

中国建筑实践

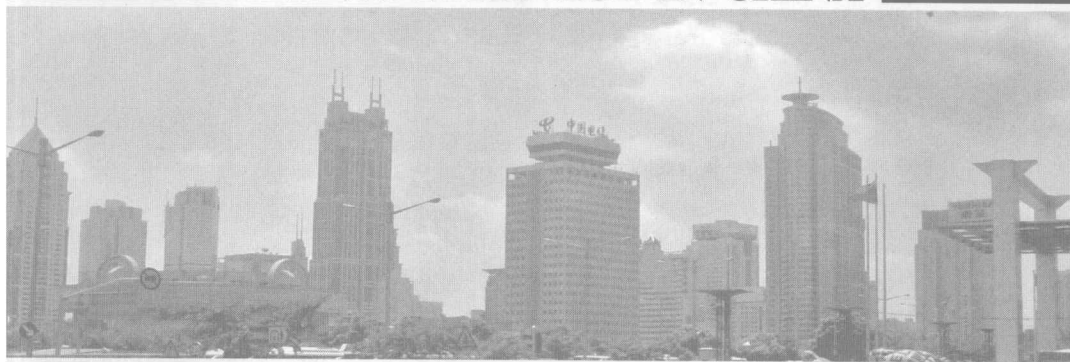
薛求理 著

Charlie Q. L. Xue

BUILDING PRACTICE IN CHINA

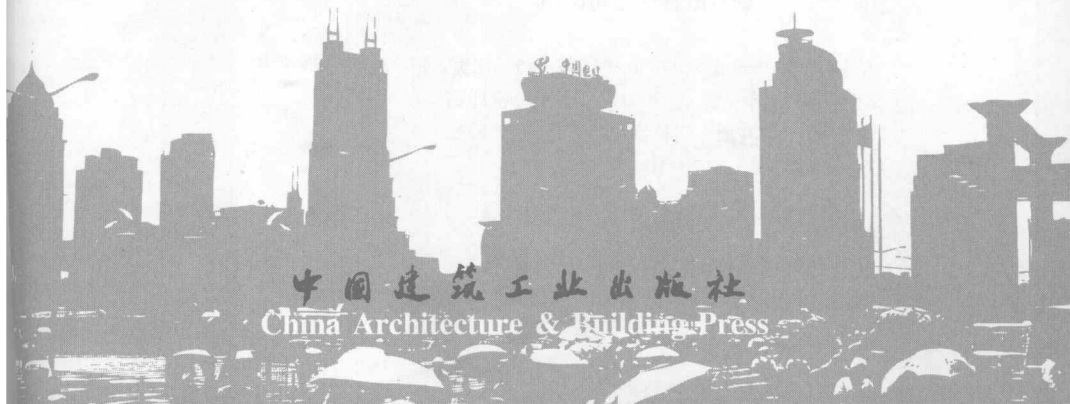
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Charlie Q. L. Xue

