The Journal of Sociology & Social Welfare

Volume 17
Issue 1 *March*

Article 4

March 1990

Housing and Health in Beijing: Implications of High-rise Housing on Children and the Aged

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The authors are at present engaged in a Swedish-Chinese interdisciplinary and crossectional project on housing and health in Beijing. This article is concerned with a literature review on the topic and general observations during two recent visits to China.

After some basic assumptions concerning high-rise dwellings, private space and life style, this paper contains explicit comparisons of the design, use and experience of traditional courtyard houses, flats in mid-rise and high-rise buildings as well as a comparisons of two vulnerable groups , i.e., children and elderly residents.

The article ends with a discussion, and the authors conclude that city planning without involvement of specialists from the field of psychological factors and environmental health (i.e., a matter not only of quantity but also of quality) will provide an inadequate environment for the development of children and care of the elderly.

The *aim* of the article is to give an outline of, as well as a presentation of the *first phase* of a project entitled "Effects of various types of city dwellings on family functions and the health of children and the elderly in the People's Republic of China". The article is based on general observations from two visits to China in December-87 and October-88 completed with some findings in the literature on the implications of urbanization on dwelling, health and well-being. The *second phase* of the project is to start analyzing the systematic measurements from the field study. The systematic measurements have not yet

been analysed. This will start in spring 1989 and will last about one year.[1]

We assume that change from traditional dwellings to mid- and high-rise dwellings, as it is presently carried out, implies changes in both the private space and the lifestyle of Chinese families (especially the young and elderly). From our preliminary and general observations during two visits in Beijing we have come to the following basic assumptions:

(a) Rapid changes in the built environment demand a lot of mental activity in the sense that the inhabitants must *appropriate* (Korosec-Serfaty, 1976) the new environment and learn how to use and live "together" with it. The individual capability for this kind of adaptation and assimilation is usually high when the individual is young but becomes very low among elderly persons (refer to diagram 1).

(b) Rapid, radical and extensive changes to the built environment make a lot of people lose their "home-feeling". Cultural and individual identities will be put under stress and partly lose their connections with the built environment. The cultural heritage and earlier appropriated knowledge, concerning the environment, will extensively be useless in new high-rise residential areas (refer to diagram 1).

(c) The built environment may help, counteract, or make it difficult to satisfy the needs of human beings of *contact* (seeing, listening to, speaking with or interacting with others) and of *privacy* (being able to screen oneself off from others and from external influences), *experiences* (to be able to see, hear, etc.) *play* and *development, structure* (to be able to guide, to be able to place things in the environment in relation to myself), *identification* and *aesthetic* (symbols, order and values of the building).

(d) The building environment may variously and to a varying degree satisfy the needs of the supply of social and commercial services, places of work, cultural and recreational activities as well as collective transport facilities.

1 This article is descriptive. The data from the field study mentioned in the text is not finalized. Therefore statistical comparisons are excluded in this version.

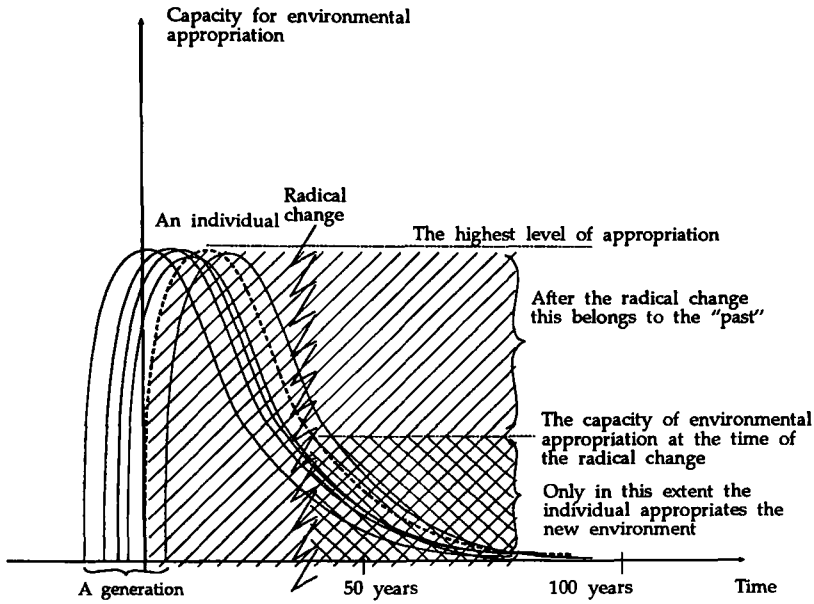


Diagram 1. Capacity for environmental appropriation through the life span.

1. The assumptions (1) and (2) could in a simple form be illustrated by a diagram. Individual capacity for environmental appropriation is indicated on the Y-axis. On the X-axis, time (age) is visualized. The capacity of environmental appropriation is best when the individual is between 5 and 20 years old and the most intensive period is probably between eleven and fifteen years of age. Afterwards the capacity decreases and in the last part of the life cycle it is very low. If the environment changes fast and radically when the person has passed the peak of her capacity, her relation to the new environment will be correspondingly reduced. The older the individuals are the more they will became strangers in a changing environment.

In this article we make an explicit comparison between the old traditional house type, the one-storey courtyard house, and the modern flats in mid- or high-rise buildings. We also pay attention to the different ways of living in the two kinds of houses and the impact upon children and the elderly.

A Swedish-Chinese Joint Project

The authors are engaged in an epidemiological research collaboration between the Department of Stress Research, Karolinska Institutet, Stockholm and the Institute of Mental Health, Beijing Medical University. Today some of the collaboration also includes the Department of Architecture at Chalmers University of Technology in Göteborg and the Department of Architecture at Tsinghua University in Beijing. The project has been approved by the Ministry of Health in Beijing and is funded by the Swedish Council of Building Research for a period of three years.

