian, the size of the palace is about $4d^2$. Heijo's palace ' not including the eastern section -is $4d^2$; Heian's palace compound was also $4d^2$until 879, when in order to have stricter controls of its grains, the palace was extended northwards to include the half-row beyond the palace making the area of the

palace $5d^2$. In the case of Nagaoka, the actual size of the palace is still uncertain; the most recent drawings of the city show a palace compound of $5d^2$. See Muko City Centre for Archaeological Research, *Capital.* 1999.3 No. 10, p. 134. I am grateful to Mr Kawano Kazutaka of the Kyoto Prefecture Research Centre for Archaeological Properties for providing me with the latest maps and excavation reports of Nagaoka as well as the issue of *Capital* cited above.

[7]
Archaeological records gave the total width of the city as 18.37 *li* (or 18 *li* and 111 *bu*) or 2% more than 18 *li* ' an acceptable margin of error. The dimension of the city according to archaeological report was 18 *li* 111 *bu* by 16 *li* 105 *bu.* See 'Brief archaeological report on Tang Chang'an,' for detailed dimensions of the different components of the city.

[8]
There were two measurements to the Tang measure of *li*, the longer one of 532 meters was used both in the construction of Chang'an and in the Japanese capitals of Heijo, Nagaoka and Heian. The Tang foot is 0.2956 meters. The Tang *li* being 300 *bu* or paces is hence 6 x 0.2956 x 300 m since each *bu* measures 6 Tang feet.

[9]
Also recent archaeological findings reveal that the remains of the 'Altar of Heaven' lay south of the city walls east of Mingde Gate, the main southern gate. It is my conjecture that the remains are probably very close to the southern boundary of the conceptual square. Once the exact location is published, it would be possible to test the hypothesis.

[10]
This was probably necessary as otherwise the wards would be too big to be administered effectively by the ward headmen.

[11]
See Howard S. Levy, *Translations from Po Ch'-I's Collected Works*, Vol. 2 (New York: Paragon Book Reprint Corp., 1971), p. 46.

[12]
Curiously, if one were to add up all the dimensions given in *CAZ* for the lengths of the Palace and Imperial Cities, the wards, and the width of the E-W streets, the total length of the city is 18 *li* 130 *bu* (18.4 *li*). This is about 2.2% more than the anticipated 18 *li* and is very close to the width of the city (18.37 *li*).

[13]
The dimension given by *CAZ* for the length of the city is 15 *li* 175 *bu* or 15.58 *li*. This is 3.8% larger than the 15 *li* that theoretically would have been the length of the city should it be made up of the dimension of two-and-a-half large units, ie., 2.5 times 6 *li*.

The plan of Luoyang deviates from that of Chang'an. Cut into two halves by the Luo River, the outer city wall of the city was almost square with sides of about 7.3 km. The city was planned according to a regular grid, albeit of a smaller module of one *li*. The geographical conditions and the desire to align the imperial and palace cities -hence the major axis of the city -with the natural features of Mt Mang to the north and Yi Que to the south probably account for the unusual asymmetrical layout. The northern half of the city was wedged between the Lou River and Mt Mang. Figure 7 shows the reconstruction of Luoyang done by Fu Xinian and the delineation of a module of about 2 *li*.

Perhaps the plan of Luoyang could be interpreted, despite its irregularity as one of the variations of the theoretical permutations. Referring to Fig. 4, there is a configuration C4 and its transformation C4' which are both 10d x 10d. Luoyang could be based on the configuration C4', in which case, it is not an anomaly but belonged to the same family of solutions.

Let us turn our attention to Fig 8, the plan of Luoyang over which we have overlayed a diagram with AEXY indicating the compound where the palace and the imperial cities are located as well as what I consider to be the core section of the city -ABCD. The city is divided into a northern and a southern half by the Luo River, along the bent line EF. If we

ignore the presence of the river and slide the two halves together with the compound AEXY immediately north of the first row of wards in the southern section, we obtain a theoretical plan as shown in Fig 9. It is now possible to superimpose on this theoretical plan the configuration C4' suggesting that the plan of Luoyang could have been generated by further rationalisation and manipulation of the paradigm first formulated in the planning of Chang'an.[1]

During the 105 years that separated the building of Luoyang and the contemporaneous capital city of Heijo, the system of planning developed by Yuwen Kai must have become even more rationalised and systematised and used as a formula for the planning of Heijo and later, Nagaoka and Heian. The plans of the three cities show that in fact all three

capitals conform to C7 or C7a, one of the theoretical configurations and its variant. [2]

Fig 7. Reconstruction of Luoyang by Fu Xinian

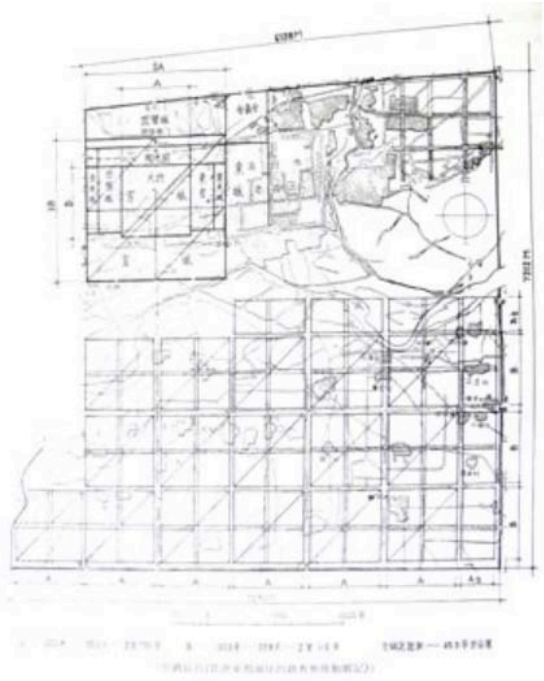
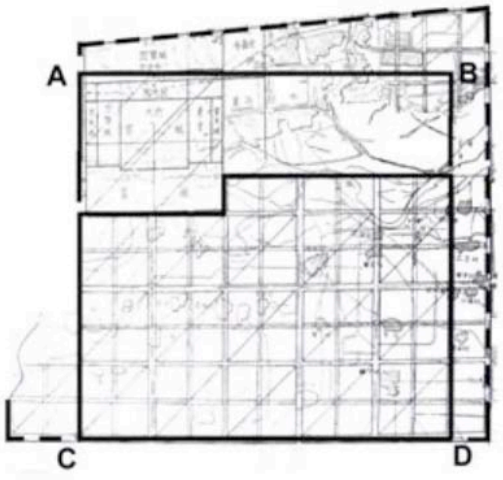



Fig 8. Core of Luoyang ABCD



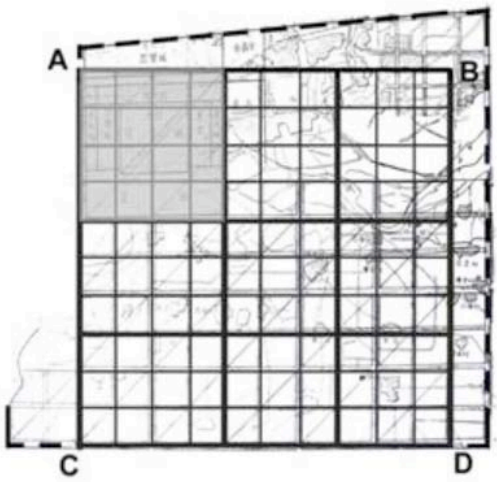



Fig 9. Theoretical plan formed by sliding N and S halves together

Fig 10. Configuration C4' over theoretical plan

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[1]The dimension of the individual avenues between the wards must be taken into account in more detailed study. In this case an average dimension 'd' of each square of the configuration C4' is one *li* plus the width of the avenues. Given a total width of around 7300 metres for 13 'd'. Each 'd' is about 561.5 metres or one *li* (532m) plus an average of 30 metres for the avenues between wards.

[2] For detailed discussion on the plans and theoretical configurations of Heijo, Nagaoka and Heian, please see endnote 36 and Heng Chye Kiang, 'Sui-Tang Chang'an, Nara, Nagaoka and Heian: Inventing A New Urban Paradigm in East Asia.'

