The Logic of Space and Life

The making of public places in a Chinese residential neighbourhood

61

Arlen M Ye
The University of Hong Kong

61.1

0 Abstract

Until recent past, architects in China interpreted the designing of public place in a neighbourhood unit basically as one of creating a community centre by gathering most amenity and service facilities into one place and giving that place a formalistic layout-a planning attitude which is quite opposite to a "street-centred" residential planning tradition first appeared in Chinese cities in the 13th century. This study argues that the spatial configuration of a housing area and the dynamics of daily life can play an equally vital role in the making of genuine public places-physical settings which are not assigned a "centre function" by design but which have emerged as a kind of "virtual community centre" in a housing area. These public places are basically pedestrian paths-turned-street market occupying strategic linear spaces in a residential neighbourhood and being densely used by local inhabitants and visitors alike. The underlying logic sustaining these public places is captured by space syntax analysis and systematic observations of patterns of pedestrian movement. The findings of the study are discussed in the light of "natural movement" theory of urban grid. A morphological perspective on public space design in housing development is proposed.

Key words neighbourhood unit, public space, configuration, community centre, strategic design choice.

Arlen M Ye PhD
Department of Architecture
The University of Hong Kong, Pokfulam Road, Hong Kong SAR

Tel: +852 28592566;
Fax: +852 25596484
E-mail: arlenye@arch.hku.hk

1 Introduction: The neighbourhood unit and its fictive public space

In the past three decades or so, large housing developments in China have almost unexceptionally been projected after a model known as the "neighbourhood unit", or the "residential sub-district"(xiaoqu) if translated literally from Chinese. Typically, the design of a neighbourhood unit will first undergo a process in which a pattern of life will be programmed in relation to a scheme of communal facilities and certain ideas about social organisation. That pattern will then be materialised in a plan according to a few layout principles. The residential buildings will be grouped together to form clusters of varying size, with respect to a projected population. The local circulation system will be subject to a hierarchical differentiation to ensure traffic safety and to assign different uses to street spaces so differentiated. Shops and communal facilities will be gathered into one place to form a community centre, often in a formalistic layout. Finally a system of green areas will be assigned to open space left over by the deployment of buildings and other physical elements (Bai, 1979; 1993; Ye, 1993a).

Once a housing development is given such a structure, open areas in-between the buildings will also receive their labelling in terms of accessibility and subordinate relations. An open space surrounded by the smallest dwelling grouping, thus will be defined as a "private" or "semi-private" one. Those at the next higher level-i.e. larger open areas enclosed by several dwelling groups, will constitute a second layer

61.2

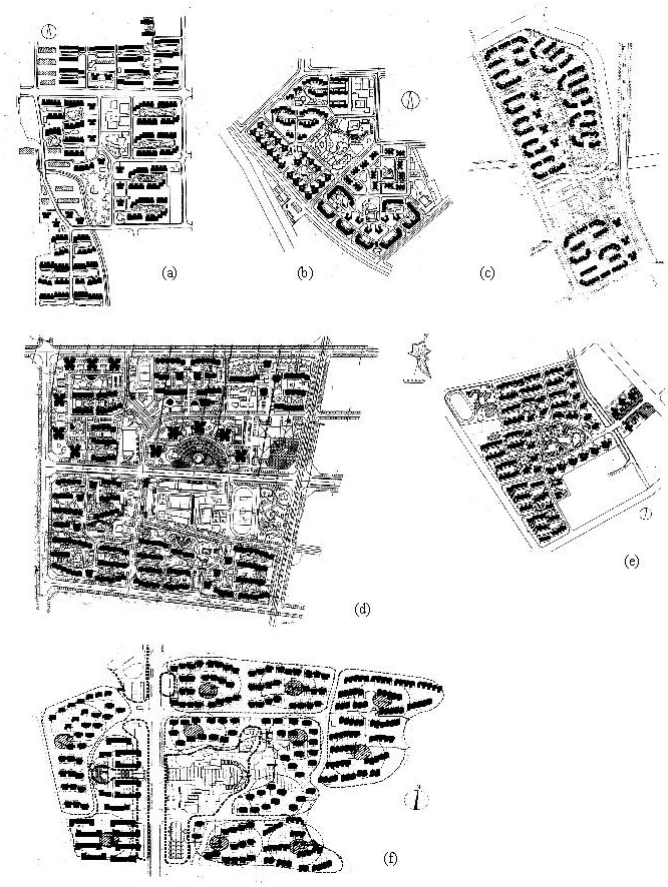


figure. 1 Housing developments recently completed or planned to be built in the different parts of China: (a) Yanzishan neighbourhood, Jinan City, Shangdong province, 17 ha; (b) Canfu neighbourhood, Tianjin city, 12.5 ha; (c) Jiangqiao neighbourhood, Shanghai, 14.7 ha; (d) Yanhua residential district, Beijing, 38 ha; (e) Qinyuan neighbourhood, Wuxi city, Jiangsu province, 12.5 ha; (f) Dongshan residential district, Zhangjiagang city, Jiangsu province, 28 ha. (Source: Bai 1993; Zhongguo xiaokang zhuzai shifan gongcheng jicui, 1996)