The project endeavours to bring about interdisciplinary and crossectional epidemiological research collaboration and result utilization.

In the project we have selected 120 three-generation households, comprising approximately 600 persons in Beijing in an area called Western District, well known to the collaborating Chinese researchers. The Western District is comprised of a little more than 30 neigbourhood committees. Among those, five were selected by representative sampling. Each household includes at least one person from the oldest generation, and a child 14 years old or younger. The household should have been living in the same place for not less 18 months. The sample of households represents three types of dwellings with 40 households selected from each type:

(a) *Dwellings in traditional courtyard houses* dating back to the time before 1949 (usually one-storey buildings around an open quadrangular courtyard, often very densely populated and without modern conveniences)

(b) *Dwellings in mid-rise buildings* (flats in 3–6 storey houses, usually constructed in the first decades after 1949)

(c) *Dwellings in high-rise buildings* (flats in 7–20 storey houses erected from 1977).

Such a small sample cannot possibly be representative for Beijing and still less for China in general, but it still represents three of the most common dwelling types in large contemporary Chinese cities.

The questionnaires were administered in structured interviews by two medical doctors (one asking, one recording). The documentation of the physical environment, including inside measurements and time-space diaries, was carried out by two architects. The field-study is finished and the analysis of the data started during Spring 1989.

Some Facts about Housing in Beijing

The People's Republic of China has the world's largest rural population, in absolute figures as well as a portion of the total population. An enormous surplus of labour results from the current rapid mechanization and modernization of Chinese agriculture. Half the population is 21 years or less, and mean length of life is increasing, so the population is sharply increasing: during the next 14 years there will be an increase of 200 to 300 million people. At the same time, the rapid expansion of light industry creates a huge demand for labour, primarily in small- and middle-size towns. Together, these developments are predicted to cause a wave of urbanization and crowding without a counterpart in history (Levi and Tseng, 1983; Ekblad, 1985). At present, rapid urbanization has increased the urban population to roughly 40% of China's total population (Lavely, 1989). The term urbanization in China concerns an intermediate sector that is neither city nor farm, i.e., farmers who leave the land to ply trades in market centers in rural areas (i.e., towns). The world's largest and oldest agrarian state will become a predominantly nonagricultural society. A housing shortage will become a real and acute social problem. Yet, the results of published studies on crowding, density and absolute numbers are not clear. However, Chinese families, appear to manage without the negative effects of crowding that might cause serious stress in Western societies (Mitchell, 1971; Andersson, 1972). The urbanization process has established city populations, i.e., "floating population" of temporary migrants who lack permanent urban registration. Official data indicate that the floating population makes up approximately 10% of the urban population in Beijing. The Chinese government undertook a number of programmes as part of its activities for the International Year of Shelter for the Homeless during last year, 1987. (Some facts about Beijing are found in Table 1 in the Appendix).

Traditional Architecture, Housing Policies, and Dwelling Designs

Introduction

The Chinese cities, and perhaps above all Beijing, have been built in a hierarchical feudal system of square blocks during a thousand year or more. In Beijing this form is dominated and generated by the Imperial residence and the Forbidden City. The smallest unit or cell in this system is the traditional courtyard house. This is still the most frequent residential house in Beijing, especially in the "Outer City", the area outside the Forbidden City but inside the outer wall of Beijing (see map Figure 1). Most of the courtyard houses in this area were built in the Qing Dynasty (1611–1911).

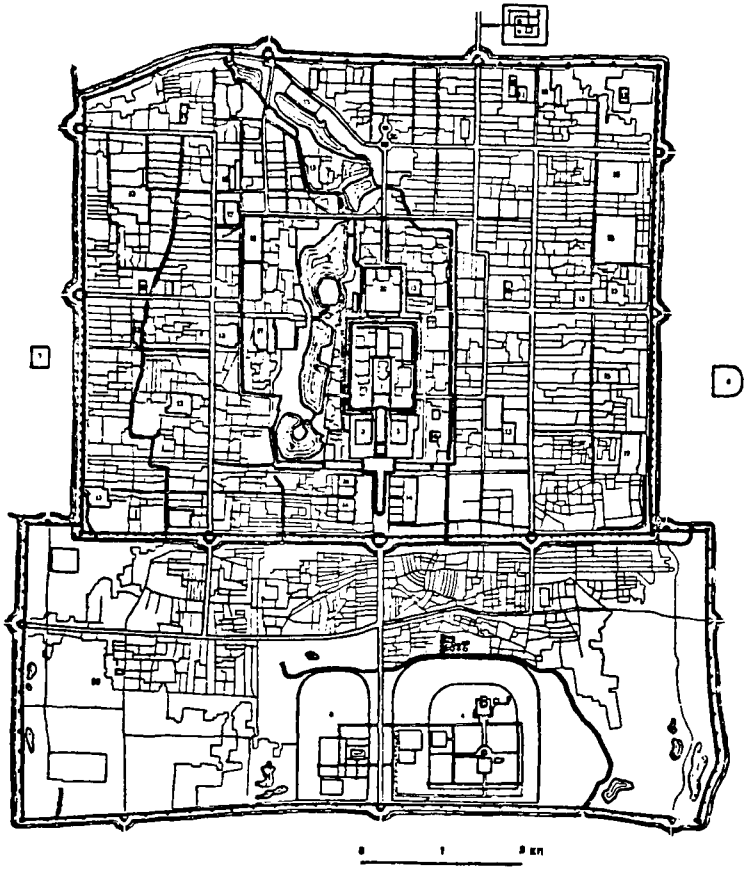
Traditional Courtyard Houses

The basic architectural element used in the traditional concept of city planning is this generic courtyard house, surrounded by a wall. All houses face inwards to the courtyard, and the outer wall encloses it from surrounding units and streets. The streets are like narrow channels, on both sides bordered by heavy walls without any windows and only interrupted by the portals framing the entrances to the courtyards.