Let us now turn our attention to the Japanese cities that were inspired largely by Chang'an and examine the capitals of Heijo-kyo (or Nara, 71084), Nagaoka-kyo (784-94), and Heian-kyo (built in 794), the founding of all of which were contemporaneous with Tang-period Chang'an. (See Fig. 6) Following the Taika reforms based on the Chinese system of government that brought land under the direct ownership and administration of the central imperial government, 7th-century Japan began the establishment of a permanent capital. Until then, a new capital was built by the new regime at a different site following the death of the previous emperor and the abandonment of his capital. Fujiwara, founded in 694 by Empress Jito, provided the first

evidence of a neatly grided city based on Chinese planning principles.[1] Heijo, Nagaoka and Heian built in the 8th century were unmistakably influenced by their Chinese counterparts. There was much cultural exchange between the two countries during the 7th, 8th and 9th centuries. By 804, 16 Japanese emissary missions had been to China. Monks and scholars of various disciplines accompanied such missions to China and

brought back much knowledge and experience.[2] Among others, city building was an area where strong Chinese influence was evident. Direct reference was made to the Chinese capitals when the western (or right) half of Heian was then called Chang'an and

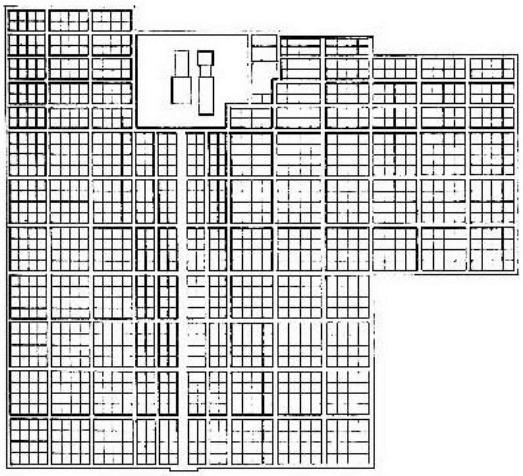
the eastern (left) half of it named Luoyang.[3]

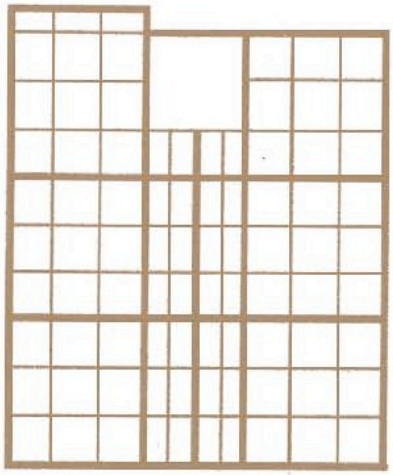
***Which Plan?***

Closer inspection of the reconstructed plans of the three cities will show that in fact all three capitals conform to C7 or C7a, one of the theoretical configurations and its variant arrived at in our earlier discussion. Either the planners of the three cities were inspired by the plan of Chang'an (and to a certain extent, Luoyang) and had tried as did Yuwen Kai to reconcile the two traditions of having the nine N-S and nine E-W streets and yet have the palace located in the north centre, or the theoretical configurations were already firmly established in China or elsewhere by the beginning of the 8th century. In the case of Heijo, if we were to omit the extension east of the rectangular profile of the

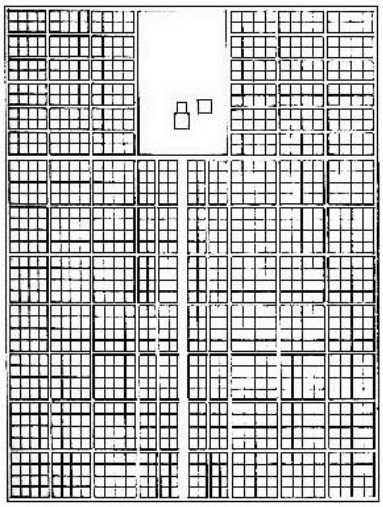
main city as well as the eastern extension to the '8-cho-square' palace[4] and examine the main outlines, we could superimpose the diagram C7 derived from the earlier hypothetical configurations over it. The same configuration could also be superimposed on Nagaoka-kyo or Heian-kyo. The only difference is that in the case of Heijo-kyo or Heian-kyo, the row of wards north of the palace is only ' module deep instead of a full module in depth. However, the presence of this ''-row' is crucial as it is with this row that one could count the first street as a major avenue and have the nine latitudinal streets. It is therefore without surprise that in order to conform to the classical stipulation, the planner would resort to adding at least a ''-row' north of the palace. In fact, the presence of this ''-row' lends

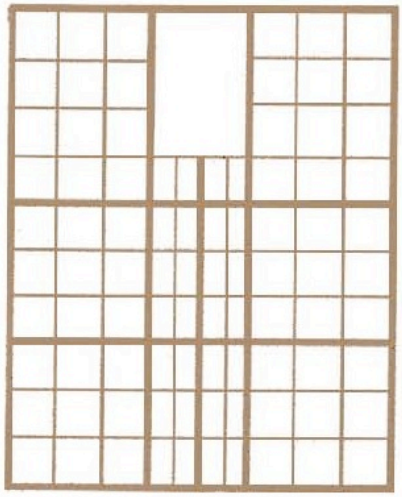
further credibility to the theory since it was practically dispensable but symbolically necessary to give the cities the 9th latitudinal street.[5]



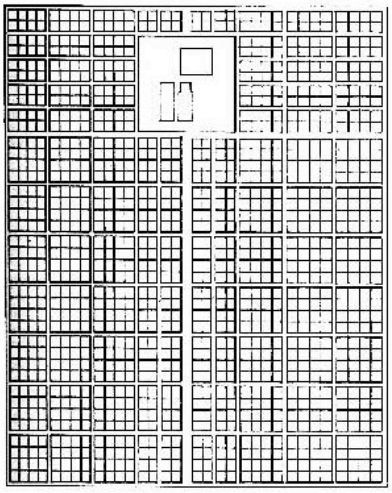


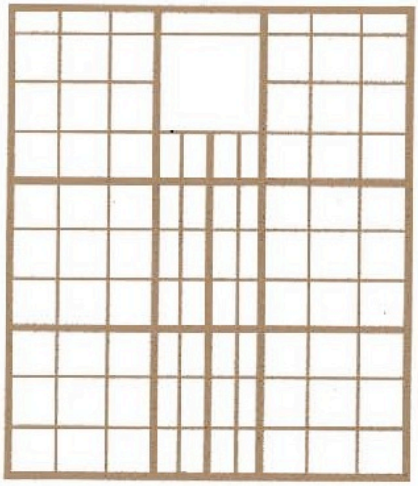
Heijo 平城





Nagaoka 长冈





Heian 平安

*Figure 6: Plan and conceptual layout of Heijo, Nagaoka and Heian*

From archaeological data, Heijo measured 4.3km E-W by 4.8km N-S (excluding the Outer City and the ''-row' north of the Palace) while Nagaoka was 4.29km E-W by

5.35km N-S and Heian measured 4.46km E-W by 5.18km N-S.[6] (Fig. 6) For Heian, the total width of the 9 E-W streets added up to 85 *jo* or 251.3m, while the total width of the 9 N-S streets added up to 104 *jo* or 307.4m.

Let us now assign to the configuration C7 a value for the module. If we used as did Yuwen Kai for Luoyang the Tang li of 532 meters, the dimensions for C7 would be 4.26km E-W by 5.32km N-S or almost the exact measurements of Nagaoka (4.29km by 5.35km).
For configuration C7a the dimensions would be 4.26km E-W by 4.78 km N-S (or 5.05 km N-S including the ''-row' of wards) or the very close to the dimensions of Heijo (4.3km by 4.8km). Finally if we add the total width of the nine N-S and nine E-W streets of Heian to the dimensions of configuration C7a, the new dimensions would be 4.52km and 5.09km respectively, or, once again, almost the exact measurements of Heian

(4.46km by 5.18km).[7]

***Hypothesis***

From the discussion above, we may arrive at the hypothesis that Yuwen Kai had conceived of a new urban paradigm that was susceptible to theoretical manipulations based on certain priorities related to imperial symbolism and practical realities of modular planning. The paradigm developed was used in the first instance for the planning of the Sui capital of Chang'an and quickly became the model for other East Asian cities. More than 100 years later and with further rationalization, at least three Japanese capitals used it together with the larger dimension of the Tang li of 532 meters as the basic module for its city blocks or *bo*.

***Structure of a Tang residential ward***

Such similarity in the configuration of the basic city-planning module between Chang'an and these Japanese cities made it possible for us to deduce the composition of the wards of Chang'an by examining the related cities of Longquan fu of Bohai kingdom

[8]

and the three Japanese cities as well as Yuan Dadu and subsequently Beijing.