of "semi-public" space, and so on. At the highest level of this hierarchy, open space surrounding the community centre will by implication become the only "public" space accessible for both local inhabitants and visitors. Figure 1 gives a small sample of neighbourhood units completed or planned to be built in the different parts of China in the past two decades. The plan geometry of these neighbourhood units differs from each other substantially. The standard of housing and communal facilities also varies within a wide range. As far as the location and differentiation of the public space is concerned, however, we can detect an almost identical structure behind the geometrical dissimilarity of all these developments.

Precisely because of these organising principles, the neighbourhood unit could virtually be adopted by any housing development accommodating no less than seven to eight thousands people, in any urban settlement ranging from a city of ten millions to a village affiliated to some large industrial establishment. Figure 2, for example, is a large housing development in Beijing which is assembled with four neighbourhood units. The development is more than one hundred hectares in size and constitutes at present the largest residential district completed in the city. The fact is, if housing development everywhere in China keeps being designed this way, it wouldn't take very much of our imagination to visualise such a scenario, in which vast tracts in Chinese cities are composed solely by physical entities like the neighbourhood units, with almost identical public space structure.

Has the public space in Chinese residential developments always been configured this way? A review of historical studies immediately suggests that this is hardly the case. For according to some scholars (He, 1980; Yu, 1980; Johnston, 1983), at least by

61.3

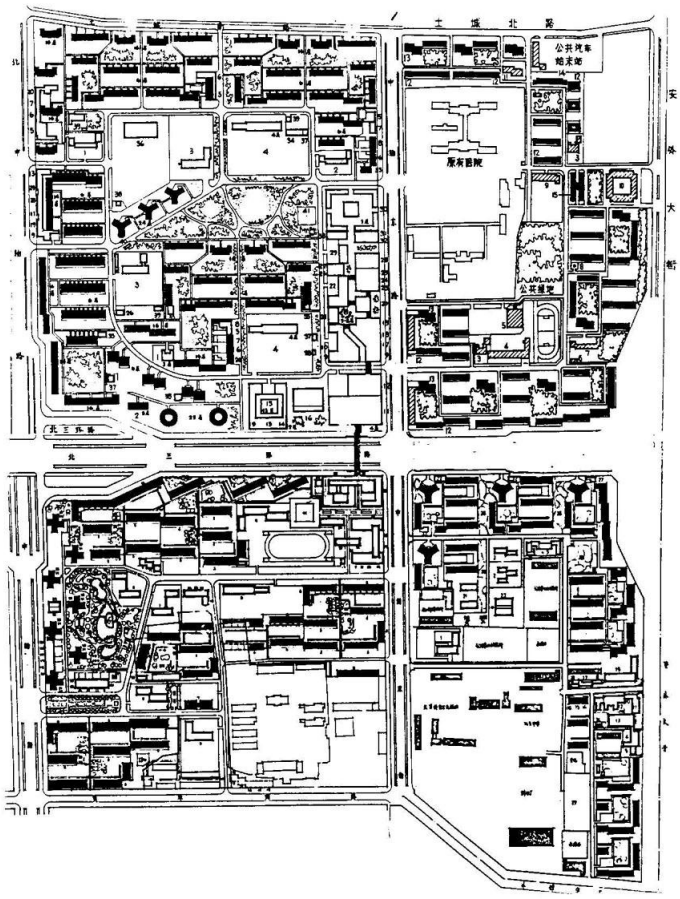


figure 2. *A recently completed large housing developments consisting of four neighbourhood units, Beijing. (Source: Beijing Institute of Architectural Design)*