The courtyard house is a *type* with many variations. It is mostly a one-storey house, called "ping-fang" in the Chinese language. The organization and the form of the courtyard house is the result of a long process in which the form of the house and the social, economic and cultural needs and habits of the Chinese family, all are developed in a process of interaction. A building regulation system was developed already 700 years ago and later modified from time to time. In the harmonic phases of this process, the house reflects the traditional culture and this culture is correspondingly materialized in the house.

However, today, the courtyard house reflects the feudal society, and it is still quite possible to see, what person a particular courtyard house was initially designed for. Not only the number of courtyards and houses but also the number of *jian* (the area between four pillars), the decorations and even the colours followed a strict code, corresponding to the rank of the

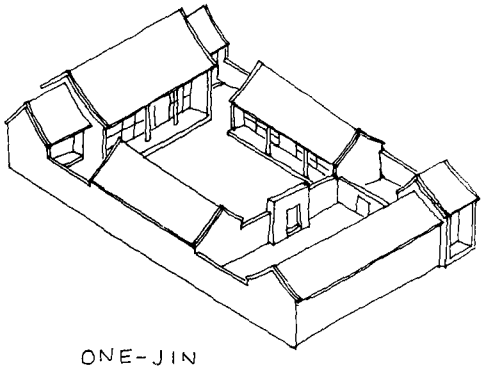
Figure 1.



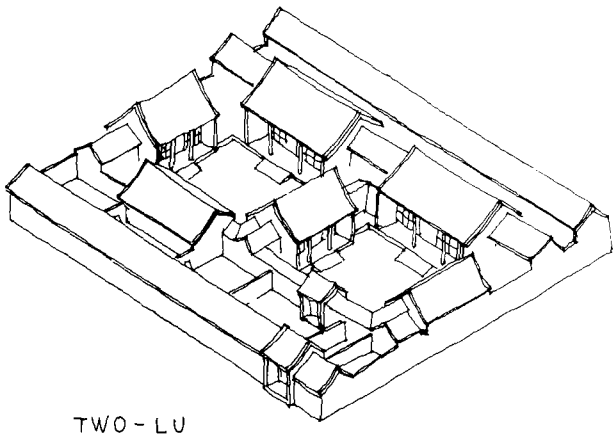
household. According to this system, the courtyard houses were specially designed for each category of princes, dukes, officials of different ranks, and common citizens (Figure 2).

The inner organization of the courtyard also reflected the traditional family system based on Confucian patriarchal principles. In one family there might be three, four or even five generations. The head of the family was the father of the oldest generation and the older generation always had precedence over the younger. All this was worked out in the design and in the use of the buildings and the courtyards between them.

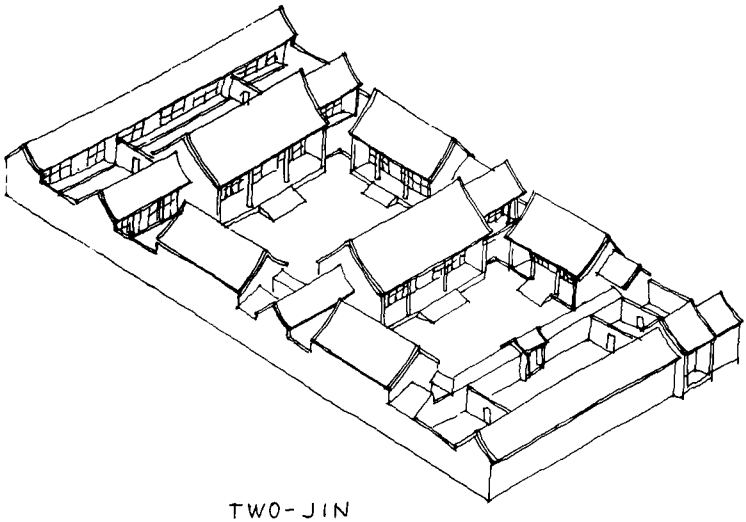
Figure 2.



ONE-JIN



TWO-LU



TWO-JIN

The main axis of a typical courtyard house is from south to north, which is also the length of the rectangle. On each side of the courtyard, buildings or suites of rooms are symmetrically placed. The entrance is at the corner, mostly on the south wall.

Traditionally, the head of the family and his wife lived in the northern house, facing the south. This house was the largest and it was situated on a platform often three steps above the level of the courtyard. Here were also the main living room and perhaps a bedroom for the younger children. Here the family ate, celebrated, and received their guests. Older children lived in one of the east or west buildings and perhaps a married son and his family in the other. The platform of those houses were lower than that of the main building. The south building was occupied by members of the family of the lowest rank, or by servants. This house was also situated on the lowest platform, only one step above the courtyard (Figure 3).

