A CROSS-CULTURAL COMPARATIVE STUDY OF URBAN FORM, CHINA AND UK

by

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A thesis submitted to the University of

Birmingham for the degree of

DOCTOR OF PHILOSOPHY

School of Geography, Earth and
Environmental Sciences
University of Birmingham
September 2023

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Thesis statement of originality and contributions

This is to certify that the content of this thesis is wholly and entirely my own original work. This thesis has not been submitted for any degree or other purposes. During the preparation of the thesis, the following people have provided important feedback: Professor Jeremy Whitehand; Professor Rob MacKenzie; Dr. Terry Slater; and Associate Professor Feng Song. The responsibility for any errors or inaccuracies remaining is entirely my own, of course.

Abstract

This thesis conducts a cross-cultural examination of morphological developments in two model urban case studies, located in China and the UK. It begins by analysing the differences in distinct institutional, historical, cultural backgrounds and landscape basis at the national and city levels. Subsequently, the thesis provides a comprehensive morphogenetic landscape analysis of the two cases in four aspects: their plans; patterns of built forms; land and building use patterns; and the utilisation of green space. The thesis systematically explores both the commonalities and disparities between these case studies. Disparities arise from multiple factors, including distinct cultural backgrounds, developmental stages, and, notably, institutional differences. The thesis argues that these institutional differences are the fundamental drivers behind the divergent evolution of their townscape. However, beyond these differences, the two cases also exhibit significant similarities. When viewed from a broader perspective, both demonstrate a similar concern for their working classes and vulnerable communities, leading to similar community spatial organizational forms. Moreover, both cases have come to be designated as heritage sites over time, signifying their cultural value. The thesis argues that, beyond the mere preservation of physical structures, safeguarding the essence of utopian ideals is of greater significance.

Acknowledgments

It is a sunny day today, with sunlight streaming through the blinds of Aston Webb Building, Room 113, casting dappled shadows on the table. In this mottled play of light and shadows, I pen down these words of gratitude.

I want to express my heartfelt thanks to the China Scholarship Council for providing me with this scholarship. Without this scholarship, a young girl from the rural areas like me would never have had the opportunity to venture abroad and pursue the research I am passionate about.

I am deeply grateful for my late supervisor, Professor Jeremy Whitehand, who dedicated so much of his time and effort to nurturing both my academic and personal growth. Jeremy showed me that one person could possess so many wonderful qualities. I recall the sparkle in his eyes every time we discussed my research topic; that glimmer gave me confidence and courage, illuminating my path to continue studying urban morphology. I want to extend my gratitude to Jeremy's wife, Susan Whitehand, who continued to care for me even after Jeremy's passing, visiting me on campus every month.

I am extremely thankful for my supervisor, Professor Rob MacKenzie. After Jeremy's passing, Rob stepped in to support me, always lending a helping or saving hand when I faced difficulties. Rob's ability to manage his time and his vast knowledge have never failed to amaze me. What I've learned most from Rob is his knack for helping me see the wide-ranging connections in various subjects. From him, I saw the true essence of a scholar who transcends disciplinary boundaries. I also want to express my sincere gratitude to Dr. Lloyd Jenkins for his support as my supervisor.

I would like to express my gratitude to Dr. Terry Slater, who is not my official supervisor but guides me no less than any other supervisor. Terry taught me many valuable lessons through our weekly brainstorm-like conversations, extending far beyond urban morphology. I always had a sense that Terry's academic interests were rooted in a love for life. I am thankful for Terry's various forms of gentle encouragement and 'harsh prodding' that pushed me to complete my thesis.

I want to express my gratitude to my master's supervisor, Associate Professor Feng Song at Peking University, who always provided me with both financial support and academic guidance. Feng has always selflessly created various opportunities and platforms for his students, including me. Without him, I would never have had the opportunity to study at the University of Birmingham. I want to extend my gratitude to Feng's wife, Jie Deng. I have benefited so much from their generosity and wisdom in both my academic and personal life.

I am deeply grateful to Rod Fennell and his wife, Elaine Fennell, for their kindness, which has empowered me with the confidence and courage to persevere. I also want to express my appreciation to Deanne Brettle and all the members of Room 113 for fostering a loving

community. I am thankful for Claire Thomas from the School of Geography, Earth and Environmental Sciences for her invaluable assistance with administrative matters. I am also deeply appreciative of Professor Patricia Noxolo for the invaluable emotional support she has extended to me throughout my doctoral career. I extend my heartfelt gratitude to Suntop Planning Company for their support in 2022 during my time in Beijing, with special thanks to Guofei Xu, Chairman of the Board, and Jin Cheng, Chairman of the Supervisory Board.

Lastly, I want to express my gratitude to my family. My departed father served as a resilient and optimistic role model for me. My mother's unconditional love has been my source of courage as I navigate through life. I am also deeply thankful to my husband, Dr. Fang Sun, whose unwavering support has been a pillar of strength throughout. To all my other family members, you are my sanctuary. My love for each of you is as boundless as my love for life itself.

Yanhui Shi
Birmingham
September 2023

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List of abbreviations

CDA	Comprehensive Development Area
Factory 1	The First Zhengzhou State-owned Cotton Textile Factory
Factory 3	The Third Zhengzhou State-owned Cotton Textile Factory
Factory 4	The Fourth Zhengzhou State-owned Cotton Textile Factory
Factory 6	The Sixth Zhengzhou State-owned Cotton Textile Factory
SEZ	Special Economic Zone
ZUC	Zhengzhou Urban Construction archive

Chapter 1. Introduction

The introductory chapter provides a brief exploration of the research objectives, the case studies, sources, and research methods. First, it emphasizes that this thesis constitutes a cross-cultural study aimed at extracting diverse landscape evolution mechanisms through a comparative analysis of two cases from distinct cultural backgrounds, with a specific focus on the role of institutions. Subsequently, the circumstances of the two selected cases are introduced, and the issue of comparability in cross-cultural research is analysed. The available sources for the two cases differ significantly, and this issue is addressed. With respect to research methods, landscape genesis, morphological, and comparative analytical methods will be employed in this study. To conclude, the research structure of this thesis is briefly outlined.

1.1 Objectives and aims of the thesis

This thesis selects two utopian neighbourhoods created in different time periods and cultural backgrounds (i.e., in post-WW2 China and turn-of-the-20th-century (‘fin de siecle’) UK). While the neighbourhoods share underlying connections in their design concepts, their physical appearances are markedly different. These distinctions are attributed to cultural backgrounds, regional characteristics, developmental stages, and the broader social systems in which they are rooted. In the investigation of urban landscape evolutionary mechanisms, prior extensive contributions in urban morphology have yielded universally significant concepts that facilitate analysis and synthesis. These include Conzen’s comprehensive set of morphological terminology and methods (Conzen, 1969), along with the agent-agency theory developed by Whitehand and others (Whitehand and Whitehand, 1984). However, the agent-agency theory has mainly concentrated on the immediate or indirect participants influencing changes in Western urban landscapes, and much of the existing research has been conducted within relatively similar cultural and institutional backgrounds (pp. 13-15). As a consequence, some more subtle factors often remain unnoticed—certain assumptions, mental models, or procedural logics specific to particular institutions may be considered self-evident, causing them to be overlooked. These limitations become particularly evident when examining

countries with significantly diverse institutional contexts.

This thesis aims to illuminate the influence of various factors, particularly political systems and state governance strategies, as well as historical and cultural aspects, on the formation and transformation of two ostensibly dissimilar landscapes in China and Britain. By analysing and comparing these two cases, it seeks to uncover the similarities and differences in the evolutionary mechanisms of urban landscapes in both countries. This research holds three significant implications for the advancement of urban morphology. First, it delves into the role of institutional factors in shaping landscape evolution. Secondly, it incorporates green space as a crucial element in urban form. Thirdly, it re-evaluates the applicability of classic urban morphological concepts and processes that originated in Western cultures within the Chinese context.

However, it is important to note that emphasizing the importance of institutions, does not imply neglecting or disregarding the influence of other factors. The author is well aware that history itself is immensely complex, and no matter how abundant and reliable the primary and secondary sources may be, historical reality can only be approached but never fully comprehended. The process of human development is not linear; rather, it is intricately shaped by various factors, including the social, cultural, and ideological contexts of the time and preceding periods. The mechanisms, extent, and relationships of these interacting factors can be perplexing due to the subjectivity and contingency of the researchers involved. Therefore, this thesis avoids adopting a 'whiggish' interpretation of history, which oversimplifies the developmental processes of the two cases by solely attributing spatial differences between them to institutional variations (Butterfield, 1965). Instead, the focus of this thesis is on institutions as defined by Williamson (2000) (pp. 16-17) among the numerous influencing factors, highlighting their participation in the evolutionary process of urban landscapes, and exploring the variations in mechanisms under distinct institutional backgrounds.

1.2 Research objects and comparative basis

The research focuses on two planned utopian communities, The Third Zhengzhou State-owned Cotton Textile Factory (hereafter Factory 3) in Zhengzhou, China, and the Bournville garden suburb

in Birmingham, England. Both cases represent self-contained communities, where production spaces, living spaces, and integrated community amenities, along with attractive physical environments are arranged in close proximity. The cities of Zhengzhou and Birmingham, where these two cases are located, share similarities in their geographical locations as both are situated in the central regions of their respective countries. Additionally, both cities are industrial centres, with their development closely tied to transportation developments. So, why were these specific cases chosen in these two countries?

From the perspective of country selection, there are two reasons for choosing China and England. First, the two countries can be seen as representative examples of 'pioneering' modern nations and successful 'latecomer' nations. Over a long period, England has gradually transformed geographical advantages into the world's first industrial economy, while China has changed its existing social and economic structure by borrowing foreign models (Rozman, 1982). These over-arching processes have already been reflected in their spatial manifestations. The second reason is relatively straightforward; these two countries are my homeland and the two countries where I have spent the most significant portion of my life, thus I have a relatively deeper understanding of them.

At the case level, these two examples can be seen as the embodiments of utopian social reformist ideas that emerged in different historical stages and under distinct cultural and social institutional contexts, showing a continuity in ideological concepts. The Chinese case, Factory 3 went through the process of the formation and subsequently dismantling of the *Danwei* system (see chapter 5. The *Danwei* system is translated as 'unit system' in some English studies). From its inception, the *Danwei* system reflects the socialist pursuit of fairness and the transformation of governance philosophy and policies in socialist society, representing the spatial practice of utopian socialism in communist China. Subsequently, it exemplifies China's transition from a planned economy to a market economy. Similarly, the Bournville garden suburb represents the spatial practice of utopian socialism in England, initiated through the efforts of the social reformist and entrepreneur George Cadbury. It sought to address the prevailing social injustices during the Victorian era and the collective endeavours of various social classes and groups to find solutions. Through a comparative study of these two cases, the history of utopian socialism's global practice

is unveiled, along with the processes of mutual learning and reflections among different regions. Spatially, both communities are self-contained, encompassing both production and living spaces, and are equipped with a multitude of supportive and welfare institutions. There has been criticism that the Bournville garden suburb is not representative of the overall situation in England, at least not as widespread as a case like Factory 3 in China. However, it is important to note that the Bournville garden suburb did not emerge out of thin air nor exist in isolation. Instead, it was deeply rooted in its social context and connected to a continuum of social reform experiences. Furthermore, when viewed through the lens of urban morphology's tripartite division (roads, plots, and buildings), the physical forms of the Bournville garden suburb, fall within the general category of corresponding features found in England.

In this study, there are at least three themes that deserve special examination in relation to these two communities. First, they share similar aspirations but exhibit considerable differences in their built environment, influenced by social, political, and cultural contrasts, as well as temporal variations. This aspect is morphologically expressed in the institutions provided for daily life and the house forms, which reflect the distinct organization of living conditions in each case. Secondly, both cases reveal the contrast and balance between efficient industrial production in the factory and the perceived ideal living environments of that time: the Arts and Crafts and Garden City characteristics of living places in Bournville, and the grand Soviet-style housing with innovative architectural designs and materials in advance of its time in Zhengzhou. Thirdly, the balance between collectiveness and privacy is evident in all aspects and morphological periods of both cases.

1.3 Time lag

The two cases occur in distinct cultural contexts, exemplifying how utopian ideas take on diverse forms. When adopting a comparative lens, the key aspect that requires thorough consideration is the time lag between the occurrences of these cases. Taking a diachronic view, each case resides within its unique developmental stage, and their respective forms can only reflect the specific circumstances during that particular era. From a synchronic standpoint, the two cases unfold in countries at distinct stages of development. It cannot be denied that there is a time lag of over one

hundred years between the developmental processes of the countries where the two cases are situated (Figure 1. 1). In light of this, the comparison in this thesis will focus on the processes of establishment and subsequent landscape evolutionary development of the two cases. The social, cultural, and institutional factors before their establishment will also be taken into consideration. This is because institutions exhibit inertia, and the genesis of both cases is rooted in their unique historical backgrounds and societal contexts. Without understanding these factors, the underlying reasons behind the phenomena cannot be comprehensively grasped. (For specific years of the historical dynasties mentioned in this thesis, please refer to the Appendix.)

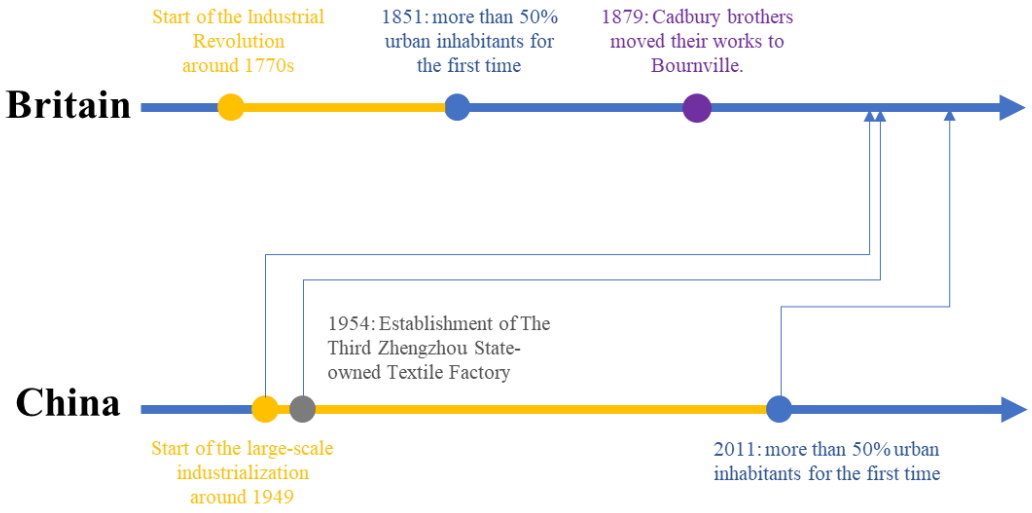


Figure 1. 1: Time lag between the two cases. The Cadbury brothers moved their works to Bournville in 1879. Before this move, Britain had completed industrialization, and by 1851, there were more than 50% urban inhabitants for the first time. On the other hand, in 1954, when Factory 3 was established, China had just begun its large-scale industrialization. It was only in 2011 when more than 50% of the population became urban inhabitants for the first time.

1.4 Sources

The primary sources for the thesis consist of the author's on-site records in the two cases, encompassing town plans, building fabrics, building and land utilisation, green spaces, and with a specific emphasis on micro-morphological aspects like window forms and housing extensions. The secondary sources comprise previous research records on the two cases and historical archives, which include historical maps, building application documents, historical postcards, and more. In

the case of Bournville, these sources also encompass six versions of Ordnance Survey maps[1] at scales of 1:2500 or larger, spanning from 1884 to the present. Due to differences in their developmental stages and technological levels, the types and precision of historical map data available for the two cases varied significantly. The historical map materials for Factory 3 are relatively scarcer and less precise compared to the abundant data available for Bournville. Furthermore, Bournville's renowned status has attracted considerable research attention (chapter 6), whereas research on Factory 3 has only begun in recent years. This study builds upon the foundation laid by previous researchers, acknowledging their contributions as we 'stand on the shoulders of giants'.

1.5 Research methods

This thesis employs three methodologies. The first approach involves analysing landscape genesis, examining the processes and factors that contribute to the formation and development of the cultural landscape. The study of 'landscape' in geography can be traced back to at least the second half of the 19th century in Germany when Friedrich Ratzel (1844-1904) proposed landscape as his subject of study (Dickinson, 1980). Later, as the focus of geographic study gradually shifted to human settlements, the distinction between natural and cultural landscapes emerged. Ferdinand von Richthofen (1833-1905) concentrated on natural landscapes and argued that they should be studied in four ways: morphological, material, dynamic, and genetic methods, with particular emphasis on the genetic method (Richthofen, 1883). Afterward, his student Otto Schlüter (1872-1959) emphasized the application of morphological and genetic approaches to cultural landscapes, arguing that the process of studying cultural landscapes is to first determine what they look like as observable objects, understand the mechanisms between the various elements, and analyse the changes they undergo in the process of human-land interaction (Dickinson, 1980). Following the division between natural and cultural landscapes, there is the division between rural landscapes and urban landscapes in human geography. Carl Sauer founded the Berkeley School, proposing that 'Culture is the agent, the natural area is the medium, the cultural landscape is the result' (Sauer, 1963). He

1 https://digimap.edina.ac.uk/

advocated the study of cultural landscapes using the genetic method. On the other hand, M. R. G. Conzen focused on the study of townscapes (Conzen, 1969). The morphogenetic approach emphasizes the need for a holistic view in the study of social development and change processes through time, which means that social change needs to be explained in a comprehensive manner.

Secondly, the approach utilised in this research is urban morphological. According to the theory of urban morphology, the composite city plan is an outcome arising from the aggregation of interconnected regions, wherein each region exhibits distinctive attributes that are shaped by temporal and geographic constraints. Within the theoretical frameworks of urban morphology, the urban landscape represents a synthesis of the town plan, patterns of building forms, and patterns of urban land use. Meanwhile, the town plan encompasses a compound of three spatial pattern elements: the street-system, plot system, and building-plan system. This study will adopt these research frameworks and utilise essential morphological concepts (see below) to investigate the landscape evolutionary process of the two case studies.

Plot: In the research framework defined by Conzen, an individual plot represents the most fundamental element constituting a settlement plan. According to Conzen, each plot serves as a basic unit of land use, delineated by its ground or above-ground boundaries. Regardless of size, they can be referred to as 'plot' (Conzen, 1969). Subsequent scholars have further developed this concept, asserting that a comprehensive understanding of the property's owner, object, and the relationship of ownership between them is essential to define a plot (Kropf, 2018). However, the situation in China is more complex, particularly during the planned economy era. This thesis will also address the challenges of applying the plot concept in the Chinese context (Conzen, 1969; Larkham and Jones, 1991).

Burgage cycle: Based on investigations of the evolution of burgages across different periods, Conzen identified a pattern wherein plots undergo successive phases under the pressures of economic development. This cycle typically encompasses the repletive, climax, recessive, and urban-fallow stages, starting from the medieval period until the clearance of slums in the modern period (Conzen, 1969; Larkham and Jones, 1991).

Morphological period: For a specific region, each era leaves distinct morphological characteristics in the physical landscape due to its unique economic and social context. Each such era is referred to as a 'morphological period' (Conzen, 1969; Larkham and Jones, 1991).

Plan-unit: In Conzenian urban morphology, the town plan is composed of three systems: the street-system, plot-system, and building-block-plan pattern. Therefore, a plan-unit refers to an individual combination of the aforementioned three systems, which differs from its neighbouring units. These elementary plan-units can be further integrated to form larger plan-units so that plan-units can be defined at different scales (Conzen, 1969; Larkham and Jones, 1991; Slater, 1989).

Morphological frame: According to Conzen, the morphological frame is characterized as an antecedent plan feature, topographical outline, or set of outlines that exerts a morphological influence on subsequent, more or less conformable plan development, often passing its features on as inherited outlines (Conzen, 1969; Larkham and Jones, 1991). Slater applied this concept to describe the pre-urban landscape in the analysis of Stratford-upon-Avon (Slater, 1996a).

Fixation line: In the context of Conzenian urban morphology, a fixation line is a linear feature, often serving a protective function, that marks the traditional stationary fringe of an ancient town, such as a town wall. Fixation lines can take tangible forms, such as rivers or man-made canals, or intangible forms, such as boundaries defined by local authority planning areas (Conzen, 1969; Larkham and Jones, 1991).

Thirdly, the method of cross-cultural comparative analysis is employed in this study. While researches on the formation mechanisms of Western urban landscapes are comprehensive and fruitful, the mechanisms in socialist China differ due to variations in society, culture, and institutions, and this aspect remains under-represented in the current academic context. This thesis will employ the physical landscape as an intermediary to conduct cross-cultural comparisons, aiming to achieve a comprehensive analysis. The rationale behind this approach stems from the recognition that the physical landscape is not solely shaped by social characteristics and transformation, but it is also profoundly influenced and moulded by culture and institutional systems. The focus of the comparative analysis lies not in comparing individual elements but in abstracting mechanisms from

their evolutionary processes. By comparing processes rather than specific individual elements, the study acknowledges that two seemingly dissimilar entities today may share similar necessities, such as housing and employment during their developmental processes.