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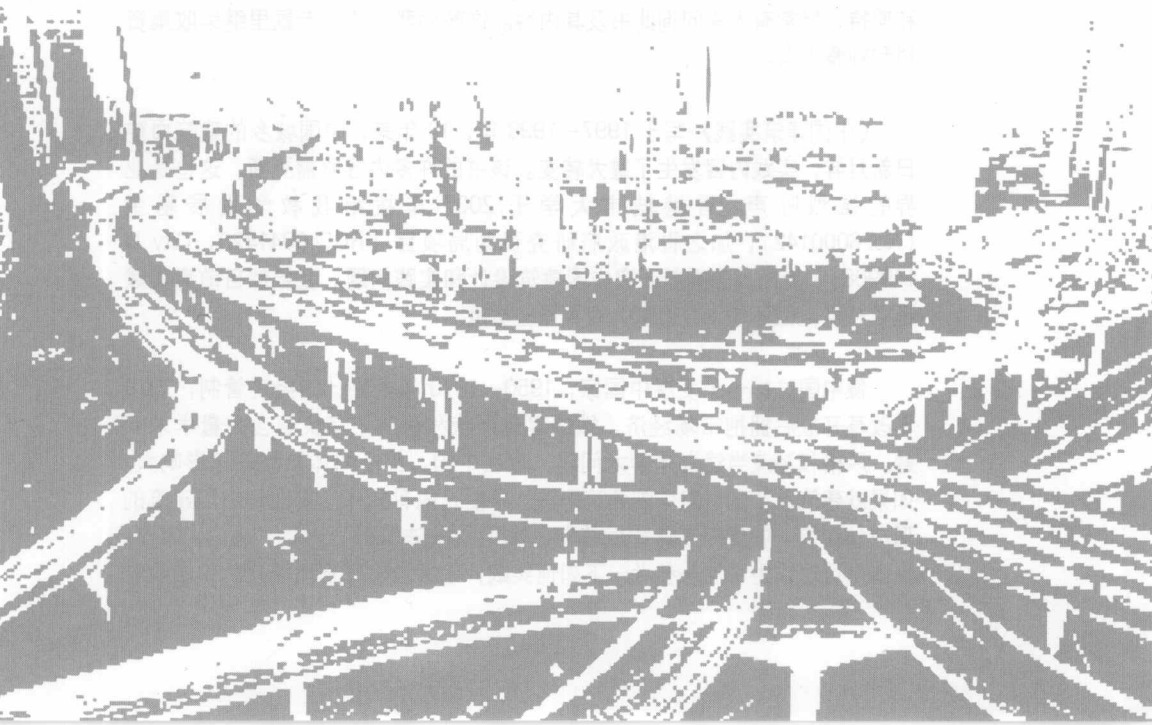
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序

20 世纪 90 年代中期, 我国的建设业已如火如荼, 而香港和海外业界对中国内地的建筑领域还处于兴奋和懵然状态。我在香港城市大学教授建筑实践课的中国内地部分, 同时通过设计课程和公司实践逐步了解香港建筑实践的体系和要义, 归纳出课程要点和章节, 遂将讲义编成中英文版《中国建筑实践》一书, 共十章, 此书 1999 年在香港出版。

《中国建筑实践》以香港和海外建筑界的业者和学生为对象, 该书出版以来, 香港和海外业界前辈同行多有赞誉, 许多公司人手一本, 该书被香港、台湾和海外大学各建筑院系选为教材, 有的院校以该书各章节作为建筑实践课程大纲的内容。初版 5000 本于一年半后售罄, 2001 年加印。10 年来, 书店每月仍有售出。这在书籍只能卖几百册的香港, 实在算是奇迹。

《中国建筑实践》之后, 我转向关注中国当代建筑创作问题, 写出了英文版《建造革命: 1980 年来的中国建筑》(香港大学出版社, 2006)、《全球化冲击: 海外建筑设计在中国》(同济大学出版社, 2006)、英文版《世界建筑在中国》(2009) 等书和此专题的文章, 发表于海内外建筑杂志。海内外同行同事们对中国当代建筑十分关注, 对此一题材的英文著述非常支持和期待, 经常有人来询问此书及其内容。这鼓励我在这一专题里继续收集资料 and 观察思考。

《中国建筑实践》写于 1997—1998 年, 10 年来, 中国城乡的建筑面貌日新月异, 实践内容发生了重大转变。该书的许多内容亟需更新, 这也是业界的强烈呼声。香港城市大学于 2007 年拨给我教学发展基金 (No. 6000142), 加之香港政府研究资助局项目 (RGC 9041420, City U 149908), 专门用来重新研究中国建筑设计 and 实践问题。我虽然目前离实践远了一点, 但还是十分愿意为业界作些贡献。

像中国这样一个发展中国家, 1950—1970 年代受计划经济管制, 1978 年改革开放后拥抱市场经济, 她的建筑现状和机制中其实蕴含大量学术问题。风格和潮流当然也是学术问题, 但在中国, 都不如体制和政策影响大。如果就建筑论艺术, 对中国建筑来讲, 只能是隔靴搔痒。要理解中国建筑的形成和面貌, 就要知道其背后体制、规范和做法等强有力的“手”。因此, 这本书可以作为手册来参考一下如何实践, 笔者也希望它能够成为中国建筑

Preface

In the mid 1990s the construction industry was booming throughout China. Practitioners and scholars both in Hong Kong and overseas were intrigued but largely uninformed by the phenomenon.