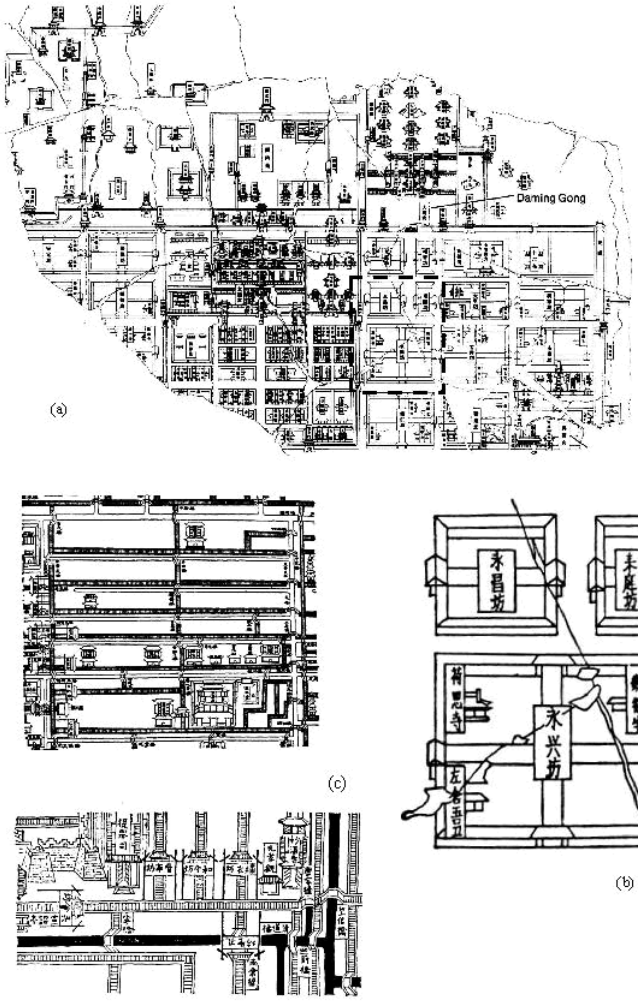
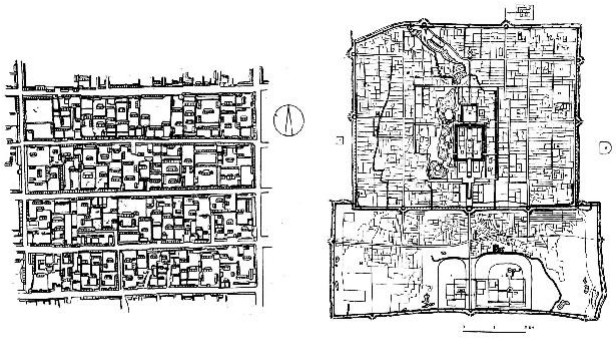


figure 3 *a, b & c. Drawings showing the evolution of housing development patterns from the middle of the Tang dynasty (618-907) to the middle of the Southern Song dynasty (1127-1279): (a) part of Tang Chang-an plan preserved on a stone stele of 1080, showing residential quarters (fang) in the city planning system of the Tang dynasty; (b) a close-up of three residential quarters (fang) from drawing (a); (c) two excerpts from the plan of Song Pinjiang city (present day Suzhou city) on a stone engraving of 1229, showing street-based (fang-xiang) housing development pattern in the Southern Song dynasty (1127-1279). (Source: Yu, 1980; He, 1980; Steinhardt, 1990)*



61.4

figure 4 a & b Drawings showing the plan pattern of Beijing in early 20th century: (a) plan of Beijing (Imperial City) by the end of the Qing dynasty (1911); (b) residential development pattern featuring main streets, minor residential streets or alleys (Hutong), and courtyard house developments. (Source: Zhongguo chengshi jianshe shi, 1982)

the middle of the 13th century, there already appeared an urban pattern in China featuring a what might be called "street-centred" public-space system in residential quarters (Fig. 3c). This pattern lasted for almost seven hundred years until the middle of the 19th century (Fig. 4), when city planning in China was for the first time subject to the influence of Western urbanism along with the setting up of the so-called "port cities"(Fig. 5).

The neighbourhood unit, then, is largely a post World War II architectural phenomenon and is, in particular, an urban design model introduced from the former Soviet Union into China in the late 50s (Bai, 1979). But the root of this model, could be traced back to those visions about human settlements that first captured the imagination of the few pioneering designers and thinkers early this century (Perry, 1929; Le Corbusier, 1935).

The neighbourhood unit model gained a firm foothold in China, as it appears, mainly because it has offered a powerful means of state intervention-i.e. as an efficient instrument for implementing welfare policies in urban housing in a country (Franz+n & Sandstedt, 1981). But it is probably also owing to this ideological legitimacy, the model seems to have attained such an important place in housing design thought in China, so much so that, not only has it become a dominant method for programming and designing mass housing, it has, without our awareness perhaps, also standardised our way of thinking of the public space-space that is largely the component of a fiction rather than the integral part of a traditional urban pattern.