The necessity of cross-cultural comparative research is aptly illustrated by a metaphor cited by renowned sinologist Timothy Brook, editor of the book *History of Imperial China*. He referenced Professor Weizheng Zhu, an expert in Qing history, to convey the unique value of foreign perspectives or cross-cultural studies. 'Imagine China as a room with only one window. I am sitting inside the room, and everything within it is within my field of vision. However, you are outside the room and can only see what's inside through the window. I can tell you every detail inside the room, but I cannot tell you the room's location. Only you can provide that information. This is why Chinese history research needs foreign scholars.' For research in the humanities and social sciences, cross-cultural perspectives are crucial as they provide diverse viewpoints. Cultural studies, in particular, can be enriched through the introduction of different perspectives. This has been a recurrent theme in urban morphology, emphasized and pursued in recent years (Whitehand, 2012).

1.6 Thesis structure

This thesis comprises seven chapters. The second chapter serves as the research background and is divided into two main parts. The first part introduces previous studies and highlights the limitations of existing disciplinary theories on physical landscapes. The second part delves into the historical development of utopian ideas and their spatial practices in different countries. At the national level, this development ultimately materialized as a welfare state in countries like the United Kingdom and socialist states in countries like China. The two case studies in the thesis are the practical implementation of utopian ideals in their respective countries. This naturally leads to the subsequent topic of conducting a comparative analysis of the two cases using the landscape genesis method. The third chapter analyses the development process of institutions in China and the United Kingdom, elucidating the evolution of their respective systems into welfare state and socialist state, and exploring the distinct manifestations of these systems in different stages. The fourth chapter examines the landscape evolutionary process of the Chinese case from four aspects: town plan,

building form, building fabric, and green space. The fifth chapter adopts a similar approach to study the British case of Bournville. The sixth chapter builds upon the aforementioned research to compare and analyse the similarities and differences between the two cases from various aspects. The seventh chapter presents the conclusion.

1.7 Positionalities within this research

Lastly are my personal reflections and the central theme encapsulated in this study. In recent years, the phenomenon of 'China's speed' has been continually generating wonders, forcing the Western world to reckon with this emerging 'colossus,' albeit accompanied by some misunderstandings. I firmly believe that these differences fundamentally arise from the distinct cultural, historical, and social backgrounds of the East and the West. Through the process of comparing the two case studies, I have uncovered numerous similarities in their development trajectories, occasionally evoking a sense of 'Just allow me to stretch my legs for a moment'[2]. All social groups encounter similar fundamental needs, including various aspects of daily life such as clothing, food, housing, and transportation. As individuals and communities pursue fairness, justice, and a higher quality of life, societies consistently progress. The preface to Isaiah Berlin's *The Roots of Romanticism* includes a quote from Henry Hardy, who quoted Bishop Joseph Butler, stating, 'Everything is what it is, and not another thing (Berlin, 2013).' This profound statement encapsulates similar message of this thesis.

2 This is an allusion from the preface of 'Night Voyage' written by Dai Zhang, a Chinese literary figure from the Ming Dynasty. The story goes that a young monk and a scholar shared a boat ride at night. Throughout the journey, the scholar was eloquently speaking, leading the young monk to believe that he possessed great talent. Consequently, the young monk kept his legs crossed all night, thinking he was in the presence of a knowledgeable person. However, as they conversed further, the young monk discovered that the scholar was merely pretending to be knowledgeable and lacked genuine learning. Hence, he remarked, 'Just allow me to stretch my legs for a moment.' In using this analogy, the author reflects on the twists and turns in the historical development of England and finds some consolation in the realization that it too has experienced numerous setbacks.

Chapter 2. Research background

Human history can be understood as a progression of symbol creation, wherein these symbols serve as the foundation for the construction of various cultures; architecture and settlements, akin to myths and religions, are tangible expressions of these human-created cultures (Cassirer, 2021). As a collective entity, humans engage in a duality of behaviours, encompassing both assimilations, wherein they adhere to established social norms, and differentiations, where they actively participate in reshaping the societal fabric (Cassirer, 2020). Consequently, purposefully constructed buildings, combined with material elements such as streets, encapsulate distinct historical and social contexts, epitomizing the outcome of artistic expression. Moreover, buildings serve as human habitats and provide the physical and social environments for diverse communities. Within these habitats, the physical existence reflects the aspirations and ideals of the communities concerning their way of life (Cherry, 1988; Rapoport, 1990). Human social groups are products of historical processes and are influenced by prevailing trends, ideas, worldviews, and events of their respective eras. These historical events can only be comprehended through the lens of their associated meanings, and the interconnectedness of various components within a broader system is essential for understanding these meanings. This system of meaning, whether in its entirety or as constituent parts, undergoes transformations from one historical period to another. The factors of these changes are often attributed to a variety of utopian social consciousness. Within this context, the idea of ‘utopia’ acts as a transformative force within contemporary social structures (Mannheim, 2003). While numerous studies contend that utopian concepts, like theological utopianism, are ahistorical or signify the culmination of developmental history, utopian ideas frequently serve as catalysts for historical development. These utopian ideas may not necessarily constitute the driving force or attribution to social progress, but they embody the overall purpose and vision of society to some extent. The pursuit of utopia is transmitted across generations, constantly changing while being influenced by the spirit of each new era. From a geographical perspective, it takes on different forms, combining the characteristics of different regions and ethnic groups. Utopian ideas and their diverse manifestations have, like all idealisations, experienced numerous failures in the real world throughout history. Today, the political utopianism relevant to the current study exists in two

dominant forms: one-party socialist states and welfare states under democratic systems (Barzun, 2000). Irrespective of its manifestation, this initially conceived perspective, fortified by the relentless efforts of generations of reformers, ultimately upholds its core principles through the establishment of laws and institutions, aiming to achieve equity and reverence for all individuals. Architecture serves as a manifestation of the spirit of each era (Feng, 2017). Utopian architecture and material forms throughout various periods reflect the prevailing and pressing social needs of their respective times (Hertzler, 2016), including the latest exemplar of utopian architecture, skyscrapers (Lepik, 2008), even though high-rise blocks are viewed unfavourably in certain countries (Jones, 2003). Thus, the quest for ideal cities and social utopias creates a structure akin to the DNA double helix, where material landscapes and social ideas interact and evolve in a dynamic interplay. Cultural, social, and institutional backgrounds serve as connectors that facilitate the transmission between these two realms.

The structure of this chapter centres on two main aspects. First, it will delve into the urban material landscape, encompassing a multidisciplinary research approach. While the agent-agency theory in urban morphology proves valuable, it falls short in acknowledging institutional factors, limiting its efficacy in cross-cultural comparative studies. Moreover, Conzen's definition of urban form overlooks the importance of green space, resulting in an oversight of its significance in traditional morphological investigations (Conzen, 1969). In fact, green space plays a crucial role in the evolutionary process of residential buildings and the urban landscape, as evidenced by the two cases presented in this thesis. Morphology has the potential and, in fact, should make more substantial contributions to the study of green space. Scholars from related disciplines, including landscape history, archaeology, and human geography, have endeavoured to offer explanations of urban landscapes based on their respective areas of expertise. Nevertheless, each approach possesses its own inherent limitations. What follows provides a comprehensive review of existing research concerning landscape as a material entity. The second aspect of this chapter will explore the global dissemination of utopian ideas and their eventual impact on spatial practices through legal and institutional forms. Through this interconnected analysis, it becomes evident that both cultural and institutional factors play a pivotal role in shaping and constraining the societal material landscape.

2.1 Existing studies on agent-agency theory

Urban morphology focuses on the evolution of urban form at different scales and developmental stages. In the early stages of urban morphology's development, M.R.G. Conzen made a significant contribution by proposing the fundamental framework and concepts for urban landscape analysis, suggesting that the plan system comprises street-systems, plot-series, and block-plans (Conzen, 1969). Subsequently, British urban morphologists applied this method to different historical periods, roughly dividing into two groups. Terry Slater and his contemporaries mainly focused on the medieval period, investigating how historical plots were divided and subdivided (Lilley, 2000; 2004; Slater, 1981; 1987; 2004). On the other hand, under the leadership of Jeremy Whitehand, more attention was given to historical research of the post-industrial revolution period, with a lesser emphasis on the original rural landholders and more on the second cycle and subsequent developments. To study the evolution of urban landscapes during this process, Whitehand proposed a research framework of agent-agency. This approach involves examining the changes that occurred, the activities that led to these changes, who instigated the changes, the resistance to change, and the reasons behind these changes (e.g., Whitehand and Whitehand, 1984; Whitehand, 1987). These studies categorized agents related to construction activities into different groups, such as developers, planners, architects, estate agents, and others. Some research focused on architects (e.g., Whitehand and Whitehand, 1983; Freeman, 1988; Larkham, 1986a, 1986b), while others delved into estate agents (e.g., Healey *et al.*, 1982; McNamara, 1984; Larkham, 1988), resulting in a wealth of research outcomes.

This research process is based on the accepted evolutionary process of urban landscapes that occurred under the laissez-faire market economy in different times and policy contexts in the United Kingdom. Typically, in urban areas, newly developed roads are often accompanied by the division of plots along the streets. Subsequently, speculative developers purchase one or more plots and commission architects for design and planners for planning, and after construction, the properties are sold or rented out. Therefore, later research could identify the changing elements in the urban landscape and then trace the roles played by different agents in this process. To some extent, it is outcome-oriented, which has its limitations. First, it may overlook elements that have been replaced

or intangible factors. Secondly, within the same cultural context, it becomes challenging to recognize the role of deeper institutional factors studied by geographers using a structuralist approach (Gregory, 1981). It is because when analysing the reasons for change, multiple factors may be at play, but an outcome-oriented approach may lead to a focus on explicit attributions of explicit changes, potentially neglecting the deeper institutional reasons within the system. This becomes particularly evident when conducting cross-cultural comparative studies.

2.2 Morphological research on China

In socialist countries, the implementation of various social and economic activities is determined and guided through planned work. 'This planning is not anticipatory or speculative but directive' (Economic Data Editing Committee, 1955), and it is centrally controlled by the state. The state employs a comprehensive set of resources and institutions to fulfil its economic organizational functions. The state exercises control over crucial aspects such as production, distribution of social products and national income, allocation of investments in different regions and sectors, training of labour personnel and skilled workforce, as well as cultural and educational development (Economic Data Editing Committee, 1955). It is through this highly centralized planned economy that construction activities are carried out through administrative bodies, and extensive nationwide implementation is achieved through a unified planned economic system. In comparison, the free-market economy concept of 'agent' and 'agency' refers to actors directly involved in the process. This emerged in the context of the development of the market economy in Britain when the division of labour and clear processes were established. In socialist countries like China, which operate under highly-centralized planned economies, the system itself acts as the most significant driving force behind the actors. The state's power, as a special agent, has a broad and forceful scope of influence. If one only focuses on the direct actors and overlooks the fundamental institutional elements behind them, the risk is that the study may become superficial and the genuine mechanisms of landscape evolution may be difficult to grasp.

Although most of the existing morphological research has focused on Western cities, in recent years, there has been a growing trend to shift the focus towards China (Whitehand, 2008). Some

studies are more case-specific, focusing on the morphological characteristics of Chinese cities by examining the evolutionary processes of particular settlements in different regions, aiming to complement urban morphological theories (e.g., Zhang, 2015; Chen, 2018). Others concentrate on the uniqueness of Chinese urban morphology, which is often influenced by distinctive urbanization processes or specific historical stages (e.g., He and Henwood, 2016; Fu, Wang, and Sun, 2022; Zhang and Ding, 2018). Additionally, some researchers have further developed classic concepts of urban morphology, such as the application of fringe belts in China (He, 2018), and explored connections with related disciplines or practices like heritage conservation and urban design (Guo and Ding, 2021; Gu, *et al.*, 2021; Song, Dai, and Li, 2016). In recent years, there have also been attempts at cross-cultural comparisons between China and the West (Whitehand, Conzen and Gu, 2016), but few studies have explored comparatively the generative mechanisms of urban morphology in China and the West from an institutional perspective.

2.3 Urban morphology and green space

Urban morphology has historically shown insufficient attention to green space (Whitehand, 2019a). Although there has been an increase in focus on green space in recent years (e.g., Hopkins, 2012; Whitehand, 2019b; Zhang, 2019), much of the research still associates green space with fringe belts, without considering green space within residential housing. This aspect can be traced back to Conzen's definition of urban landscape, where he regarded townscape as a combination of town plan, pattern of building forms, and pattern of urban land use (Conzen, 1969). Conzen's focus was mainly on the hard-surface elements, the tangible solid buildings, plots, and streets, while other spaces were often perceived as 'empty'. Consequently, the significance of green space was overlooked. However, in reality, these 'non-existent' spaces are dynamic and can grow, becoming changeable parts of the built-up areas and influencing even the buildings themselves, making them essential components. Moreover, in the context of residential history, the incorporation of green space within housing has been an important historical process, which could even lead to social revolutions (Miller, 1913). With the changing perceptions of green space forming a critical background and driving force for this study, the comparison of green space is an essential aspect of the research.

2.4 Institutional and governance analysis, and their spatial response

The impact of institutions as influencing factors on society has been studied in various disciplines in recent years. First, there is institutional economics, which examines the influence of institutional factors such as social and cultural systems on economic activities (Commons, 1931; Kasper and Streit, 1999). Second, there is new institutional economics, which emphasizes the effects of various institutional arrangements, such as property rights and contractual systems, on economic behaviour (Coase, 1998). Economists emphasising the significance of institutions argue that social institutions connect the past, present, and future through continuity, and understanding the past is crucial in the historical narrative of institutional evolution. Institutions play a key role in understanding the interplay between politics and economics, as well as how this relationship impacts economic growth (or stagnation and decline) (North, 2008). Following Williamson's analytical framework, institutions in social analysis can be understood at four levels. The first level of institutional form encompasses informal constraints, including social norms, customs, and religious beliefs deeply embedded in the social system. The second level is the institutional environment, consisting of formal regulations, legal constraints, property rights and so on. The third level is governance, referring to concrete rules and contractual forms that facilitate transactions, mitigate conflicts, and achieve mutual benefits. The fourth level involves rules determining resource allocation and utilisation (Williamson, 2000). These diverse institutions, in the form of rules, planning policies, govern construction behaviours through political, economic, and everyday activities, ultimately shaping cultural landscapes (Webster, Adams *et al.*, 2005). Although this framework is primarily focused on socioeconomics, it can be applicable to this study as well. The thesis discusses institutions across the aforementioned four levels, exploring formal and informal social institutions in different temporal backgrounds of the two countries. It includes land institutions, real estate systems, property rights protection mechanisms, administrative organizational structures, legal regulations, religious beliefs, and rules governing everyday practices in communities. Various disciplines, including political science and management, have also been actively involved in the research on urban governance and development. In recent years, some of the more prominent and

classical theories in this field include urban regime theory (Mossberger and Stoker, 2001), the concept of the entrepreneurial city and city competitiveness (Hall and Hubbard, 1996; Lauermann, 2018), urban governance theory (Pierre, 1999, 2005, 2014), and the politics of scale (Swyngedouw and Heynen, 2003). Urban planners and human geographers have applied these theories to the evolution of the urban landscape (Hubbard, 1995). Some have utilised these theories to explore and address the urban issues that emerged during the post-modern era in Birmingham (Henry, McEwan and Pollard, 2002; Ward, 2003; Barber and Hall, 2008).

China's urbanization practice has provided a fertile ground for the aforementioned theories, as in a span of just a few decades, the country has experienced two significant institutional changes, with the more recent one leading to massive and rapid transformations in urban landscapes. Many human geographers have conducted research on this topic, with a focus on the impact of institutional changes on urban spatial structures (e.g., Zhang, 2001; Yin, Zhang and Luo, 2005; Zhang, Wu and Ma, 2008). Some studies have explored how institutional changes influence urban governance structures and subsequently altered urban spaces (e.g., Shen, 2001; Zhang, Yin and Luo, 2006; Wu, 2008). There are also investigations into social issues arising from the process of institutional changes and spatial justice concerns within urban landscapes (e.g. Li, 2002; Wu, 2008). These studies offer various perspectives and approaches to understanding the relationship between institutional changes and spatial responses, enhancing our understanding of the role of institutions in the process of landscape evolution. Although these theories effectively explain the forces behind urban landscape changes, one limitation is that they often concentrate on macro-scale research and general theories, typically at the city level or above, and may not adequately address smaller geographic areas or individual building units, as well as the interrelationship between micro-forms and functions.

2.5 Landscape history and landscape archaeology

As a discipline, landscape history can be traced back to W. G. Hoskins and M. W. Bereford (Hoskins, 1955; Hoskins, 1967; Beresford, 1967), who acknowledged the influence of historical geographer H. C. Darby (Darby, 1951; 1953) on their research methods. In recent years, numerous ecologists

have been involved in landscape history research (e.g., Balée and Erickson, 2006; Rackham, 2020; Turner, Nakamura, and Dinetti, 2004), making landscape history a battleground for historians and ecologists, who have contributed a wealth of research findings on various landscape types and elements. Landscape archaeology, as a research paradigm, explores how past societies interacted with their surrounding environments, creating and shaping landscapes, and establishing connections between human behaviour, specific locations, and time periods (Anschuetz, Wilshusen, and Scheick, 2001). This type of research typically employs archaeological methods, such as earthwork analysis and excavation, to reconstruct archaeological landscapes, particularly when historical sources are scarce or distant in time. These studies address various urban issues, such as unravelling the construction of ancient cities by their inhabitants (Creekmore and Fisher, 2014) or reexamining the origins and development of urbanism from an archaeological perspective (Cowgill, 2004). Some contributions focus on reconstructing regional historical landscapes (e.g. Flad and Chen, 2013; Young, 2000; Moore, 2005). Others utilise the latest archaeological techniques to rediscover facets of historical urban life and landscape organization (Smith, 2014) or employ LiDAR technology to reconstruct landscapes that lack historical records (Evans, *et al.*, 2013). These studies offer valuable and meaningful insights into the mechanisms of landscape evolution. However, their research also has three limitations. First, in terms of the research subject, there is a lack of attention to landscape changes within urban settlements. Secondly, the temporal and spatial scales are often too broad, which hinders the exploration of small-scale, long-term changes. Thirdly, in terms of research methods, there is a lack of consideration for the impact and constraints of geological, geographical, and other spatial elements on spatial patterns, or the utilisation of historical plans that contain spatial information in the analysis (Slater, 1996b; 2000; 2004).

2.6 Utopian ideas and global spatial practices

The concept of utopia has its historical roots in two aspects. First, there was the rational ideal city form in ancient Greece, and secondly, the culmination of the millennium in Christianity and the coming of the Messiah in Judaism. Both of these aspects can be seen as the pre-history of modern utopia (Kumar, 2003; Kishtainy, 2023), although they are not utopias themselves. Modern utopia, as we know it today, originated in the early 16th century with Thomas More's book *Utopia*.

Subsequently, the idea of utopia has undergone two parallel developments. On one hand, it has been continuously explored and refined in the realms of creative thought and politico-philosophical theory. On the other hand, its supporters have made various attempts and spatial practices, such as the establishment of model villages worldwide, even if not explicitly labelled as utopias. The interaction between theoretical advancement and practical implementation has propelled initiatives, usually, in the modern era, aiming to foster human equality and alleviate poverty. These initiatives have been solidified in the form of policies or institutional arrangements, further constraining practices at both societal and spatial levels.

Thomas More's *Utopia* was the first explicit exposition of the principles and rules of utopian socialism, marking the starting point of the utopian socialist ideas. In the book, he described the fictional island of 'Utopia' through the account of a navigator, expressing his ideals for the social, political, and economic systems. He believed that the root of all this inequality lay in private ownership and, therefore, proposed 'communism' in 'Utopia,' exploring how to organize social production based on the principle of equality without private ownership (More, 2020). More's innovation lies in his focus on collective ownership of the means of production rather than communal ownership of consumer goods, as he believed that the foundation of social relations is determined by the organization of production, not consumption. However, the concept and practice of communal living were not solely innovated by Thomas More; rather, they have ancient religious roots. For example, in the New Testament, the Gospel of Matthew advocates, 'If you wish to be perfect, go, sell your possessions and give the money to the poor, and you will have treasure in heaven,' encouraging people to share their surplus with the less fortunate. In the early Christian communities, where many believers were impoverished, they often coexisted in the same community, offering mutual care and support while sharing their possessions and resources. In truth, this form of communal living in a religious context continues to persist today. The Iona community, as an illustration, represents a Celtic Christian community, where members cohabit and collaborate on the island, jointly undertaking religious and social responsibilities within the monastery (Power, 2006; Sawatsky, 2009).

After envisioning ideal social systems in the 16th and 17th centuries, utopian socialism

progressed to direct communist theories by the 18th century (Marx & Engels, 2009). In the first half of the 19th century, it reached its peak, represented by three great utopian thinkers: Saint-Simon, Charles Fourier, and Robert Owen. Saint-Simon (1760-1825), devoted himself to designing a new social system where work and products are distributed in an orderly manner, marking the first instance in the history of utopian socialism that linked labour results to distribution, containing the germ of the idea of distribution according to labour (Barzun, 2000). Charles Fourier (1771-1837) advocated for the establishment of a 'harmony system,' with the basic unit being the *phalanstery*. The phalanstery represents a socialistic community where approximately 1,800 people lead a harmonious life combining labour, leisure, and freedom in a communal building (Fourier, 1996). The building is divided into three parts based on the nature of activities, the age and wealth of residents - with the central part for quiet functions such as dining rooms, conference rooms, and libraries, one wing for noisy production activities and playgrounds for children, and the other wing for hotels and dancing halls. A practical outcome of Fourier's ideas took place in the United States (Bestor, 2018). Robert Owen sowed the seeds of idealistic socialism in England and the U.S.A. Beginning in 1799, he practiced social improvement at his textile mill in New Lanark, Scotland. At this mill, in addition to the necessary production facilities, he built the Institute for the Formation of Character, which included playgrounds, schools, and more, as he firmly believed in the critical role of the environment in cultivating and shaping individuals' (Owen, 1832).

