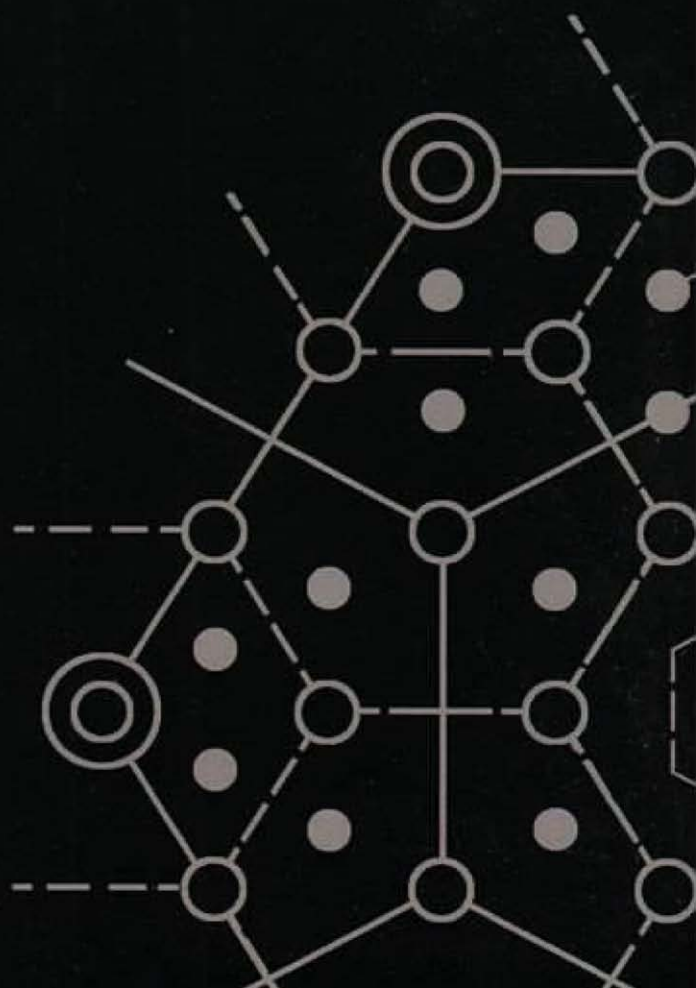
Organic Evolution of the Urban Green Space System:

A Case Study of Shanghai

ZHANG LANG



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Preface

The urban green space system, an artificial ecosystem, is the only infrastructure with life. With the acceleration of urbanization in China, there has been an obvious increase in hyper-metropolises. Focusing on the weak points of China's urban green space system research in layout and structuring, this study conducts theoretical and empirical research on the green space systems of hyper-metropolises.

There are serious imbalances between the current theory and the practical development of green space system planning of hyper-metropolises. With the background of the globalization of hyper-metropolises, the study sets forth and demonstrates urban green space system evolution theory in the light of system theory and evolutionism through the empirical investigation of urban green space system planning and construction in Shanghai.

This book is made up of five parts. Chapter One defines the characteristics and connotations of the urban green space system in hyper-metropolises and puts forward the organic evolution theory, a sustainable development mode of green space systems. Chapter Two makes a comparative study of the urban green space planning theories at home and abroad and expounds the mechanism of the organic evolution theory. Chapter Three compares the layout and structures of green space systems in hyper-metropolises at home and abroad. Chapter Four is a historical review of the layout of green space systems in Shanghai and probes into its future construction. Chapter Five elaborates on the basic ecology network planning in Shanghai.

The following are innovations provided by this research from the perspectives of logic, thinking mode, theory construction and research method.

To begin with, it is the first systematic research at home and abroad focusing on the layout and construction of the green space system in hyper-metropolises.

Secondly, it is a relatively comprehensive research on the layout and structure of green space systems in hyper-metropolises, one of the most important and the most

difficult problems of today.

Thirdly, it employs the innovative thinking mode in the research of green space system planning of hyper-metropolises.

Furthermore, it sets forth and demonstrates the urban green space system evolution theory.