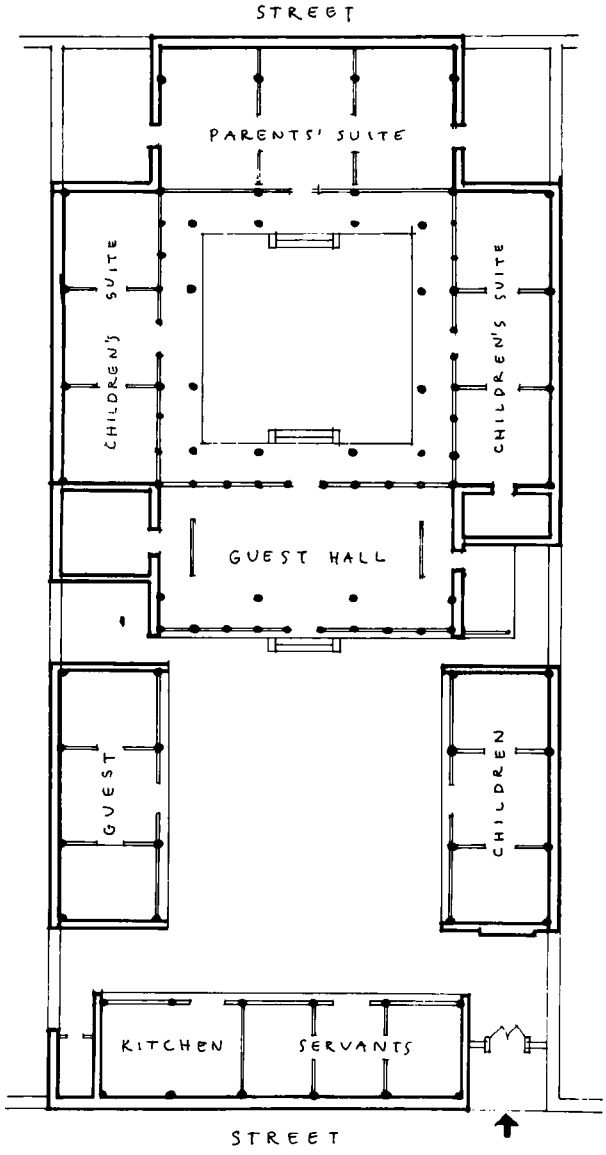
The kitchen, which often dominates the dwellings of many other traditional building cultures, has a less important influence on the organization and design of the traditional Chinese courtyard house. It does not take up any definite room or location and can be set up outdoors on a temporary basis, at the back of the house (when more than one courtyard) or in a side room (Zhao, 1985).

This house type (Figure 2–3) is known to have existed for at least two thousand years and is to be seen on pictures from the Han dynasty (206 BC – 220AD). They have changed very little since. Until 1949, the courtyard house, was the dominant dwelling in Beijing. There was only a small amount of western influence or colonial dwellings.

Transformations after 1949

The traditional courtyard houses are now being rapidly and extensively demolished and replaced by high-rise buildings. According to recent plans for Beijing only a few smaller areas are being preserved and restored (interview at Ministry of Construction). This rapid change will probably lead to a significant change of every day life of the citizens of Beijing, and deeply influence the Chinese culture and society. However, some changes in the domestic culture began immediately after the Liberation 1949.

Figure 3.


STREET
PARENTS' SUITE
CHILDREN'S SUITE
CHILDREN'S SUITE
GUEST HALL
GUEST
CHILDREN
KITCHEN
SERVANTS
STREET

Housing was not given high priority in 1949. The authorities adopted the principle "production first, life second". During the next 30 years the average living space (i.e., the net habitable area such as bedrooms, living rooms, etc.) per inhabitants decreased from 4.5 square meters to 3.6 square meters in the urban areas, due to insufficient investment and construction (Zhang, unpublished).

The policy after 1949 of considering housing as a welfare service, aimed at lightening the family economic burden in view of the prevailing low wage system. The average family expenditure on rent has been 1–3% since then, (i.e., social welfare about the same as the cost of electricity!). In most of the cities of China, until late 1979, domestic space was distributed by local governments or leaders of working units, and family size was one of the major criteria for distribution. Since the onset of the national campaign of one-child families, which China was the first country to launch, in 1979, local government leaders in most cities usually have assigned living quarters of the same size to one-child and to two-child families.

In the 1950s and 1960s the investment in urban housing accounted for no more than 0.7% of GNP. In 1985 according to official statistics, the figure was 3%. The low cost system leads to a shortage of funds for maintenance and repair. Private investment and private ownership of the apartments is encouraged by the officials. According to official statistics the percentage of private urban housing has been increasing from 17% in 1982 to about 20% in 1987. Still there is no private home insurance, which complicates the situation whenever something is demolished in the house or apartment.

From 1949, there was, as mentioned above, an extreme shortage of housing and the traditional way of using the courtyard house, just for one family, was more or less abandoned. Several families were now forced to live around the same courtyard and even under the same roof. Single buildings, which were not originally built to live in, were now used as bedrooms and living-rooms. Extreme overcrowding became common and today the situation is still the same, and in some big cities, for example Shanghai, perhaps even worse. In these traditional residential areas in Shanghai there are still less than three square

meters living area per person. Also in Beijing, many courtyards are densely built-up with a lot of extra small houses, usually erected by grown-up sons of the families living around the courtyard. This in-fill activity was accentuated in Beijing after the big earthquake in 1976 (with its centre in Tangshan), when a lot of households received building materials from the state to repair the damages. This material was often used to erect new small houses in the courtyards.

What actually is happening is that the old traditional social pattern tries to take form, now in a more overcrowded situation, and we can see how the three generation family tries to stick together in the same household but now side by side with other three generation families inside the same courtyard.

The courtyard is still a central part of the traditional Chinese dwelling. It serves as a playground for the children as well as the place for a lot of domestic activities including cooking, repairing bicycles, storing of coal and cabbage, laundering and so on. It is also the place for social interaction between members of the household and people from different households. It is also an open space where the inhabitants meet strangers and other visitors, a private or semi-private zone between the house and the street. Most of these activities still take place in the courtyard, even if the social situation is changed when one family has to share the place with other families. However, this new situation also leads to quarrels with neighbours about the common use of the courtyard.