These visionary sparks of utopian socialist thought had an important social impact in the subsequent two centuries. From a global perspective, this influence can be primarily divided into two aspects. First, it gave rise to a multitude of social ideologies and movements, such as social democracy, Fabianism, labour unions, and cooperative movements. These ideologies and movements not only reshaped the political landscape of several nations but also ushered in the emergence of welfare states through policy reforms and institutional changes (chapter 3 will provide a further illustration of this process using the example of the United Kingdom). Secondly, it paved the way for the establishment of socialist states, where socialism became the guiding political doctrine and was adopted within single-party systems.

Based on the theories and practices of utopians and social reformers in Western Europe, in the

mid-19th century, Marx and Engels based on their observations of various European societies, introduced historical materialism and the theory of surplus value. They identified fundamental contradictions in capitalist society, particularly the contradiction between the social nature of production and the private ownership of the means of production under capitalism. This transformation turned socialism from utopian dreams into scientific theories (Geoghegan, 1987), though also faced criticism from some theorists who considered them utopian due to what they perceived as a lack of rigorous scientific grounding. They also combined their own experiences and put forward the Communist Manifesto in 1848. In this manifesto, they explicitly stated that 'the characteristic feature of communism... is the elimination of bourgeois ownership.' Marx and Engels also proposed that after the proletariat seized power, it should gradually take over the capital of the bourgeoisie, nationalize land, banks, transport, etc., and implement production according to a common plan (Marx and Engels, 2009). Guided by this theory, the Soviet Union enacted decrees to implement socialist transformation after the October Revolution. Subsequently, Lenin integrated Marxist theory with specific Russian practices and established the world's first socialist state (Pons and Smith, 2017). Through this process, the Soviet Union carried out forced socialist industrialization and collectivization of agriculture, leading to the establishment of a relatively complete industrial system and the integration of farmers into the collective economy (Soviet Academy of Sciences Institute of Economics, 1979). After World War II, a group of socialist countries emerged (chapter 3 will offer a detailed explanation of this process, with China as an example), further expanding the practice of scientific socialism from a single nation to multiple countries (Brincat, 2013).

Alongside various utopian ideas, visions and theories, there emerged the diverse forms of ideal communities established by their proponents around the world. As social classes and relationships evolved over time, these ideal communities manifested in different ways during different historical periods. Their origins can be traced back to the great 'Improvement' in 18th-century England, where the landowning class demolished surrounding hovels and constructed new lines of cottages within parks and estates, driven more by aesthetic preferences than philanthropic motives (Darley, 2007). As the industrial revolution progressed, a class of factory owners who had accumulated a great amount of capital emerged, alongside the formation of the working class (Thompson, 2007). The

housing and living conditions of these workers, often impoverished manual laborers, became a pressing social concern. In response, some socially responsible philanthropic factory owners started building model villages around their factories, exemplified by cases such as Owen's New Lanark (mentioned above) and the Bournville case presented later in this thesis. With the expansion of the industrial revolution worldwide, the idea of model villages found implementation in diverse regions, exemplified by Krupps' village in Germany, Van Marken village in the Netherlands (Darley, 2007), and Pullman and Lowell in the United States (Lindsey, 1943; Dublin, 1992). Model settlements gained significant traction, particularly in less developed industrial areas, leading to the planning of numerous new villages in Scotland dedicated to textiles and fishing, such as Fochabers (Slater, 1980). As new social and environmental challenges arose, the ideals and social vision embodied by model settlements found new expressions in the form of garden cities, which gained global prominence during the 20th century. Additionally, socialist countries witnessed the emergence of architectural and community models reflecting socialist ideology. In China, a notable form is the *Danwei* system (the Chinese case study in this thesis is one example). Under this system, akin to model settlements, production and living spaces were situated in close proximity, accompanied by various amenities for workers or residents, including educational facilities, healthcare services, and public baths, among others (further elaborated in chapter 5).

2.7 Conclusions

In this chapter, two main aspects were examined: the material landscape and its research methods, and the utopian visions, thoughts, and institutions influencing social development. Building upon the limitations of existing research in various relevant disciplines and the comprehensive review of these two aspects, this thesis proposes the use of landscape genesis methods to facilitate cross-cultural comparative research on the evolutionary development of two utopian communities with distinct historical backgrounds. This approach is instrumental in uncovering the interdependent relationship between the material landscape and condensed visions, which are institutionalized within the systems, as they mutually shape and influence one another. By examining two case studies, this research will offer valuable insights into the broader societal panorama.

Chapter 3. Evolution of systems of social institutions in China and Britain

In both China and Britain, the modernization process has unfolded in essentially two dimensions. First, modernization involves transformations in the economic framework for mass production and livelihood, along with the strategic deployment of resources. This transformation encompasses the shift from an agrarian production model primarily grounded in land resources to an industrial production paradigm that predominantly relies on capital resources. Second, the path of modernization involves a significant institutional transformation, characterized by the shift away from a feudal system or a feudal-imperial system towards capitalist or socialist frameworks (Feng, 2006). This institutional evolution encompasses changes in property rights, economic systems, and industrial structures. These two dimensions are not completely independent, but rather intricately intertwined, mutually dependent, and mutually reinforcing. Together, they have shaped the contemporary forms of life we experience today. However, many fail to recognize that what we perceive as today's welfare systems were once seen as utopian lifestyles in the 16th century (More, 2020). These welfare systems have evolved from their origins of providing basic sustenance solely to the impoverished, expanding to encompass all individuals and offering a broader spectrum of protections. This evolutionary journey demanded not only productive and technological innovations but also the establishment of institutional frameworks to anchor these utopian ideas and visions. Owing to the distinct developmental phases, global contexts, and ideological choices of China and the United Kingdom, their respective paths toward modernization are different. This chapter's objective is to dissect concisely the trajectories of socio-economic shifts and institutional metamorphosis within these nations. Numerous relevant institutions undoubtedly influence the paths to modernization of these countries; this chapter will focus on the aspects most relevant to the specific cases under examination.

3.1 China

This section will be organized into four distinct historical phases: the period before the establishment of the People's Republic of China (pre-1949), the period after its establishment leading up to the

‘Cultural Revolution’ (i.e., 1949-1965), the ‘Cultural Revolution’ (1966-1976), and the post-1978 ‘Reform and Opening-up’ period. Within these phases, I will trace back to specific historical periods marked by significant events and elements of social systems which played a pivotal role and then examine the substantial transformations that occurred within societal, cultural, and institutional elements. Through this exploration, and noting that such an exploration starts inevitably from my own position (pp. 10), my goal is to uncover the intricate interplay between historical legacies and the existing institutional systems, which collaboratively shape the urban landscape.

3.1.1 Pre-foundation era: centralization of authority

In the perspective of the Chinese population in 1949, the history of China spanning over a century before that year was perceived as a page that required swift turning. Nevertheless, the historical realities and aspirations that preceded 1949 have consistently wielded influence over the subsequent trajectory of Chinese history. This impact manifests in at least three distinct facets. The first facet is the enduring legacy of centralized governance. Virtually all analyses of Chinese society acknowledge that the prevailing imperial political structure was characterized by a highly centralized bureaucratic system. The robust centralized government exercised control through mechanisms such as taxation and conscription systems to regulate officials’ promotions and facilitate nationwide resource allocation. Regions were directed under unified central command, ensuring the functioning of the state (Ning, 2009). Nonetheless, the degree of such centralization should not be indiscriminately expanded. In fact, since the Qin Dynasty (221 BC - 207 BC), rulers continuously struggled to reconcile the contradiction between administrative centralization and local decentralization with varying degrees of success (Zhou, 2022). Nevertheless, the legacy of centralized governance and a robust governmental presence has been passed down to subsequent historical phases, playing a pivotal role in China’s journey toward modernization.

The second facet of the impact of pre-1949 history on modernization involves the dissemination of western culture and technology in China, which began in the mid-19th century. The dissemination took shape initially through western nations establishing trading ports in China. These early ‘treaty’ ports were primarily situated in coastal and riverside cities, reflecting their strategic

transportation and commercial significance. Over time, this phenomenon extended to border provinces (Figure 3. 1). Likewise, the Qing government also established governmental 'Self-opening Trade Zones' in areas with promising commercial potential. In contrast to many river- or sea-based treaty ports, Zhengzhou's location was strategically chosen due to its position within the emerging railway and road network. Subsequently, the Qing government initiated the 'Self-Strengthening Movement' between 1861 and 1895 (Zhong, 2018). Led by the Qing government, this marked the first comprehensive national endeavour toward westernization in modern China (He, 2009). During the Republican era (1912-1948), despite prolonged periods of warfare, some inland cities also began to develop trade zones or industrial areas. For instance, a trade zone was set up in Zhengzhou in 1923 (Modern History Data Editing Team, 1994). As a result, by 1949, China had transitioned from being predominantly agrarian to possessing a certain level of industrial foundation. However, this industrial base was markedly unbalanced, primarily concentrated in a few major cities, specific coastal and riverside regions, as well as areas connected by railways and roads. In contrast, many other interior cities and towns lacked a substantial industrial basis even as late as 1948 (Murphey, 1970). This disparity helps to explain why, in the first official population census in 1953, the total urban population comprised only 13.26% of the national population (National Statistics, 1953).

The third facet revolves around the years of continuous warfare. Warfare had a pervasive presence in China's history from the latter half of the 19th century to the first half of the 20th century. Starting with the First Opium War (1840-1842) between China and Britain and extending to the First Sino-Japanese War (1894-1895), foreign powers employed advanced naval prowess, modern technology, and superior weaponry to forcefully open China's gates. This unprecedented intrusion resulted in a profound national crisis for China, compelling intellectuals to grasp the significance of the 'modern era' and advocate an active assimilation of Western knowledge. The ongoing wars also exacerbated a widespread problem of poverty. The issues of poverty and modernization were intricately intertwined, shaping the government's approach to both poverty and development during the nation's (re-)establishment in 1949. The aspiration was to address poverty concerns during the pursuit of modernization.

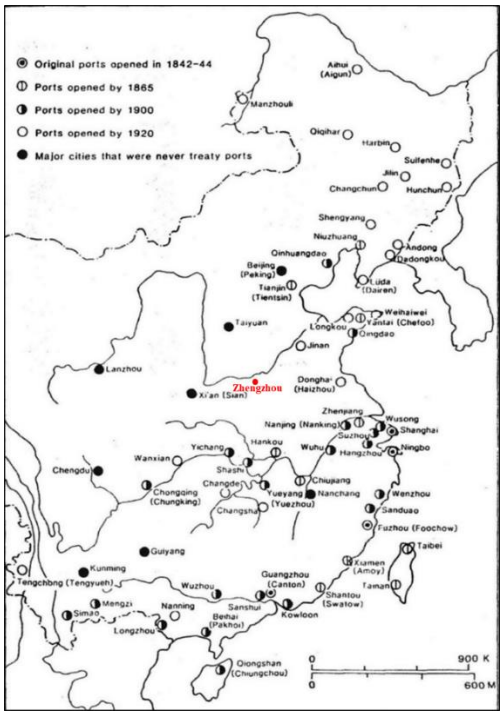


Figure 3. 1: The treaty ports of China (data from Murphey (1970))

3.1.2 Post-foundation to the ‘Cultural Revolution’ period (1949-1965)

During this phase, China established a structured governmental administrative system and a socialist planned economy. Concerning land ownership, urban land fell under state ownership, while rural land was collectively owned. Therefore, the urbanization development of rural land requires transferring land ownership from local rural collectives to the state. These arrangements facilitated nationwide resource allocation and macro-level distribution, ensuring planned product supplies. The urban planning system began to take shape, and, to align with the rapid production demands, standardized design approaches were adopted. In terms of production and living arrangements, a *Danwei*-based system (see below and chapter 5) was uniformly adopted across urban areas so that housing was also provided as part of social welfare. However, due to the prevailing ‘heavy industry first’ development strategy of the era, living amenities, including housing, were relatively modest. This framework guaranteed a national-scale production process and rapid industrialization accompanied by planned social welfare.

After 1949, China’s administrative structure underwent several modifications, primarily

settling into five tiers: central, provincial, municipal, county, and township. This arrangement remains in effect today. A notable organizational principle within this structure is referred to as 'management through lines and blocks' (Zhou, 2017). In terms of 'lines,' a prominent trait of governmental bodies at various tiers is their replicated design. Lower-level entities often mirror the departmental frameworks of higher-level counterparts, enhancing vertical alignment and task coordination. Regarding 'blocks,' distinct features arise from different departments within administrative boundaries. The integration of central vertical management and the localized governance model forms a novel pattern known as 'Management through lines and blocks' (Figure 3. 2). According to this paradigm, China's planning system is divided into two primary groups: central ministries and commissions vertically plan the economic aspects within their respective domains, while local governments horizontally plan the economic aspects within their own jurisdictions. Gaining an understanding of this concept is pivotal for comprehending the developmental process of Factory 3.

The land tenure system in socialist China exhibits a dual structure between urban and rural areas. In rural regions, the Land Reform Law of 1950 facilitated the transition of rural land from landlord ownership to peasant ownership, which subsequently shifted to collective ownership of rural land by communes around 1957. In urban areas, the nationalization of urban collective land in 1958 resulted in over 90% of urban land being brought under state ownership (Zou, 1998). The 1982 Constitution introduced a significant legal precedent by declaring that 'urban land is owned by the state,' solidifying the ownership status of urban land. The ownership and usage rights of urban state-owned land are separate: land ownership belongs to the state, while land usage rights belong to specific entities. Urban state-owned land was allocated to various institutions, organizations, and enterprises. It cannot be independently bought, sold, leased, or transferred and must be centrally managed by the state. During this period, land was not treated as a commodity, leading to the absence of a concept of land ownership. This clearly planned economic-oriented land allocation system made a significant contribution to socialist construction.

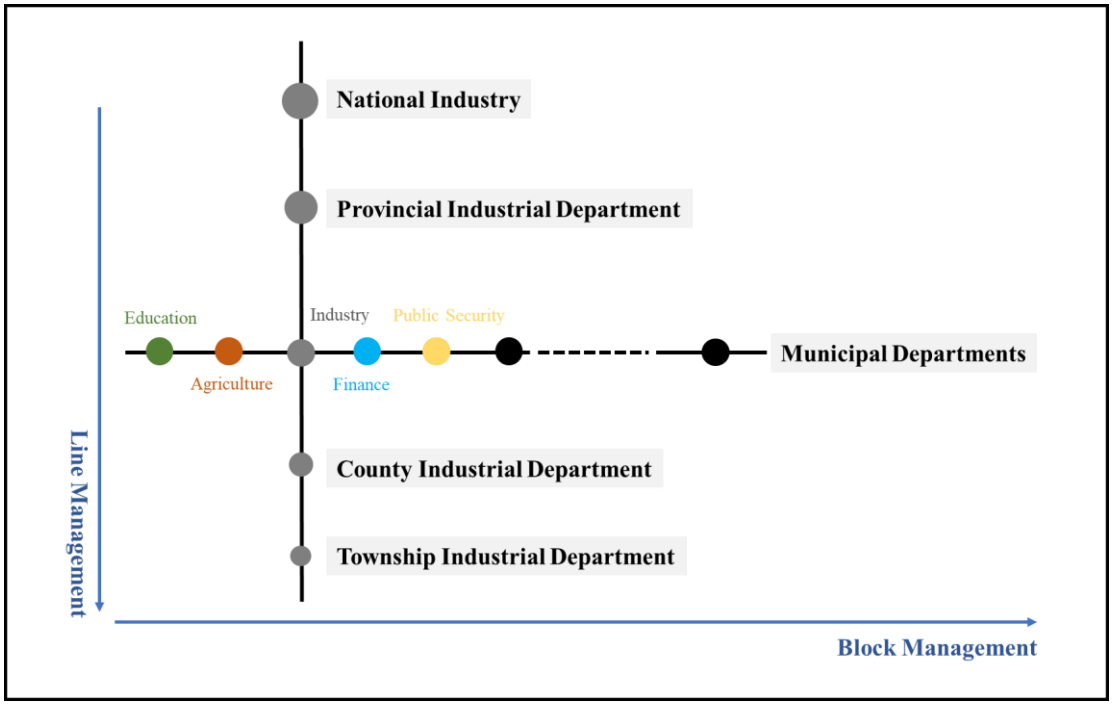


Figure 3. 2: China's administrative structure of 'Management through lines and blocks.' Using the city-level industrial department (intersection point of two lines) as an example, in the vertical direction, it is directly or indirectly under the leadership of both the national-level and provincial-level industrial departments. Moving downward, it exercises authority over county-level and township-level industrial departments, exemplifying line management. Horizontally, it collaborates with other departments such as education, agriculture, finance, etc., collectively constituting municipal departments. These departments are overseen by the city-level government, illustrating block management.

The robust control of government administration and the state's ownership of urban land paved the way for the establishment of a planned economic system. In its early stages, the People's Republic of China followed the example of the Soviet Union by implementing a highly centralized planned economy. Within this framework, resources were allocated nationwide based on various planning quotas, administrative affiliations, and directives. Enterprises had limited decision-making autonomy, and institutions for material management and commercial distribution were structured according to the administrative system. Labour supply was managed through administrative labour resource management departments established within the administrative system. The products produced by enterprises were not directly introduced to the market; instead, they were allocated by material and commercial departments based on categorization and administrative affiliations (Jia,

2010). As for specific development objectives, the national guiding principle was the Five-Year Plan. China's inaugural Five-Year Plan spanned from 1953 to 1957. The 'First Five-Year Plan' encompassed a comprehensive allocation of investments, production targets, and more. The plan revolved around the core theme of 'shifting the focus to basic construction,' placing significant emphasis on concentrated industrial development. This approach also enabled an assessment of productive capacity throughout the entire nation. Prior to the establishment of the People's Republic of China, industrial sectors were mainly concentrated in the eastern coastal and riverside regions. During the 'First Five-Year Plan' period, there was a shift in the distribution of construction projects, focusing mainly on the north-eastern, central, and western regions (Figure 3. 3) (Chen, 2015). This nationwide distribution of productive capacity facilitated Zhengzhou's swift rise as a significant centre of the textile industry. Within the confines of Zhengzhou city, this also aided in the concentrated allocation and coordination of related departments for urban development. For instance, alongside the construction of the textile factories, establishments like textile machinery factories and textile planning and design institutes were strategically positioned. Moreover, to accommodate a larger female workforce in textile factories, certain heavy industries were established to balance the gender ratio (see chapter 5).

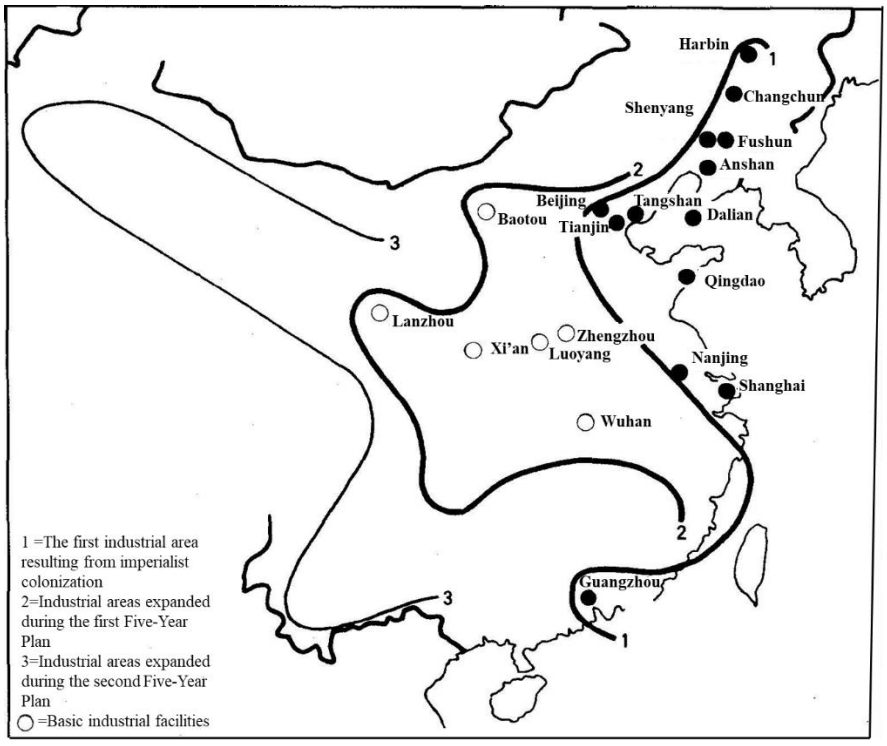


Figure 3. 3: Reconfiguration of industrial cities (after Hua (2006) and adapted by the author)

In response to the swift demands of industrial construction, China drew inspiration from the Soviet Union's expertise in economic and large-scale housing construction, particularly in the standardization, prefabrication, and assembly of housing components. Architectural standardization employs modular coordination to harmonize the sizes of building components with the overall structure. This involves creating various combinations to design diverse types, purposes, and forms (Ding, 1985). During that period, both central urban design institutes and local architectural design institutes in nearly every province and major city established specialized departments for residential standardization. These departments handled preliminary design, construction drawings, and variations of standard unit types. They also considered other neighbourhood facilities, each with its own standard diagrams. As such, a large-scale project could commence within a few weeks from the decision to initiate construction. Standardization and prefabrication played a crucial role in the early years of the People's Republic of China, facilitating the completion of significant construction tasks and the swift provision of housing, thereby transforming the appearance of cities from their impoverished state (Hua, 2006). During the process of coordinating key project construction urban planning efforts found their footing and evolved.

