Comparative Study on Residents' Perception and Activities in Their Outdoor Spaces
-Cases of Traditional Blocks and a New Housing Project in Beijing

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Abstract
This paper reports the results of a comparative study on traditional blocks and a new housing project with relatively high population densities in Beijing concerning the residents’ activities, perception, and evaluation of their outdoor spaces. Outdoor spaces in both the two residential settings function as essential places for the residents’ daily and communal lives and a variety of activities were observed. The spaces in the traditional blocks, however, are considerably more used and satisfied with by the residents than those in the new project are, although they are perceived as problematic in evacuation and rescue in emergencies while the spaces in the new project are seen as areas of potential criminal activities. The traditional outdoor space as a whole retains a clear cognitive hierarchy space from public to private domains, whereas the modern outdoor space lacks definite regions that can be recognized as semiprivate or private.

Keywords: Outdoor Space; Activity and Perception; Traditional Blocks; New Housing Project; Beijing

1. Introduction
1.1 Study Objectives
This is a report of an investigation into actual conditions of residential environment in China. It specifically focuses on outdoor space in residential settings, since such space may affect residents’ lives as their houses themselves do. So far a number of studies on residential issues in China have been undertaken, however, studies related to its residential environment and to outdoor spaces in particular are few ¹.

Large cities in China have built numerous new housing projects in their urban and suburban areas in order to cope with serious housing shortage accelerated by rapid increase in urban population as well as change in housing needs in the last few decades. In general, the projects are made on the basis of planning ideas and principles shared with Western countries but with little respect for the unique tradition and culture in housing life that China has long fostered ².

Conducting case studies on a pair of different types of residential areas with a comparatively high population density, one modern one in the suburb and one traditional one in the inner city in Beijing, this paper tries to clarify how residential open spaces are perceived, evaluated, and used by the inhabitants and to compare characteristics and problematic aspects of outdoor spaces in the contrasting types of residential areas.

1.2 Study Areas
The modern example studied is Enji, a new residential project constructed by the municipal government of Beijing in 1993; it is located in the west suburb, six kilometers from the center of the city. The site covers an area of 9.98 hectares and contains four clusters of mid-rise housing units with 6,225 inhabitants in total (1,885 households, total housing floor area: 114,288 square meters) as well as facilities such as shops, markets, an elementary school, a kindergarten, and a nursery.

The other object of this study is Shique Hutong, of which Hutong signifies the urban blocks as well as the primary access street itself: the spatial system of Hutong originated in the Jin and Yuan Dynasties and has been inherited by today's Beijing. Shique Hutong, with a total area of 2.42 hectares, is one of the old city's typical blocks, which consist mostly of quadrangle houses, or Siheyuan, a prototype of the single story courtyard houses ³: approximately 1,500 inhabitants live in the area (312 households, total housing floor area: 17,908 square meters) while shops and a post office are situated along the main street on the area's boundary.

Although the gross population densities of the two

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areas are almost equally high, 624 persons per hectare for Enji and 620 persons for Shique Hutong, their outdoor spaces are significantly different in type and dimension: the outdoor spaces of Enji consist of streets, parks, green spaces, and largely open spaces between housing units, with the total area of these spaces covering almost 60 percent of the site, while those of Shique Hutong consist of streets, side alleys, and largely, courtyards of houses, covering nearly 28 percent of the total area 4 (Table 1).

| Enji          | area (m²) | percentage |
|---------------|-----------|------------|
| Total Site Area | 99800     | 100.0      |
| Streets       | 3710      | 3.7        |
| Park/Green Spaces | 8500    | 8.5        |
| In Between Open Spaces | 47320   | 47.4       |
| Total Open Space Area | 59530 | 59.6       |
| Shique Hutong |           |            |
| Total Site Area | 24200     | 100.0      |
| Streets       | 2610      | 10.8       |
| Side Alleys   | 860       | 3.5        |
| Courtyards    | 3270      | 13.5       |
| Total Open Space Area | 6740 | 27.8       |

1.3 Methodology of the Surveys

A set of observation and questionnaire surveys was conducted in each of the study areas. As for the observational method, the daily life activities of typical outdoor spaces and times were classified by types of activity and generation of the participants: the results were recorded on the site maps. It was carried out during six different periods of 30 minutes from 7:00 am to 7:30 pm on weekdays 5. The spaces selected for this survey in Enji were a space between housing units, the central park, the front yards of shops and markets, and the promenade, those in Shique Hutong were courtyards of three housing compounds, and the entire length of Hutong street, the primary street of the area. The generation of participants were judged by their appearance.