Today it is a fact that, for some people, the traditional house and the overcrowded courtyard, represent a bad dwelling and a nonattractive way of living. Yet, it is also a fact that many people, without hesitation, would prefer to live in a small courtyard house, surrounded by the network of their own family, than to live in a small apartment in a high-rise building without their family.

Mid-rise in the 1950s

During the first period after the Liberation, buildings and designs of residential areas were influenced by Russian architecture and planning. Types and forms were more or less copied from Russian projects. In some projects at the beginning of the

fifties, some efforts and experiments were made to adjust the Russian types and style to Chinese traditional building culture. These projects were criticized because they were said to cost too much and further experiments became impossible for a long period.

The Russian influence (or rather: Russian transformed West-European influence) represents a break in the Chinese tradition in many ways. Instead of the one storey courtyard houses, 3–6–storey residential houses were erected, so called *mid-rise buildings*. In this new concept of residential planning the "private" or "semi-private" courtyard disappeared and was replaced by open "in-between" space, an open-ended courtyard, directly connected to the street. The extremely diversified and intensive use of the courtyard became reduced to "simple" passage. Concurrently, the character of the streets changed from narrow "channels between walls", to wider streets with visual presence of balconies, windows and views into the space between residential building blocks. People in the streets became more involved in the privacy of the inhabitants, because the visitors and passing pedestrians could now be watched from windows and open courtyards. At the same time, the courtyard became more public because of the open connection with the street and the passing pedestrians.

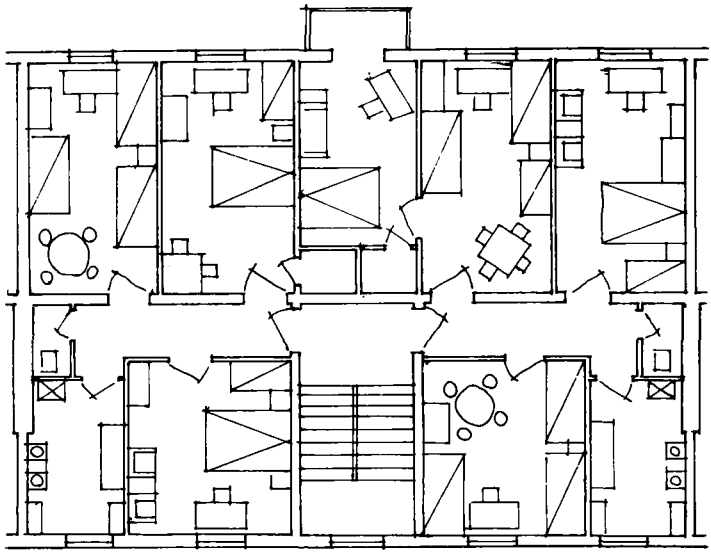
The flats were designed to fulfill the needs generated by an extreme shortage of dwellings. Corridor plans were preferred at first because they allowed a temporary overcrowding of the dwelling with one family per room and common use of facilities such as toilet and kitchen (Figure 4).

Flats in High-rise Buildings

By the mid-1970s, the concept and mode of residential building had changed again. It became directly influenced by Western industrial building systems and high-rise buildings. During the Cultural Revolution, 1966–1976, the building activity was very low.

This caused an increasing demand which brought about a situation that led an insufficient number of city planners, architects and housing developers to solve a lot of problems caused by an enormous population pressure. They have responded

Figure 4.