Existing knowledge and writings of Tang Chang'an show us that a typical Chang'an ward of 1,064m by 532m (or 2 by1 *li*) such as those adjacent to and south of the two markets could be divided into 16 subdivisions. Each of these subdivisions (including the area occupied by roads) would measure 266m by 133m or more than 3.6 hectares in area. This is still a very large area and should usually be further subdivided into smaller plots of land for the homes and fields of the common folks.

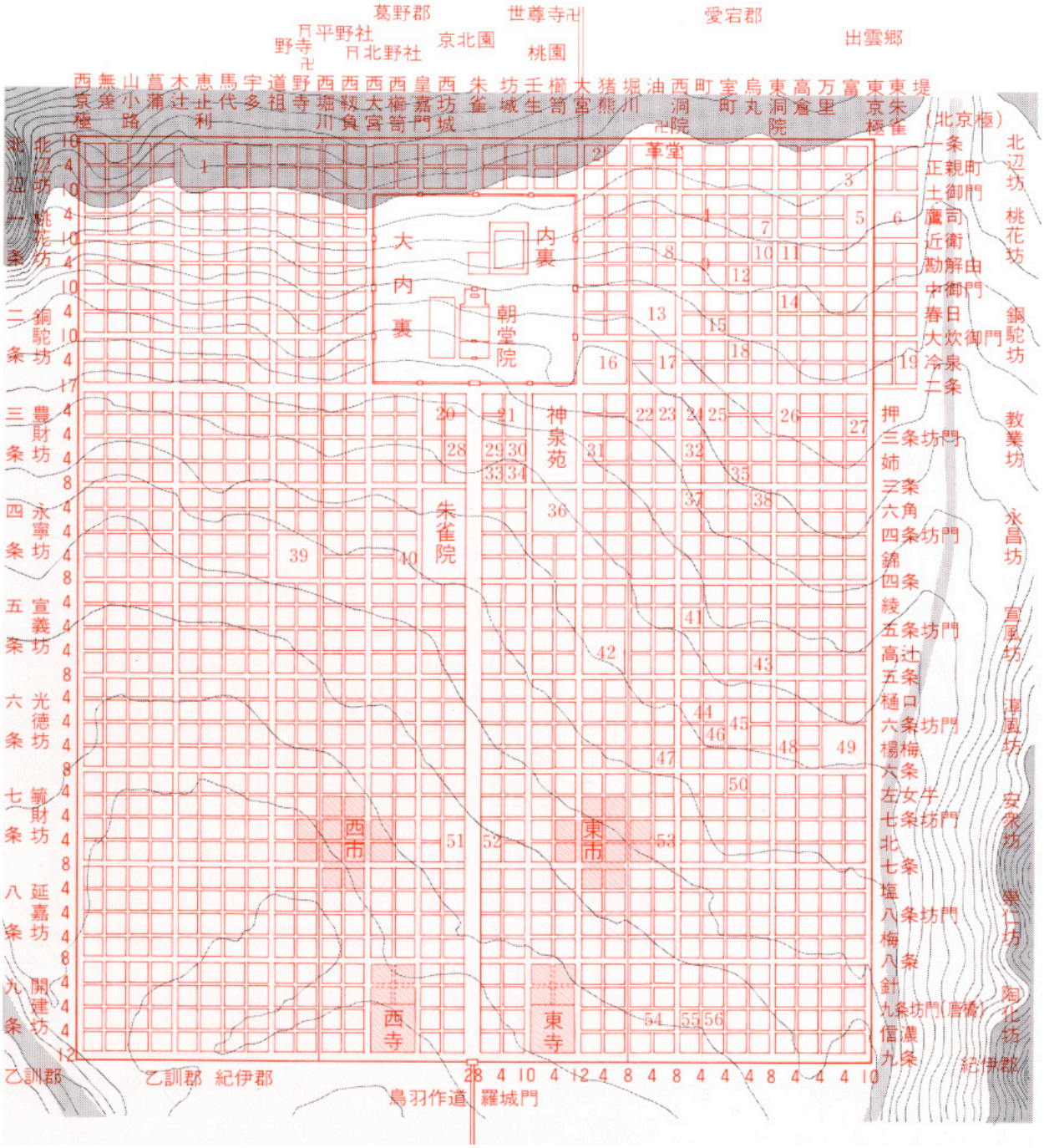



*Figure 7: Plan of Heian-kyo*

***Wards in Heian***

In the case of Heian, like Luoyang founded almost 15 years after Chang'an, the wards were square and measured only 1 *li* on each side. Like their Chinese counterparts, Heian's wards or *bo* were also divided into 16 quarters or *cho* 町(here indicated as 'Hn *cho*'), about 120m by 120m each (assuming the roads are all about 17.5m on average). Each of these Hn *cho* was further subdivided into 32 plots by a network of lanes. If we do not include the land area used for the lanes and alleyways, each of these plots is theoretically about 15m by 30m or 1/32 x 1/16 *li*. In the case of

Heian, the lanes are mostly N-S in direction while the plots of land are longer laterally than deep.

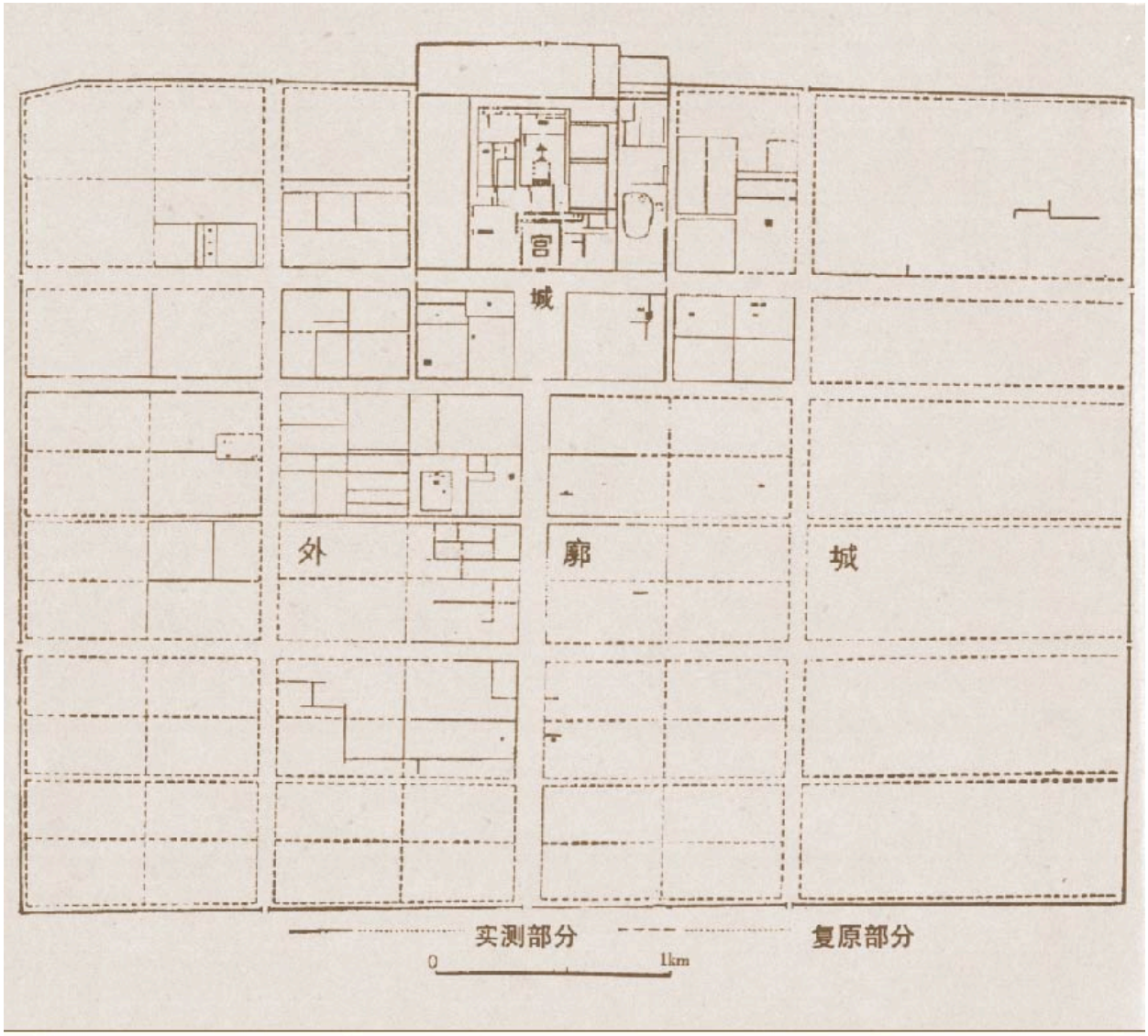



Figure 108: Archaeological survey plan of Longquan fu
图108: 龙泉府的考古实测平面
Figure 109 (facing page): Plan and conceptual layout of Heijo, Nagaoka, and Heian