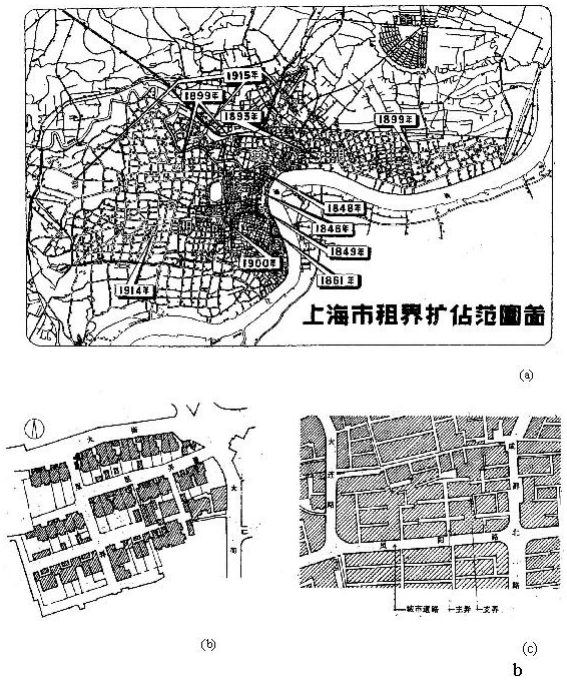


figure 5 a, b & c Drawings showing the evolution of plan pattern in Shanghai since the middle of the 19th century: (a) map showing the expansion of foreign concessions in Shanghai basically in the grid form; (b) residential development pattern within a street block, dwelling form influenced by the town house from the West; (c) residential development mainly composed by tenement houses evolved from vernacular courtyard dwelling. (Source: (a) Zhongguo chengshi jianshe shi, 1982; (b) (c) Bai, 1993)

b

In this paper, I would argue that there is an imminent need to re-examine our conception of public space in modern housing area and the principles for its design. For despite all the "progressive" intent (Choay, 1969: 31) as carried by the neighbourhood unit model, what its layout principles have actually contributed to modern urban form, could to some extent be also seen as a kind of "cultural impoverishment" in open space design. Rather than being open and sensitive to all the subtle qualities as implied by different spatial patterns, intellectually, the way open space design has been simplified and programmed in the neighbourhood unit model, may have already led us into a kind of cognitive cul-de-sac.

While allowing the usefulness of the neighbourhood unit for housing programming, I propose that design should start to search for an alternative perspective on public space formation in the housing area. I will try to clarify my point through a case study in which the space syntax method (Hillier & Hanson, 1984) was used to analyse the spatial configuration of a built neighbourhood unit and its implications for public place formation. The findings of the study will be interpreted with the "natural movement" theory, one which argues that the spatial configuration of an urban layout is capable of generating patterns of pedestrian movement that would be either equalised or multiplied by the location of certain "attractors"(Hillier et al., 1993). I will argue that a genuine public place can arise from street spaces where the configuration of an urban layout tends to play a significant part in generating dense pedestrian movement that in turn would encourage passing trade and other kinds of space use. The paper ends by proposing a morphological perspective on public space formation that advocates a street-centred approach to housing layout design.

2 Urban public space in history and its modern opposite

The traditional pattern of urban housing development in China is basically a street-centred one. This pattern began to appear in Chinese cities in the middle of the Southern Song dynasty (1127-1279) and had constituted a dominating urban characteristic up to the 20th century. In a study of the evolution of city planning ideas and practices between the 7th and the 13th century, the Chinese scholar He Yeju (1980: pp.43-49) identified a what might be called fundamental morphological transformation in urban public space during that period. According to He, until the middle of the Tang dynasty (618-907), the official city planning idea in China was typically represented by a strict separation of commercial and other land uses from the residential one, as evidenced by the planning of Tang Chang-an (present day Xian). In the plan of Tang Chang-an, two super-blocks, called shi (administered marketplace) in Chinese, were purposefully set up to accommodate all the shops and trading activities. The rest of the urban area was subdivided and organised in the form of fang, a walled super-block which was reserved solely for residential development and where no shops or commercial activities were allowed (Fig. 4a & b). Thus, if there was any place in Tang Chang-an which can be called a "public place" by planning, that place could only be found in the "official" marketplace. Streets, on the other hand, were reduced to some "mono-semantic" space devoted to circulation and ceremonial procession only.

Since that time, this rigid separation of residential development from the commercial ones by means of physical planning had undergone fundamental transformations that led eventually to the establishment of fangxiang-a "street-centred" urban

pattern by the Southern Song dynasty (Fig. 4c). In a city planned according to the fangxiang pattern, shops were permitted to open onto streets surrounding a residential quarter (fang) as well as onto its interior; walls and guarded gates once encircling a residential quarter were removed to create a continuous urban fabric in which the xiang (residential street) functioned as a uniting rather than dividing element. Also gone is the shi, the official public place established by earlier city planning system. While the xiang-residential streets surrounding which housing developments would unfold, arose as the de facto public space in the modern sense of the expression.

61.6

From an urban design point of view, He's study is more than the clarification of a historic fact of city building in China; it has contemporary relevance and significance as well. For what his study told us, is not only about the shifting from a city planning system dictated by political ideological ideals, to a system which was to a large extent brought about by economical development of the time. It shows that the same process had been inextricably accompanied by a morphological change which indicates how genuine urban public space-in this case minor residential streets arising as the main stage of civic life-would have come into being once residential planning was freed from ideological doctrine.

There is no historic study that attempted to clarify if the urban pattern first established in the 13th century had been officially accepted by later dynasties as a city planning model. But most physical evidence so far available seems to be suggesting that that pattern had been since adopted by city builders almost like a quasi-official planning principle in China, if not also functioned in an autonomous way regulating the relationship between residential buildings and public space (Fig. 4).

