A Multimedia Package On Tang Period Chang'an

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Abstact

Digital modeling is becoming an increasingly effective tool to assist in the visualization of built environments. Extending from more conventional applications in project planning, this technology is proving to be an invaluable asset in the reconstruction of historical sites (Heng et.al. 1997). This paper presents first the results of a research project conducted at the School of Architecture, NUS, to reconstruct the urban landscapes of Tang period (618-907) Chang'an in order to gain a better visual perspective of its past and to study the important aspects of its urban form (Heng Chye Kiang 1995, Heng Chye Kiang and Milton Tan 1996). It also introduces a multimedia package that was subsequently developed for the Asian Civilizations Museum based on the research.

During its heyday, Chang'an, the capital of the Tang dynasty, was the foremost city in Asia. Its plan was widely copied by other capital cities in East Asia. Chang'an's city walls enclosed a territory of some 84 km2 and contained about a million people, making it then the largest and probably the most prosperous city in the world. Its significance is not confined only to the historical world for the legacy of the strict gridiron layout could still be felt today in many Chinese cities. Destroyed at the end of the Tang dynasty, the grandeur of Chang'an remained primarily in literary descriptions. It was near impossible to capture the magnitude and complexity of the city in drawings and archeological reconstructions. The sheer physical size of the Tang capital and the nature of its terrain preclude seeing the capital all at once. Any pre-modern endeavor (and there were several) to represent the city graphically stemmed more from the translation of an intellectual understanding of the city than from an actual visual perception of the entire city. These graphic depictions were attempts by scholars and artists alike to record the capital city and to render them more comprehensible to the beholder. While this is probably achieved as far as understanding the urban organization or structure is concerned, they failed to inform us of the cityscape, or worse, misinform us of the cityscape. Even recent graphic attempts to represent the city were unsuccessful in showing the cityscape of the capital. The vast scale of the city precludes any convincing hand-drawn reconstruction unless the illustration covers several square meters of paper.

Digital Reconstruction

With the help of the digital media, one could produce a more visually convincing and accurate reconstruction of the city. Parts of the city could be modeled separately and then assembled to form the whole. Such images help render the awesome scale and cityscape of the Tang capital, once imagined only in the minds of scholars and researchers, accessible to the layperson. Walkthroughs of the model could be simulated. With enough computational power, simulating the urban environment in virtual reality in real time virtually transports the viewer to the city, providing him with the possibility of experiencing and understanding the historical urban landscape.

With the help of primary and secondary sources such as archaeological reports, period paintings, funerary objects, literary documents, extant architectural examples and current knowledge as the basis for interpreting, first, the architectural style of the Tang period, and, second, the cityscape of Chang'an, digital models were made. Digital models were made of urban elements such as bridges, corridors, gates and walls, etc., and individual buildings such as pavilions, houses, towers, shops and the like. These models were constructed at different levels of resolution and they were then combined first to form compounds and later to create wards and finally the entire city (Heng Chye Kiang 1995). Some aspects of the reconstruction were, to an extent, conjectural. In such cases, deductions and projections were made based on historical evidence and interpretation. However the experience of the virtual city is only as accurate or as good as the model itself and therein lies the difficulties.[2]

Textual mapping the digital models also poses problems as the colors and textuals of the materials (and buildings) have to be created. Repeated trials were made to render the models as close as

Fig. 1

possible to what we consider to be accurate.[3] However, conjecture is once again inevitable.

Multimedia Package

With the completion of the reconstruction and modeling process began the production of an interactive multimedia package on Tang period Chang'an for the Asian Civilisations Museum in Singapore. The package has to be user friendly and accessible to the layperson. This involves the generation and assemblage of different forms of information ranging from text, graphics, slides and digital still images to animated sequences and audio signals. With the help of authoring software Icon Author, a user graphic interface was designed and developed allowing the user a variety of options and a certain level of control over his itinerary in the virtual city.

The objective of the package is to reveal to the layperson the cityscape of Tang period Chang'an. As such it has to present to the user as complete an understanding of the city as possible through animated sequences of the following:

- General bird's eye view of the city,

- Mingde Gate, the main gate of the city as well as a view of the city from the gate tower,

- Zhuque dajie, the major N-S avenue,

- A major temple compound as well as the interior of a temple,

- Walled residential wards of various densities as well as residential compounds,

- A market ward,

- Daming Palace complex and the two compounds of Hanyuan Hall and Linde Hall,

- The landmarks Dayan pagoda and Xiaoyan pagoda

These sequences were scripted and generated and together with still images, texts, and slides of archaeological sites combined to give the viewer an interpretation of the cityscape of Tang period Chang'an. A first version of the multimedia package was completed in April 1997.
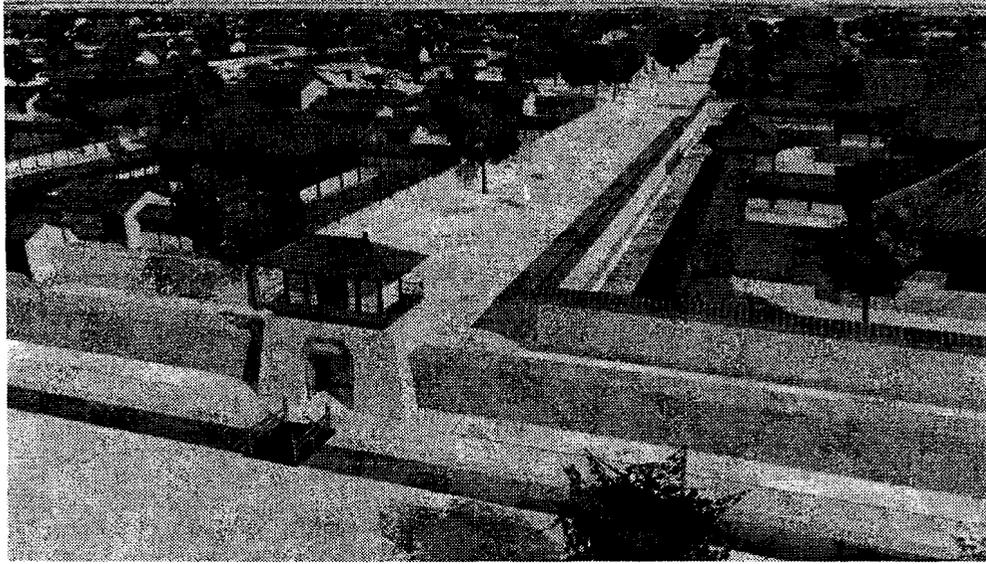
Fig. 2