*Figure 8: Archaeological survey plan of Longquan fu*

***Wards in Longquan fu***

Similarly, we can examine the parcellation of Longquan fu of the Bohai kingdom, contemporaneous with the Tang dynasty. The kingdom, though autonomous, had intimate economic and cultural ties with Tang China and was subject to its influence in almost all aspects. The planning of its capital Longquan fu was similarly modeled after its Tang counterpart (Fig. 8). Although only about 1/5 the size of Chang'an its layout recalls that of the Chinese capital. Archaeological surveys of the city show a grided city with rows of wards south of the Palace City much like Chang'an. Like the Tang capital, theoretically these wards, measuring almost 2 *li* by 1 *li* each, are about twice the size of those of Luoyang or Heian. The survey map shows some wards with streets beyond the major and minor crossroads that divided

the wards into 16 quarters of ' x ' *li* each (for easy reference, we shall call them 'LQF *cho*' here). (See Fig. 9) Some of these lanes and alleys seem to further divide the LQF *cho* into quarters. Given the larger size of the wards, these further subdivisions of '' LQF *cho*' each measures 1/8 *li* by ' *li* or about 66.5m by 133m. Closer scrutiny actually shows lanes and alleys further subdividing the '' LQF *cho*' at places. In fact, some of these lanes and alleys seem to indicate that the '' LQF *cho*' could be further quartered giving plots of 1/16 of the size of a 'LQF *cho*' or about 33.25m by 66.5m. In general the map also shows more roads in the E-W direction than in the N-S direction. This is also consistent with the layout of Tang Chang'an's Imperial City in which lateral streets dominated.

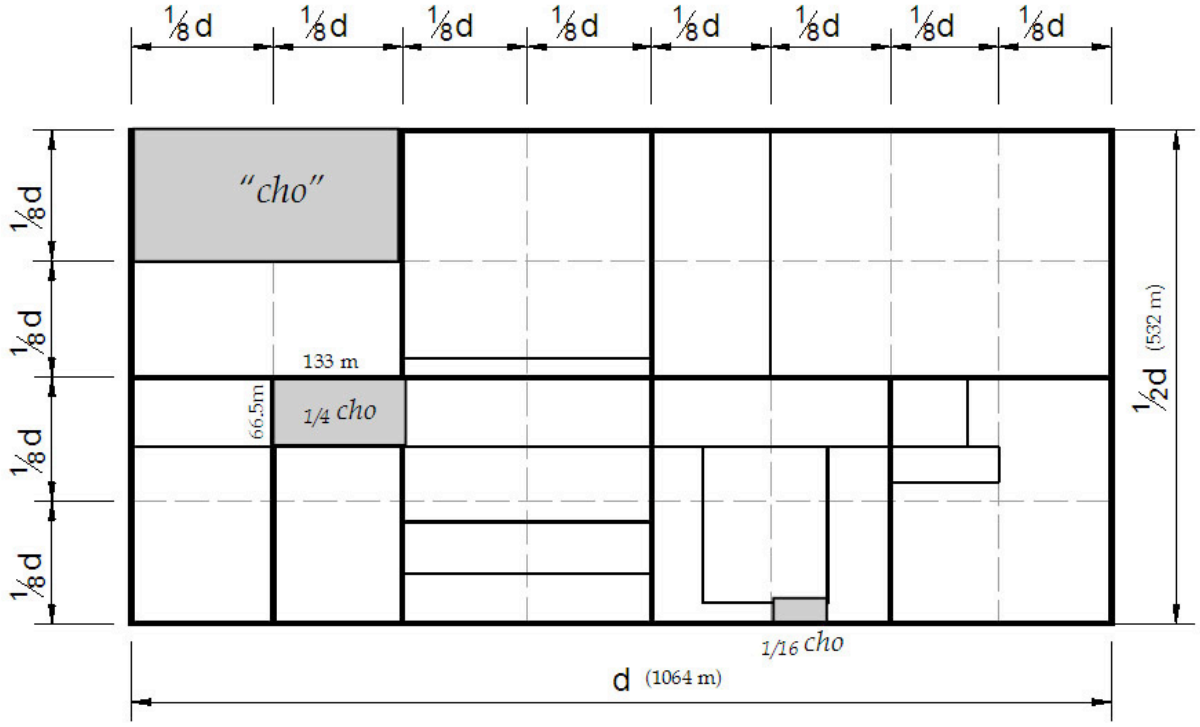



*Figure 9: Hypothetical analysis of a ward immediately south of Palace City in Longquang fu*

What was described above and shown in Fig. 9 is a hypothetical analysis. Closer examination however reveals that part of the right-half of the ward, which is made up of 2 squares 1 li by 1 li adjacent to one another, was taken up by the road. An analytical diagram consisting of 2 squares of 544m each side-by-side could be made. 554m is the approximate value measured from the archaeological map mentioned earlier in Fig. 8. The first square ABCD on the left is divided into sixteen smaller squares of 68m each (or 8 *cho* of 68m by 136m each). The width of the second square BEFC on the right is reduced by 1/8 or about 68m. The balance BGHC is once again divided into 16 quarters although the dimensions are now 68m by 59.5m (resulting in *cho* of 68m by 119m each). Superimposing this analytical diagram on the ward immediately south of the Palace City, one notices that there is a strong correlation of the ward structure as defined by the roads and the subdivisions shown in analytical drawing as hypothesized earlier in Fig. 9. One notices also that in the N-S direction, part of the ward is also given to the roads north and south of the ward. In this case, about 17 meters is provided at each end, hence giving the ward a net length of 510m (See Fig. 10). Actual measurement from the archaeological survey map gives dimensions that are a little different from the theoretical ones listed earlier.