I joined the faculty of City University and was assigned to teach building practice in China. Practice courses were generally ignored in China's architectural education system, especially before the 1990s. I studied building practice and regulations in Hong Kong through my teaching and design consultant activities. From the viewpoint of a Hong Kong practitioner, I compiled my lecture notes into a bilingual book of ten chapters, *Building Practice in China*, which was published in 1999.

Building Practice in China is now extensively used by students and building professionals in Hong Kong and overseas. It is gratifying to know that the book is highly appreciated by colleagues in the field—in fact in some companies, every staff member had a copy for reference when dealing with Chinese projects. Universities in Hong Kong, Taiwan and the USA used the book as their standard reference text. Some academic institutions offered a similar course using the titles of the ten chapters as a basis for their syllabus. 5000 copies of the first print were sold in 18 months; a second print was produced in 2001. After ten years the book is still selling well and has set a precedent for technical book sales in Hong Kong where ordinary books usually sell only a couple of hundred copies.

After *Building Practice in China*, I turned to the contemporary history of Chinese architecture, design trends and theories. Several books have been produced, for example, *Building a Revolution: Chinese Architecture since 1980* (HKU Press, 2006), *The Global Impact: Overseas Architectural Design in China* (Tongji University Press, 2006) and *World Architecture in China* (2009). More than ten research papers on these topics were presented and published in international conferences and journals. My peers in China and overseas were very enthusiastic about the topics and actively supported English language writing on Chinese architecture. Having received

业和设计业的一份记录和评论。在本次重写中，笔者加强了与建筑设计相关的一些程序和规定，如土地、规划等。并在各章中增加实例和说明问题的插图。第一版的第九章“施工与监理制”、第十章“在华投资与中外合资合作建筑行业”离建筑设计实践稍远，且合资合作已经成为现今业务的常态，故两章皆取消。

《中国建筑实践》的资料，过去 10 年，我一直在断断续续积累。再版重写，实则另起炉灶。我查阅那些新的数据，常常吃惊于发展的快速和数量的巨大。此次再版重写，特聘请上海青年才俊王颖博士协助，王颖攻中国近代建筑史，在钻研实践和体制问题上勤奋用功。她在本书第一版基础上，就第三、四、七和第八章收集整理了新的材料和文字。王颖博士和我访问了上海的业界权威，请教问题。感谢前辈蔡镇钰老总、郑时龄院士、莫天伟教授百忙中拨冗解答问题。上海市规划局局长伍江教授、戴明先生，上海市建筑建材业市场管理总站勘察设计监理招标投标管理科顾勤华科长、上海卢湾区城市规划管理局朱军浩科长对本课题给予宝贵意见。同济大学卢永毅教授对是项工作给予大力支持。感谢诸位对本书的指导和扶持。中国建筑工业出版社慧眼拾遗，全力支持本书出版。本书的英文采用简写形式，由作者初稿，同事梅清宁（Brian Mitchenere）博士审校。梅先生几十年如一日，在城市大学寻查基建图纸和施工中的问题。现在则帮我检查文稿中的问题，他审英文稿，也从实践的角度提出许多问题和建议，谢谢 Brian 先生。

《中国建筑实践》的初版，由香港建筑元老何弢博士、香港大学坚立信（Sivaguru Ganesan）教授作序。两位业师已经退出了生产和教学的第一线，遥祝前辈身体康泰，并喜见中港两地新人辈出。中国建筑实践，波澜汹涌壮阔，后浪推动前浪，希望将来，可以更新出一版又一版。

薛求理

2009 年初春

识于 香港 马湾

many enquiries about the subject matter, I was encouraged to continuously observe Chinese practice, collect and comment upon materials in the field.

The first edition of *Building Practice in China* was written in 1997—1998. After ten years, numerous grand buildings have been completed in the vast land that is China. Building practices during that time also underwent dramatic changes. In response to strong demands I realized that the book should be updated to include the numerous new developments in the industry. In 2007, City University awarded me a Teaching Development Grant (No. 6000142), plus the General Research Fund from Research Grant Council, Hong Kong government (No. 9041420, City U 149908) for the study of Chinese architecture and practice which allowed me to produce this contemporary version of my earlier book.