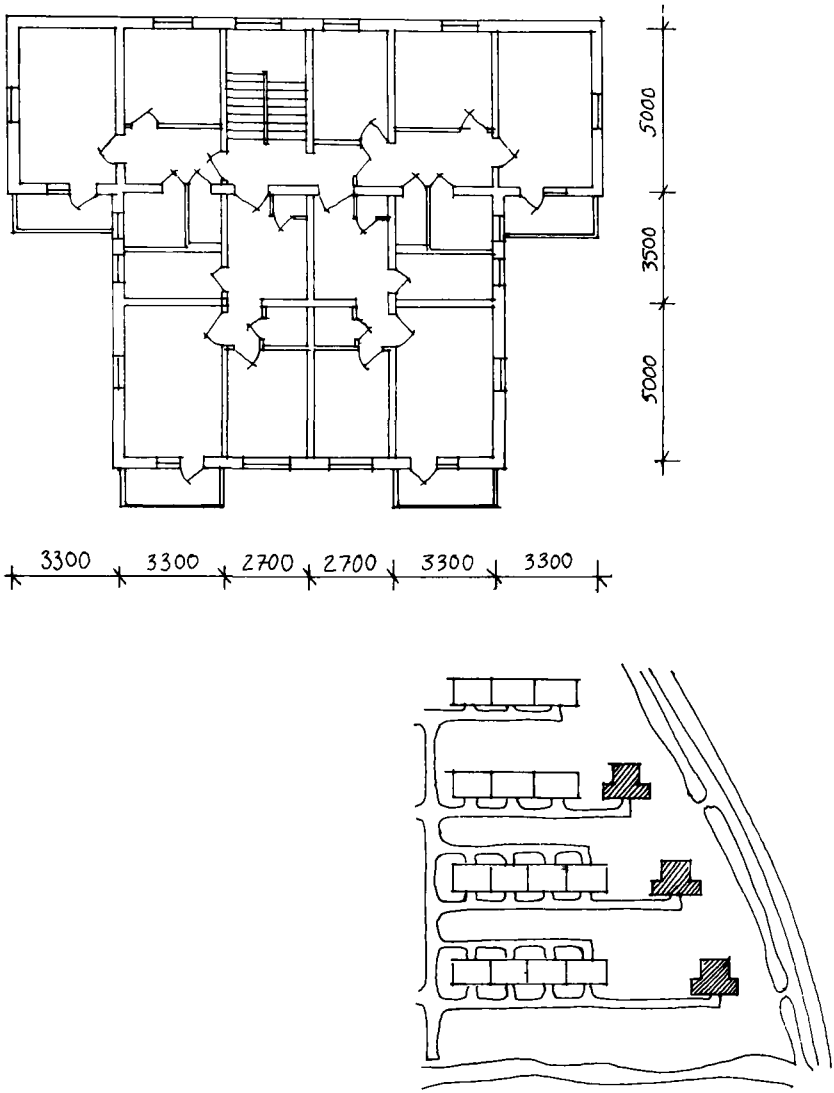


with intensive construction activities often concentrated on high-rise residential buildings (Figure 5) with large numbers of relatively small flats. Concurrently, not much attention was given to the social and psychological consequences of these change to the physical environment. During 1974–75 some experimental systems were carried out for the construction of residential high-rise buildings. On the basis of this work, over 400 000 square meters of high-rise apartment buildings were erected along the Qiananmen Street in Beijing during 1976 (Hu, 1985).

From 1978, we can speak of a *high-rise building boom* in the great cities of China. In 1979–1983, 395 million square metres of urban housing were completed in China.

The proportion of high-rise units is at least 30–50% in the cities of China, and in Beijing nearly all in high-rise. Most of them are 18 stories or more. Each apartment in high-rise costs 70–80% more to construct than in mid-rise. For instance, to construct a high-rise apartment consumes three times as much electricity compared to the building of an apartment in mid-rise (Zhang unpublished).

Figure 5.



In 1985, the first Chinese urban housing census was completed by the Ministry of Construction (former called Ministry of Urban and Rural Construction and Environmental Protection, MURCEP) and the State Statistics Bureau on a material involving about 150 million urban inhabitants from different parts of

the country. The results are summarized in Table 2. Only about one-third of the total housing units were equipped with private kitchens, lavatories and basic facilities. Qualitative as well as quantitative improvements are highly needed.

The annual volume of new housing in urban areas is now around 100 million square metres and Beijing 7–8 million square metres. In Beijing, they are mostly flats for low-income groups, usually 2-room units each with its own toilet and kitchen. According to the plans, the living area per urban resident will reach 8 square metres in the year 2000. So far it seems that the rate of living area is increasing even more than expected.

However, the housing shortage tends to dominate the thinking of government officials and architects in an immediate, shortsighted way and other problems seem unimportant. Nonetheless, Brogan and James have showed results from investigations indicating that characteristics of the physical environment are about as important as characteristics of the socio-cultural environment in explaining variations in psycho-social health (Brogan & James, 1980). What will happen in the long term? What other problems will arise? What will be the impact on socio-cultural development? Do the new urban areas and the new kind of dwellings have a negative impact on the well-being of the inhabitants? Do the changes lead to measurable changes in the health status of the respective resident populations?

Experiences of Living in High-rise Flats

Introductory Remarks

During recent decades some research has been done in the Western countries about living in flats in high-rise buildings. Some existing data suggest that explanations of area differences are more likely to come through a focus on the process, whereby populations with particular characteristics come to inhabit particular areas, rather than a focus on the physical environment. However, this is not to say that the built environment has no effect on the health and well-being of residents, including the lifestyle of the elderly, parenting and child development.

Vulnerable Groups

Children are probably the most vulnerable group (many without child care). The child's perception and appropriation of the surrounding environment is of great importance for the development of the child's identity and mind. Childrens' lives in flats, especially in high-rise, contribute to the social isolation, which is common in modern cities and under the impact of which many families break down. There is general agreement that living in high-rise apartments has disadvantages, but there is less agreement about what the disadvantages are as well as their relative importance.

Stewart (1970) reviews the following findings in the literature on children living in flats:

(a) *Health and illness:* Higher incidence of respiratory infections in young children and of psycho-neurotic disorders in woman, postulated in previous research, was not confirmed in Stewart's study.

(b) *Space considerations:* Spatial restrictions might have a double effect on a child. It is recognized that factors, like living in a high-rise apartment, which restricts the child's environment and experience during the early years, might lessen that child's potential for intellectual development. At the same time the effect of space restrictions on the parents might affect the relationships between them and their child(ren).

(c) *Noise:* The troublesome noise to the residents are internal noise within the flats and between them (i.e., intermittent and irregular noise like lifts, stairways, machinery and pumping apparatus). In this case, the effect on the child is twofold. The parents might restrict the child's play because it makes a lot of noise. At the same time, the parents' own irritation by noise combined with guilt-feeling about the regular restraint can result in a more severe attitude to noise than is justified.

In high-rise residential buildings, children have difficulties to meet each other at home in small apartments. In the traditional Chinese dwelling, the courtyard is the natural playground. In the new high-rise areas the children can seldom find a comparable substitute. Sometimes they solve this lacunae by seeking out other places (i.e., streets, tea-houses, railway stations, bus stations).

Smaller children also have difficulties to have contact with their parents outside the high-rise building and feel unsafe (Björklid 1982). The caretaker of the child does not see them and there are often no playgrounds around the high-rise. Another effect on children, in the new developed residential areas, concerns the lack of diversified activities in the environment, which reduce the possibilities for children to develop new capacities through watching or participating in the adults work. In the traditional courtyard housing areas the children encounter a lot of activities in the outdoor environment (i.e., handicrafts, workshops, adults outdoor work in the courtyards).

In high-rise housing, *the elderly and the handicapped residents* may easily become passive and isolated compared to those groups in courtyard housing. The design of dwelling units is not suitable for the needs of these groups. For instance, on the sixth floor and less there is no elevator. In high-rise buildings the elevator usually stops at alternative (even or uneven) floors and does not work during the night. The lack of daily service in high-rise areas is common.