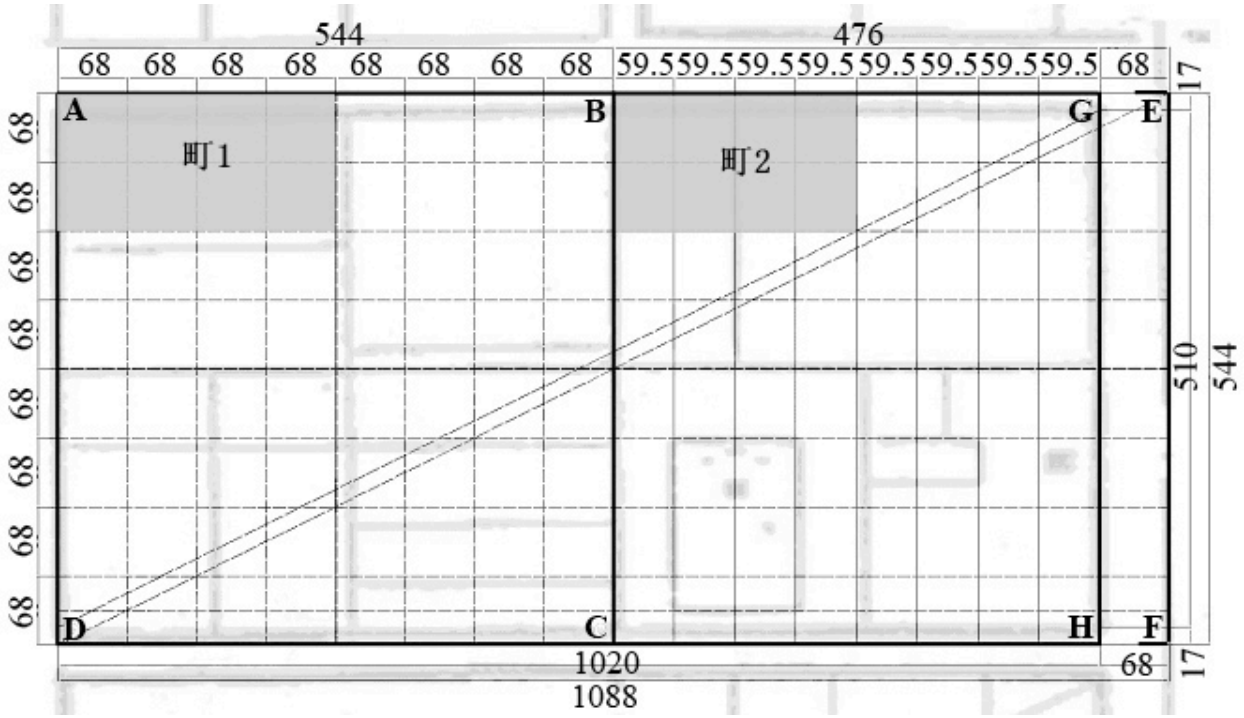



*Figure 10: Overlay of theoretical analysis over Longquang fu ward.*

***Wards in Yuan Dadu and Qing Beijing***

Let us now turn our attention to Ming/Qing Beijing which inherited its urban structure from its predecessor Yuan Dadu. In the case of Yuan Dadu, officials were allocated a standard plot of residential land of 8 mu. From the research conducted by Deng and Mao of the structure of Qing-period Beijing, they concluded that from center-to-center, the distance between two E-W hutong or alleyways was about 77m.24 Subtracting from it the width of the hutong, the distance from edge-to-edge would be 67.76m. A regular plot of land of 8 mu or 4,553.47m2 in an area with 67.76m on one side would have about 67.2m2 on the other ' almost a square. These dimensions are curiously close to those of half a '' LQF cho'. It is probable that Yuan Dadu's urban structure was a continuation of earlier practices and the basic residential unit of 8 mu was actually similar to that of half a '' LQF cho' or an area of about 66.5m x 66.5m in Tang Chang'an or '' Hn cho' in Tang Luoyang or Heian. Smaller plots could be a subdivision of these dimensions as was indicated earlier in parcellations 1/16 the size of a LQF cho or '1/16 LQF cho'.

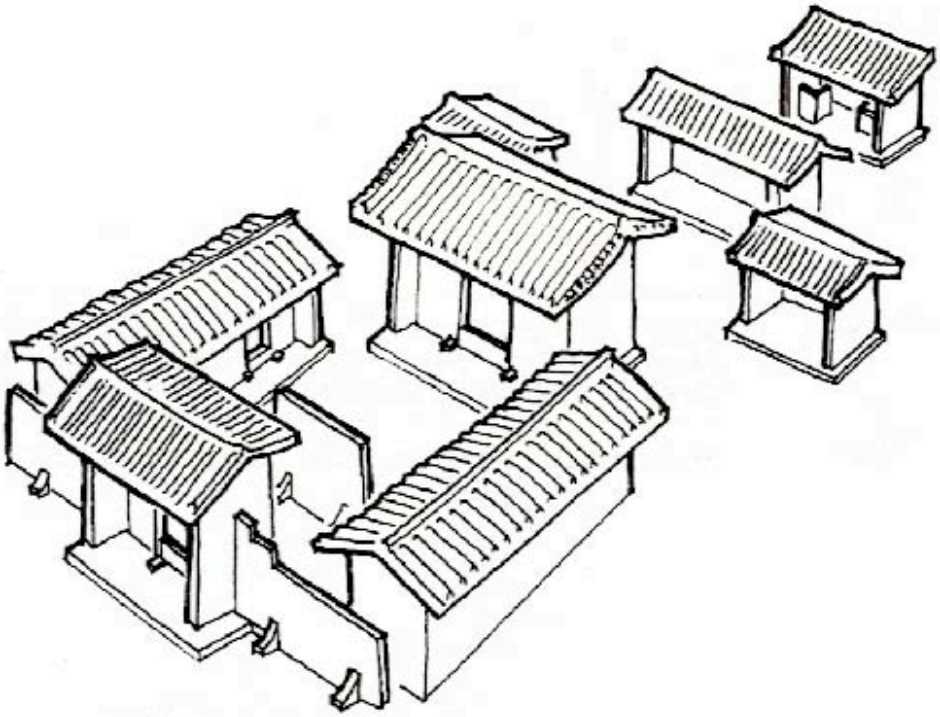


*Figure 11: (bottom) Example of Tang-period courtyard dwelling excavated from tomb of Wang Xiutai in Changzhi, Shanxi*

图*11*：山西长治唐王休泰墓出土明器住宅

*... and Figure 12: (top) Example of Tang-period courtyard dwelling*

In the Shaanxi Provincial Museum in Xi'an is a Tang-period model of a courtyard compound in very

good condition (Fig. 11). The model shows a courtyard house compound organized around a couple of courtyards. Another published example shows one organized around 3 courtyards (Fig. 12). In terms of organizational and compositional principles, they are not very different from those that we see depicted in the 1750 Qianlong map of Beijing.

The brief table below shows four Beijing courtyard houses of different sizes and their

typical dimensions.[9] The average width of the first three smaller courtyard houses is about 22m. The depth (or length) of the courtyard houses vary depending on the number of courtyards in the house concerned. Hence a house with a single courtyard could be 22.8m or 28.6m depending on the number of halls along the N-S axis. The larger house with 2 courtyards measures 39.1m while one with 3 courtyards is 55.1m long (Table 1).

| ( 单位：米) | Type A 类型A一进院 | Type B 类型B二进院 | Type C 类型C三进院 | Type D 类型D四进院 |
|---|---|---|---|---|
| Width (E-W) 东西广 | 21.3 | 22.2 | 22.2 | 30.7 |
| Length (N-S) 南北长 | 22.8 | 28.6 | 39.1 | 55.1 |
| Dimension of xiangfang(N-S x E-W) 厢房尺度（南北x东西） | 4.1 x 8.3 | 3.8 x 8.3 | 4.0 x 8.7 | 5.6 x 10.0 |
| Dimension of main hall 堂屋尺度 | 10.2 x 5.0 | 8.8 x 5.6 | 9.3 x 5.8 | 13.7 x 8.3 |
| Dimension of courtyard 院落尺度 | 10.2 x 11.9 | 8.8 x 11.3 | 9.3 x 12.0 | 13.7 x 12.7 |
| Dimension of xiangfang(net) 厢房尺度(净) | 2.6 x 7.0 | 2.5 x 7.2 | 2.5 x 7.5 | 3.7 x 8.3 |
| Dimension of main hall (net) 堂屋尺度(净) | 8.9 x 3.4 | 8.0 x 4.3 | 8.2 x 4.4 | 11.6 x 6.1 |

Table 1: For plan and dimensions of the 4 courtyard houses, please see Yu Luxiang and Wang Qiming, *Beijing Courtyard Houses*, Beijing: China Construction Industry Press, 1996, pp. 79-82, figs. 4-13, 4-17, 4-19 and 4-23

Considering that a basic unit of residential land of 8 *mu* is a square of about 67m or a length equivalent to 3 courtyard houses built side-by-side (Fig. 13). Length-wise, it is the combination of

either two Type-B houses, or combination of Types B and C, or simply a larger Type-D house. This combination is verified once again by the Qianlong map of Beijing. In the case of Tang Chang'an, it is also possible to build 3 Type-B courtyard

1

houses in a plot of land such as that of ' / LQF cho' or about 33.25m x 66.5m.

16

Summarizing the above discussion, we have shown from the various cities influenced by Tang Chang'an the following:

1 In the case of Heian, the 1 *li* by 1 *li* ward could be divided first into 16 Hn *cho*. Each Hn *cho* can be further subdivided into 32 parts, each about 15m by 30m.

2 In the case of Longquan fu, the wards are similar in size to Chang'an's larger wards. Longquan fu's ward theoretically measures 2 *li* by 1 *li* and could be divided first into 16 quarters or LQF cho. Each quarter can be further subdivided into 4 parts or '' LQF cho' measuring 66.5m by 133m.

3 Theoretically '' LQF cho' could be further divided into four or '1/16 LQF cho' each measuring 33.25m x 66.5m.

4 In the case of Yuan Dadu, the basic residential lot of 8 mu is a square of about 67 meters or half-a- '' LQF cho'

5 The net distance between two *hutong* in Yuan Dadu (or Qing Beijing) is about 67m or very close to the width of a LDF cho (hence also a Chang'an cho)

6 Using dwellings with sizes following those of Qing Beijing's courtyard houses, a basic resident lot of 8 *mu* could be occupied by several smaller houses further subdividing the 8 *mu* lot into at least two or six smaller parcels.