Between the 1950s and 1970s, the developing country of China was constrained by the planned economy. After the open door policy was adopted in 1978, the country zealously embraced a market economy which brought with it a large number of bureaucratic procedures which included academic problems. Discussions on design, style and trends are of course often held among academics. In China however they never tend to impact on architectural development so profoundly as matters of policy. Appreciating design in Chinese architecture is fine, but merely discussing aesthetics cannot reach the essence of how buildings are produced. To understand the formation and rationale behind Chinese architecture one has to be cognizant of the powerful systems, policies and regulations which shape the end product.

This book can be read as a practice manual in the first instance. I also hope that the book contributes to the history of Chinese architecture by highlighting construction and design methods and procedures. In rewriting the book, I strengthened the sections related to procedures and regulations effecting architectural design such as land acquisition and planning. Examples and illustrations are added in all chapters. Chapter 9, “Construction and Supervision Systems,” included in the first edition, has been deleted as it is now somewhat separated from current architectural design practice. Similarly, Chapter 10, “Investment in China and Joint Ventures in its Building Industry” has also gone because joint ventures are now a common feature of large scale projects.

During the past ten years, I accumulated materials for updating the book to a new edition. The second edition is actually a new book. While examining

all the new data, I was often overwhelmed by the fast pace of development, the changing face of new buildings and the large amount of construction work being undertaken. Dr. Wang Ying of Shanghai was employed to help rewrite the project. Wang Ying specializes in the modern history of Chinese architecture. In undertaking the task, she studied in particular the problems in practice and organization systems; she helped collect materials and drafted Chapters 3, 4, 7 and 8. Wang Ying and I visited and consulted the authorities in the building industry in Shanghai, including my mentors and masters Professor Cai Zhenyu at the Shanghai Modern Group and Academician Professors Zheng Shiling and Mo Tianwei. In the past, I grew up in their shadow and in the future, I will walk on the way they paved. Professor Wu Jiang, director of the Shanghai Planning Bureau, Dai Ming of the Planning Bureau, Gu Qinhua of tendering management section and Zhu Junhao of Planning Bureau of Luwan District in Luwan District kindly answered our queries with great patience. Encouragement to produce this book was also provided by Professor Lu Yongyi of Tongji University. I am indeed indebted to all these people with whom I have a great affinity and affection.

The publication of this book was made possible by the China Architecture & Building Press, the largest and most authoritative building publisher in China. I feel honored to have worked with the Press which has been producing quality material for 55 years. The English version is simplified and all end notes are in the Chinese section. My colleague, Dr. Brian Mitchenere proofreads the English manuscript and gives useful suggestions from time to time. Thanks so much Brian.

The Forewords in the first edition were written by Dr. Tao Ho and Professor Sivaguru Ganesan. These two mentors are now retired and I sincerely wish them a peaceful and healthy life. A new generation is taking up their causes and building on their valuable experience. Building practice in China has a bright future. We look forward to producing a further update of this book at an appropriate time.

Charlie Q. L. Xue
Ma Wan
Hong Kong
2009

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第一章 中国城乡和发展概况

Chapter 1 Chinese Cities and Their Development



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中国城乡和发展概况

1.1 吾土吾民

中国幅员辽阔,纬度和经度差异巨大,东西时差超过4h,背倚欧亚大陆、面临太平洋。若以13亿人口去除以960万 km^2 ,人口密度比英国还低。然而在这块国土之中,山地多,在南方,福建、江西、安徽以西皆山峦迭嶂;在中原,从河南入陕西,一路可见刀切斧砍似的山梁沟壑。海拔500m以下的平原和丘陵只占国土面积的25.5%,却要容纳79.7%的国民;海拔2000m以上的高原山区占了国土面积的32.9%,却只有2.1%的国民居住。¹新疆占国土面积1/6,166万 km^2 (比香港大1600倍),然而绿洲平原只占总面积的4.3%,其余皆戈壁荒漠。我国干旱半干旱地区本已占据一半国土,由于近年环境恶化加剧,有近30%的国土蜕变为沙漠,沙尘暴在肆虐,沙漠化还在逐年扩大。²因此,中国国土面积虽大,但可用来耕耘和造楼的土地却并不多。

在中央政府领导下,中国大陆境内有31个省、市、自治区,其中北京、上海、天津、重庆为直辖市。1997年7月1日以后,香港成为特别行政区;1999年12月21日后,澳门成为特别行政区。