In order to analyze quantitatively a variety of activities and participants, types of activities and generation of participants were simplified further in some categories. Types of activities were summed up into the three categories classified by Zhu Jianda, a Chinese architectural scholar: 1) necessary activities which are originally given to it: the number of participants in each activity as well as its change over time was not considered. Places of activities with movement from one place to another were defined at the center or the initiated spot of the activity. Such a method that deals with human behavior on a quantitative basis may not be strictly accurate but helps in understanding how relatively different in intensity of use such open spaces are.

The self-report measure was carried out for a week in each of the study areas by asking residents to answer the closed questions that the authors prepared in advance. The number of effective replies obtained in each study area was 50 6, a relatively small number, but the subjects were selected from different genders and generations so as to cover a wider range of demographic groups (Table 2). The questions are about attributes of the respondents and about their perception and evaluation regarding the outdoor spaces of each site: public-private distinction and preference in space, satisfaction and its reasons, sense of safety and security, and use of space. As for the spatial distinction and preference, the respondents were asked to indicate on site maps the regions that they perceive as public, semipublic, semiprivate, or private space in addition to the places they like most. The other questions were answered by selecting a single or multiple answers among the plural choices on the prepared questionnaire sheets.

| sex          | male | female |
|--------------|------|--------|
| Enji         | 23 persons | 27     |
| Shique Hutong| 24 persons | 26     |

2. Daily Life Activities in the Outdoor Space

2.1 Qualitative Study

1) Enji-New Housing Project (Figure 1)

(1) In-between Space of Housing Units (Figure 2)

Outline of the Space: Six housing units with four to six stories enclose the rectangular open space: it is covered with grass or flowers except the housing unit entrance path that are paved. Outdoor furniture like a sand pit and benches are provided in this open space, and bicycle sheds are installed at the entrance of this cluster of housing units. Total area of the in between space is about 2,150 square meters.

Notable Activities: Preschool children are looked after by their parents or play in the nearby spaces of the entrance of their housing unit. Most school-age adults, and those who seemed to be over 60 years old as the elderly.

The density of these three types of activity was calculated. An activity was numerically counted one case as long as it retained the same classification originally given to it: the number of participants in each activity as well as its change over time was not considered. Places of activities with movement from one place to another were defined at the center or the initiated spot of the activity. Such a method that deals with human behavior on a quantitative basis may not be strictly accurate but helps in understanding how relatively different in intensity of use such open spaces are.

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| items          | Enji         | Shique Hutong |
|----------------|--------------|---------------|
| sex            | male         | female        |
| -19 yrs        | 8            | 6             |
| 20-29          | 7            | 8             |
| 30-39          | 9            | 8             |
| 40-59          | 13           | 12            |
| 60-             | 13           | 16            |

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children play games in a group, such as riding a bicycle, digging in the ground, kicking a ball, or running after each other. Their game-playing activities are found at nearby spaces of the entrance of a housing unit or of the sand pit after school and before supper. The activities of adults are performed mostly at the bicycle sheds; some adults bring their children with them to play or take a walk around the entrance zone of their housing unit. Old people spend much time sunning themselves, watching people, and chatting with others, again at the entrance of their housing unit. Many of them play chess or chat with others at the bicycle sheds, too. Some elderly take a walk in the morning carrying a birdcage with them around the in-between space.

(2) Central Park

Outline of the Space: It is located in the middle and by the main street of the project site. A children's playground, a recreational area for adults, and a pavilion, a shelter from rain and sunshine, are provided in this park. Its total area is about 5910 square meters.