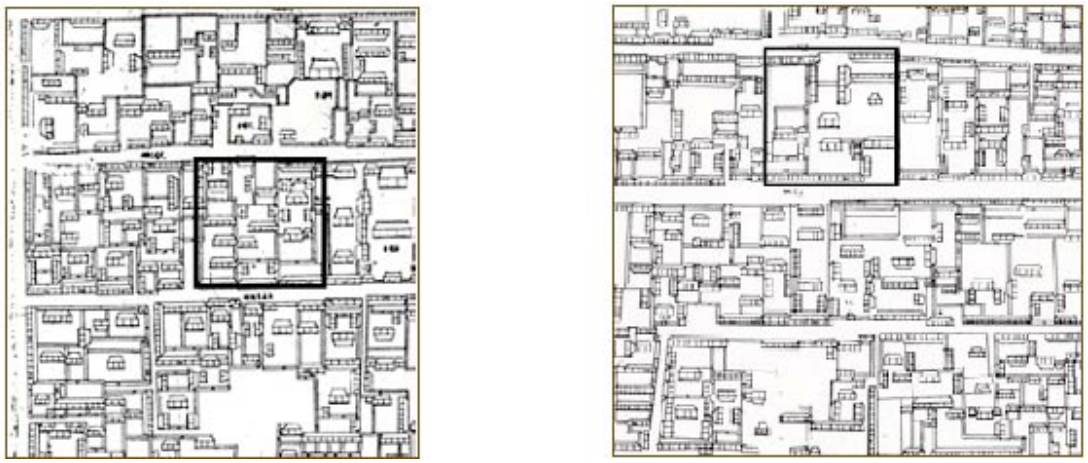


Figure 13: Qing Beijing's hutong and courtyard houses overlaid with a square of 8 *mu* in area

Drawing from the points listed above, we can produce a theoretical plan of a ward in Tang-period Chang'an as shown below in the N-W corner of the ward with the thicker lines indicating possible roadways and the thinner ones showing possible parcellation (Fig. 14). Myriad possible permutations could be generated from the theoretical structure shown in the N-W 'cho'.

Having established a theoretical structure for a typical Chang'an ward, we could now reconstruct a typical ward with a more detailed network of streets and alleys serving residential compounds of various sizes. This also provides the theoretical basis for the reconstruction of wards with a finer urban grain and for such wards to achieve the visual

density commensurate with that of a population of about a million people at its peak.[10] With the theoretical parcellations available, we could also fill the land parcels with appropriate residential layouts and 'populate' the wards accordingly. In the following section of the paper, we will use the example of Yongning ward to illustrate the methodology of reconstructing a ward. We will also attempt to reconstruct its cityscape to provide a visual understanding of its residential density, land parcellation, layout of residential compounds and spatial characteristic.

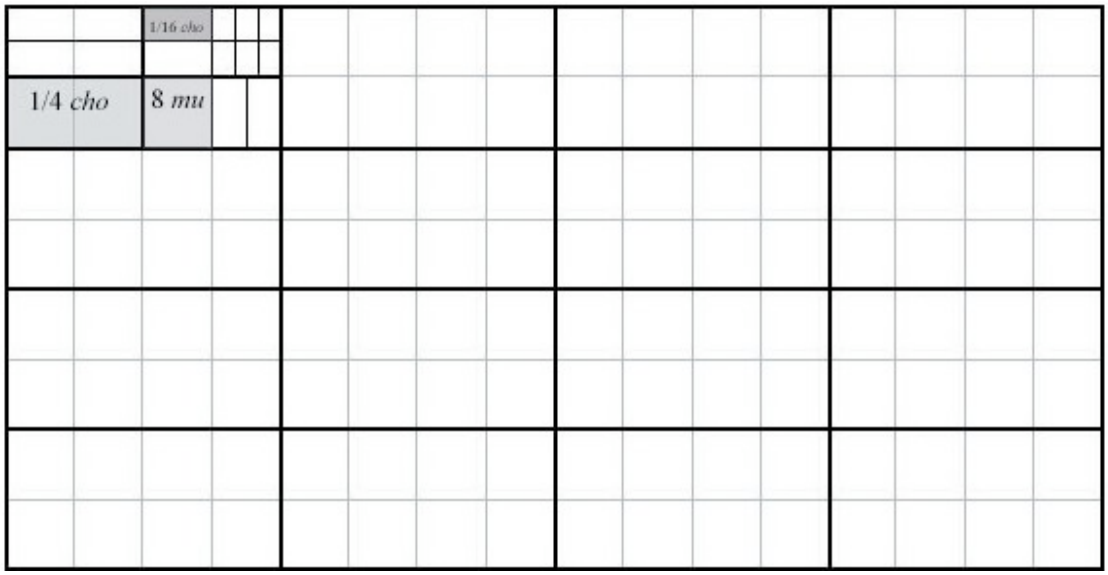



Figure 14. Theoretical parcellation of a Tang Chang'an ward.

[1] Unfortunately, the plan of Fujiwara is still the subject of speculation and will, as such, not be included in the subsequent discussion.

[2] See Wang Renbo 王仁波, 'Studying the Cultural Relations between China and Japan from Archaeological Dicoveries' 从考古发现看唐代中日文化交流[Studying the Cultural Relations between China and Japan from Archeaological Discoveries], *Kaogy yu wenwu* 考古与文物, no.3 (1984), pp. 100'108.

[3] See Su Bai, "Sui-Tang Chang'an and Luoyang," in *Kaogu,* 1978/6, p. 423.

[4] The extension of the three columns of wards is also known as the Outer City. See Tsuboi Kiyotari and Tanaka Migaku, *The Historic City of Nara: An Archaeological Approach*. The Centre for East Asian Cultural Studies/UNESCO, 1991, pp. 26'31, esp. p. 28.

[5] This street is in fact numbered the First Row Road (*Ichijo-dori*) since the numbering sequence began from north to south.

[6] This street is in fact numbered the First Row Road (*Ichijo-dori*) since the numbering sequence began from north to south.

[7] Heian's measurements were 1,508 *jo* by 1,753 *jo*. See Takahashi Yasuo, *An Illustrated History of Japanese Cities*. University of Tokyo Press, 1993, p. 50. Although the plan of Nagaoka as drawn in Takahashi Yasuo and in *Capital* are different, their overall proportions are identical and the number of N-S and E-W streets the same. More detailed discussions of Nagaoka is only possible with more archaeological data.

[8]
Heng Chye Kiang, *A Digital Reconstruction of Tang Chang'an,* China Construction and Building Press. 2006: 130-137. The theoretical work on the parcellation of a Tang ward was first published as Heng Chye Kiang, "Cultural exploration of an invisible city: the digital reconstruction of Tang Chang'an and its wards:" in *In Insights of Digital Cities*, ed. Chiu Maolin, CAADTalks, vol. 04, Taiwan: Archidata, 2005: 151-174.

[9]

[10]
Although earlier estimates put Chang'an's population at its peak at about 1 million, more recent scholarship places it closer to 700,000. See Seo Tatsuhiko, 'Tang Chang'an's population and its distribution within the city' 唐代长安城的人口数与城内人口分布，in *Zhongguo gudu yanjiu* 《中国古都研究》12，1998:179-189.

In the case of Yongning ward, we have selected to reconstruct its cityscape at the peak of the Tang period just before the An Lushan rebellion.

> The cityscape of a place changes with time and population. In the case of Yongning ward, we have selected to reconstruct its cityscape at the peak of the Tang period just before the An Lushan rebellion. We have also chosen the estimate of 700,000 for the population of Chang'an during this period. At this juncture, it is important that the proviso that the calculation of population density in any specific ward can only be very approximate be made since there are many variables and unknowns.

We are aware that the southern section of the city was very sparsely populated. The southernmost four rows of wards had large tracks of fields and vacant land with hardly any population. This is understandable given the enormous size of Chang'an and the location of major activity centers in the northern section of the city. The area taken up by
the last 4 rows of wards is about 28km$^2$. Part of Chang'an's population, particularly those related to the throne, also lived in the palatial complex of Daming gong located northeast of the city. Built in 634, the Daming palace complex measured about 3km$^2$.

In essence, most of the population of 700,000 or so people would have lived in an area of about 60 km$^2$. This translates into a population density of about 11,500 people per km$^2$ or about 2300 families per km$^2$ if we assume an average family size of 5 members. Since
we have already discounted those areas that were sparsely populated, let us assume that
Yongning ward, being a couple of blocks away from the East market, was a ward with at least an above average population size. With an approximate area of about 0.5km$^2$, Yongning ward would have been able to house at least 5750 people of the equivalent of some 1150 or more 'families' within the confines of its ward walls.