Finally, it is the first empirical study on the planning and construction of green space systems in hyper-metropolises considering both the horizontal (space) and vertical (time) dimensions.

August 28, 2013

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Chapter *1*

Characteristics, Contents and Sustainable Development Modes of Urban Green Space System in Hyper-metropolis

Urban green space, a special kind of eco-system, not only provides a good living environment for urban residents and creatures in cities, but also improves the natural environment of urban landscapes, achieving harmony between people and nature in cities, for which it is called "the lung of the city".

The legal norms and academic researches of different countries offer different explanations and definitions for the word "urban green space". In Western countries, "urban green space" is seldom referred to, while European countries use the concept of "open space" instead. No matter whether one looks at the urban environment improvement and city beautification movement 150 years ago, or the conservation movement nearly one hundred years ago, the large-scale urban renewal after World War Ⅱ and the rebuilding of modern city centers, as well as the planning of open space, were all carried out with green space at their center[1].

In China's *Standard for Basic Terminology of Landscape Architecture* (CJJ/T91-2002)[2], urban green space is further divided into two concepts, one in a broad and one in a narrow sense. Urban green space in a broad sense refers to the various green spaces within the city planning range, including "public parks, productive plantation areas, green buffers, attached green spaces and other kinds of green spaces". While the urban green space in a narrow sense means the greening sections with fewer green spaces, with fewer or without facilities, different from the relatively comprehensive "parks" with more land and facilities. According to *Standard for Basic Terminology of Urban Planning*[3], "green space is the greening space specifically used to improve the ecology, to protect the environment, to provide recreational areas for the citizens and to beautify the landscapes".

Thus it follows that urban green space is the regional space in cities where natural landscapes are reserved or restored, including parks, stadiums, square green spaces,

cemeteries, green spaces attached to urban roads and squares, rivers, lakes, marshes, forests, farmlands, orchards, nurseries, unit area green spaces, green spaces attached to housing estates, edge-waters, islands, mountains, hills, gullies, and so on and so forth. It is the comprehensive reflection of both urban natural landscapes and human landscapes; it can provide people with good recreational places and also plays a vital role in the improvement of the urban environment.

1.1 Definition of Hyper-metropolis

1.1.1 Concept of Hyper-metropolis

According to the definition in *The Act of Urban Planning* (1990), a city where the non-agricultural population in the urban areas and near the suburbs reaches 500,000 is called a metropolis[4]. Generally, if the residential population reaches 1,000,000, the city is defined as a hyper-metropolis[Note 1][5]; from a population of 2,000,000 onwards, the city becomes a super hyper-metropolis.

Since the founding of New China, the number of hyper-metropolises has been continuously increasing. In 1949, there were only five hyper-metropolises in China; during the two following decades, up until 1980, the number of hyper-metropolises remained at 15, because of the implementation of policies restricting rural population mobility and controlling the scale of big cities[6]. Since the Reform and Opening up policy, there has been a boom in the number of hyper-metropolises (see Table 1-1). Until 2000, 40 hyper-metropolises had emerged; by 2004, the number had reached 49[7]. According to previous predictions in *Some Observations Concerning China's Urban Development* from China's National Development and Reform Commission, by 2010, the number of hyper-metropolises with a population of 1,000,000 would increase to about 125 (National Development and Reform Commission, 2006)[8], and China's urbanization would enter an era of high-speed development.

Table 1-1 Evolution of Chinese hyper-metropolises

Time (Year)	1949	1960	1980	1990	2000	2004	2010
Quantity	5	15	15	31	40	49	125

Source of statistics: collected and summarized by author

1.1.2 Characteristics of Hyper-metropolises

1. Population aggregation with high density

Since the Reform and Opening up Policy, China has targeted the coastal regions in the implementation of its policies, and at the same time, loosened restrictions on population household registration management, thereby encouraging people in the midwestern parts of China to migrate to the coastal regions. This trend has become more and more obvious and has caused a boom in the population in coastal regions[9]. According to the result of the fifth Nationwide Census in 2000, the population of the top ten metropolises in China stands approximately around 10 million or higher(see Fig. 1-1), in cities such as Shanghai, Beijing, Tianjin, Chongqing, Harbin and others.