英国的城市化水平在1851年时已达到50.2%,而中国在1893年也已有3.9万个城镇和集镇。按照美国和中国学者的研究,这些城镇按人口分为4000人以上,2000~4000人和2000人以下三种。而100年后,即1950年,中国城市化水平只有10.6%。1990年代,当英美诸国早已消灭城乡差别,全世界城市化水平踏入50%之际,中国的非农业人口只及总人口的25%。到2010年,我国的城市化将达到50%的水平。2005年,我国有建制城市660个左右,在21世纪的前20~30年,城市将达到800多个,另有2.1万个建制镇,即在20世纪末到21世纪初的几十年里,几亿人正在或将从农村搬到城市居住。³

然而,在这较低的城市化水平之下,却呈现出城市的区域性不平衡和少数大都市人口的超常聚集。1920年,江苏省1万人以上市镇居住人口已达到19.9%,10万人以上的市镇居住人口达到13.1%,浙江省约14.4%,江浙两省大约领先全国城市化水平60年左右。这种由地域差别造成的城市化不平衡现象在当代中国还有继续扩大的趋势。每年沿海地区城市人口增加将近一个百分点,而内地省区仅有0.5左右的百分点。⁴

Chinese Cities and Their Development

1.1 The Country and Its People

The territory of China is so extensive. Backed by the European and Asian continents it faces the Pacific Ocean to its east. Even with its 1.3 billion people, the population density of China is still lower than that of Britain's. However, China's arable or "buildable" land is not as extensive as one would expect. In the south, mountains or hills dominate provinces such as Fujian, Jiangxi, Anhui and their west. In the center, from Henan to Shanxi, steep, barren and precipitous mountains and valleys border the major traffic routes. Plains and hilly land-less than 500 m. above sea level-account for only about 25.5% of the whole territory but accommodate 79.7% of the country's total population. Plateaus and mountain areas-greater than 2000m. above sea level-account for 32.9% of the total territory but only house 2.1% of the population. The autonomous region of Xinjiang, containing an area of 1.66 million sq. km., accounts for 1/6 of the country's overall land which is 1600 times larger than that of Hong Kong. However, in the home of the Uygur people, only 4.3% of the land is oasis, the rest being the Gobi. The arid and semi-arid regions make up the country's heartland. Owing to the continuous deterioration of the environment, 30% of land falls to desert where sandstorm is prevalent every year. This huge country does not generate much useful terrain.

Under the central government of Beijing, there are 31 provinces, as well as directly controlled cities and autonomous districts, amongst which Beijing, Tianjin, Shanghai and Chongqing are centrally administered. After July 1, 1997, Hong Kong became a Special Administrative Region as did Macau after December 21, 1999.

In 1851, urbanization in Britain had reached 50.2%, whilst nearly 100 years later in 1950, China only managed 10.6%. While the disparity between city and rural areas is almost eliminated in Western Europe and the USA, and the urbanization of the world was already standing at 50%, the

在东部,各大平原区的人口较稠密,其中黄淮海大平原平均每平方公里近600人,东南沿海各河口三角洲每平方公里700人左右,长江三角洲和钱塘江平原每平方公里达750人。人口密度随高度增加而逐渐减少。在西半部,人口多集中在水源条件较好的河谷平原或绿洲地带,平均人口密度为每平方公里50~100人。而青藏高原北部、新疆南部、内蒙古西部等各县,平均人口密度每平方公里小于1人,盖因地势高寒或极端干旱,至今没有常住人口⁵。

近代以来,中国的城市化水平虽低,但特大型城市却不在少数。如上海市在1910年为128万人口,1949年增至545万。广州市在清末已超过100万人,武汉市在1932年为125万,重庆在1945年为105万。中国在1979年的城市化水平不足20%,但同期的百万人口特大型城市已达到20座(不包括港、澳、台地区),占了世界特大型城市总数的1/10左右。1995年的统计表上,除32个百万人口以上的城市外,50~100万人口的城市也达到41个。打开中国版图,若从兰州、成都、昆明划一根线,国土则分为东西两半,西面的疆土似乎比东面还大些。然而,1996年公布的32个100万人口以上的特大城市,31个在东部,西部只有一个乌鲁木齐。在未来的年月里,数亿农民还会涌向城市寻找工作和机会,而城市里的中产阶级则逃往郊区追求稍为宽敞的住房和绿地。仅上海,10年内就有几百万人迁往郊区居住。⁵