Notable Activities: Brought to this park by their parents, preschool children play at the playground under their parent's surveillance. School-age children come to play at this park chasing each other or skipping a rope or a rubber band after school. Adults accompany their preschool children to this park particularly after supper. Old people do exercise of traditional boxing at the playground or the skipping a rope or a rubber band after school. Adults accompany their preschool children to this park particularly after supper. Old people do traditional boxing exercise in

![Fig. 1. Site of Enji and Its Activity Survey Areas](image1)

![Fig. 2 Activities of In-between Space of Housing Units, Enji](image2)
the playground or the recreational area, or take a walk in this park. Some of them enjoy the sunshine under the pavilion in the morning while chatting.

(3) Front Yards of Shops and Markets
Outline of the Space: These yards are located on the boundary of the project site, facing a busy city street. They serve primarily for the shops and markets, on the ground floor of a housing-commercial complex, the main shopping place of this area; they are composed of paved squares and plants or shrub and flowerbeds: benches for temporary stay are provided at the side of shrub and flowerbeds. The total area of these yards is about 2,120 square meters.

Notable Activities: Preschool children are likely to come with their parents to see the entrances and windows of shops or markets; school-age children also come to see these busy and lively places after school. Many adults in this area buy food and daily goods here on their way home after work; they perform simple social activities like greeting each other while shopping. The elderly also come and stay here to greet others or sit on a bench to watch other people or vehicles passing by; some of them gather and play chess in the corner spaces of these yards.

(4) Promenade
Outline of the Space: It consists of two green belts with plants and flowers and a paved pedestrian path between them; it is located along the main street that penetrates the project site. Rectangular corners with plants, shade, and sitting places are designed in this promenade. The total area of this space is approximately 1,160 square meters and the average width is 16.5 meters.

Notable Activities: This is the major place in this project site for school age young to come and get together and make social contacts with other young people. Few adults, however, come to this place and take a rest. Contrarily, many old people also stay here to chat, play chess, or sing songs in the morning or after supper. This space appears to be an essential center of elderly social life just as the central park is.

2) Shique Hutong
-Traditional Housing Blocks (Figure 3)
(1) Courtyards (Figure 4)
Outline of the Spaces: Courtyards of three housing compounds were examined: areas of the three sets of spaces are 150, 130, and 190 square meters each. All of the courtyards were fundamentally rectangular spaces surrounded by one story housing on each side; however, many parts of the houses have been altered or had extensions added including kitchens and storage. Although a large family exclusively used each of the courtyards in the past, it is shared with plural families who live in the surrounding houses today.

Notable Activities: The young in general play in various ways such as chasing each other and dancing in various parts of their courtyard; many school age children do their homework under the eaves or porches or in the corridors of their house after school. A great variety of household work is carried out mostly by adults in front of their own houses. Activities including washing laundry and cooking are carried out, while clothes or vegetables are hung to dry, cooking stoves are fired up, or the repairing of things is done under the eaves or porches. When doing their domestic
jobs, they communicate verbally with their family members or neighbors. The elderly get sunshine, read a newspaper, drink tea, take a nap, or do some household work and look after their grandchildren under the eaves or in the corridors of their own house or under a tree in the courtyard.

(2) Hutong Street

Outline of the Space: It is the skeletal street of these traditional housing blocks, penetrating east to west and dividing this area into two sub-areas. Groups of housing compounds are arranged in a north-south direction and the gates of each group are open to this street. The street is six to seven meters wide on average and usually used by pedestrians. Shops are located at its entrance that faces a main city street and trees line its east part. The total area of this space is 2,160 square meters.

Notable Activities: Many of the young throng and hang around on this street or play football in a group, dancing, skipping a rubber band, or performing a play, especially after school hours. Much domestic work, such as hanging laundry to dry or fixing a bicycle, is extended over from the courtyards and is conducted around the compound gate by adults. A considerable number of the elderly sit at the gates of their compounds to spend time by watching people passing by alone or with their grandchildren. Some old people take a walk while carrying a birdcage in the morning. Some others get together at corners of the street to chat, play cards, or chess with others, mainly in the afternoon.

2.2 Quantitative Study (Table 3)

1) Enji-New Housing Project

In the selected outdoor spaces in Enji, the necessary activities including doing house work in the in-between space of housing units and shopping at the front yards of shops and markets were observed, but their cases were not so many when compared with those of Shique Hutong. Adults mostly performed these types of activities during the evening hours. The total density of these activities during the time periods of three hours in total was slightly over 100 cases per hectare.