Traditionally, care of aged parents in China is not an option but a moral responsibility of adult children. Chinese culture, strongly influenced by the Confucian ethic of "filial piety", emphasized that children care for their elders at home in accordance with filial devotion and obedience. Neglect of one's parents is considered unethical and immoral, a break of traditional values and customs.

In the traditional courtyard the elderly can do a lot to enrich their lives. They can care for grandchildren, call on friends and have a chat, do some work if they are still capable, grow flowers, keep pet birds or fishes, write, paint or calligraphy, pay cards or chess with friends and do physical exercises. These activities are difficult to perform in high-rise residential buildings. Their social environments may be expected to differ significantly from those who live in traditional courtyard houses.

Elderly citizens are most vulnerable to the feeling of loneliness and uselessness. Loneliness is specially found among elderly in high-rise. The fact that they hear noises from other flats while not seeing anyone, can influence the feeling of loneliness. Conversation is not easy to establish since in the Chinese

culture such contacts must be preceded of an introduction by a third person. For cognitive impairment, or dementia, environments lacking in stimulation are suggested to be one factor which may contribute to decline (Whitehead 1984). Furthermore, the absence of safety and security have added to the difficulties for the elderly in high-rise residential buildings and their surroundings.

Debate Concerning High-rise

In Chinese mass media articles about the consequences of building high-rise are quite common today. Are Western mistakes, for example, not to see the negative socio-cultural, psychological, economical, environmental, and other effects of building high-rise, to be repeated in China? The articles quote that high-rise housing units cause many problems and are not a symbol of modernization. They destroy the skyline and environment of the city, increase construction costs, and create difficulties for children and the elderly because of the poor conditions of elevators and other facilities. The main reason for building high-rise is said to be the need to save ground area. On the contrary, it is argued that some developed areas in Beijing with fewer high-rise buildings, house more people per hectare than others with more high-rise (Li, 1987). This finding is already substantiated with respect to the post-war housing in Britain (Dunleavy, 1981).

The debate is still ongoing, as well as the construction of high-rise buildings. Yet, as far as we know, there are no systematic studies in China of the impact of the process of environmental changes on family functioning or on health and well-being. However, studies in industrialized as well as in developing countries suggest that both positive as well as negative effects may arise (Levi and Andersson, 1974). Positive effects may be expected due to greater accessibility to facilities for basic hygiene. Negative effects may be caused by the dissolution of formal and informal social networks (the large family, neighbourhood communities), plus changes in functions and lifestyles, owing to the rapid environmental changes and the divergence between the old traditional dwelling culture and the new spatial organization of daily life.

Discussion

Surveys in many developed countries have revealed a higher incidence of psychic disorder in the slum districts of city centres and also in newly constructed suburbs, (i.e., in dwelling environments where a number of the above needs have not been met and led to social disintegration) (Rahim and Cederblad, 1982, 1984). Contrary to this, a study concerning health and well-being from a human ecology perspective, among urban Chinese in Hong Kong, from 1974, indicates that there was evidence of high family bonds and networks even though there was indications of lack of social cohesion. The degree of disorder and its prevalence among the inhabitants did not appear to be excessive. There are characteristic cultural factors (e.g., regulations and social networks) in the Chinese culture which might to some extent counteract the detrimental effects of stress (Boyden, Millar et al., 1981). The philosophical concept of "optimum health" in Chinese is a state of balance between man and environment, between man and other people, as well as between all parts of man's internal organs (Cheng and Williams, 1986).

Whatever the outcome of the urbanization process in China, there is no doubt that it can influence family functions as well as socio-psychological development and the mental health of young and old people. However, the highly effective social networks in Chinese society seem to have *protective properties*, or "buffering effects". The question is how far these "buffering effects" can be strained and if the rapid change and the new environment are inhibiting these networks. Yet, this seems to be the case when comparing lifestyles in traditional courtyard houses with those in modern flats. The second phase of our project will perhaps give us some more substantial cues on this question.

Review of Literature Survey

Very little epidemiological data exist on mental health and urbanization among mainland Chinese children and the elderly. The data in Beijing show no indication, so far, that mental disorders have been caused by urbanization and changes in lifestyles. Some recent observations support this view.

Child mental health. Mental health studies on relatively small samples of selected populations of children have been

carried out in different, large Chinese cites. In a recent study (Ekblad, 1985) it was found that Chinese children learn to control their emotions more than Swedish children, and that Chinese children learn to orient themselves towards collective norms more than Swedish children, who are more individualistic.

The findings gave a valid picture of the behaviour and attitudes of the Chinese children: by and large they were nonaggressive, well-behaved, ambitious, friendly and pro-social and exerted strong control over aggressive feeling and behaviour tendencies. In possible conflicts with adults, they were likely to take a humble and submissive attitude. Shen, Wong and Yang (1985) have reported results on hyperactivity among children in different parts of Beijing. Here the findings are contrary to expectations, with the lowest rates in the urban areas, higher rates in the suburbs, and the highest rates in impoverished mountain communities.

Divorce rate. An effect of the strict regulations and the mediation groups at the grassroots level[2], is the low divorce rate, being 0.67 per cent in age group of 30–54 years old in 1981, according to official statistics (Ekblad, 1985). The divorce rate is now increasing but is still low in comparison to rates in Western countries.

Juvenile delinquency. In 1983, the number of reported crimes in China was 1.3% of those reported in the United States. Another difference from many Western countries was that more than 80% of China's crimes were cases of theft, while violent crimes that endanger people's lives and security such as homicide, robbery and rape, accounted for only eight% (Beijing Review, 1983). Poor education during the Cultural Revolution (1966–1976) is officially stated to be the main reason for the increase of youth problems.