根据1995年的统计,中国每10万人口中,有2065人受过高等教育,38440人有小学教育程度。1.45亿人为文盲或半文盲,超过总人口的10%。到了1998年,国家开始大力发展高等教育,每年大专院校招生400~500万,北京、上海、杭州等城市,适龄青年70%~80%可以接受到各种形式的高等教育。由于连续多年的持续扩招,受大学教育的人数占到总人口的15%,已经高过了香港的统计数字。⁶

我国改革开放的30年来,经济生产持续增长,1990年代当世界的国民生产平均增长率为2%的时候,中国一直以9%~10%(某些省市以双位数)的速度在推进。一个200年来在世界经济上无足轻重的国家,到了21世纪,其经济总量排在美国、日本之后,成为世界第三。中国对外贸易的顺差,2007年与2001年相比增长了11.6倍。⁷瑞士世界经济论坛全球竞争力的排名在世界上得到广泛承认,在其2007—2008年度的报告上,美国、瑞士、丹麦、瑞典、德国、芬兰、新加坡、日本排在前十位,中国香港在第12位,中国在第34位。竞争力包括经济实力、政府管理、国际化、基础设施、财政制度、金融服务、人口素质等等项目。1994年中国为第34位,1995年为第31位。⁸在美国传统基金会(Heritage Foundation)和《华尔街日报》评选的全球经济自由度排名上,中国香港从有报告开始的1994年始,连续十几年排名为第一,中国从第127名升到2003年的89名,2005年的86名。⁹

non-agricultural population in China only accounted for 25% of its own total in the mid 1990s. The level of urbanization is projected to reach 50% in 2010. In 2005, there were 660 cities in China, with a prediction of more than 800 in the first 20 ~ 30 years of 21st century. There are 21000 rural towns. In the first quarter of the 21st century, billions of people will move from rural areas to towns and cities.

There exist the phenomena of uneven geographical distribution of towns and over-population in a few Chinese metropolises despite low urbanization. In the 1920s in Jiangsu Province, 19.9% of the population lived in towns of more than 10000 residents and 13.1% lived in towns of more than 100000. The rest of China is around 60 years behind the urbanization level of Jiangsu and Zhejiang Provinces. This uneven development between different areas is expanding. Every year, there is a 1% increase of population in the coastal cities and 0.5% in the hinterland provinces.

In eastern China, the plains next to the Yellow Sea have a density of 600 persons per sq. km. The density on the estuaries of the southeast is 700 persons per sq. km. and reaching 750 on the Yangtze River Delta in the east. Population density decreases with heightened topography. In the west, people usually settle near a river, river valley or oasis, where the average density is 50 ~ 100 people per sq. km. In the northern area of Qinghai and Tibet, the southern area of Xinjiang, and the western parts of Inner Mongolia, the population density is less than one person per sq. km. because of the inhospitable highlands and deserts.

Despite low urbanization, ultra-large cities are not rare in China. For example, Shanghai had a population of 1.28 million in 1910 and 5.45 million in 1949. Guangzhou had over 1 million at the end of Qing Dynasty (1644—1911); Wuhan had a population of 1.25 million in 1932 and Chongqing had 1.05 million in 1945 after World War II. China's urbanization level was less than 20% in 1979 but at this time, there were 20 Chinese cities with a population of over 1 million each (not including Taiwan, Hong Kong and Macau), accounting for 1/10 of the world's total population. In 1995, besides the 32 cities with populations of over 1 million, there were 41 other Chinese cities where the population numbered between 500 thousand to 1 million people.

On a map of China, the country can be divided by almost a straight line from Lanzhou at the top, through Chengdu in the middle to Kunming at the bottom.