In the realm of specific life and production organization, a prevalent form of social governance in urban areas during China's planned economy era was the *Danwei* system. This system encompassed a variety of entities, including administrative units within party and government institutions, state-managed service entities, and state-owned enterprises. These entities not only provided wages to their members but also offered services such as housing, subsidized medical care, education, cafeteria facilities, bathing facilities, social security, and welfare (Lu, 1989). The Chinese case study presented in this thesis, Factory 3, exemplifies this pattern, much like the surrounding entities. Its production and residential zones are divided by a road. Within the residential zone, one can find not only housing units but also welfare amenities including barber shops, bathhouses, and restaurants (see chapter 5).

3.1.3 The period of the 'Cultural Revolution' (1966-1976)

The period of the 'Cultural Revolution' (1966 to 1976) is commonly referred to as the 'Ten Years

of Turmoil.' Politically, although the original goal was to eliminate phenomena like corruption, privilege, and bureaucracy within the party and government in order to strengthen and reinvigorate the party, in reality, this era witnessed a decline in the strength of party organizations and national political authority. A substantial number of intellectuals and officials suffered persecution, plunging the nation into a profound political crisis. Although the economic implications were not as substantial as the political ones, it is evident that this phase marked a considerable setback. The expansion of Zhengzhou during this period was marginal (see chapter 4).

3.1.4 After the 'Reform and Opening-up' (post-1978): from planned economy to market economy

Since 1978, the 'Reform and Opening-up' policies have gradually guided China's economy toward market-oriented reforms. In the context of this reform, the vision is to hand over some social aspects to the market while keeping more vital affairs under state control. Against this backdrop, the role of government planning in production and distribution has diminished, while the influence of the market has grown. The reform began by liberalizing agricultural production and later extended to the industrial sector, gradually encompassing various sectors including land, housing, and finance. The 1994 tax-sharing reform marked a significant shift from the previous system where tax revenues were negotiated separately between the central and local governments. It established a new, unified taxation system nationwide. Post-reform, the central government began to claim more than 50% of all tax revenues, ensuring a reliable source of funding for large-scale infrastructure projects. However, as a consequence of devolving numerous responsibilities to local governments, they struggled with heavy financial burdens. To compensate for budget shortfalls, many local governments turned to land-based financing, which has since contributed to various social issues in China, including soaring property prices. Regarding the land system, the experimentation with a compensated land-use system began in Shenzhen in the 1980s. This culminated in the introduction of the Land Management Law in 1986, which facilitated the legal transfer of state-owned land usage rights. These rights were treated as distinct commodities within the market. Users acquired these rights through processes like agreements, bidding, and auctions. Consequently, this phenomenon triggered the rise of the urban land economy. For instance, due to the higher value of downtown

land, enterprises within the built-up areas of Zhengzhou, including the case study discussed in this thesis, began to relocate their production workshops to suburban areas amidst operational difficulties. Subsequently, they sold the vacated land to real estate developers to capitalize on land profits. This process coincided with the revitalization of the inner city and the emergence of new urban landscapes (see chapter 4).

The housing system reform was also in progress, aiming to shift from government-controlled housing construction and supply during the planned economy era to a market-oriented approach where the market primarily drives housing construction (Liu & Weng, 2007). This process, along with other institutional reforms such as healthcare system changes, led to the dissolution of the *Danwei* system (see chapter 5). Following the government's gradual disengagement from housing construction, a new role emerged: the provision of public housing intended for lower-income groups. This encompassed various types of affordable housing, including low-cost housing and public rental housing. Zhengzhou has also seen the development of numerous such residential areas targeting lower-income segments within both the urban built-up areas and the periphery (see chapter 4).

During this era, another significant driving force behind the rapid expansion of cities was the establishment of a variety of developmental zones. In 1980, the State Council officially introduced Special Economic Zones (SEZs) in Shenzhen because of its beneficial location with respect to Hong Kong. The primary goal of these SEZs was to attract foreign capital, advanced technology, and managerial expertise, thereby serving as test-beds for market-oriented reforms. In addition to the SEZs, an array of preferential policies, such as land policies, was trialled in different regions. Initially concentrated in coastal cities, the concept of these developmental zones gradually extended to different parts of the country, encompassing various types, hierarchical levels, and even cross-regional initiatives. The objective was to grant these zones special policies and privileges, allowing them to bypass certain institutional constraints and unleash their full developmental potential. As the process of establishing diverse developmental zones unfolded, the city of Zhengzhou underwent swift expansion (see chapter 4).

All of the aforementioned reforms have laid the foundation for urban expansion and the evolution of urban landscapes in the modern era. Over the past few decades, urbanization in China

has experienced rapid growth, and any researcher with a comprehensive understanding of Chinese society recognizes that there's no place where the saying 'the more changes, the more remains' (Lieberthal, 1995) is more fitting than in this country. This essentially means that as changes accumulate, certain characteristics remain unchanged or become more prominent. For instance, Conzen's mention of revolutionary transformation (Conzen, 1969) in urban landscapes not only occurred during the urban construction of the planned economy era, but it also remains applicable in the present in the extensive and widespread flattening of old villages during the contemporary urban renewal process. This outcome is a consequence of the centralization of authority and the state's ownership of land, both factors contributing to the government's predominant role throughout the entirety of the process. In today's Chinese urban development, the forces of accumulated and unleashed institutional dynamics are still evident.

3.2 United Kingdom

This section will be organized into four distinct historical phases: 1800 to the mid-Victorian period (1800-1875), the late Victorian to Edwardian era (1875-1914), the Inter-war period (1918-1939), and the Post-war period (1945-). While the establishment of the welfare state in the United Kingdom primarily unfolded during the 20th century, its roots can be traced back to the 19th century, an era marked by significant economic and social challenges consequent to the capitalist Industrial Revolution. Throughout this discussion, I will revisit this evolutionary process, placing specific emphasis on the social issues that emerged during the 19th century. This includes housing problems among the impoverished population, which played a role in the eventual emergence of town planning. I will also closely examine the range of solutions explored by various social groups (one of which forms the basis of the British case study in this thesis). Through this exploration, my objective is to analyse how social historical realities at the national level laid the groundwork for institutional progress and how these evolving institutions and urban development interacted and influenced one another.

3.2.1 1800 to the mid-Victorian Period

During the era of the Industrial Revolution, several pivotal advancements emerged that wielded

substantial influence on its trajectory. The successive generations of Abraham Darby made significant strides in the refinement of coke-fuelled blast furnace technology and iron casting (Mott, 1957). Concurrently, Arkwright's embrace of the water-powered spinning frame signalled a transformative shift in manufacturing techniques (Hopkins, 2013). Complementing these innovations, the pioneering invention of the steam engine by James Watt assumed a central role. This collective progress engendered a marked phase of expansion in the latter part of the 18th century (Ashton, 1997). Two overarching facets emerged as pivotal during this period. First and foremost, the centrality of coal cannot be overstated. Beyond being the prime propellant of the Industrial Revolution, coal's role extended to catalysing advancements across multiple spheres, encompassing metallurgy, manufacturing, and the paradigm-shifting developments in transportation. The distribution of coal resources correlated with the emerging trends of industrialization and urban expansion (Figure 3. 4). Secondly, the advent and assimilation of the steam engine emerged as a watershed. At the heart of the Industrial Revolution lay the recalibration from human-driven labour to mechanization, fostering an escalated reliance on engines. The establishment of the Soho Manufactory in Birmingham during the 18th century by James Watt and Matthew Boulton exemplifies this shift. Gaining recognition for crafting exceptional engines and notable metal creations, the Soho Manufactory embodied the fundamental significance of the steam engine in this era. Simultaneously, within the confines of the Soho Manufactory, Matthew Boulton spearheaded innovative models of management and organization. By strategically consolidating production processes Boulton heralded the emergence of the early factory system, foreshadowing the subsequent advancements in the industrialization journey. This systematic methodology, defined by vigilant supervision of production sequences and the division of tasks, reverberated across diverse industries within Birmingham (Baggott, 2016). In his seminal 1776 work, *The Wealth of Nations*, Adam Smith delved into an exploration of Birmingham, with a specific focus on the local pin industry. Smith's emphasis on the practical implementation of labour division, encompassing the segmentation of tasks into manageable units to harness cost-effective labour, notably including the engagement of women and children, underscored the abiding relevance of these principles (Smith, 1776). This distinct production modality effectively positioned Birmingham as a pivotal bastion of manufacturing prowess within England (see chapter 4).

One prominent hallmark of the Industrial Revolution was the significant upsurge in population. The increased productivity, preceded by agricultural improvement, capable of sustaining a larger populace, is evidenced by the fact that the population, which stood at 6.5 million in 1750, had surged to 10.5 million by 1801. By 1901, the population had escalated to 40.8 million (Wrigley and Schofield, 1989). Moreover, the rise of the factory system provided increased employment opportunities for this growing population. As a result, an even more noteworthy aspect emerged, characterized by the swift concentration of this populace within urban areas. This concentration of industrial workers in cities gave rise to an array of pressing societal challenges, including poverty, cramped living conditions, the spread of infectious diseases, limited access to clean water, child labour, and restricted educational opportunities (Briggs, 1993).

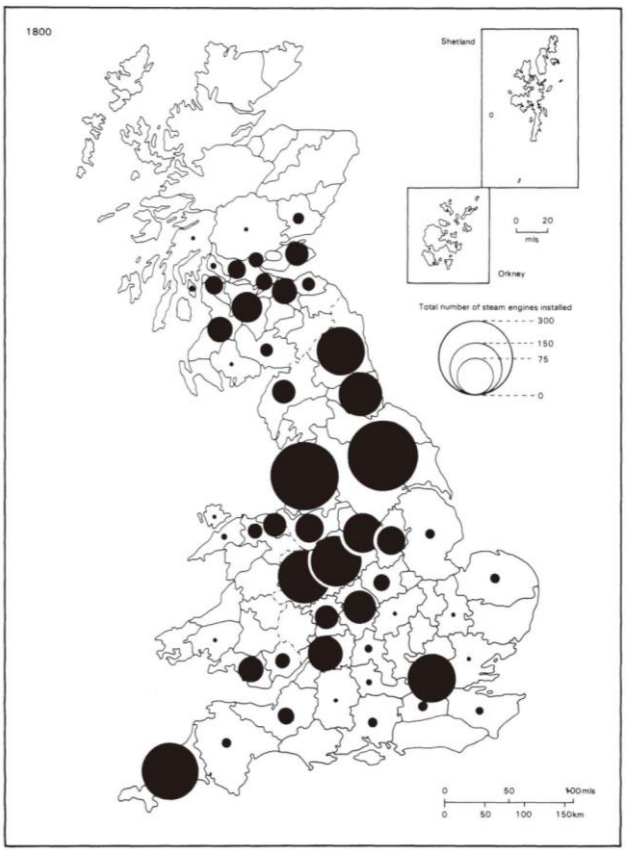


Figure 3. 4: Steam engines built by 1800 (Langton and Morris, 2002). It can be observed that by the year 1800, the utilisation of steam engines was primarily concentrated in the Midlands and Northern regions of England, as well as the southern parts of Wales. This alignment generally corresponds to the distribution areas of coal.

The Industrial Revolution brought about a noticeable consequence - the escalating prominence of the poverty issue. In earlier times, impoverished communities were dispersed, and relief efforts were managed through a charitable system rooted in the church and local settlements (Charlesworth and Williams, 2014). However, the concentration of a considerable number of impoverished individuals in urban centres transformed poverty into a chronic and pressing societal concern. Individuals from a variety of sectors actively engaged in critical reflection and criticism of this poverty problem. On the national level, the implementation of the New Poor Law in 1834 represented a response to address this growing challenge. This law not only removed outdoor relief for labourers but also mandated their confinement to workhouses, resulting in the separation of families. Over time, its significance can be viewed from at least three perspectives. First, it standardized relief decisions and criteria on a national scale, aiming to reduce regional disparities. Secondly, it introduced government participation in the realm of poor relief, marking an emerging collaboration between Church and State. The law sought to establish a national network of workhouses, structured around groups of parishes (Poor Law Unions), where access to poor relief was exclusively provided within these workhouses. Thirdly, despite encountering substantial practical criticism, it expanded the government's scope of social intervention and protection. This methodical expansion contributed to the anticipated engagement of local governments in public affairs, thereby laying the groundwork for future provisions of municipal services by local government (Brundage, 1978).

The Industrial Revolution necessitated the rapid construction of housing to accommodate the growing workforce, leading to the emergence of back-to-back houses in certain areas (see chapter 4). The crowded living conditions and inadequate sanitation facilities within these houses gave rise to numerous health issues. Consequently, housing and sanitation problems among the working class came into public focus, eventually leading to the enactment of relevant legislation. Edwin Chadwick (1800—1890), a member of the Poor Law Commission, published a report in 1842 titled 'An Investigation into the Sanitary Conditions of the Labouring Population of Great Britain.' This report brought attention to alarming health concerns among the labouring population (Chadwick, 1843). Chadwick's vision of centralized public health management played a pivotal role in the introduction of the first Public Health Act by the British government in 1848 (Hamlin, 1998). This marked the

UK's first explicit public health legislation, primarily aimed at providing clean drinking water, managing sewage and sanitation facilities, but it was not prescriptive. The implementation of the 1848 Act led to the establishment of the Central Board of Health and the development of standardized health regulations nationwide eventually leading to the Public Health Act of 1875, which further extended the regulatory framework, comprehensively covering aspects such as housing, drinking water, sewage, and the prevention of infectious diseases (Niemi, 2016). In the realm of housing, the 'Common Lodging House Act' and the 'Labouring Classes' Lodging House Act,' enacted in 1851 (Daunton, 2015) was followed by the 1868 Artizans' Dwellings Act (Torrens' Act) which compelled the owners of slum housing to keep them in good repair. The 1875 Public Health Act and the 1885 and 1890 Housing of the Working Classes Acts had a significant impact on housing and urban landscapes. It introduced compulsory housing standards, mandating that local governments ensure housing met specific criteria outlined by the law (Gauldie, 1974). As a result, in many industrial cities, there was a widespread construction of so-called 'bye-law' terraced houses (see chapter 4). In summary, regarding social institutions, the imposition of housing standards in Britain initially relied on regulatory measures for minimum standards, in contrast to China after 1949, where the state took ownership and undertook housing construction.

3.2.2 The late Victorian to Edwardian era

The conclusion of the Victorian era's economic prosperity came with the 1873 'great depression', unearthing the resurging social contradictions that had been concealed during times of economic expansion (Musson, 1959). Charles Booth's meticulously crafted 'London Poverty Map' shed light on the spatial distribution and contextual factors of poverty in London (Booth, 1889). As these newly surfaced social issues gained prominence, the discourse on social reform once again took centre stage. This profound shift in societal dynamics sparked a revival of British socialist thought, giving rise to movements like Fabianism (Shaw, 1906). It questioned the principles of laissez-faire market liberalism that had dominated public discourse since Smith's (1776) *Wealth of Nations*. These notions of societal betterment (Wittrock, 1982) reshaped perceptions of poverty and philanthropy, introducing the concept of a social service system to the public consciousness.

During this period, a series of movements and policies were put in place to address the challenges faced by marginalized communities and ordinary labourers. Notably, the 'Garden City Movement' and the emergence of professional Town Planning were significant responses. In response to the various social issues arising from industrialized cities such as overcrowding, unsanitary conditions, and environmental pollution, Ebenezer Howard proposed a novel approach that combined elements of both traditional rural and urban settings, resulting in the concept of garden cities (see chapter 6). To some extent, this could be seen as one of the early attempts at idealised urban planning. Building upon the various government involvements in public affairs during the 19th century, the foundation for a city planning system was laid. In 1909, the Housing, Town Planning, Etc., Act 1909 introduced the concept of 'urban planning' within legislative frameworks for the first time, marking the initiation of governmental engagement in managing planning (Cherry, 1996b). The first formal urban planning law, however, materialized with The Town Planning Act 1919, representing the United Kingdom's inaugural explicit urban planning legislation. This hallmark legislation officially established urban planning as an independent field. Its primary objective was to formulate planning schemes for town development. Furthermore, it stipulated that local governments could grant approval for development projects to ensure alignment with overall urban development strategies. Importantly, it also empowered local authorities to exercise compulsory land acquisition when necessary to realize urban planning goals (Sutcliffe, 1981). This legislation marked the commencement of a new chapter in British urban planning.

3.2.3 The Inter-war period

The unparalleled magnitude of the First World War had a monumental impact on British society, catalysing significant societal and institutional transformations. The exigencies of war compelled the government to abandon the traditional British laissez-faire approach in the realm of industry and commerce, marking the advent of an era characterized by heightened government intervention in social and economic domains. This transformation gave birth to a wartime 'planned market economy' (Toye, 2003). During the inter-war period, regulations concerning urban planning underwent several rounds of amendments and enhancements. Both urban and rural areas were incorporated into the scope of planning efforts. The Town and Country Planning Act of 1944

bestowed local governments with the authority to undertake reconstruction initiatives in areas devastated by the conflicts (Cullingworth and Nadin, 2002). Regarding housing, the Housing Act of 1919 made a commitment to construct 500,000 ‘Homes fit for Heroes,’ although the final tally reached only approximately 200,000. The Tudor Walters Report (1918) which recommended the standard for council house design and plan for the next 60 years (Swenarton, 2018). This legislation, alongside subsequent laws during the 1920s, established the obligation of local governments to ensure the provision of adequate housing.

A range of protective social systems were under exploration, among them the National Insurance Act of 1911, a significant milestone that introduced insurance coverage for sickness and unemployment, thereby playing a vital role in the evolution of the modern welfare state. Additionally, the momentum generated by The Old Age Pensions Act (1908) led to the development of the progressive Old Age Pensions Act of 1925, designed to further improve provisions for the elderly population. Against the backdrop of these social initiatives, a watershed moment arrived with the Beveridge Report of 1942 during the Second World War, a comprehensive blueprint for a ‘cradle-to-grave’ welfare state encompassing healthcare, employment, pensions, and a spectrum of social safeguards (Able-Smith, 1992). This seminal report stands as a milestone in the evolution of social security concepts, deeply embedding the notion of the ‘welfare state’ in collective consciousness and wielding a significant global influence.

3.2.4 Post-war period

The British government’s effective resource management during the war bolstered faith in the feasibility of Keynes’ theory of state intervention (Keynes, 1997). Guided by the tenets outlined in the ‘Beveridge Report’ and embracing the principles of Keynesian economics, the post-war Labour government embarked on an ambitious trajectory, encompassing various nationalizations and the introduction of crucial legislations in areas such as education and pensions (Lowe, 1990). The ground-breaking National Health Service Act of 1948 established a comprehensive healthcare system (Fraser, 2017), marking the establishment of the modern welfare state and the abolition of the Poor Law system. During the period of the ‘post-war consensus,’ various levels of government

directly constructed 4.4 million units of public housing, providing affordable rental options for low-income citizens[3]. In the realm of urban planning, a pivotal moment was reached with the enactment of the Town and Country Planning Act of 1947. This landmark legislation served as the foundation of the contemporary British planning framework thereafter, solidifying urban planning as a distinct responsibility of local authorities. Furthermore, the act nationalized land development rights and established a central planning authority to coordinate the efforts of various local authorities. Building upon this foundation, the Town and Country Planning Act of 1968 fortified the structure of a comprehensive and unified planning system (Cullingworth, 2002). During the two decades following World War II, urban renewal predominantly took on a government-driven character, centred on the revitalization of the built environment. An illustrative example is the Urban Programme, set in motion by the central government and executed by local authorities through the framework of the 1969 Local Government Grants (Social Need) Act. This initiative sought to address issues within inner-city areas by means of improving both land and architectural structures (Wilson, 2011). Against this backdrop, the city centre of Birmingham experienced a substantial urban renewal process under the guidance of the government (see chapter 4). The 1980s, characterized by a shift in the political landscape through the election of a monetarist Conservative government led by Ms. Thatcher and marked by strong neoliberal ideologies, brought about a transformation in policy discourse. This era emphasized the principles of a small state, deregulation, and the promotion of public-private partnerships, along with the introduction of the 'right-to-buy' scheme for council house tenants (Cherry, 1994). It's important to note that neoliberalism also had its own 'utopian' visionaries, including the ideal of liberal democratic states linked to a free-market economy (Fukuyama, 1992).

3.3 Conclusion

This chapter has reviewed how China and the United Kingdom, guided by their respective utopian visions, addressed poverty and achieved modernization at the national institutional level. In the case of China in 1949, with a fragile foundation for development, the country's leaders believed that

3 https://england.shelter.org.uk/support_us/campaigns/story_of_social_housing (accessed 17th August 2023)

achieving modernization entailed eradicating poverty in the long-term perspective. Consequently, the focus was primarily on development. Over the subsequent decades, China learned from the development philosophies of advanced socialist and capitalist nations, ultimately accomplishing the formidable task of lifting one of the world's most populous countries out of poverty. As the first country to undergo industrialization and urbanization, the United Kingdom led in many aspects but also confronted the challenges posed by emerging social issues in a capitalist framework. It was among the first to explore solutions across various strata of society. This 'problem-solving' logic led to incremental progress and institutional innovations, culminating in the establishment of the welfare state after World War II. With this national institutional framework in mind, the subsequent chapter will investigate the historical development of the two cities where the two cases are based, examining the evolving interplay between institutions and urban landscapes, and how they mutually shape and transform each other.