Given the theoretical plan of a ward arrived at earlier, it is now possible to divide Yongning ward into 1024 theoretical plots of land of 15m by 30m or about 450m$^2$ by a network of major and minor streets as well as lanes and alleyways of varying dimensions.

*Figure 15. Theoretical subdivision of Yongning ward into 1024 plots of land 15m by 30m.*

This would represent the lower limit of residential density for Yongning ward given its close proximity to the East Market and the two palace complexes of Taiji gong and Xinqing gong. With the equivalent of about a thousand families living in the ward, there would have been at least 5000 to 6000 residents in Yongning.

Another option, probably more likely, would be to double the density and further subdivide the ward into some 2048 theoretical plots of land about 15m by 15m in size. This is a strong possibility since there is an indication that the famous general Guo Ziyi's residence which took up a quarter of Qinren ward, just north of Yongning ward, had some

3000 people living in it.[1] This is the equivalent of about 600 families living in a quarter of the ward. Assuming that the residential density of a large residential compound such as that of Guo Ziyi is similar to that of smaller ones, the total number people that could be accommodated in Qinren ward would have been around 12,000 or about 2400 families. As Qinren ward is immediately adjacent to the East Market, it would have been a ward of high population density and the equivalent of 2400 families would probably represented the upper limit of population density, at least for this part of the city. It is conceivable that the areas around the West Market were even more densely populated given the more popular nature of that section of Chang'an. A simple simulation is made to visualize the doubling of residential density of Yongning ward in the illustration below.

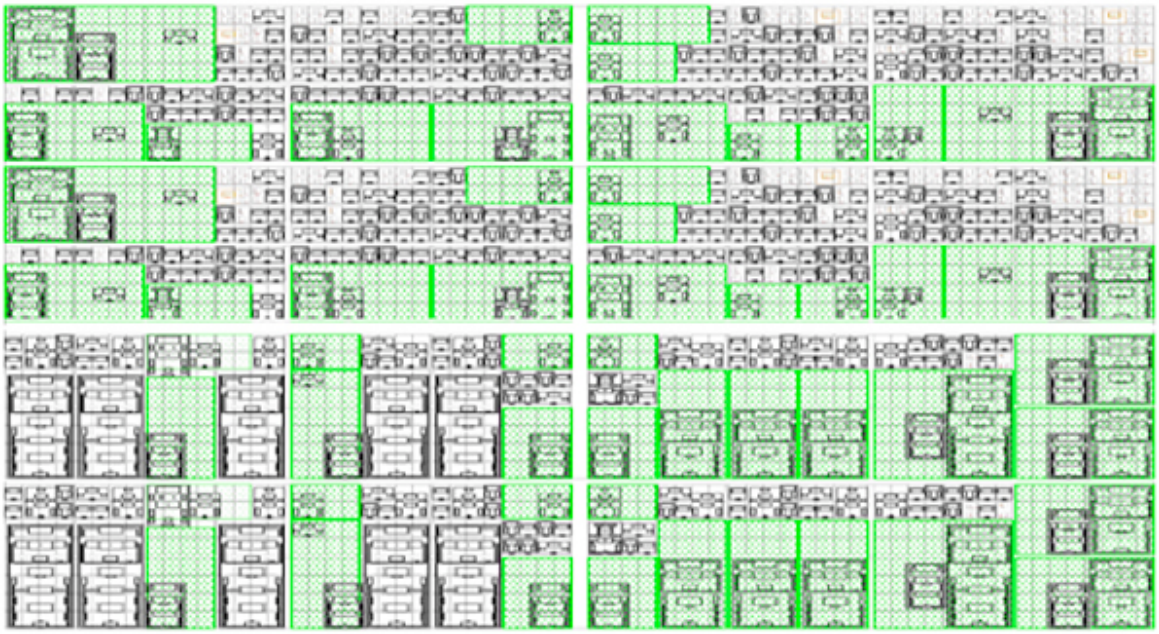


*Figure 16. Theoretical subdivision of Yongning ward into 2048 plots of land 15m by 15m.*

Hence, we have established the lower and upper limits for the population density of Yongning ward located near the East Market. Being fully conscious of the implications of such a range of residential density, we have chosen to use the first estimate of about 5750 residential population for Yongning ward to reconstruct its urbanscape.

In order to have a more accurate rendition of the ward, it is also necessary to distinguish institutions as well as the larger residential compounds of high ranking officials from those of the common folks. The table below shows institutions that had existed and officials who have lived in Yongning ward during the Sui and Tang dynasties. We have selected to depict Yongning just prior to the point when the upheavals of the An Lushan rebellion reached Chang'an in 756 and have therefore included all important buildings and compounds, the records of which are available to us, up to the point of the invasion. We also assume that buildings built earlier, even during the Sui dynasty, were used in one way or another by subsequent owners and had included them in our reconstruction.

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| 《隋唐两京坊里谱》p.39 | | | | |
| | 京兆府 | | 东南隅 | <长安志>:东南隅京兆府籍坊； 《城坊考》添《注》： 按此长安志文，籍坊未详，或徒坊、病坊之类； |
| | 明觉寺 | | | 隋，大业七年废 |
| 《唐代长安词典》P.190；《增订唐两京城坊考》p.100 | | | | |
| | 苏威: | 5a | 南门之东 | 隋时为纳言、光禄大夫、开府仪同三司隋尚书左仆射房国公 |
| | 田宏 | 5a | 西门之北 | 隋兵部尚书 |
| 618 | 郑善果 | 5a | 东门之北 | 唐初官拜检校大理卿、民部尚书 |
| 626-683 | 裴行俭 | 5a | 南门之西 | 太宗时为长安令，高宗时拜礼部尚书 |
| 626-649 | 江王嚣 | 5a | 西北隅 | 太宗第十一子，本礼部尚书郑善果宅，后江王嚣买之 |

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| 653 | 王大方 | | | |
| 682 | 杨政本 | 7a-5a | | 幽州范阳县令， 年甫十五， 归于隋尚书左丞国子祭酒弘农杨汪第五子幽州范阳县令政本。''杨国忠四世祖汪四世祖令本，杨政本应为令本之兄弟 |
| 685 | 崔呐 | 7a-9a | | 幽州府县丞 |
| 689 | 独孤亟 | 5a1 | | 都水监 |
| 713 | 杨仲宣 | 5b | | 开元时官至吏部郎中。 |
| 708、713 | 韦顼 | 3a1 | | 开元初官拜卫尉卿。《大唐故银青光禄大夫卫尉卿扶阳县开国公护军韦公顼墓志铭》云： |
| 705-707 | 李晋 | 3a2 | 东门之北 | 神龙初官拜宗正卿，'',缮造廊院称为甲第 |
| 705-710 | 裴炎 | 3a | 西北隅 | 中宗时官拜中书令，炎死后宅没官，为徒坊 |
| 713-741 | 王仁皎 | 3b | 东门之北 | 开元初为将作大匠、开府仪同三司、封祁国公礼部尚书郑善果宅 |
| 735 | 张守珪 | 3a | 东南隅 | 开元二十三年（ 公元735年） 官拜辅国大将军； 乾元元年（公元758年）以其宅置为司天监 |
| 742 | 李符彩 | 7-9 | | 右金吾卫胄曹参军 |
| 756-779 | 李辅国 | 1b | | 宦官，事肃宗代宗，受开府仪同三司，封博陵郡王 |
| 756-805 | 徐浩 | 3b | | 肃宗时授中书舍人， 见上书右丞。代宗时为岭南节度使，招拜礼部侍郎。德宗初，召受彭王傅，进郡公。 |
| 779-805 | 王锷 | >=3b | 东南 | 德宗时为河东节度使、同中书门下平章事。锷曾为岭南节度使，征商权舶税，广蓄财富，营地华侈。 |
| 778 | 寇锡 | 5b | | 朝议郎守工部郎中 |
| 785-805 | 高郢 | >=3a | | 贞元末擢中书侍郎、同中书门下平章事， 后以尚书右仆射致仕 |
| 797 | 孙孙 | | | 旅舍 |
| 805-820 | 羊士谔 | 8a | | 唐宪宗时任监察御史。 |
| 806-820 | 杨凝 | 5b | | 元和时官居兵部郎中 |
| 820-840 | 史宪诚 | 2b | 东南 | 穆宗长庆时为魏博节度使， 文宗时加司徒， 赐宅于永宁坊东南。 |
| 827-840 | 王涯 | >=4a | | 文宗时官拜检校司空兼门下侍郎、同中书门下平章事 |
| 831 | 李载义 | 2b | | 文宗时加司徒，赐宅于永宁坊东南 |
| 827-840 | 李听 | 1b | | 太宗时官拜太子太保，封涼国公 |
| 846-859 | 李固言 | 1b | | 宣宗初为太子太傅、分司东都。 |
| 846-859 | 张直方 | 2b | | 宣宗时授金吾卫大将军，自幽州入朝长安永宁坊。 |
| 852 | 裴休 | 1 | 与张直方相对 | 大中六年（ 公元852年） 官拜同中书门下平章事。张直方居宅与裴相公相对 |
| 861 | 白敏中 | 2a | | 懿宗时官至司徒、门下侍郎、中书令。咸通二年（ 公元861年）以太傅致仕。 |
| 861 | 白敏中 | 1a | | 开府仪同三司守太傅致仕太原郡开国公 |