Elderly mental health. According to prevailing Chinese culture, as mentioned above, children shall take care of their parents. Both the absolute and relative figures of the elderly are expected to increase continuously in the next 30 years. It is

2 Most people belong to an extended family. Each family belongs to a group of families. In the city, these groups becomes residences, neighbourhoods, districts and municipalities. Each level provides a means of dealing with problems of a certain degree of complexity and a means of passing the remaining problems on to the next higher level (Kraft and Swift, 1979).

estimated that one in ten will be retired (55 years of age for labour women and 60 for male labour) next year in Beijing. At the same time, the size of the family will decrease. At present, the adult children living separately with their parents are 70% of all families in the capital. Nearly four of ten elderly are single or living without relatives in the city. These trends may engender a series of social problems. The authorities assume that improving the dwelling and physical environment (security and convenience) is one of the methods of decreasing the problems of the elderly.

It may well be that the incidence and prevalence of family dysfunction and mental illness in children and the elderly is indeed low and not just an expression of an unwillingness or inability to record, report and label such phenomena, nor a repression of their manifestation. This may be so partly because of *protective properties* of China's highly effective social network. The role of external coping resources, or social support systems, in buffering the effects of *stressors* plus internal resources also buffer the effects of stress, as well as impact directly on mental health status.

An optimum integration of the processes producing the combinations of poor environments, low resources and personal vulnerabilities that generate pathogenic family environments will be of paramount importance in understanding the Chinese urban population's physical, mental and social well-being. However, such data are very rare even outside China, because these processes cross all disciplinary boundaries, involving macro-social processes, local political organization, medicine, architecture and psychology. According to Quinton (1988) two approaches hold the possibility of opening up this subject further: life history and life events research.

Authorities and city planners all over the world must not only *realize* that city planning is a crossectorial and very complex matter which influences all parts of the daily life of the citizens, but they should also develop methods and tools to *manage* it as such. The powerful technological and economical approach that dominates today, always seems to be rational, in the short term. In the long term, however, we must realize that without involvement of specialists from different fields, we can not satisfy basic

human cultural, societal, psychological and physiological needs. Both qualitative and quantitative parameters should be examined from an integrative perspective.

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Appendix

List of illustrations.

Figure 1: *A Short History of Chinese ancient architecture,* Vol 1, Compiled by Committee of the compiling of the history of Chinese architecture, Beijing 1962, p. 183.

Figure 2: After: *Annotation to Chinese Wooden Structure Regulations,* Guo Qinghua, unpublished, CTH 1987.

Figure 3: *After: Chinese Architecture and Town Planning 1500 B.C.—A.D. 1911,* Andrew Boyd, London 1962, p. 80–81.

Figure 4: After: *Architectural Journal,* 1956:1.

Figure 5: After: *A Collection of Urban Housing Illustrations,* Zhang Shou Yi, Li Dao, Tsinghua Univ. 1982, p. 19.

Table 1

Some Facts about Beijing (1983/1984)
(China Daily, 23 & 24 November 1987; Li, 1987; Women of China, Dec 1987; Zhang, unpublished.

Population:	9.83 million, plus 10% temporary residents, floating population.
	Significant ethnic minorities: 5.1% of the population consists of different minorities; 94.9% is Han.
	Rate of growth per year: 5.45/1000.
	Family size: One child per each family policy. 3.67 members per family compared with 9.41 (1949). 30% of the total of all households consists of three generation families. 38% elderly in Beijing live alone without relatives.
	Pre-school activities: 47.8% of pre-school children go to nursery and/or kindergarten.
	Illiterate: 11.2%
	Unemployment: 2% (5.9% in 70s). The youth unemployment is estimated to be 3.7%.
Accommodation:	More than 2 million people are estimated to have no place to live or are living in run-down homes.
	Population density: In agrarian area of Beijing: 0.1 ha per person.

In housing from the 1950s (3–4 stories): 400 persons per ha.
In housing from 1970s (5–6 stories): 600–800 persons per ha.
In high-rise from the 1980s (18–24 stories): The figure is not yet available.

Table 2

The Results from the First Chinese Urban Housing Census 1985 (MURCEP, 1987)

Ownership
Enterprise or department owned properties constituted 75%, and 9% were owned by local housing administration departments. Private properties accounted for 16%.

Structure
45% of the housing stock was of masonry and concrete structure, while 38% was of brick-and-wood structure.

Storey height
Single-storied building and multiple storied buildings occupied 50% respectively.

Time of construction
36% of the buildings stock was built in the 80s, 32% in the 70s, while only 9% was built before 1949.

Usage of the total area surveyed
49% residential buildings
29% industrial, communication purposes and warehouse
9% commercial establishments
7% educational, medical or scientific institutions
1% cultural and sport purposes
4% office buildings
1% other use

Residential conditions
Living space per inhabitant has risen to 6.1 square meters. However there is still a housing shortage and uneven distribution in living areas with many families still living in poor standards. About one-fifth of families or one-fourth of all inhabitants still have less than four square metres per person. Moreover, the distribution is uneven between cities.

Facilities
a) electricity: provided for 96% of urban families
b) water supply: provided for 73% of families (57% independently and 10% share)

c) kitchen: provided for 70% of families (63% independently and 10% share)
d) flush toilet: provided for 34% of families (24% independently and 10% share)

According to the household structure and in view of future changes, the principles in deciding housing standards should be, according to Professor Zhang Shou Yi, Department of Architecture Tsinghua University, Beijing, an average living area per inhabitant of approximately eight square meters (2–3 rooms, floor space 50 square meters) with:

1. one family per apartment
2. separate bedrooms for boys and girls over 10 years of age
3. built in facilities, such as private kitchen and lavatory