Chapter 4. Urban morphological analysis of Zhengzhou and Birmingham

This chapter presents an analysis of the historical development processes of the two cities where the two case studies are situated. Combining the national-level institutional framework introduced in chapter 3, this chapter examines how changes in institutions during different historical stages have impacted the morphological evolutionary process of the cities. It also investigates the new features of urban landscapes and building types in successive periods. This chapter aims to provide a historical and geographical context for the subsequent two chapters about the development processes of the two case studies.

4.1 Developmental history of Zhengzhou

The state-level institutions and characteristics of different eras discussed in chapter 3 have produced profound physical changes in the city of Zhengzhou. Unsurprisingly, the concepts, customs, fashions, rules, and institutions of different periods have influenced building types, their combination into built assemblages, residential layouts, urban expansion patterns, and their successions across periods. Whilst the multifaceted nature of this evolutionary process is acknowledged, the section is organized from a morphological perspective, exploring how different temporal, institutional and geographical factors have mutually influenced building types and urban form through time (Ünlü, 2023). Changes in the relationship between modes of production and residence over time will also be considered. Finally, the section identifies the crucial factors that explain the urban morphological pattern in Zhengzhou's development.

China's economy has sustained remarkably rapid growth for decades, resulting in massive expansion and development of cities (e.g., Wu et al., 2008; Naughton, 2010). Zhengzhou is a prime example of this growth (Zhengzhou Local History Compilation Committee, 1997). A city's physical form is a palimpsest, erasing, obscuring, but also revealing the development process and cultural history through the fabric of built-up areas (Conzen, 1969). The street pattern in Zhengzhou's old city can be traced back for more than a thousand years (Zhu, 2011). In the early 20th century, the

development of railway transportation during the late Qing Dynasty dominated the entire subsequent urban pattern. Thus, this section focuses particularly on the late Qing Dynasty and beyond.

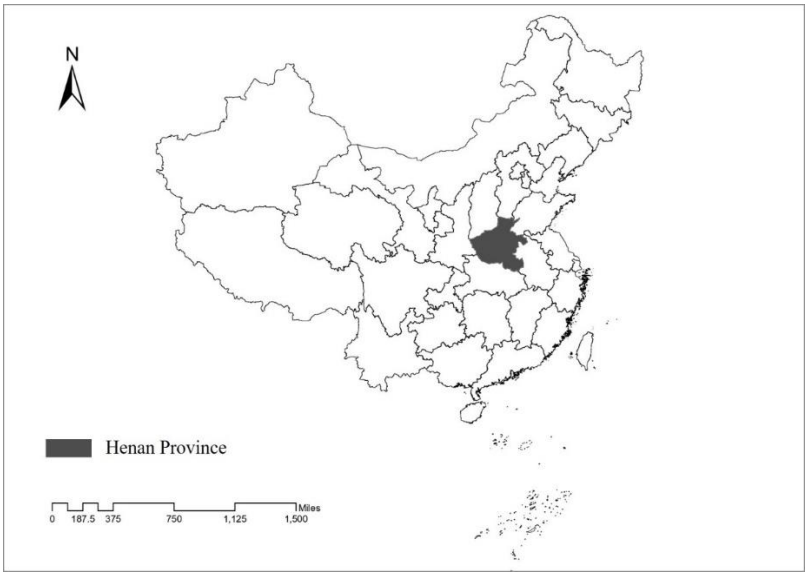


Figure 4. 1: The location of Henan Province in China

Zhengzhou City, which was called Zheng County before 1948, is the regional centre and contains the governmental services of Henan Province. This province is located in east-central China (Figure 4. 1). Though not strictly central geographically, Henan Province has been called the Central Plains for over 2000 years. It has been widely believed that it is the birthplace of Chinese civilization (Xia, 1985). The total area of the province is 167 000 km^2, accounting for 1.74% of the total area of the country. It stretches over Topographical Region II and Topographical Region III (Zhengzhou Local History Compilation Committee, 1997), with its terrain being 'high west and low east' (Figure 4. 2). Three mountain ranges form almost a half-ring along the western provincial boundary. Most of Henan Province is located in the warm temperate zone, with four distinct seasons, synchronous rain and heat, and frequent extreme weather. The long history and favourable water, heat and soil conditions have contributed to Henan being referred to as the 'Populous province' and the 'Agricultural province' of China. The abundant population resources in Henan Province have provided Zhengzhou with a substantial labour force, playing a significant role in the city's industrial development.



Figure 4. 2: The Three Major Topographical Regions of China

Zhengzhou is located in the north-central part of Henan Province, and to its north lies the Yellow River. Its geomorphic features accord broadly with the general topography of the whole province, being 'high in the west and low in the east' (Figure 4. 3). Its south-west part is in Topographical Region II, and its eastern plain is part of Topographical Region III. The rivers flow mainly eastward. Due to the variations of height within the region, groundwater is abundant in the plain area and intermontane basin, and poor in the side slope area. This affected the siting of the new industrial area in late 1950s (see below).

Compared to adjacent cities to the east and west, Kaifeng and Luoyang, Zhengzhou does not have such rich historical and cultural resources. Nevertheless, like Kaifeng and Luoyang, Zhengzhou is also one of the eight ancient capitals of China, dating from as early as 5,000 years ago (Guo, 1994). It served as the capital city during the early and middle periods of the Shang Dynasty (1600 - 1046 B.C.). To this day, remnants of the Shang Dynasty's rammed earth city walls can still be found in the centre of Zhengzhou. The southern layers of rammed earth from the Shang Dynasty align seamlessly with the southern city walls of Zhengzhou's historic Ming and Qing old town. Since the 1950s, numerous Shang Dynasty archaeological sites and remains have been unearthed in the city centre. Zhengzhou underwent gradual development during the feudal imperialist period before 1912 (Henan Provincial Institute of Cultural Relics and Archaeology, 2015). Over the past

70 years, specifically in the period following World War II and the War of Liberation, it has undergone rapid expansion. In 1994, the city was added to the List of Precious Chinese Historico-Cultural Cities (Lishi Wenshua Mingcheng).

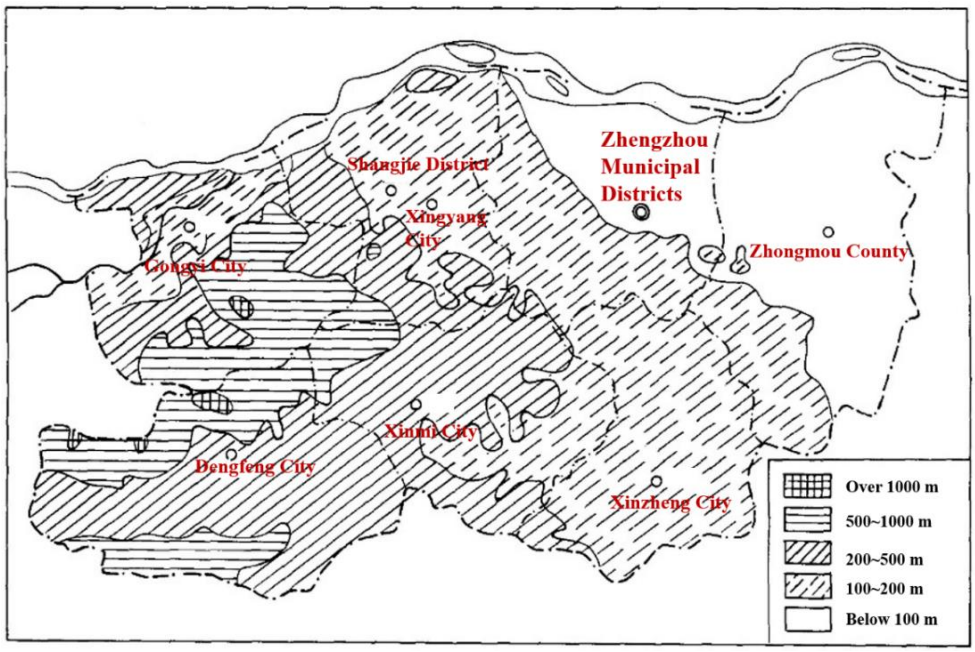


Figure 4. 3: Topography of Zhengzhou (after Zhengzhou Local History Compilation Committee, 1997 and adapted by the author). The total area of Zhengzhou is 7,447 km^2, of which mountainous areas account for 31.9%, hilly terrain accounts for 30.3%, and plains account for 37.8%.

4.1.1 The difference between Zhengzhou Municipal Districts and Zhengzhou Municipality

The current urban administrative management system in China employs the city-county system, in which a city governs multiple cities and counties, as well as autonomous prefectures or autonomous counties. This system gained popularity in the 1980s as a means of breaking down the urban-rural divide and promoting economic integration between urban and rural areas (Li, Liu and Yang, 1986). Zhengzhou Municipality comprises six urban districts, five county-level cities and one county (Figure 4. 4). Within the jurisdiction of Zhengzhou Municipality, there are at least six distinct designated new districts. These districts have been developed on previously untapped or agricultural land and serve as specialized zones rather than administrative divisions. Each of these districts

operates under a range of diverse preferential policies. They are: Zhengzhou National High-Tech Industrial Development Zone (HTDZ); Zhengzhou National Economic and Technical Development Zone (ETDZ); Zhengzhou New East Urban District; and Xinzheng International Airport of Zhengzhou (Figure 4. 5). The establishment of these functional zones has greatly affected the evolution of Zhengzhou's urban spatial structure. In this study, the urban space of Zhengzhou discussed mainly refers to the Zhengzhou Municipal District. By 2019, Zhengzhou Municipal District had a population of 3,960,095 and a gross area of 1010 km^2. The population of Zhengzhou Municipality was 10,136,016, with a gross area of 7,446 km^2. (Zhengzhou Statistics Department, 2019).

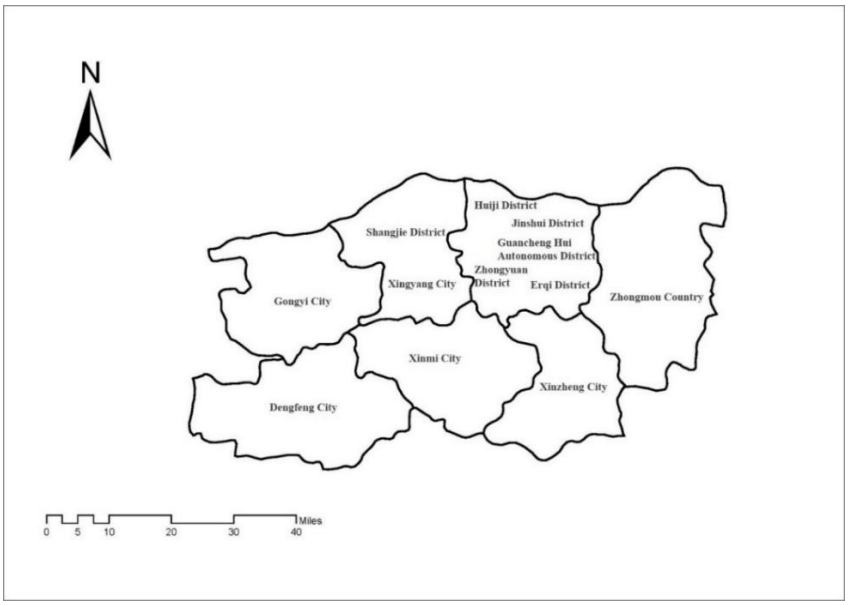


Figure 4. 4: Administrative division map of Zhengzhou

The early walls of Zhengzhou were rectangular, with one km from west to east, and 650m from north to south (Xu, 2005). By the end of 19th century, the urban area covered only 2.23 km^2, with a population of roughly 20,000 individuals (Zhengzhou Local History Compilation Committee, 1997). The urban scale and spatial pattern of Zhengzhou was contained within the walls from the Tang dynasty (618-907 AD) until the late Qing dynasty (1636-1912), whilst the street structure has survived as long as 1,000 years (Zhu, 2011). The principal streets were a west-east street connecting the west gate and the east gate, a north axial road from the north gate and a south axial road from the south gate (Figure 4. 6). Subsidiary streets were roughly parallel, or perpendicular, to the main

streets, but did not form a regular grid pattern. Such a street pattern, avoiding an unimpeded thoroughfare, was not uncommon in historic Chinese towns (Skinner, 2000). It was beneficial for defence, and, according to folk belief, ghosts could only walk in straight lines. The principal streets divided the walled area into four parts. The northwest part was traditionally occupied by government

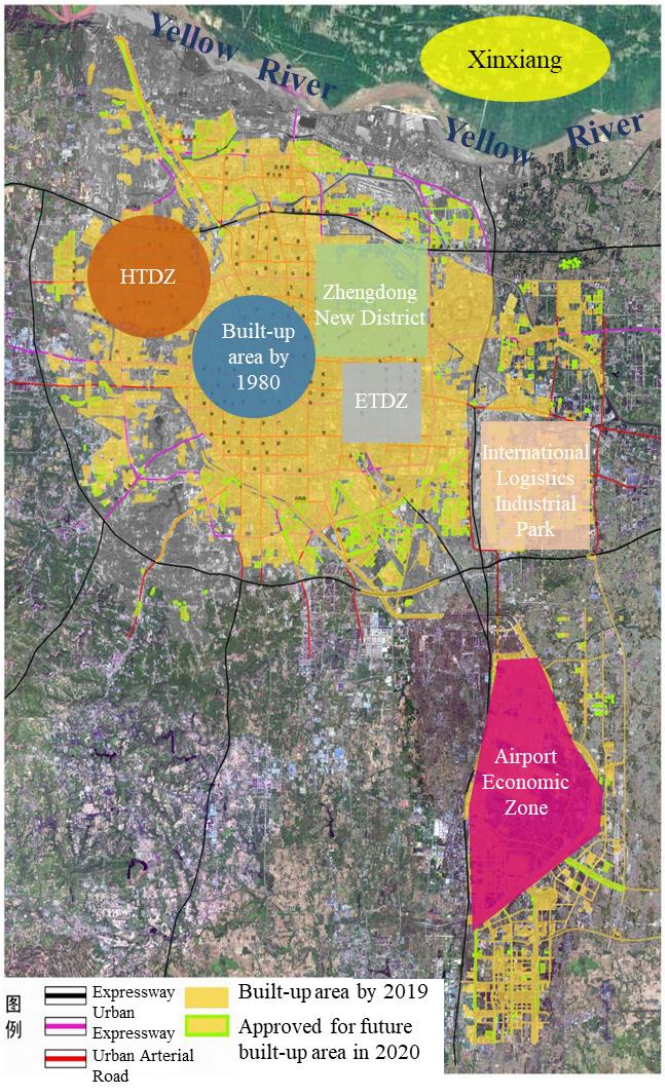


Figure 4. 5: The location of new districts of Zhengzhou in 2020 (The base map is sourced from an official document published by the Zhengzhou Municipal Government: https://gfxwj.zhengzhou.gov.cn/u/cms/gfxwj/202209/291055211f1u.pdf). Note the Yellow River at the top of the image and the significant land use changes on both of its sides. The Yellow River serves as the boundary between Zhengzhou and the northern city of Xinxiang. The northernmost portion of the map depicts rural areas of Xinxiang.)

buildings, and among other uses, it is now occupied by the current Guancheng Hui Autonomous

District government. The city mainly served as the location of the Yamen, where the representatives of central power worked and lived. The Yamen consisted of officials responsible for tax collection and conscription of soldiers through governmental institutions (Hua, 2006). Situated to the west of the Yamen in this north-western quadrant (later relocated outside the city walls), there was an official stagecoach station that played a crucial role in transportation during that era. This stagecoach station was situated on an important transportation artery that ran from Chang'an through Luoyang and Zhengzhou before heading east to Kaifeng and beyond (Figure 4. 6). As the only major station between Luoyang and Kaifeng, it saw a high volume of daily traffic, including people, carriages, and horses. The north-eastern quarter of the city was dominated by religious buildings surrounded by open spaces, as well as the less affluent residents whose housing was frequently subject to flooding due to the relatively low-lying terrain within the city walls. The north-west and south-west quarters were highly built-up areas, whilst in the south-east quarter there were secular schools and much open space. Before 1906, spatial development was confined within the city walls.

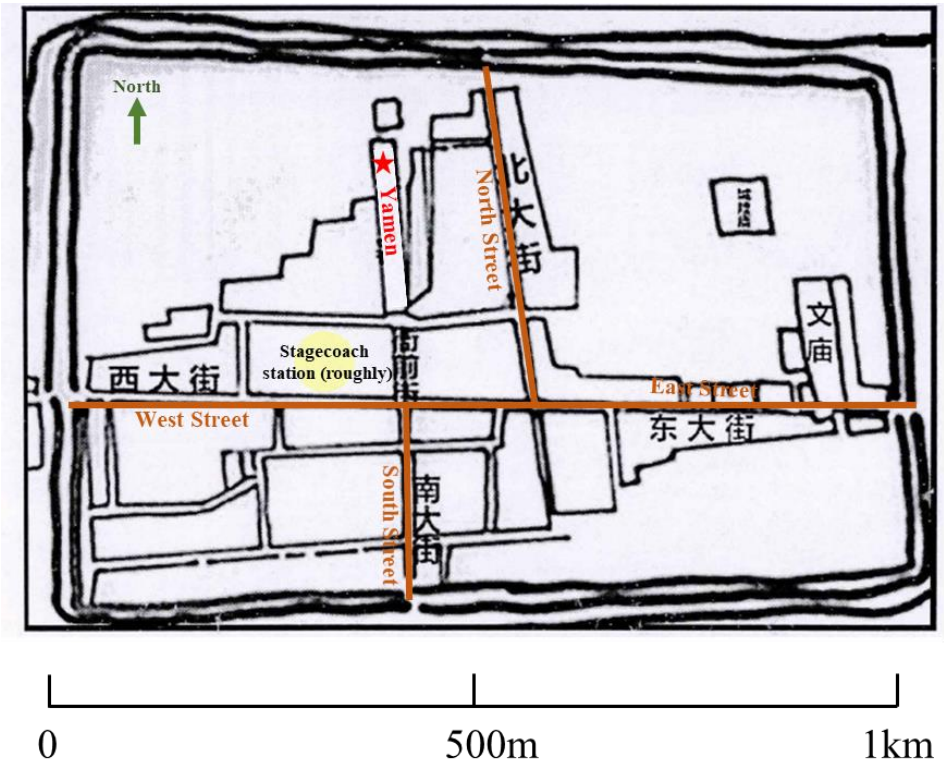


Figure 4. 6: Zhengzhou County in 1905 (after Zhang (2014, p. 11) and adapted by the author). Note that the city wall extends approximately 650 metres in the north-south direction and around 1km in the east-west direction.

The great effect of transportation (including land routes, railways, and recent high-speed-railways) on urban form has been supported by a large number of historians and geographers (Xiong and Ren, 2009; Zou, 1991; Historical Geography Research Centre of Fudan University, 2005; Wang and Xiong, 2006). The modern development of Zhengzhou is closely related to the introduction of the railway (Zhang, 2014). In 1906, a major railway was built from Beijing to Wuhan (Jingguang Railway), passing one km west of the historical town, and having a station 800m from the south-west corner of its walled area. In 1908, it was joined by a west-east railway line from Kaifeng to Luoyang (Figure 4. 7). This developed into an arterial route from Lanzhou to Lianyungang (the Longhai Railway) in 1909. It transformed Zhengzhou into a major railway junction.

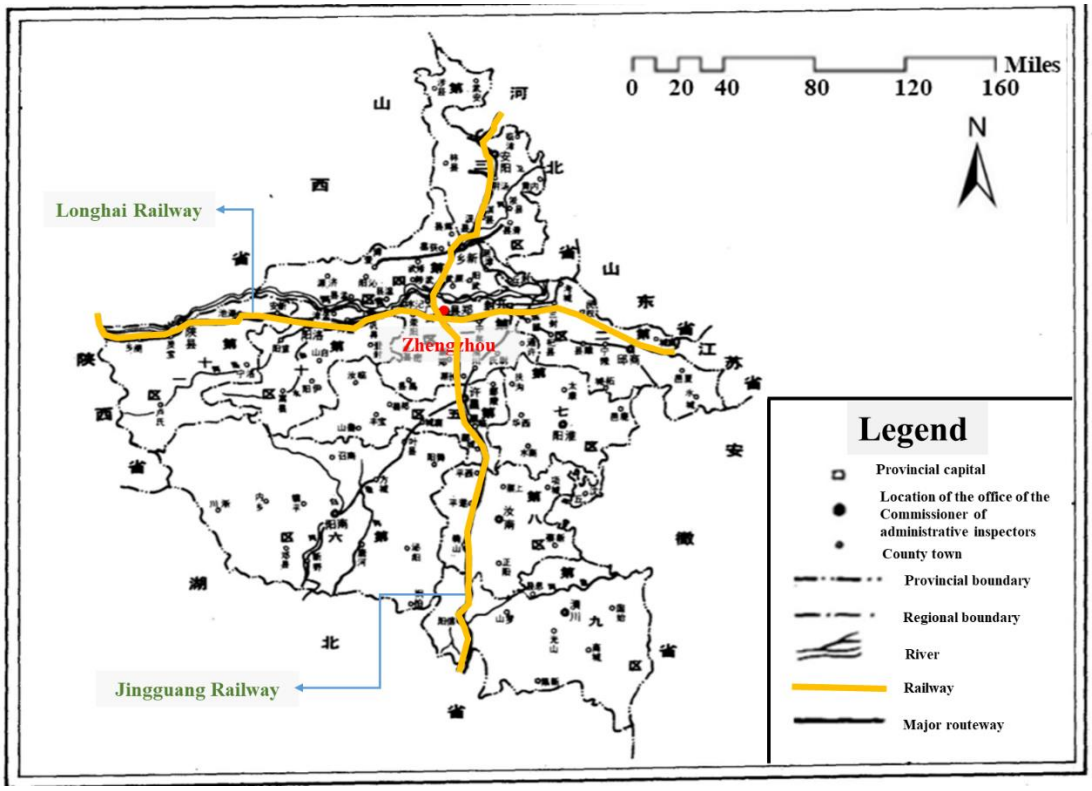


Figure 4. 7: The intersection of Jingguang Railway and Longhai Railway in 1933 in Zhengzhou (Compiling Committee for Modern Architectural History of Henan Province, 1995, title page)

As a consequence, the town gained extensive railway yards where the two lines converged. There followed a period of rapid development between the historical town and the railway, including a street, the later Jiefang Road, joining the west-east road of the old town to the railway line. Between 1906 and 1916, the area between the old town and the railway station was infilled with informal development centred on a cross roads including a west-east avenue (Malu Street) and a

north-south road (Dehua Street) (Figure 4. 8). During that time period, a new commercial centre emerged, becoming the most vibrant and thriving area of the city. This marked a departure from the previous pattern of Zhengzhou's urban development, which had been characterized by a single central area for thousands of years. Instead, a polycentric structure began to take shape, with the old city remaining the administrative centre and the area between the old city and the railway becoming the commercial centre.