Western influence coming with the establishment of the "port cities" in China had somewhat changed the traditional Chinese urban pattern but had not eliminated its essential configuration. Subdivision of urban land had been more influenced by the what might be called "quasi-grid" pattern than by traditional block form. Denser, hybrid row house developments had been in place of typical courtyard house which was more suitable for traditional mode of living featuring a large household. But the configuration of the public space in traditional Chinese cities, i.e. a web of streets and alley-streets closely defined by a mixture of housing and other land uses, seems to have remained unchanged (Fig. 5).

The introduction of the neighbourhood unit model and the Modernist planning approach into housing development in Chinese cities, then, has not only changed the evolutionary course of urban pattern but also our design conception of the relationship between buildings and open space. Streets have been isolated from the buildings in order to be treated as an independent element and be subject to a hierarchical differentiation based on rational, functional considerations. Layout of residential buildings has been freed from the constraints of urban grid and has been manipulated to create various types of enclosures and domains, often based on dubious assumptions. Public space has been extracted from its humble, residential street origin and has been assigned with particular location, layout form and symbolic status. What has been replaced, is the kind of interface relationship

between buildings and streets that characterises a traditional residential development pattern, and a subtly differentiated open space system in which a public place tends to emerge as a natural extension of the street space.

Admittedly, the requirements of modern urban living and, in particular, contemporary mode of housing development, have rendered certain changes in traditional urban pattern almost inevitable. But the satisfaction of modern requirements does not necessarily mean that the spatial organisation of a housing area should be conceptualised in the way as it has been produced and reproduced. In this respect, thinking in terms of a "tree structure"(Alexander, 1965) and a "reversed solid and void relationship"(Krier, 1979) in urban design, as it appears, to a large extent should be held responsible for the general trend in housing design thinking identified earlier. If design ever wants to get out of this cognitive cul-de-sac, then the first issue we will have to address is to search for alternative ways to think of spatial pattern in modern housing developments.

3 Morphological description of space and life in a neighbourhood unit

I would like to use the morphological structure of a neighbourhood unit to illustrate an alternative approach to thinking of as well as designing the public space in modern urban housing. The neighbourhood unit whose open space has been examined is the Caixian Cun housing development in Suzhou City, China.

Suzhous is a regional city boasting a long history and a canal system that has played an important part in local transportation since the ancient time. It is also the city where the street-based (fangxiang) residential pattern was first documented on a stone engraving and had been adopted for housing development until the 19th century (He, 1980; Yu, 1980; Johnston, 1983). But despite its proclaimed intent to take into account these contextual features, the Caixian Cun housing development was designed according to a completely different plan pattern whose main features are described as follows (Fig. 6).

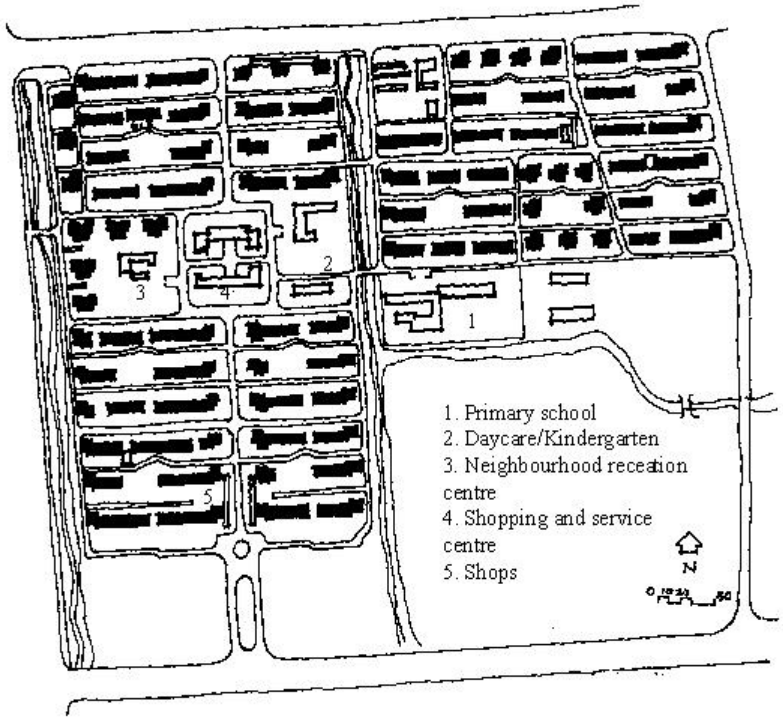


figure 6 Caixiancun neighbourhood, Suzhou, site plan.