The types of spontaneous activity such as taking a walk and sunning themselves were seen in each of the selected spaces, but few. In all the selected spaces, the primary participants in these activities were the elderly and other adults; most of these activities were carried out during the morning and evening hours. The total density of these types of activity was less than 100 per hectare.

Social activities including greetings and talking to each other or playing games with others were observed in all the selected spaces and the total density was relatively high at over 200 per hectare when compared with those of the two others above. The young and elderly performed these activities during the afternoon and evening hours in particular.

2) Shique Hutong-Traditional Housing Blocks

Many cases of necessary activities such as doing domestic work were observed in all the selected courtyards of houses in Shique Hutong: the same types
of activity were seen at various spots on Hutong street as well. Adults mostly carried out these activities during the morning and evening hours; the elderly and the young also participated in these activities. The total density of necessary activities was more than 700 cases per hectare, which is nearly seven times as many as that of Enji.

On the other hand there were not so many spontaneous activities, their total density was about 100, slightly more than that of Enji. The major participants in these activities were the elderly and they carried them out mainly during the morning and afternoon hours largely on Hutong street.

Among the three categories of activity, the social activities were the most frequently observed both in the courtyards and on the Hutong street: the total density of these activities reached over 1,500 cases per hectare which is more than seven times as many as that of Enji. The participants were from all the generations, the young, adults, and the elderly. The young carried out these activities mainly during the morning and afternoon hours, adults during the morning and evening hours, while the elderly performed them during the afternoon and evening hours.

### 3.2 The Outdoor Spaces

#### 3.2.1 Public-Private Distinction and Preference in Space

| Time Periods | Study Area | Necessary Activities | Spontaneous Activities | Social Activities |
|--------------|------------|----------------------|------------------------|------------------|
|              |            | Young               | Adults                | Elderly          | subtotal | Young      | Adults    | Elderly | subtotal | grand total |
| 7:00-7:30am  | Enji       | 0                    | 11                    | 2                   | 34       | 0          | 4         | 0       | 4         | 47         |
|              | Shique Hutong | 18                  | 39                    | 7                   | 77       | 0          | 0         | 8       | 0         | 94         |
| 8:00-8:30am  | Enji       | 0                    | 11                    | 1                   | 18       | 2          | 4         | 0       | 2         | 17         |
|              | Shique Hutong | 8                    | 28                    | 8                   | 44       | 0          | 0         | 3       | 3         | 46         |
| 9:00-9:30am  | Enji       | 0                    | 7                     | 4                   | 12       | 3          | 0         | 4       | 7         | 26         |
|              | Shique Hutong | 0                    | 7                     | 2                   | 9        | 0          | 0         | 6       | 6         | 16         |
| 9:30-10:00am | Shique Hutong | 0                    | 1                     | 1                   | 2        | 1          | 1         | 0       | 1         | 5          |
|              | Enji       | 0                    | 2                     | 3                   | 7        | 1          | 1         | 0       | 1         | 10         |
| 11:00-11:30am| Shique Hutong | 0                    | 3                     | 1                   | 4        | 0          | 0         | 5       | 5         | 15         |
|              | Enji       | 0                    | 47                    | 6                   | 53       | 9          | 3         | 16      | 12        | 121        |
| 12:00-12:30pm| Shique Hutong | 0                    | 43                    | 4                   | 47       | 0          | 1         | 1       | 33        | 38         |
|              | Enji       | 0                    | 29                    | 7                   | 36       | 0          | 7         | 11      | 8         | 16        |
| 7:00-7:30am  | Shique Hutong | 0                    | 21                    | 1                   | 22       | 5          | 4         | 1       | 5         | 33         |
|              | Enji       | 0                    | 108                   | 22                  | 149      | 9          | 27        | 64      | 98        | 306        |
| total no.    | Shique Hutong | 59                    | 152                   | 59                  | 752      | 59         | 15        | 91      | 154       | 468        |
| total density | Enji       | 0                    | 55                    | 19                  | 114      | 8          | 22        | 56      | 85        | 121        |
|              | Shique Hutong | 59                    | 152                   | 59                  | 752      | 59         | 15        | 91      | 154       | 468        |

Most of respondents in Enji are members of nuclear families including a couple with one or a few children, contrarily in Shique Hutong, nearly half of the respondents are those who belong to a multi-household family including a family with two or more generations.