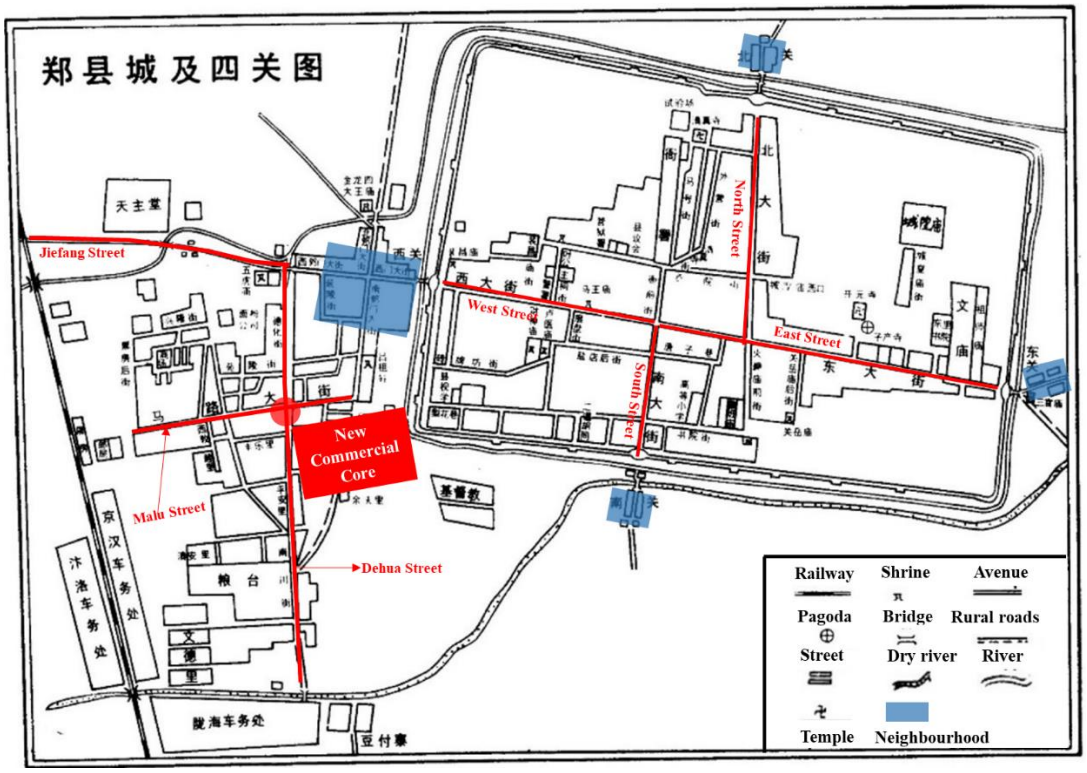


Figure 4. 8: Zhengzhou and its four neighbourhoods outside town gates in 1916 (Guancheng Hui Autonomous District government, 1992, title page)

During the First World War, the wars between European imperialist states had provided a good opportunity for the development of national industry in China. In this environment the industrialists of Zhengzhou had initiated a number of cotton-related industries. Industrial development took place north and south of the commercial district, to the east of the railway. Offices, goods yards and housing for railway workers were constructed by railway companies, linking their properties to commercial roads. A number of agricultural settlements occupied the area to the west of the railway. Four neighbourhoods had formed around the four city gates by this time (Figure 4.8). Within the walled town a high proportion of the area was occupied by open space and institutions. In

morphological terms, these formed an inner fringe belt inside and outside parts of the town walls. In the extramural town of the early 20th century, another incipient fringe belt can be recognized. This consisted of the industrial area, railway offices and religious precincts, surrounding the new commercial core. The railway line acted as a fixation line (Figure 4. 9).



Figure 4. 9: Inner fringe belt of Zhengzhou (1916) (after Figure 4. 8, with adaptations by the author)

Due to the railway and road network of Zhengzhou, the town was set up as a 'Self-opening Trade Zone' (see chapter 3) in 1923. This led to more extensive urban expansion and construction. In 1928, the west wall of the old town was demolished. The moat was filled in, and a new road, called Shuncheng Street, was built on its site. The demolition of the west wall had speeded the growth of the area between the old city and the northern part of the Jingguang Railway. Compared with Figure 4.8, Zhengzhou had expanded in four areas (Figure 4. 10). In Plan Unit 1, Zhengzhou had spread beyond Jiefang Road and developed into a contiguous construction area with a road system taking shape. Plan Unit 2 was the accretive development of the space between the railway and the commercial centre in Figure 4. 8, with the regular road plan revealing that the development had been consciously planned. In the area outside the south gate (Plan Unit 3), more streets had been

laid out, and a distillery had been built. Plan Unit 4 consisted of railway works and offices.

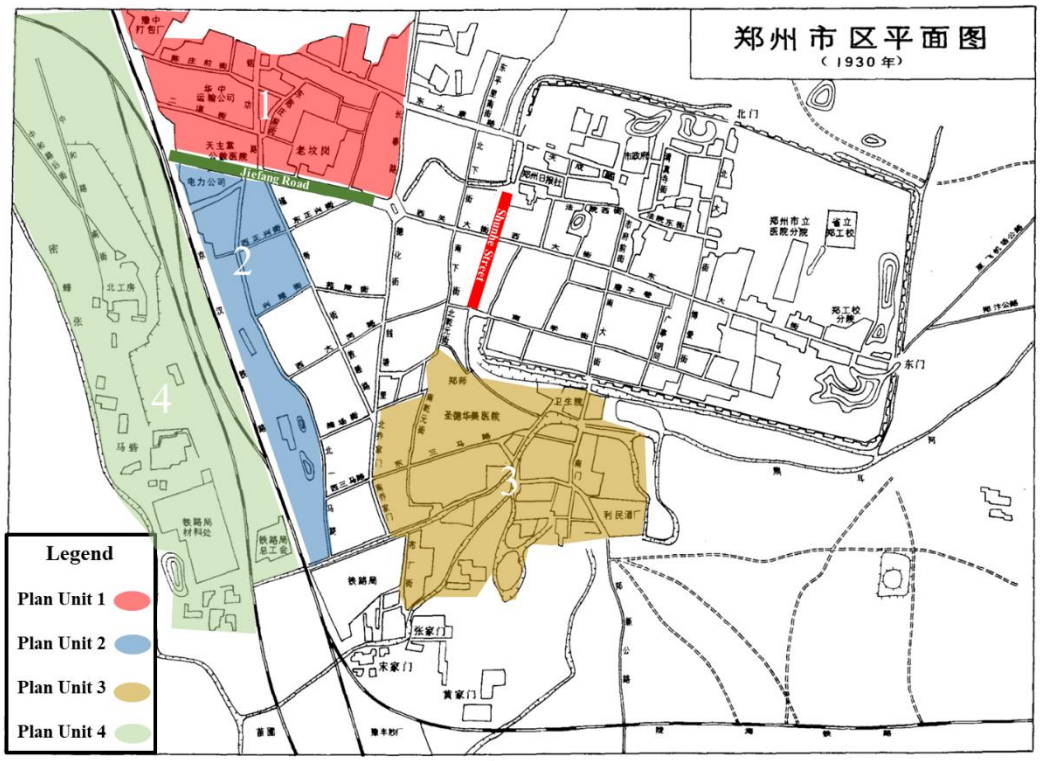


Figure 4. 10: New Plan Units of Zhengzhou urban area in 1930 (after Zhengzhou Local History Compilation Committee (1997), adapted by the author)

Economic and physical expansion of a large number of Chinese cities in the late 1930s was seriously hindered by the Sino-Japanese War (Cai, 2004). During this period, the population of Zhengzhou declined dramatically, from 329,629 before the war to 101,450 after it. More than 28,035 *Jian* (In Chinese traditional architecture, a standardized measure of a bay), and most of the city wall were recorded as having been destroyed during the war. Eighty per cent of industries were bankrupt and most of the shops were closed (Zhengzhou Local History Compilation Committee, 1997). The destruction of Zhengzhou caused by the war not only came in the form of direct damage, but also in broader consequential losses. After the fall of Nanjing (the Chines capital of the time), Chongqing was designated as the provisional capital because of its more westerly location, and some factories and shops in Zhengzhou began to move to Chongqing and other relatively safe cities. All banks, except for a small number of staff in Zhengzhou, moved inland too (Policy Research Office of the Zhengzhou Municipal Committee, 1986). The industry and commerce of Zhengzhou had dramatically declined.

Maps provide a visual representation of how the city has developed over time, and this is evident in the comparison between Figure 4. 10 and Figure 4. 11, which shows that Zhengzhou did not undergo significant expansion during the 1930s and 1940s. Two notable observations that can be made from the two maps are first, the railroads served as a fixation line for development in Zhengzhou. Most of the city's growth was confined to the eastern side of the Jingguang railway. Secondly, the railroad's strong magnetic pull caused the development of Zhengzhou to shift westward, leaving the walled town behind. While agricultural fields can still be found within the city walls, they are mostly located in areas away from the railroad. Comparing with Figure 4.8, the influence of the railroads on the city's growth can be seen in the varying degrees of expansion in the four extramural gate suburbs. The western and southern clusters have merged with earlier developments between the city wall and railway, while the northern and eastern neighbourhoods remain comparatively smaller in size.

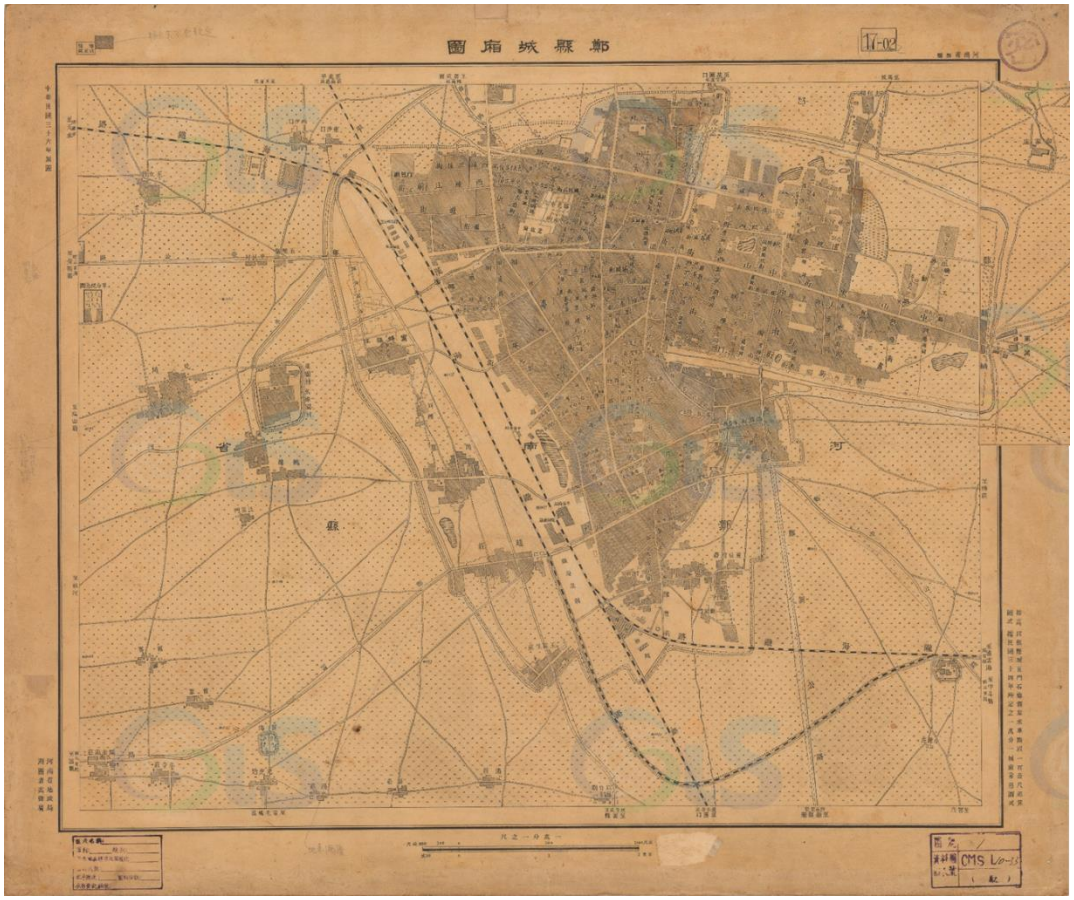


Figure 4. 11: The Development of Zhengzhou by 1947 (source: ACADEMIA SINICA)

In terms of green space, before 1949, Zhengzhou had very limited green resources, and the types were relatively uniform. There were a few institutional plots with some green space, such as Peng's Shrine, and Hu's Shrine in the built-up area, and the Bishagang Martyrs in the western suburbs. There were still substantial cultivated lands within the old city walls. As well as the extensive field land around the city, there was a specialized railway nursery, covering approximately 13.34 ha, dedicated to cultivating tree seedlings for afforestation and landscaping purposes. Furthermore, a few very small private gardens existed. Other forms of green space were represented by the few trees planted within residential courtyards (Mao, 2014).

4.1.2 The morphological period from the dynastic era to 1949: extended-family courtyard dwellings

Between 1840 and 1949, the building type of Chinese residential architecture underwent a gradual shift from courtyard dwellings to collective low-rise terraced housing (Lv *et al*., 2002). This trend was initially observed in cities with treaty ports (see chapter 3) and eventually spreading to other cities. Although Zhengzhou was slower to adopt this style than some of these other cities, it was also influenced by this trend following the establishment of a 'Self-opening Trade Zone' in the area (Liu *et al*., 1988).

Zhengzhou was a completely traditional Chinese city especially before the introduction of the railway in 1906. Like other Chinese cities, it had shown the quality of economic parasitism to some extent, by which the people who lived within the city walls were landlords, officials and literati, and 'servants' who worked for them directly or indirectly. Within the old town, streets were arranged east-west or north-south, and the width of streets showed apparent hierarchical difference from traffic artery to pathway (called *Hutong* in Chinese) in residential areas. The width of Hutongs varied but was predominantly below 7 meters, with the majority being under 5 metres, and the residential walls on both sides were approximately 4 meters in height (e.g. Lu and Wang, 1996; Zhao, Xu and Yin, 2005). Unlike British residential buildings distributed along streets, Chinese residential areas were composed of private courtyards side by side. In fact, traditional architectural rules included axial development; the main building facing south with its back to the north;

contiguous and progressive courtyards, and necessary enclosing walls could be found in all ordinary residential buildings.

The narrow pathways, *Hutongs*, connected all the courtyards together. The distance between two parallel *Hutongs* was determined by the greatest depth of the series of courtyards. The distance could be shared by one or two courtyards, in which case, there must be one side where the courtyard faced north (Bai & Bai, 2006). Traditional Chinese dwellings are not typically composed of a single block, but rather a group of buildings. Each building is separated and arranged in a certain form around the courtyard (Hua, 2013), whereas in western homes typically the yard(s) or garden(s) lie to the front or rear of the house (Zhang, 1989). Morphologically, a prominent characteristic of a traditional Chinese courtyard was that the yard was in the middle, surrounded by building on three or four sides and had a wall on any side that did not have a building on it. Entrance gates were normally in the south-east corner of the courtyard, ensuring visitors could not immediately see into the main courtyard. The surfaces of yards were covered by stone slabs, with trees, flowers or bonsais on both sides of the main building (Figure 4. 12). The main building faced south, and the buildings on the east and west sides were wing buildings, with 'ear rooms' in the corners. The yards were not substantially shaded (Duan, 2016).

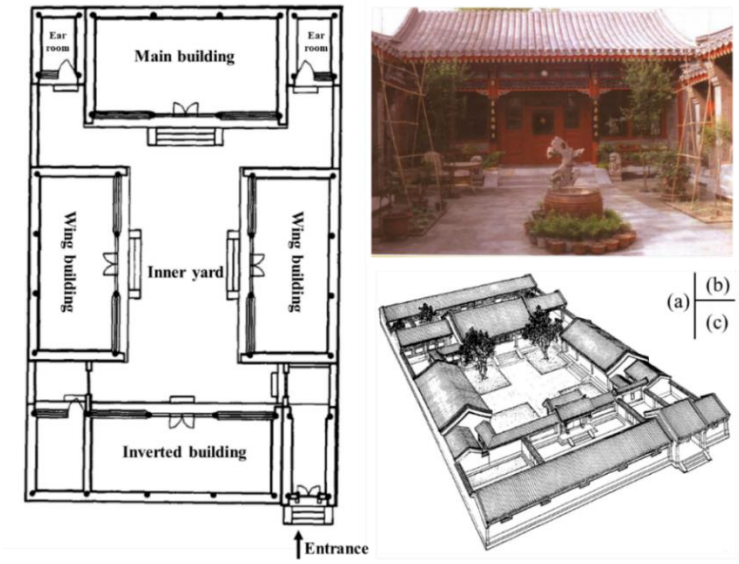


Figure 4. 12: A typical basic courtyard. (a) Plan of a basic courtyard house; (b) A photograph showing existing greenery within a Beijing courtyard, featuring trees, potted plants, vegetables, and more; (c) Illustrative sketch of a typical Qing Dynasty courtyard, with trees as the prominent

green elements (Ma, 1999).

The size and arrangement of courtyard dwellings were a reflection of the social class of the owner. This was evident not only in the choice of building materials and form, but also in the number of courtyards. The basic unit of traditional courtyard dwellings is *Jin* and *Kua*, which refers to the number of courtyards arranged longitudinally along the north-south and east-west axes, respectively. Figure 4. 13 shows the courtyard pattern of two- and three- *Jin* courtyards. In a two-*Jin* courtyard, generally, it was divided into two parts: the front and the back. There was a gate in the front, often to the east of the central axis. A screen wall, standing in the yard, faced the gate of the courtyard. Through the second gate on the central axis, called the floral-pendant gate, there was the inner yard, which was larger (Lu & Wang, 1996). While if the owner's financial situation was not strong enough, they may not have constructed courtyard dwellings on every side. Depending on the number of buildings constructed, they are referred to as 'Erheyuan' for two-sided courtyard, 'Sanheyuan' for three-sided courtyard, or 'Siheyuan' for four-sided courtyard (Zhang, 2004; Liu, 2018). Figure 4. 14 shows the last courtyard in Zhengzhou.

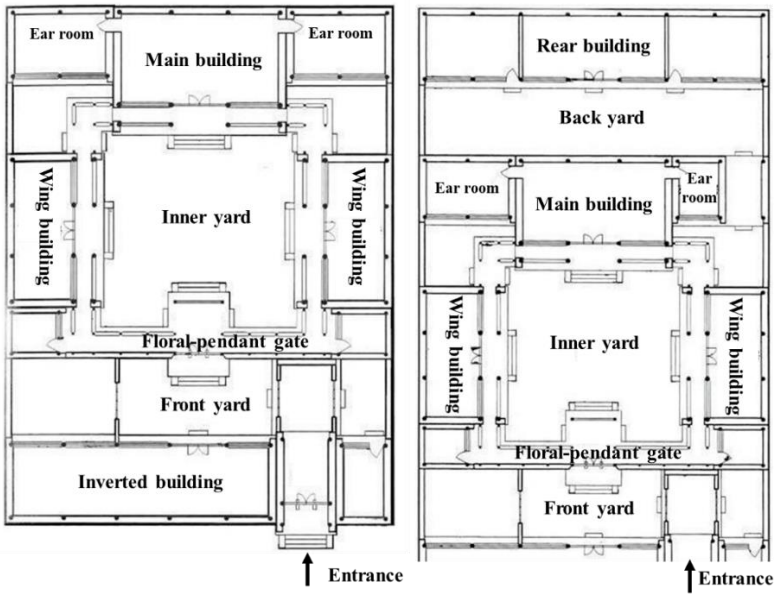


Figure 4. 13: Plan of two- (left) and three- (right) *Jin* courtyards. Two-*Jin* courtyard generally has a width of around 15 to 16m and a north-south depth of approximately 20m to 30m (Ma, 1999).