The development was located in a newly expanded district containing several large housing projects and other developments but was neatly demarcated from its surroundings by streets and canals. The residential buildings of the development were arranged in parallel rows to imitate the traditional "fangxiang" pattern. These row buildings however were cut into smaller segments to be grouped around some landscaped open areas to create a series of semi-public domains in a spatial hierarchy. While the street system of the development takes the form of a grid, that grid system is designed for circulation within a single development rather than cross-development movement given the super-block solution adopted by city planning. Finally, instead of locating shops and service facilities along minor residential streets accessible for the local inhabitants and the passers-by, the designer chose to bring most of the communal facilities and shops into one place to create a community centre in the middle of the development. In terms of plan arrangement, therefore, the Caixian Cun housing development was modelled a perfect neighbourhood unit, with its hierarchically differentiated public space system.

Has a characteristic pattern of residential life actually evolved in line with this structure, then? And, if there is any pattern of space use which can be systematically described, then how far can the plan aspect be linked to that pattern? It was with these questions in our mind that we made a space syntax analysis of this neighbourhood, which in turn belonged to a more extensive investigation of the morphology of the neighbourhood units (Ye, 1993b).

3.1 Plan configuration and the making of "virtual community centre"

The way life is unfolding in the Caixian Cun neighbourhood initially would leave one the impression that the design logic underlying its layout seems to be working exactly as intended. The main street of the neighbourhood, which constitutes its main north-south axis and is the only access street on which motor vehicles are permitted, appears to have attracted most of the local traffic coming to and leaving the neighbourhood. Minor streets that at once separate and connect dwelling groupings seem to have been occupied predominately by the local inhabitants moving between these groupings. Finally open spaces inside individual dwelling clusters appear to have been largely deprived of pedestrian flow because of their relatively segregated position in a space hierarchy, and so on. However, a more careful examination of the way public space at different levels are used, nevertheless suggests certain disagreement between a public space's labelling and its actual performance.

The main north-south street of the neighbourhood, for example, is one which probably received the best design treatment among all the streets in terms of dimension, landscaping and maintenance. And yet it is both designed and used as a mere movement channel rather than a residential street on which spontaneous use of street space other than movement might take place. The community centre of the neighbourhood is situated in the most "public" place where most of the commercial and amenity facilities are concentrated and ample open space is provided for public gathering and the like. Despite these obvious advantages, however, the place seems to have never acquired the kind of liveliness to match its scale, capacity and location. But the most interesting and also most thought-provoking pattern of space use found in this neighbourhood, is related to a street market evolving along two minor streets

(a)

(b)

figure 7 a & b Street market spontaneously formed along two pedestrian paths inside the Caixiancun neighbourhood: (a) a half-permanent market formed along pedestrian path numbered as line 69; (b) a vegetable market formed at the crossing of axial lines No. 69 and No. 32.

inside the neighbourhood (Fig. 7), even though these streets were intended primarily as pedestrian connections between smaller dwelling groupings in a circulation hierarchy. Can we find a design explanation for all this?

A syntactic analysis of the Caixian Cun neighbourhood was carried out in order to clarify this and other questions. Axial modelling was first applied to the street network of the neighbourhood to describe its integration pattern and some other configurational properties. The integration structure so captured is indicated by axial elements making up the top 25% and the lowest 25% of the total integration value of the system, respectively (Fig. 8). Using that structure as a reference system and as a criterion we then selected a sample of street segments (by their respective integration value) and made systematic observations of pedestrian movement taking place on these spaces. The number of people found as moving on them within

a given time was correlated to the integration values of these spaces to search for trends of co-variation. Fig. 9 gives the route used for observation of space use and movement in the Caixian Cun neighbourhood and a scatterplot showing the correlation between its morphological property and movement density.

Among other findings of the analysis the most important one is about the integration structure of the neighbourhood. Despite the designer's effort to create a community centre featuring a strong axis and a large building compound, the few most integrating streets of the neighbourhood, as indicated by numbered axial lines in Figure 8, turned out to be all clustered around an area off that centre. And this integration structure later was also shown to have a describable relationship with the way people move about in the neighbourhood once observational data was correlated to integration which produced a strong co-efficient value (r = 0.767). Thus, while the open space of the neighbourhood had been entirely subjected to a hierarchical structuring and most communal facilities had been located accordingly, a morphological analysis of the neighbourhood seems to be pointing to a different logic-the logic of its plan configuration-that has also played a role in affecting the use of street space. But can we link this configurational dimension also to the spontaneous formation of street market in the neighbourhood?