| | | | | |
|---|---|---|---|---|
| 864 | 杨玄略 | 3a | | 银青光禄大夫行内侍省掖庭局令员外置同正员致仕上柱国弘农县开国侯赠内侍省内侍 |
| 871 | 王铎 | >=2b | | 咸通十二年（公元871年）由礼部尚书进同中书门下平章事，加门下侍郎、尚书右仆射，超拜司徒。 |
| 873-888 | 殷保晦 | 9a1 | | 僖宗时官至校书郎。《三水小牍》载，广明元年（公元880年）黄巢率农民军入长安， |
| 874 | 李缨 | 7-9 | | 魏王府参军 |

The locations of these larger properties are often indicated in an approximate manner as 'east of the south gate', 'north of the east gate' or 'northwest corner', etc. In many cases, the locations were not specified and we situate these properties after the following guiding principles:

1) For officials above the third rank, wherever possible, their properties are located along the southern ward wall since they are allowed to have their front gates open directly onto the main avenues.

2) For other lower ranking officials and those who are unable to find land along the southern wall, we locate their properties along the northern edge of the major E-W street.

Unlike the case in certain wards where rough indications of the sizes of certain properties were given'as in half or a quarter of a ward'none were available for those in Yongning ward. However we are also aware that certain residential compounds in Yongning were rather spectacular; Dugu ji's（独孤亟) property, for instance, boasts of a fabulous garden with a pond fed by water diverted from the Huang canal（黄渠). Lijin's（李晋) property just north of the east gate with its galleried courtyards must have been quite impressive too. Jingzhaofu（京兆府) located in the southeastern corner of the ward too would have been a very significant compound given the fact that it is responsible for the city's administration.

Bai Juyi wrote about his property in Luoyang when he was an official of the fifth rank as having a total of 17 *mu* of which a third was allocated for his residence, a fifth for a pond, and a ninth devoted to a bamboo grove. In essence, other than the area allocated for his residence, the rest were his garden comprising among other things a pond and a bamboo

grove. 17 Tang *mu* is equivalent to about 8875 $m^2$ or a stretch of land about 133.5m x 66.5m or almost exactly twice the '' LQF *cho*' (' Tang Chang'an '*cho*' or '' Hn *cho*' in Tang Luoyang or Heian) that we have arrived at earlier.

Bai Juyi's property, though located in Luoyang, gives us an indication of the size of the residential compound that an official of the fifth rank is able to afford. The ensuing task involves the creation of residential compounds of different types and sizes. As there are no extant examples from the Tang period, we have to depend on funerary objects, paintings, murals and textual descriptions to create accountable residential layouts ranging from a

simple single courtyard house compound to those with multiple courtyards and axes. As in the case of Bai Juyi's house in Luoyang, we have provided the larger properties with pleasure gardens, fields and stables.

25 of 29 12/26/08 3:04 PM When arranging the house compounds in Yongning ward, we have also deliberately created several different conditions including:

1) Interruption of the continuity of the minor orthogonal cross streets ( 小十字街) in some instances;

2) Creation of a complex network of roads, streets, lanes and alleyways within the ward;

3) *Sanjue* (三绝) houses that are allowed to open their gates in the ward wall and provided with direct access to the main avenue because of their location along the ward wall and their being surrounded on all the other three sides by other properties;

4) The location of very small houses at rather inaccessible locations. (Fig. 17)

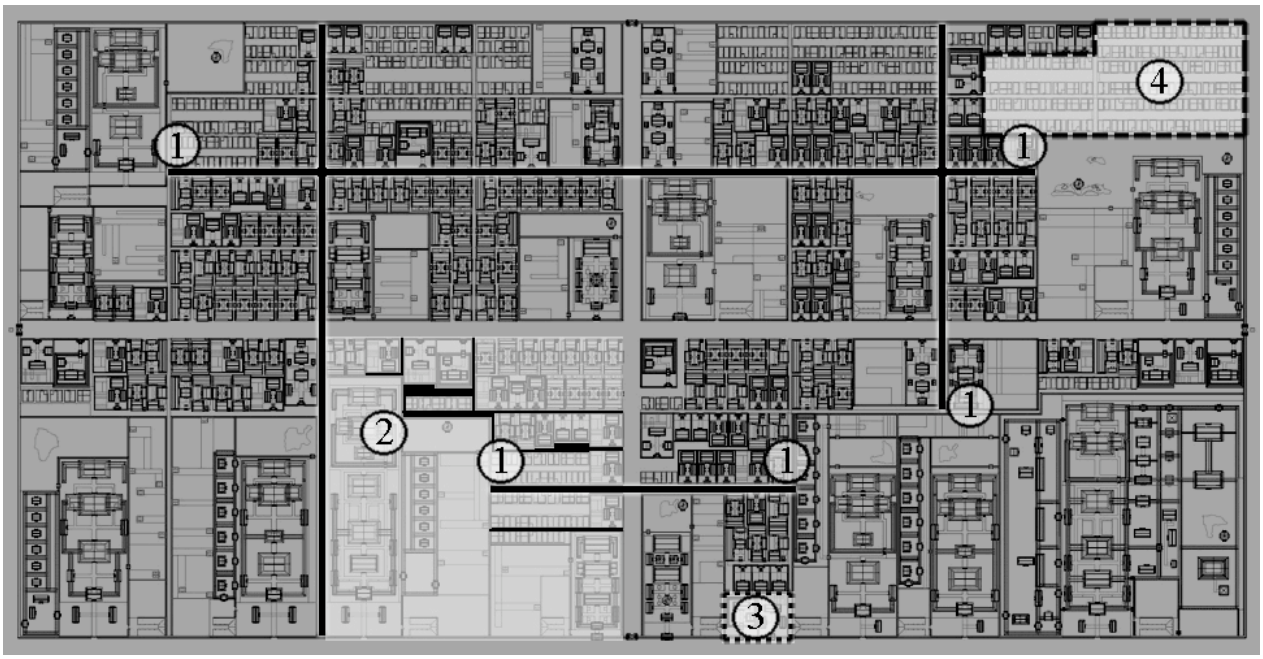


*Figure 17. Reconstruction of Yongning ward with different types of residential compounds, network of streets and alleys.*

In reconstructing Yongning ward, we hope to recreate and visualize the physical setting in which much of the daily life had taken place in Tang period Chang'an. Due to the nature of the scanty evidence available, this reconstruction is necessarily the combination of theoretical reasoning and rational deduction based on currently available information as well as careful conjecture. Together with the possibilities afforded to us by the digital media, we can now create visual information that was hitherto inaccessible. The process of digital reconstruction is an iterative one; each rendered image allows us to test, evaluate and refine our initial understanding and further improve our reconstruction.

Although the current reconstruction is wholly theoretical, this rendition can be made more accurate

with the incorporation of future archaeological data if and when they become available. In the meantime, it affords a visual and tangible framework over which discussions could be made and the reconstruction'and hence understanding'further improved through the collaborative efforts of scholars from different disciplinary backgrounds.

*Figure 18 (below). Rendering of Yongning ward showing the distribution of residential compounds, network of streets and alleys etc., that provide the setting for Chang'an's daily life.*

[1] 徐松(1781-1848). 唐两京城坊考, 1848, 中华书局出版社, 1985 年版: 第65-66页.