Courtyard dwellings were typically occupied by an extended family, with the main building situated in the central position of the inner courtyard. This building was typically the highest-ranking

structure in the group and was used by the master of the household. The wing buildings were used by the master's sons and daughters-in-law. The backyard was mainly for the female family members, including the mother, wives, sisters and daughters of the male owner. The ear rooms were generally smaller and used as storage rooms (Henan Modern Architectural History Editing Committee, 1995).

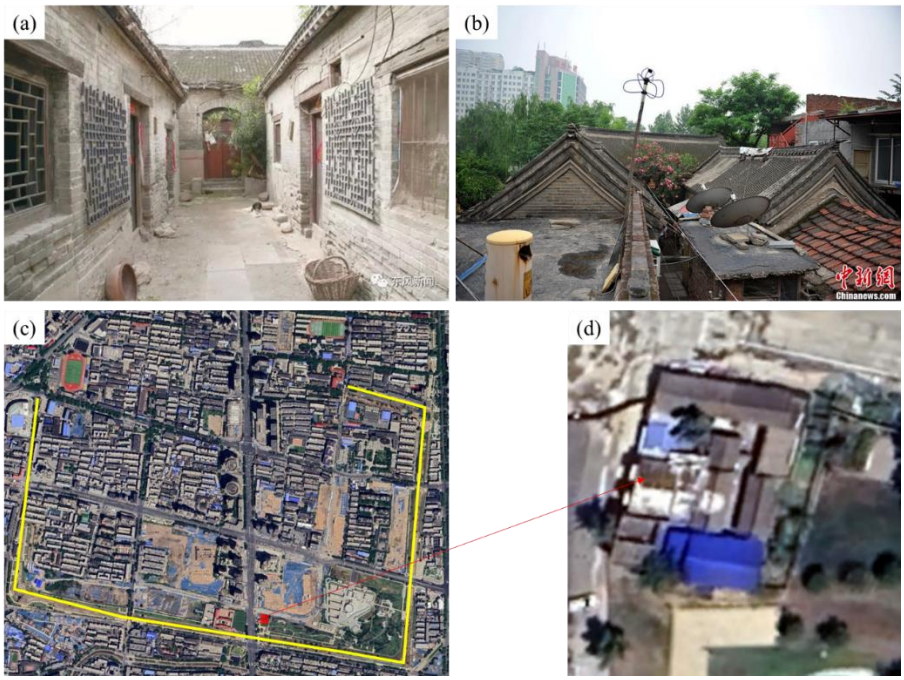


Figure 4. 14: The last courtyard in Zhengzhou - Guo family courtyard, built in 1930 (Zong and Zhu, 2016). (a) Photograph of Guo family courtyard; (b) Roof form. The oleander is over 60 years old (https://china.huanqiu.com/gallery/9CaKrnQgTni, accessed 31st August 2023); (c) Location map of Guo family courtyard in the Zhengzhou urban area (shaded in red; the yellow line indicates the previous city wall.) (d) Google Earth satellite image of Guo Family Courtyard.

With the advent of the railway, merchants from across the country flocked to Zhengzhou to set up businesses, factories, workshops, inns and so on. These commercial and industrial establishments were often located around the new commercial centre or in the western part of the old walled town. For instance, West Street, stretching roughly 1000 meters, accommodated not only four grocery businesses and over twenty cotton stores, but also a plethora of pigment stores (Meng, 2004). Many of these stores were family-owned, with the householder acting as the owner and family members serving as shopkeepers. Their mode of production was often workshop-based, with the front store serving as the sales outlet and the back room functioning as the production area. During the 1920s,

a new form of production - the factory - emerged, leading to the take-off of industry in Zhengzhou. By 1936, dozens of large and small factories had been built, driving the city's industrial growth. New economic activities gave rise to new forms of architecture, such as two- to three-storey (even four-storey) brick-and-wood structured buildings with grey tile roofs. These new architectural styles were commonly seen in commercial buildings, but also appeared in residential dwellings, which were typically one- or two-storey structures (Meng, 2004).

During the Republican period, the development of Zhengzhou was also influenced by 'heroic' individuals, such as the famous warlord Yuxiang Feng. He served as the chairman of Henan Province from 1927 and during his tenure, he strongly advocated and fundraised for the construction of many public service facilities. One of these was the construction of the Bishagang Martyrs Shrine in 1928, which covers an area of over 400 mu (1 mu≈667 m^2). Another of his significant developments in residential architecture was the new residential villages. In 1927, he constructed three new civic villages in the north-west of old Zhengzhou, with a total of 148 *Jian* multi-occupied bungalows. This undertaking foreshadowed the extensive development of communal housing during Zhengzhou's *Danwei*-based era after 1949. In addition, he also organized the construction of public services such as hospitals, schools, parks, nursing homes and almshouses for the disabled, the poor, and less-well-off working people (Zhengzhou Local History Compilation Committee, 1999).

The disparity in wealth was reflected in the city's architecture. Wealthy individuals such as bureaucrats, landowners, gentry, and the newly emerged wealthy merchants and warlords began to adopt a mix of Chinese and Western architectural styles, using modern materials to construct luxurious mansions and villas, often located in scenic areas outside the built-up area. However, the majority of public officials and citizens still lived in traditional courtyard dwellings, with occasional minor improvements made based on traditional building forms (Henan Modern Architectural History Compilation Committee, 1995). Those in the lower social classes often lived in poor conditions, such as factory housing or workshops, bungalows that were half residential and half rented, or even shantytowns (Wang, 1989). This led to the formation of morphological regions I and II (Figure 4. 15): the 'old walled town and new commercial centre' nucleus consisting of extended-family courtyard housing, and the inner fringe belt.

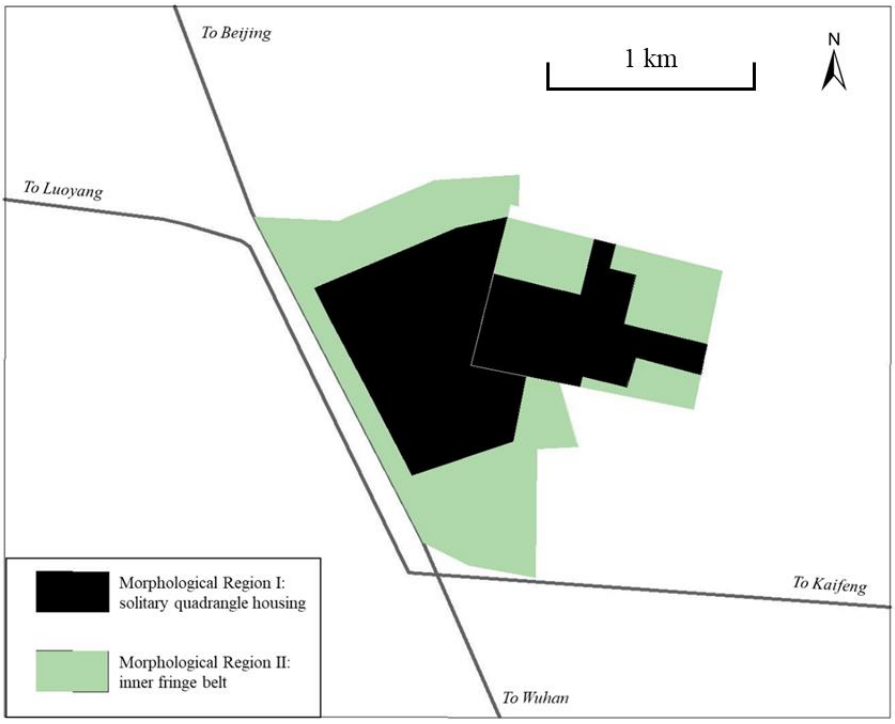


Figure 4. 15: Morphological regions of Zhengzhou in 1949 (author)

4.1.3 The morphological period from 1949 to 1977: amalgamated slab buildings

Following the Civil War, Zhengzhou fell to the communists in 1948. The former Zhengzhou County was set up as Zhengzhou City soon after by the People's Republic of China (Zhang, 2009). Due to the extensive cultivation of cotton around Zhengzhou and its railway transportation advantages, as well as strategic considerations aimed at balancing economic development between the coastal region and the central plains, Zhengzhou was designated as a significant industrial city. It was positioned as one of the country's six major centres for textile production in the 'Five-Year Plan' introduced in 1953. It was also allocated production of electric cables, aluminium, and machine engineering (Henan Provincial Local History Compilation Committee, 1997). In 1954, Zhengzhou was selected by the government party as the regional capital of Henan Province. According to the Master Plan of Zhengzhou City approved by the State Construction Commission in 1955, the urban area was planned to mainly develop to the west. The plan made by Soviet experts for Zhengzhou during the 1950s utilised the Renmin Road as the axis which would link the railway station to the

provincial government administrative district. The section of Renmin Road extending from the southern end to Erqi Square (Figure 4. 16 and Figure 4. 17), was eventually completed and made accessible to the public in 1986 (Compiling Committee for Henan Gazetteer, 1997). The district west of the railway was designated as workers' housing and an industrial zone the whole laid out on a grid plan. Large industrial enterprises had been planned westward along the Longhai Railway and the parallel Mianfang Road, and medium-sized industrial enterprises on both sides of the Jingguang Railway line in the northern suburbs. The northeast was designated as an administrative and cultural area.

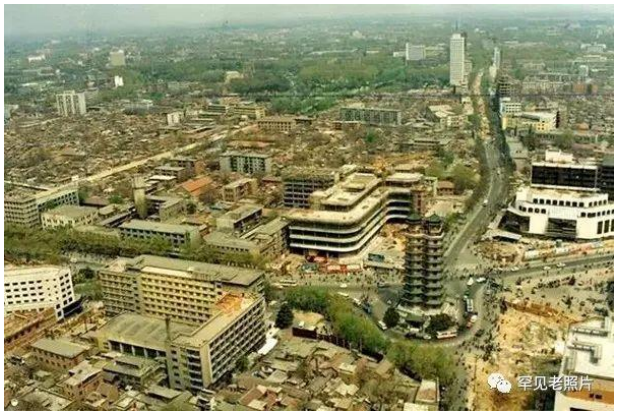


Figure 4. 16: Erqi Square in 1980s. (https://www.dahebao.cn/news/1532217?cid=1532217, accessed 31st August 2023)



Figure 4. 17: Master Plan of Zhengzhou City in 1955 at 1:40,000 scale. The scale bar top left represents 2km (Zhang, 2007)

As a result of the relocation of the provincial government to the north of old Zhengzhou and the establishment of an industrial zone to the west of the Jingguang Railway. Substantial suburban regions underwent a profound transformation, evolving into a vibrant urban hub and driving an unprecedented city expansion. By the end of 1956, the urban area had ballooned to 39 km^2, a 6.5-fold increase since the beginning of the liberation, with 3.63 million m^2 of actual housing space, which was 2.2 times more than that in 1948. During the ten years from 1956 to 1966, the capital invested in Zhengzhou's basic construction continued to increase, amounting to a total of 1.6 billion yuan, 2.4 times more than in the previous eight years. This investment paved the way for Zhengzhou's rapid expansion, resulting in an urban area of 73 km^2 and a population of 635,600 by the end of 1966 (Policy Research Office of the Zhengzhou Municipal Committee, 1986).

Zhengzhou's development since the founding of the People's Republic of China has resulted in the original old city receding into the background, making way for expansion towards the north and west. The northern administrative district, centred around the Henan provincial government offices, features an orthogonal road network. Meanwhile, the industrial area to the west of the Longhai Railway is centred around the Zhengzhou Municipal Government offices, with a similar orthogonal road layout. The four landmark buildings in Zhengzhou, namely the Zhengzhou municipal government offices, Zhengzhou Railway Station, Erqi Square, and the Henan Provincial Government, and their surrounding parts, are connected by Zhongyuan Road, Renmin Road, and Jinshui Road (Figure 4. 18).

Due to this rapid urban expansion, Zhengzhou has developed a third morphological region, mainly located to the west and north of the pre-PRC developed areas. On the satellite image of 1968, the region could be divided into 7 plan units (Figure 4. 19). Jianshe Road was based on an old official route from Zhengzhou to Luoyang, which together with the north-south and west-east railways constituted the early pre-urban elements. The east section of Jinshui Road, parallel with the Jinshui River, connected to University Road to its south-west, acting as the inner ring road. This combined the administrative area and the western industrial district. It was also an entry to the old town area for cars from the south. Jingguang Road and Nanyang Road run parallel with the Jingguang Railway.

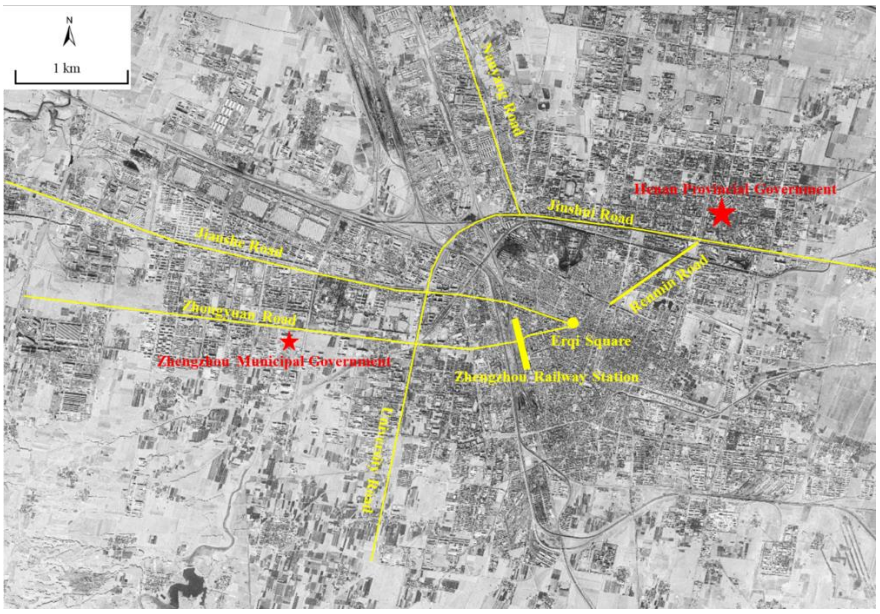


Figure 4. 18: Map of Zhengzhou City in 1968 by USGS

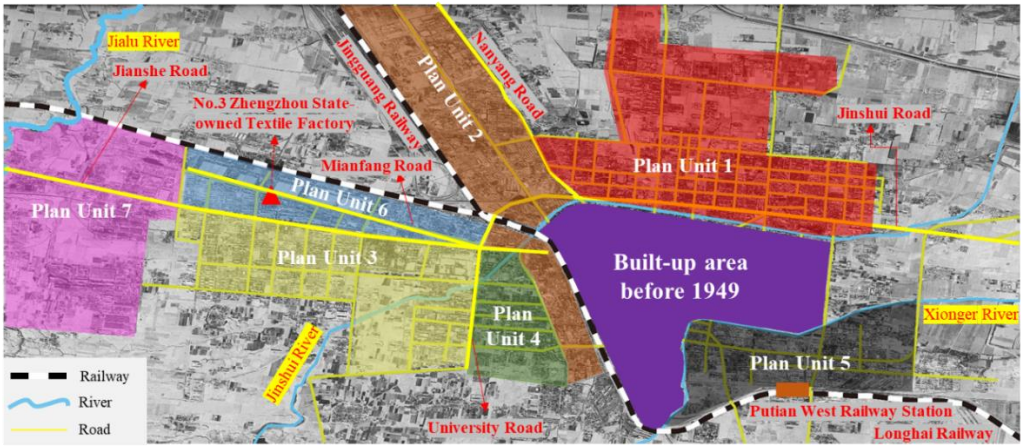


Figure 4. 19: Plan units of Zhengzhou in the 1960s (based on a satellite image (1968) by USGS, adapted by the author)

Plan unit 1, extending north from the old town is, in comparison with plan unit 3, based on a relatively small street grid along Jinshui Road. According to the Master Plan of Zhengzhou City in 1955, this area was designated as the administrative and educational and cultural quarter. Consequently, extensive areas of governmental offices and associated buildings, together with a number of universities, were built. This region also contained a military area and related functional institutions, hostels, hospitals, and sports and cultural facilities. The streets were laid out in a regular grid with rectangular plots.

Plan unit 2 is comprised of areas along the north-south railway, bounded by the railway, Nanyang Road, Jingguang Road and Jinshui Road, with the north-south railway being the dominant feature. Railway-related hotels and staff relatives' courtyards were distributed in this area. It was composed of two parts, both in stark contrast to the formality of Plan unit 1. In the southern part, the plots were piecemeal and irregular, having been developed early in the early 20th century. In the northern part, large plots were scattered along the railway line.

Plan unit 3 includes the Jianshe Road to the north, and University Road to its east. It consisted of mainly heavy industrial factories. This area was not developed evenly from west to east, but in two parts divided by undeveloped agricultural fields. The western part was mainly to the south of Jianshe Road, with the secondary roads following the grid at right angles to this road. The eastern part was distributed along the University Road, following the grid at right angles to this road. Like Plan unit 1, the plots were relatively large and rectangular.

Plan unit 4 is between University Road and the north-south railway. It contained east-west access roads. As in the adjacent areas of plan unit 2, there were some railway related enterprises, institutions, service facilities and courtyards occupied by staff and their relatives. Zhengzhou University was situated within this area. The street grid followed a similar grid to the one to its west, and the street system was less regular than that of plan units 1 and 3.

Plan unit 5 was the area between the east-west railway and the edge of old town. The development of this area had benefited considerably from the establishment of Putian West railway station (formerly Zhengzhou East freight station in 1953). Zhengzhou East freight station was a comprehensive special freight station and class I port for inland railway freight transportation. The axial roads were parallel to the east-west railway. The secondary roads extended at right angles to the Longhai Railway.

Plan unit 6 was occupied by five textile *Danwei*s, bounded on the north by the Longhai Railway and on the south by Jianshe Road. Mianfang Road, parallel to the railway, formed a division between the factory area and the living area in the textile *Danwei*s. The five textile *Danwei*s were arranged east-west successively. Factory 3, which was in the middle of the *Danwei*s, is the subject of further

study later in this chapter. Within this area, the primary road was Mianfang Road, and the secondary roads were at right angles to it.

Plan Unit 7 was primarily characterized by the presence of two key industrial entities: the thermal power plant, which received technical guidance from experts from the Soviet Union and East Germany, and the Zhengzhou Second Grinding Wheel Factory, benefiting from expertise provided by professionals from East Germany. They were surrounded by large tracts of farmland which hadn't been developed yet. In this area, raw materials and finished products were primarily transported to and from the Longhai Railway via railway branches, and then sent to various parts of the state. Meanwhile, for urban transportation, the Zhongyuan Road and Jianshe Road served as the primary means of travel, extending through the area. However, the predominant traffic on these roads wasn't primarily composed of cars, at least until after 2000.

The speedy development from the 1950s was succeeded by downturns caused by the Cultural Revolution from 1966-1976. During this period, urban planning was criticized as 'revisionism', and the planning system was paralysed. The planning department was closed down and the staff were dismissed in 1968. The system was restored in 1972. Within the Cultural Revolution decade, the investment in basic construction was greatly reduced, and state investment was reduced by 20% compared with the previous decade. Consequently, there were only minor expansions in the urban area compared with the satellite image of 1968 (Figure 4. 18 and Figure 4. 20). The undeveloped agricultural fields in Plan Unit 3 in Figure 4.17 were built over and the development of this area was completed. Moreover, there were also some important projects completed during the Cultural Revolution, including the Zhongyuan Road overpass, which was the most important traffic artery connecting the east and west urban areas.

The housing during this period had a distinct planned economic character. Specific institutions, such as political and land systems introduced in chapter 3, formed the basis of the welfare housing system at that time (see chapter 5). Under this system, the state-controlled investment and policies in residential construction according to the condition of the national economy (Chen, 2015). Since its establishment, the People's Republic of China has prioritized heavy industry and adopted a development strategy of 'production first, then living'. Consequently, the proportion of money

invested in housing was relatively small (Table 4. 1). During the 1950s, China embraced the standardized design system and quota indicators for housing advocated by the Soviet Union. However, the Soviet quota standard, when applied in the Chinese context, proved to be excessively generous, resulting in the construction of houses that surpassed the practical needs of the average



Figure 4. 20: Developments in Zhengzhou during the Cultural Revolution (after Zhengzhou satellite image (1977) by USGS and adapted by the author)

Chinese family during that era. Notably, according to a comprehensive survey encompassing 50 cities across the nation at that time, the average per capita living space was a mere 3.6 m². In contrast, the housing norm imported from the Soviet Union stipulated a generous 9 m² per person (Zou, Wang, and Zhang, 2009). This incongruity prompted the adoption of the slogan 'Reasonable design, unreasonable use,' which inadvertently facilitated the sharing of a single dwelling among multiple families. This practice, while born out of necessity, led to a range of intricate social challenges and complexities.