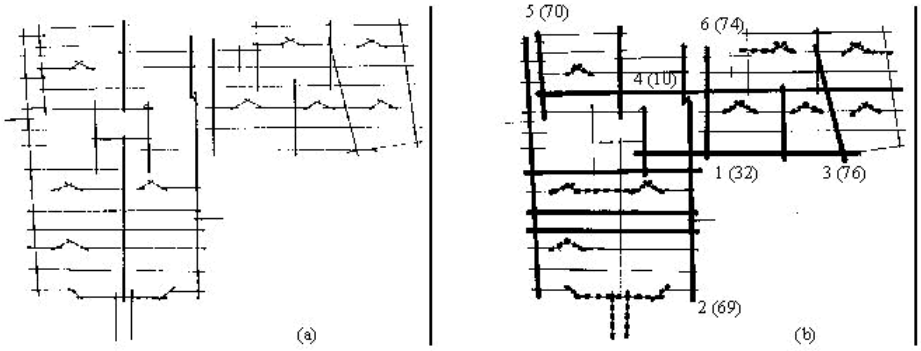


figure 8 a & b (a) Axial map of Caixiancun neighbourhood; (b) integration map showing the 25% most integrated axial spaces (thick black lines with ranking order of their integration values) and the 25% least integrated spaces (dotted lines) of the neighbourhood, number in parentheses indicate the coding number of axial spaces.

To answer this question we need to turn to the "natural movement" theory of urban grid (Hillier et al., 1993). According to this theory, the spatial configuration of an urban system, i.e. the way in which spatial elements (streets, alleys and so on) are linked together to form a kind of global pattern, should be seen as the primary generator of pedestrian movement patterns. Whereas retail land uses are located on a particular place primarily to take advantage of the opportunities offered by passing trade and would act as multipliers on the basic pattern of pedestrian movement generated by configuration.

The way in which street markets have been formed along two minor streets in the Caixian Cun neighbourhood exactly reflects this morphological principle working in a housing area. The provision of commercial floor areas inside the neighbourhood was so rigidly programmed that some additional accommodations for farmers and craftsmen to sell their surplus products were never taken into consideration by the developer of the housing area. While the plan configuration of the neighbourhood was shown to have a describable impact upon the distribution of movement, in that the more accessible a street or alley appears to be for those moving from one place to another, the more people one can expect to find using that street. Thus, for

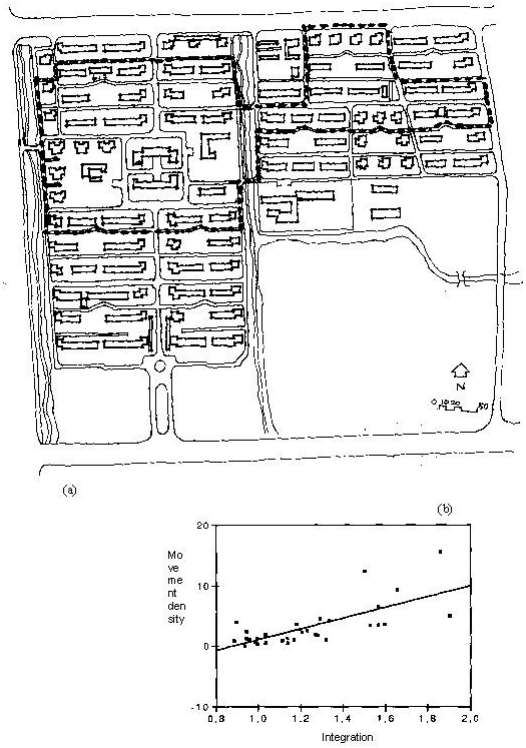


Fig. 9 (a) Map showing the route used for observation of pedestrian movement in Caixiancun neighbourhood, on route including 32 space segments; (b) scatterplot showing the correlation of movement density with integration (r = 0.767).

those who were eagerly looking for the best opportunities offered by passing trade around the neighbourhood, the busiest pedestrian streets naturally would become their first choice of location. And this, may well explain why the two strategic linear spaces picked by the street marketers turned out to be also the two most integrated ones in the neighbourhood (see Fig. 7 & Fig. 8).

Once the complex relationships between a housing layout, its intended as well as unexpected impact upon patterns of space use are disentangled by space syntax analysis, we may have also gained a better understanding of the configurational logic of urban form-one that is capable of contributing to the making of genuine public place. For if we accept that a truly successful public place in an urban area should be a space that enjoys maximum spontaneous use and visit by people, while the pedestrian path-turned-street market in the Caixian Cun neighbourhood appears to be exactly such a place, then the configurational dimension of the neighbourhood must have played a part in its formation. In the same sense, we can probably also call those pedestrian spaces containing the street market a "virtual community centre", in that they are not open spaces assigned a centre function by design, but physical setting that functions as the central stage of community life whose very existence and vitality is conditioned by the spatial configuration of the neighbourhood.

4 Tradition, modernity, and a morphological perspective on public space formation

There is one question that has engaged many of us who are concerned about built form and its relation to social life in a time when old urban residential developments will inevitably be subject to a process of modernisation at various levels. What physical aspect in a traditional residential pattern should be recognised as essentially relevant and therefore be retained or even carried forward into modern housing environment? This is a very difficult question. While sociologists may satisfy themselves

by objectively presenting us basic differences between traditional or vernacular housing environments and the modern ones as well as their implications for patterns of residential life (Chua, 1991), for the concerned designers and decision-makers a more imminent issue is how to address the question at the level of spatial planning.