Before moving to their present residence, almost all the respondents in Enji resided in other urban areas and nearly two thirds of them previously lived in a modern collective housing, while most of the respondents in Shique Hutong resided in the same area or in other urban areas and nearly two thirds lived previously in a traditional house.

#### 3.3 Perception and Evaluation of the Outdoor Spaces

### 3.3.1 The Respondents

The tributes of the respondents of the two study areas differ considerably from each other. In Enji, public office workers as well as foreign enterprise employees represent a larger number of the respondents, while in Shique Hutong, public factory workers as well as shop employees account for a larger number, although pensioners commonly hold a large portion in each area.

Most of the respondents in Enji regarded the primary street, which serves as car access to each cluster, the central park, and front yards of shops and markets as public spaces. The spaces between housings units or clusters were regarded as semipublic. Semiprivate and private domains in the outdoor spaces were not marked out by most of the respondents. The places that the respondents preferred were the nearby space of housing entrances, the cluster's entrance area, and the children's playground. Especially, the promenade along the main street is the place that the answerers commonly like.

In Shique Hutong, on the other hand, the area's entrance zones which connect the area with the adjoining major street or housing blocks were considered as public spaces, Hutong street itself was regarded as the area's semipublic space, the courtyards of houses as semiprivate, and the spaces under the
eaves or porches of houses as private. The preferred places were the spaces under eaves or porches and the courtyard of one's house as well as the gate areas on Hutong street to one's house compound.

Fig. 5. Satisfaction Levels with Open Spaces

2) Satisfaction and Its Reasons
A mere one fourth of the respondents in Enji were satisfied or very satisfied with their outdoor spaces, whereas half in Shique Hutong were satisfied or very satisfied. The proportion of the respondents who were dissatisfied or very dissatisfied in Enji reached nearly half of the total, while that in Shique Hutong accounted for only a little more than one seventh (Figure 5).

As for the reasons for satisfaction in Enji, four fifths of the respondents answered that they were calm and comfortable, whereas those in Shique Hutong, about half of the respondents replied that the outdoor spaces were diverse, much usable, and comfortable; the reasons for dissatisfaction in Enji were represented by monotony, which represented more than half of the answers, while nearly two thirds of those in Shique Hutong found the space to be vital.

Fig. 6. Safety and Security Problems in Open Spaces

3) Sense of Safety and Security
All the respondents in both areas found certain problems in safety or security in their outdoor spaces. The reasons however are quite different. In Enji more than half of the subjects were concerned about criminal activities and in Shique Hutong nearly half replied that evacuation or rescue problems in case of fire or disaster could be given as the first reason, although more than one fifth of the subjects in each area answered traffic accidents (Figure 6).

4) Use of Space
More than half of the respondents in Enji replied that they used their outdoor spaces daily for less than an hour while 40 percent answered one to two hours a day. Meanwhile, half of the respondents in Shique Hutong answered one to two hours and one fourth replied that they used their outdoor spaces daily for two to three hours or three to four hours (Figure 7).

Major activities in the outdoor spaces in Enji are taking a walk and playing with children; those in Shique Hutong are talking with neighbors, doing domestic work, playing games, and playing with children.

Fig. 7. Daily Spending Hours in Open Spaces

4. Conclusion
1) Summation
Results of the above surveys and analyses can be summarized into the following points.

(1) Outdoor spaces in the two residential settings function as essential places for the residents' daily lives and a wide variety of activities are found there. The spaces play an important role also as a spatial medium of social ties between members of the communities. Activities tend to take place in comfortable pedestrian spaces which are spatially articulated on a human scale or provide some shelter from rain and sunshine such as eaves or porches, or have some greenery, whether or not the spaces are designed to be used as such. Outdoor spaces complement the indoor spaces of housing and offer the residents various opportunities to live their daily lives with their families and neighbors.

(2) The profiles of residents can be regarded as quite different between the study areas: those in the new housing project are primarily of white collar nuclear families who moved from other urban areas, while the majority of those in the traditional housing blocks consist of multiple families engaged in blue collar jobs or retail business and live in the same area.
or lived previously in a similar type of residential district. Even though such residents' characteristics may more or less affect their attitudes and behavior regarding outdoor spaces, their great differences in activities as well as in perception and evaluation of the spaces per se should be particularly stressed.