A second version of the multimedia package completed two years later was installed in the Asian Civilisations Museum in April 99. It now incorporates the latest interpretation of archaeological data, better graphics as well as audio information. The user interface has been completely redesigned with the presentation made more user friendly. A complete tour of the package lasts an hour.

Even with the completion of the second version, the multimedia package will still need constant updating as our understanding of the city increases as more archaeological findings are available. The package presented at this conference is just a beginning, a platform for further discussion and for arriving, subsequently, at a better understanding of what was once a great city. While information
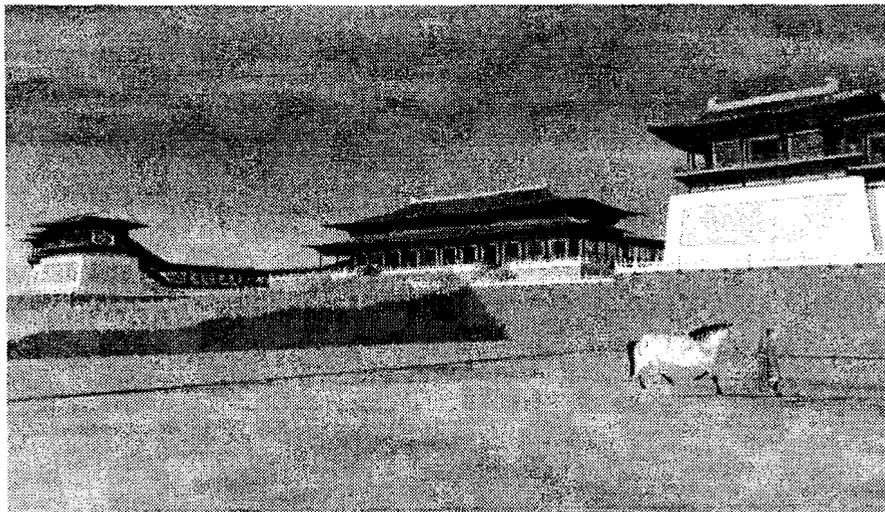

Fig. 3

technology helps enormously in this pursuit, it is the accuracy of, or at least the accountability of decisions made in the reconstruction of the city, that is of paramount importance. The contribution of this package lies less in the use of the technology than in what the author believes to be the most accurate reconstruction of Tang period Chang'an ever attempted to date.

Notes

1. The reconstruction has benefitted from discussions with and feedback from An Jiayao, Fu Xinian, Shi Nianhai, Wu Liangyong, Yang Hongxun, and Zhao Liying. Shortcomings and oversights of reconstruction are solely attributable to the author. The team working on the multimedia package includes Gan Ser Min, Leong Lai San, Eng Wang Kwoon and Dorothy Man.

2. While it is relatively manageable to model buildings that look 'Tang-like' one is far less certain where the layout of Tang building complexes is concerned as there is little to depend on. Although there are examples of house compounds and extensive temple complexes in the Dunhuang murals, the credibility of these layouts depicted is still subject to debate. We could also consult contemporary religious complexes in Korea and Japan. Early Chinese Buddhist temples, according to some scholars, were 'faithfully copied in Korea' although later Korean designs beginning in the sixth or early seventh century began to exhibit local characteristics. However as there were no examples of Chinese temple layout from the Tang period, reference to Korean and Japanese examples is necessary. These same difficulties are also encountered in the reconstruction of Tang domestic and commercial architecture. At yet another level, determining the layout of the walled wards is also problematic. Simple calculation yields an average of 2400 households or residential compounds per square kilometer of ward space. However taking into consideration differences in population distribution within the city, some wards were certainly more densely populated. The density was probably highest in the East and

West Markets and in the wards around them. There were so many shops in the East Market, for instance, that according to the Japanese pilgrim Ennin, some four thousand shops in twelve streets (hang) were destroyed in a single fire that broke out at midnight on the 27th day of the sixth moon in 843. While theoretically the larger wards were divided into quarters and further subdivided into sixteen smaller neighborhoods, large religious compounds or even aristocratic residences in the wards disrupt this pattern. The arrangement of houses, temple complexes and large mansions within each ward is also unknown. The only clues are the location of important residences and religious establishments along the edges of the ward and the fact that the compounds were most probably oriented north-south. If this was the case, then there were certainly more lateral alleys in the wards than longitudinal ones. This theory is substantiated by the layout of the Imperial City. See Heng Chye Kiang, "Visualising the Tang Western Capital Chang'an" for the methodology of reconstructing Tang period Chang'an.

3. Decisions on colors and textures to use were made after consulting contemporaneous murals depicting architecture and urban scenes. An understanding of traditional Chinese construction methods and material is also critical.

References

Heng et. al., "Use of Digital Modelling in Urban Conservation: Case Study of Drum and Bell Tower District in Beijing" in *ICUPHD'97 Cities for the 21st Century*, pp. 189-196, Singapore: CASA, 1997.

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