At the level of large housing development like the neighbourhood unit at least, my suggestion is that the way in which public space was configured in traditional residential pattern should be the focus of design attention. More specifically, I would argue that, instead of using circulation space as a dividing device to organise a housing development in a hierarchy of groupings, we should make the streets an uniting element in creating a continuous urban fabric.

61.12

The transformation from a fang-based (walled super-block) residential planning attitude to a fangxiang-based (street-centred) residential development pattern in medieval China took more than 400 hundred years. But once established, the latter has since become what might be called "traditional residential development pattern" in Chinese cities (He, 1980). In a street-centred housing development in Chinese cities, streets of varying character and the public space are almost like synonym. It is the Modernist city planning concept and the neighbourhood unit model that radically changed our conception about the relationship between buildings and open space and, in particular, about the initially inextricable relationship between the two categories.

But the configurational logic underlying an urban grid is always there, irrespective whether it is a traditional evolutionary pattern or a modern, designed housing area. Where there is less restriction, the morphological principle tends to play a more obvious role in the making of genuine public space. Ignore the relevance of this fundamental physical property to our question at issue, we will sooner or later end up with living in cities full of fictive public spaces as an unavoidable by-product of current housing planning model. Adopt a "street-centred" approach to housing layout design in historic as well as modern cities and focus on this morphological aspect whenever we design public space in housing areas at different levels, we would at least have a chance to preserve what appears to be essential to urban life-and at the same time-transcend what truly belonged to the past.

To say that we should adopt a street-centred perspective on public space formation in modern or even "post modern" urban setting does not offer a concrete design solution itself. But it may have identified the conceptual level where there is one way to address our question.

5 Acknowledgement

The author wish to thank Professor Bjorn Klarqvist at Chalmers University of Technology who co-conducted field studies of the Chinese neighbourhood unit reported in this paper.

6 References

Alexander, C (1965) "A City is Not a Tree". Architectural Forum, April/May, 58-62.
Bai, Demao (1979) "On Residential District Planning". Jianzu xuebao (Architectural Journal), 1: 7-11 (in Chinese).
Bai, Demao (1993) Residential Environment Design. Beijing: Building Industry Publishing (in Chinese).

Choay, F. (1969) The Modern City: Planning in the 19th Century. New York: George Braziller.
Chua, Beng-Huat (1991) "Modernism and the Vernacular": Transformation of Public Spaces and Social Life in Singapore". Journal of Architectural and Planning Research. 8(3): 203-221.
Franz+n, M. & Sandstedt, E. (1981) Grannskap och Stadsplanering (Neighbourhoods and Urban Planning). Uppsala: Acta Universitatis Upsaliensis, studia sociologica No. 17 (doctoral dissertation).
He, Yeju (1980) "Evolution of Marketplace and Residential Quarter in the City Planning System of the Tang and Song Dynasties". Jianzu xuebao (Architectural Journal), 2: 43-49 (in Chinese).
Hillier, B., Hanson, J., Penn, A., Grajewski T., Xu, J. (1993)"Natural Movement: or, Configuration and Attraction in Urban Pedestrian Movement". Environment and Planning B: Planning and Design, 20(1): 29-66.
Hillier, B & Hanson, J. (1984) The Social Logic of Space. Cambridge: Cambridge University Press.
Johnston, S. (1983) "The Ancient City of Suzhou". Town Planning Review, 54(3): 195-222.
Krier, R (1979) Urban Space. Academic Editions, London.
Le Corbusier (1935) La Ville Radieuse Paris. Trans. (1967) as The Radiant City, London: Faber.
Perry, C. A. (1929) "The Neighbourhood Unit". Regional Survey of New York and Its Enviorns VII. New York: Committee on Regional Plan of New York and its Environs, 22-140.
Peponis, J. (1993) "Evaluation and Formulation in Design.". Nordisk Arkitekturforskning (Nordic Journal of Architectural Research), 2: 53-62.
Steinhardt, N. S. (1990) Chinese Imperial City Planning. Honolulu: University of Hawaii Press.
Zhongguo chengshi jianshe shi (1982) The History of City Planning in China. Shanghai: Department of City Planning, Tongji University (in Chinese).
Ye, M. (1993a) Housing Layout and Space Use. PhD Thesis, School of Architecture, Gothenburg: Chalmers University of Technology.
Ye, M. (1993b) "Housing Layout Design." Nordisk Arkitekturforskning (Nordic Journal of Architectural Research), 2: 75-95.
Yu, Shengfang (1980) "A Masterpiece of the Ancient Chinese City Planning" Jianzu xuebao (Architectural Journal), 2: 15-20 (in Chinese).
Zhongguo xiaokang zhuzai shifan gongcheng jicui (1996) Selected Examples of Good Housing Design. Vol. 1. Beijing: Building Industry Publishing (in Chinese).