(3) The gap in density of activities in outdoor spaces between the study areas is remarkably large, the total of the three categories of activity of the traditional blocks is nearly six times as many as that of the new project. In addition, the average time of use of outdoor spaces in the traditional blocks is considerably longer than that in the new project. It can be concluded, accordingly, that the outdoor spaces in the traditional blocks be far more well used than those in the new project, even if the fact that the outdoor space ratio of the former example is almost only half when the latter's ratio is taken into account. This disparity between the two areas mainly comes from much more intensive use of outdoor spaces in the traditional blocks for necessary activities such as doing domestic work as well as social activities including talking or playing with neighbors or children, in comparison with those in the new project.

(4) Residents in the traditional blocks are likely to be satisfied with their outdoor spaces since the spaces are perceived as diverse, usable, and comfortable. On the other hand, those in the new project are probably not satisfied with their spaces because the spaces are recognized as monotonous, although a variety of designed open spaces are provided in the project site. The outdoor spaces in the traditional blocks are found by the residents to have problems regarding evacuation and rescue in case of fire or disaster in particular. Those in the new project are viewed as problematic regarding criminal activities.

(5) Among the reasons why the study areas are considerably different in use and satisfaction levels regarding their outdoor spaces, the dissimilarity in their hierarchical composition of public-private spaces may be an explanatory factor, as already pointed out by urban design researchers concerned with environmental psychology. The outdoor space as a whole in the new housing project lack definite regions which can be recognized as semiprivate or private, whereas those in the traditional housing blocks hold a clear spatial hierarchy from public, semipublic, semiprivate, and down to private regions. The spaces perceived as semiprivate and private are in many cases most preferred and used by the residents as their open spaces around their own houses.

2) Closure

As a home is the most fundamental base for one's private life, outdoor spaces around homes are also essential for the residents' daily lives, particularly concerning their communal lives. The cases in a Chinese city that this study dealt with do support this view, however, further studies concerning open spaces in residential settings, not only in China but also in other countries including Japan, need to be made for a wider understanding of the relationship between residential outdoor spaces and the users' activities and needs in these spaces.

Learning from precedents is also important, historical or traditional housing areas may have serious problems in their physical environment, nevertheless they still retain merits and characteristics that modern urban planning and design should inherit in their theoretical and practical development.

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Notes

1. From a normative point of view, several studies have been made by Chinese scholars: Bai Demao (1993), The Planning of Residential Districts and Environment, China, China Architecture and Building Press, about parks and other green spaces, and Dong Benqing (1990) "The Form of Residential Housing and Outdoor Spaces", China, City Planning Review, concerning hierarchical composition of residential neighborhoods can be listed as examples. Takahiro Yamamura and H. Doshi (1995), "A Survey on the Features of the Public Street Use at the Residential Area in China-In the Case of the Old Colonial Area, Hankou, Wuhanon," Papers on City Planning, The City Planning Institute of Japan, is a positive study on outdoor spaces in China, but it specifically focuses on the privatization of street spaces.

2. See for example the above-mentioned Bai Demao's book.

3. See Lu Xiang and Wang Qiming (1996), Beijing Quadrangle Houses, China, China Architecture and Building Press.

4. The source of Enji's data is Enji-Planning Theory and Practice on Residential Quarters, China, China Architecture and Building Press by Bai Demao; the data of Shique Hutong are from the City of Beijing.

5. It was carried out on May 5, 12, and 13, 1999, the weather of those days was fine.

6. See Zhu Jianda (1996), Planning of Modern Residential Districts in Selected Examples, China, China Architecture and Building Press.

7. Because the time period of surveys was limited and much time was needed to inform residents about the questionnaire, the effective samples were limited to a small number: the survey in Enji was carried out from May 1 to 7, and in Shique Hutong from May 8 to 15, 1999.

8. See for example Oscar Newman (1980), Community of Interest, NY, Anchor Press, his Defensible Space, and Clare Cooper Marcus and C. Frasnis (1990), People Places: Design Guidelines for Urban Open Space, NY, Van Nostrand Reinhold.