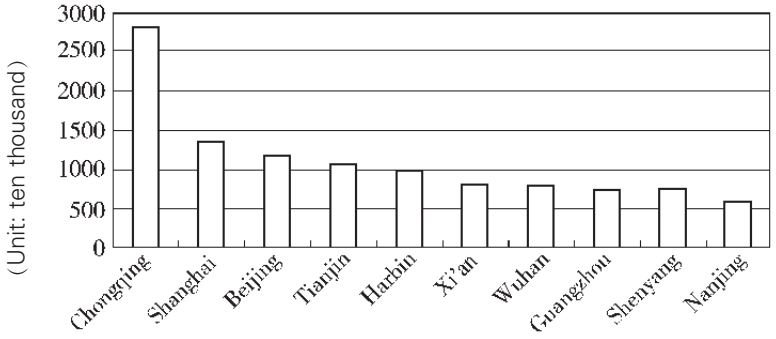

Fig. 1-1 Comparisons of hyper-metropolis population

Source of the statistics: collected and summarized by the author

According to the statistics, small cities, which take up 68.5% of China's total urban lands, only make up 16.5% of all the non-agricultural population; the big cities, which take up only 4%, however, make up 39.4% of the urban population. It's a common occurence that China's hyper-metropolises have high-density population, especially in city centers (see Table 1-2). Nowadays, the population density in most of the main metropolises of the world is only 8,500 people per kilometer square[7].

Table 1-2 Comparisons of the Chinese hyper-metropolis population density

City	Urban area density	Downtown area density	Urban fringe density	Highest density
Beijing	—	2.2	0.58	2.8(Xuanwu district)
Guangzhou	0.16	—	—	3.4(Yuexiu district)
Shanghai	0.2145	4.2	—	—

Source of the statistics: collected and summarized by the author

2. The formation of primate cities

The construction of primate cities contributes to the formation of a regional economic circle, providing motive power for the intense utilization of urban lands, as well as open space for cities, which is of vital significance to China's cities, especially in the progress of sustainable development of hyper-metropolises.

Hyper-metropolises are the products of a city's development at a certain level. In the process of urbanization once the diffusion function of the economic effect of hyper-metropolises is stronger than the accumulation function and takes the leading role, the interaction in economy and society between hyper-metropolises and their surrounding regions will be stronger, and the effect will enable the overall economic society to develop and to gradually transit to becoming the center of the region, of the country and even the economic center of the whole world, e.g. world cities, such as Shanghai in the Changjiang River Delta, Guangzhou in the Zhujiang River Delta and Beijing in the Circum-Bohai Sea Region. As the major cities of the regional economy, Beijing, Shanghai and Guangzhou, with their increasingly strong influence on the regions, country and even the whole world, already possess the function and position of primate cities.

3. The regional development of space structure

The development of China's hyper-metropolises has always been during the period of intensive development, with expansion from city centers to the outer rims, or centralized expansion. The result is the formation of a regional layer structure due to differences in the duration of development. Take Shanghai as an example (see Fig. 1-2), from the year 1947 to 1995, the city space of Shanghai surrounding the city centers, has gradually spread or centralized expansion in its development, calling into existence three obvious city circles with city space expansion apparently speeding up. During the ten years from 1996 to 2005, the development of Shanghai's city space mainly concentrated on infill development, namely walking on the path of connotative development on the basis of current space patterns.

Since the Reform and Opening up, with the reform of the urban land use system, the housing system and the household registration system, as well as the enhancement of metropolitan economic energy, an obvious dispersion trend begins to appear in the development of China's hyper-metropolises. Under the guidance of urban development policies and urban planning, based on a number of significant infrastructures, the centrifugal growth and the spatial diffusion of the city are achieved by extending the city with independent and semi-independent satellite towns or larger-scaled new cities. For instance, drawn up in 1986 a proposal of "controlling central cities, developing satellite towns" was submitted as part of the urban master plan of Shanghai. In the latest