1.2 城市分类

中国的城市,就它们各自在全国或在一定区域中的地位 and 作用,按其吸引力的强弱和辐射范围的大小,以及它们之间的职能分工而言,可以分为七级城镇体系。

第一级:国际性中心城市

香港——1997年7月1日收回主权,成为中华人民共和国的一个特别行政区。2010年左右增加上海、北京。这三个城市进入全球城市网络体系。

第二级:全国性中心城市

北京,上海,天津,重庆。

第三级:跨省区的中心城市8个

广州,沈阳,武汉,南京,成都,西安,大连,兰州。

第四级:省域中心城市

约36个,一般每省(自治区)一个,大多为本省的省会(上述第三级跨省区中心城市,也兼为本省省域中心城市),少数省(自治区)有两个省域中心城市。它们是:石家庄、唐山、太原、呼和浩特、长春、吉林、哈尔滨、杭州、宁波、济南、青岛、合肥、南昌、福州、厦门、郑州、长沙、南宁、柳州、海口、昆明、贵阳、拉萨、西宁、银川、乌鲁木齐。

第五级:省下经济区的中心城市

根据省域范围大小和省内经济发展的程度,一般每省有3~4个省下经济区,有的省可能更多些,

有的省下经济区还可细分为两级。省下经济区及其依托的中心城市,由各省根据具体条件研究划定。多数为中等城市,也有大城市。

第六级:县域中心城镇

全国约2200个县级市(不起省下经济区中心城市作用的一部分县级市)的市人民政府驻地,县人民政府所在地的建制镇,未设镇建制的县级人民政府驻地(青海、西藏较多)。它们是县域的政治、经济、文化、科技中心,一般是10万人口以下的城镇,少数经济发达的县级市和县(旗),其中心城镇也可能接近20万人。

第七级:县下“片”的中心镇

全国约8000个,它们多为县城以外的建制镇,在邻近4~6个乡镇政府驻地集镇之中,必有一个交通方便、经济发达、人口规模较大的建制镇起县域某一“片”的中心镇作用,其人口多在1万人左右。¹⁰

1.3 中国城市群概述

上述的城市分级从一个方面描述了我国城市的行政地位。这数百个城市实际上是以集群的形式在相互作用和运作。以下篇幅简要介绍值得注意的城市群。¹¹

1.3.1 长江三角洲—沪宁杭地区城市群

长江三角洲—沪宁杭地区是我国重要的城市经济区,位于我国沿海发展轴和长江产业带的交叉处。我国进入近代社会后,这里一直是

The western part appears larger than the eastern part. However, of the 32 cities in China with over 1 million people in 1995, only Urumqi falls in the western part—all the other 31 are in the east. In the foreseeable future, hundreds of millions peasants will migrate to cities seeking their fortune, while the middle class city dwellers will escape to the suburbs to enjoy greenery and more spacious housing. In Shanghai, several million people will move to suburban new towns in the first decade of the 21st century.

According to a 1995 demographic statistic, 2065 people received college education and 38441 people received primary school education out of every 100000 people. Moreover, 145 million people—around 10% of the national population—were regarded as either illiterate or semi-illiterate. From 1998, the government strikingly expanded efforts in tertiary education. Four to five million students were recruited to higher education institutions every year. In such cities as Beijing, Shanghai and Hangzhou, 70% ~ 80% youth can receive various forms of higher education. Because of continuous expansion in the past decade, the people who have received higher education reached 15% of the total population, higher in fact than that of Hong Kong.

After the open-door policy was adopted in 1978, the country enjoyed continuous economic growth. In the 1990s, China achieved a 9% ~ 10% annual increase (some provinces reached double digits) in GDP, while the rest of world lingered at 2%. In the past 200 years, China was an unimportant player in the world economy. In the 21st century, its total production output was ranked No. 3 in the world, after the USA and Japan. The foreign trade surplus of 2007 was 11.6 times that of 2001. In a world ranking of competitiveness, run by the World Economic Forum of Switzerland, the USA, Switzerland, Denmark, Sweden, Germany, Finland, Singapore and Japan are among the top ten in 2007—2008, while Hong Kong was number 12, and China 34. The competitiveness includes economic output, governmental management, internationalization, infrastructure, financial systems and services and population quality. In an economic freedom ranking, run by the Heritage Foundation and *Wall Street Journal* of the US, Hong Kong was consecutively ranked No. 1 from its inception in 1994, while China rose from No. 127 in 1994 to 89 in 2003 and 86 in 2005.

1.2 Classification of Cities

Cities in China can be classified into 7 levels according to their capacity,