During this period, dwellings were mostly divided into family buildings and single dormitory buildings. Nationally, the most common building type for both was the slab-type residential block, which typically had up to six storeys (Pan, 2014). The slab building first appeared worldwide in the early 20th century and was designed by European modernist architects for use in social housing

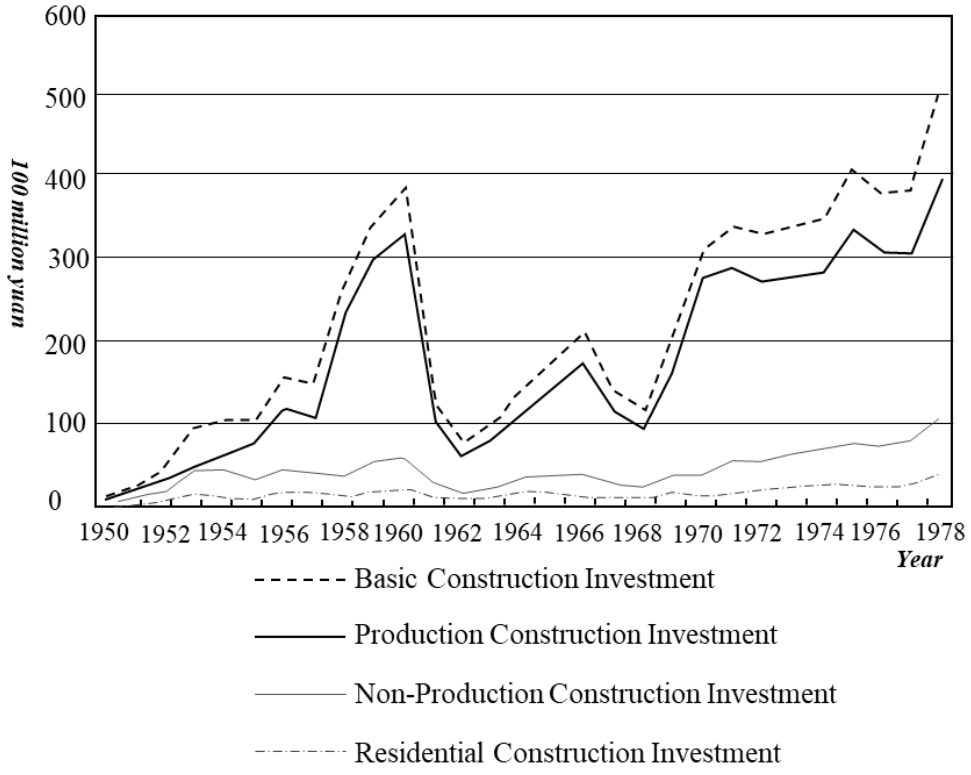


Table 4. 1: Investment changes in basic construction[4], production construction, non-Production construction, and residential construction (Lv *et al*., 2002)

experiments, such as Le Corbusier's Unité d'Habitation in Marseille (Fitting, 2002). In their concept, these large buildings were internally divided into multiple residential units, portraying the future of living with improved light, ventilation, and sanitation. This concept was closely linked to the utopian portrayal of the city (Fishman, 2016), although it faced criticism for being perceived as 'not on a human scale' (Gehl, 2013). Slab building was implemented on a large scale in the former Soviet Union. When China began to learn from the Soviet Union in the 1950s, the first slab buildings appeared in the country, and this building type has continued to be used until now. In terms of internal structure, slab buildings are typically divided into joint-unit slab buildings and through-

4 After the recovery phase (1949-1952) of the national economy, a new era of large-scale enterprise-based construction activities began. According to the 'Interim Measures for Basic Construction Work' announced by the Central Financial and Economic in 1952, any newly constructed, renovated, restored projects, and associated activities involving the expansion of fixed assets for reproduction are considered as basic construction. The content of basic construction projects included the following items: 1) construction engineering, 2) installation engineering, 3) procurement of machinery, equipment, and tools that were classified as fixed assets, 4) design, exploration, and related geological surveys and technical research work, and 5) other basic construction activities.

corridor (inner or outer corridor) slab buildings (Figure 4. 21 and Figure 4. 22). Theoretically, the former is designed for family residence, while the latter is designed for single-person occupancy. The slabs may be straight or angled in shape. Early slab buildings were often through-corridor slab buildings, with a long central corridor linking the dwellings on one or both sides (Figure 4.19b & c). Due to the relatively long length of the building, the corridors were usually dark, and the size of each flat was small, with communal bathrooms and kitchens on each floor. This type of housing continued to be used in almost all single dormitories until today. In some joint-unit slab buildings, each unit was equipped with its own bathroom and/or kitchen (Figure 4.19a). These units can vary in size from a one-and-a-half-room unit to a five-room unit, with the majority being two or three rooms (Lv *et al*., 2002). Due to the severe shortage of housing, many slab buildings that were originally designed as joint-unit buildings were divided into multiple sections later on. Even one room may be shared by several families, causing great inconvenience to daily life. As a result, the desire for unit dwellings was fostered.

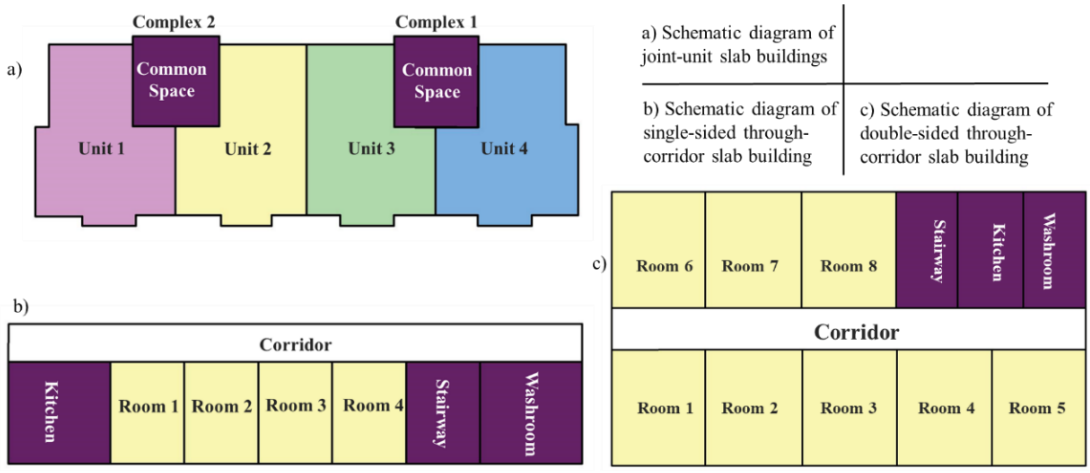


Figure 4. 21: Floor plans of different types of slab buildings (drawn by the author)

Greening efforts in Zhengzhou during this period were divided into three main parts: initial afforestation and sand control, followed by the greening of streets, and the construction of public parks. The Yellow River flows through Mount Mang near Zhengzhou, an area prone to flooding. Throughout history, there have been numerous instances of the Yellow River changing its course, bursting its banks, and causing floods. As a result, there are several major sand areas in Henan Province, and Zhengzhou is surrounded by sand areas on its southeast, north, and east sides. To

manage the sand areas, Zhengzhou adopted a state-run afforestation approach, planting trees to stabilize sand and prevent erosion. The slogan during the period after the provincial capital moved to Zhengzhou was ‘greening should serve the provincial capital, the city, and the working people’, which mandated the planting of trees wherever roads, institutions, schools, and factories were built as well as retrospective planting along existing road and institutional grounds. This was achieved through a combination of voluntary work and professional teams, with the planting and maintenance of street trees being a collective effort mobilizing the masses. Each *Danwei* was responsible for completing a specific section of the work. The third aspect of greening work involved the construction of public parks. Zhengzhou People’s Park, the first urban park established in Zhengzhou after the founding of the PRC, began construction in 1951. In the 1959 overall plan for Zhengzhou, the city was divided into six regions along three forest belts - Longhai, Jingguang, and Jinshui River - and dozens of public parks were planned within the city. However, after the start of the Cultural Revolution in 1966, garden construction and planting flowers and trees were criticized, and greening work experienced a significant setback (Mao, 2014).



Figure 4. 22: Different types of slab buildings. (a) Single-sided through-corridor slab buildings at Factory 4 built, in 1955 (The Editorial Committee of the Real Estate Chronicle of Factory 4, 1994); (b) Double-sided through-corridor slab buildings (https://zhuanlan.zhihu.com/p/39037061, accessed 31st August 2023).

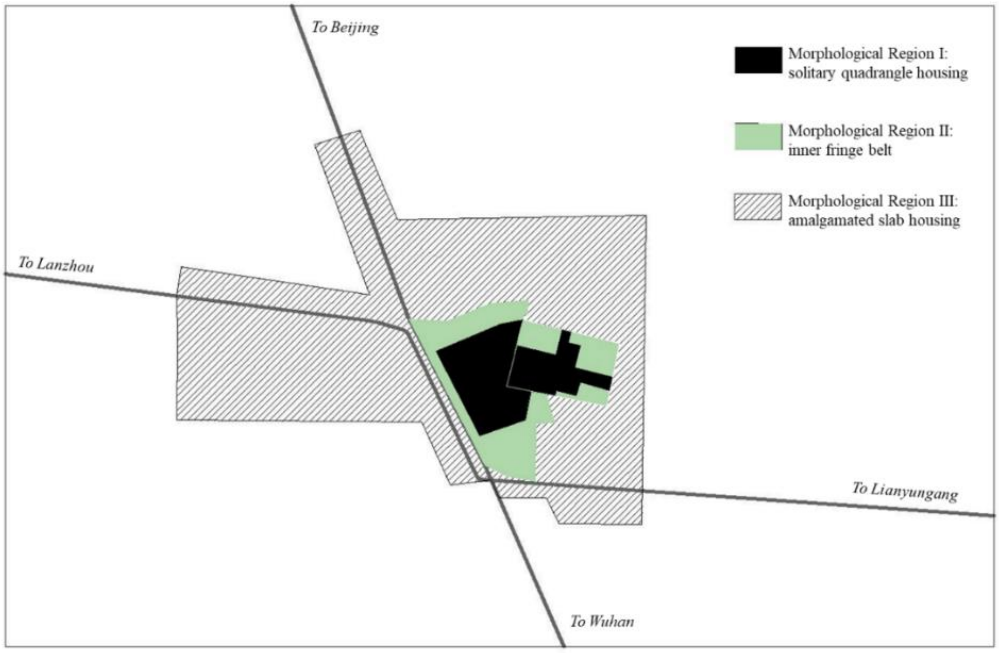


Figure 4. 23: Morphological regions of Zhengzhou in 1978 (author)

The development of Zhengzhou during this period had the following distinctive features: during the early years after 1949, Zhengzhou witnessed an unprecedented level of industrial development. This was largely due to the direct assistance provided by experts from the Soviet Union and other socialist countries who offered guidance on national construction experience. Zhengzhou's industrial development was a clear demonstration of the benefits of the socialist system, which allowed for the rapid deployment of production factors across the country, breaking through provincial and municipal boundaries. For instance, during the 'First Five-Year Plan', the Zhengzhou thermal power plant generated sufficient power not only to meet the needs of local enterprises but also to be distributed to other cities in Henan Province. During the construction process, thousands of workers from all over the country were either transferred or came voluntarily to Zhengzhou. In addition, a large number of related industries were developed in the surrounding areas to support the growth of the textile industry. Nonetheless, some local geographical constraints did come into play during the planning process. While Soviet experts initially recommended developing the state-owned cotton factories in an area north of the Longhai Railway and east of the Jingguang Railway, around the old city, further surveys revealed that the originally planned area had a high water table and poor soil conditions. These conditions made it unsuitable for constructing a

large number of buildings. Consequently, the location was changed to the western suburbs.

Secondly, in China during this period, housing underwent a complete transformation from private ownership prior to 1949 to absolute public ownership and social welfare provision, making it a unique case in the world (Deng, 2009). At the national level, the construction of residential buildings, like other productive buildings, was brought under the macro-control of the state in a planned economic system. In this process, housing was almost never designed or built as the sole objective. Rather, like other social services such as education and healthcare, it was considered an accompaniment to productive activities, subordinate and provided to workers at no cost or at a very low price. As discussed in more detail in chapter 3, it was through the *Danwei* system that this process was realized and performed. Conducting cross-cultural comparative studies focusing solely on buildings would overlook the more important institutional basis that underlies them. That is, cross-cultural studies cannot ignore culture.

Thirdly, in the developmental process of Zhengzhou, it is evident that administrative forces played a dominant role in shaping the city, resulting in a district-based expansion instead of a uniform concentric one. As per the plan, the provincial government was relocated to the north of the old city, while the municipal government was shifted to the west of the old city. This relocation, whether it was voluntary or involuntary, objectively contributed to the rapid expansion of the city and resulted in an eccentric urban structure. This characteristic continued into the next morphological period.

4.1.4 The morphological period post-1978: diversified residential types mainly consisting of tower blocks

After the implementation of the ‘Reform and Opening-up’ period, the construction and development of cities were once again on the national agenda. As discussed in chapter 3, institutional changes played a crucial role in shaping the development process and spatial structure of cities, including both outward expansion and the restructuring of internal spaces. With the establishment of various new institutions, including the paid land-use system, housing reform and the old city reconstruction, the previous *Danwei* system was gradually dismantled. This has enabled urban construction

activities such as land exchange, relocation of enterprises to the outskirts, large-scale expansion of cities, and renewal of old cities to take place. These institutional changes transformed the urban landscape and paved the way for China's urbanization in the following decades (Zhang, 2001).

Under the new national development context, Zhengzhou seized new opportunities for growth. In 1979, a new master plan was formulated, leading to rapid urban development. By 1991, the urban built-up area had expanded from 65 km^2 in 1981 to 90 km^2. However, prior to 1988, Zhengzhou's growth was largely confined to the area divided by railway intersections, and the development of the western industrial zone had yet to break through the boundary formed by the Jialu River (see its location in Figure 13).

In response to changes in the social environment (see chapter 3), the Henan provincial government strategically positioned Zhengzhou as a socialist commercial city and a regional centre, taking advantage of its unique transportation and location benefits. Under this vision, Zhengzhou developed four business clusters, which led to the establishment of 22 large-scale wholesale markets and trading centres across the city. Among these, the Zhengzhou Commodity Exchange became the country's largest agricultural futures trading centre. In 1992, the provincial government designated Zhengzhou as an inland development city, opening its doors to foreign investment, foreign institutions, and merchants from other regions. To foster a favourable business environment and to enhance regional connectivity, Zhengzhou has undertaken ten large-scale infrastructure projects over the years. In 2002, Zhengzhou East Railway Station and Xinzheng International Airport were recognized by the state to be first-class ports, providing Henan with a 'gateway' to the outside world (Han, 2018). Zhengzhou Railway Container Central Station, which was inaugurated in 2010, now operates as Zhengzhou Railway Port. In 2013, Zhengzhou initiated its first China-Europe freight train, which has since facilitated trade between Zhengzhou and countries along the Asia-Europe route, with a total of 4,850 trains operating as of 2021[5].

In addition, from the perspective of national regional balance, since the 'Reform and Opening-up', the nation has adopted a stratified regional development strategy, with a focus on prioritizing

5 https://www.yidaiyilu.gov.cn/p/188133.html (accessed 21th August 2023)

the advancement of its eastern regions. In the 2000s, the country began implementing the Western Development and Northeast Revitalization strategies, during which the Central Plains region experienced relatively slow growth. After 2006, the development plan for the Central Plains urban agglomeration was introduced, and in 2011, the Central Plains Economic Zone became a national strategy. As the principal city of the Central Plains Economic Zone, Zhengzhou's transportation location was further optimized with the 'Zhongyuan Urban Agglomeration Intercity Railway Network Planning' in 2009. Additionally, in accordance with the Central Plain Economic Region Planning, the Zhengzhou Airport Comprehensive Economic Experimental Zone was established in 2013, utilising Xinzheng International Airport as the only airport economic zone approved by the central government (Mu *et al*., 2016). As of 2021, the city has formed a star-shaped high-speed railway network, connecting Zhengzhou with all parts of the country from eight directions.

A significant feature of Zhengzhou's outward expansion during this period is the establishment of various types of new zones. Nationally, after the 'Reform and Opening-up', coastal cities began using tax and land incentives to build development zones, which greatly promoted urban development. The West has extensively studied the spatial strategies related to this, including the concept of spatial selectivity (Brenner, 1997). This refers to the process where the government, based on strategic considerations, assigns priority to specific regions and spatial scales for the allocation of power and resources, while neglecting others, thus producing upward or downward scale adjustments (Zhang, Chen & Hu, 2014). In China, this is manifested as the social construction of scale by various levels of government. Rescaling at the national level is often achieved through the establishment of cities at various levels, national-level special zones, national-level new areas, and various types of strategic regions. Local governments also adopt similar measures, such as administrative mergers and the establishment of different types of new urban zones. Zhengzhou serves as a typical example of this process. During this period, Zhengzhou's urban space experienced rapid expansion. In the west, Zhengzhou broke through the boundary of the Jialu River and established the National High-Tech Industrial Development Zone in 1988, which was the first development zone launched in Henan Province. Subsequently, many new zones were established (Table 4. 2 and Figure 4. 5). By 2021, the built-up area of central Zhengzhou had reached 709.69 km^2, with the permanent resident population increasing to 12.74 million.

	Year of start	Location	Planned areas (km^2)
Existing built-up area	By 1987		94.2
Zhengzhou High-Tech Development Zone	1988	Northwest suburbs	18.6
Zhengzhou Economic and Technology Development Zone	1993	Southeast suburbs	12.49
Zhengdong New District	2001	Eastern suburbs	150
Zhengzhou New District	2007	Eastern suburbs	150
Zhengzhou Airport Economic Zone	2007	Southeast suburbs	415
Zhengxi New District	2015	Western suburbs	72

Table 4. 2: Planned districts after 1978 in Zhengzhou (Wang and Tomaney, 2019)

Regarding changes in the internal space, the old city renewal in Zhengzhou continued (Zhengzhou Local History Compilation Committee, 1997) and it is worth noting that the urban renewal activities in this process were closely linked to the expansion activities outside the city. After the fiscal reform that separated central finance and local finance, local governments faced financial difficulties, as discussed earlier in this chapter. During the process, local state-owned enterprises were completely handed over to local governments. This partly led to the emergence of the economic value of land. In the early 1990s, state-owned enterprises held a significant amount of urban and surrounding land that had been previously allocated to them. In response to the slogan 'national withdrawal and civic entry', these enterprises quickly vacated the land and returned it to local governments. To make a profit, local governments introduced private enterprises as buyers through bidding and auctioning, resulting in significant revenue from land sales. Under the slogan 'suppress manufacturing industry and develop service industry' after 2000, local governments began to target increasing the proportion of service industry land use and encouraged the relocation of industrial manufacturing with high energy consumption and high pollution characteristics from the city to the suburbs (Shi, 2014). Therefore, many original factories were relocated. However, due to the huge demolition costs involved in the original state-owned enterprise residential areas, buyers often only placed their production spaces in the newly planned suburban industrial areas and used the original production areas for real-estate development, while the original residential areas were

still inhabited by the residents.

At the same time, local governments expanded the scope of land marketization, leading to the city's continuous expansion into surrounding agricultural areas, resulting in the rapid transformation of rural landscapes into urban ones. Due to the binary land system in China (chapter 3), the land in rural areas is collectively owned and cannot be traded on the market, whereas urban land can be bought and sold. This has led to a situation where expanding cities often encroach on rural arable land, while at the same time enclosing rural residential land to form what are known as 'urban villages'. During the rapid urbanization process that began after 1949, many shantytowns emerged due to the insufficient number of residences to house workers. These shantytowns had high building density, simple residential structures, and incomplete supporting facilities. As of 2013, the total number of shantytown residents in China exceeded 100 million.

To address this issue, the government has been promoting large-scale shantytown reconstruction and resettlement housing construction since 2009. In addition, many production and residential areas of previous *Danwei*s have become dilapidated. In response to this situation, the government began to cooperate with enterprises and implement large-scale urban renewal actions. In this process, Zhengzhou proposed the renovation of urban villages (Figure 4. 24) and shantytowns as early as 2003, and a large number of high-rise residences were built to relocate the original residents. The monetization of shantytown reconstruction methods resulted in a lot of funds flowing into the real-estate market, promoting the real-estate economy. Moreover, in recent years, Zhengzhou has begun to implement the renovation of old residential areas, leading to significant changes in the urban landscape. Many residential areas (including those left over from the redevelopment of state-owned enterprises) and factories have become dilapidated.

As for building type, in the 1970s, the Chinese central government initiated a policy to 'protect farmland and develop urban construction towards the sky'. This policy led to the construction of high-rise residential buildings in several large cities such as Beijing and Shanghai. Initially, these high-rise buildings were through-corridor slab buildings. However, in the late 1970s, the development of high-rise buildings in Beijing rapidly evolved, giving rise to a new form of residential building, known as the tower-block high-rise building. This design allowed for maximum



Figure 4. 24: The demolition of Zhengzhou's largest urban village. In 2017, Chenzhai, Zhengzhou's largest urban village, faced planned demolition through controlled explosions.

use of space while minimizing the footprint of the building. Early high-rise buildings were mostly concentrated in Beijing. By 1981, there were a total of 416 high-rise residential buildings across the country, with three-quarters of them located in Beijing. These buildings were seen as a symbol of modernity and progress, representing China's urbanization and economic growth (Zou, Wang and Zhang, 2009). Despite debates at the time about the economic viability of high-rise buildings (Zhang, 1978; Wu, 1988; Zhang, 1988; Zhang, 1990; Liu, 2013), the construction of high-rise buildings experienced rapid growth across the country. Compared with Beijing, the development of high-rise buildings in Zhengzhou was relatively late. The Zhongyuan Building, which stands across from Zhengzhou Railway Station, was the city's first large high-rise building, measuring over 50m tall and completed in 1976. During this early stage of high-rise development, such buildings were primarily utilised for official, hotel, and business guesthouse purposes (Zhengzhou Housing and Land Gazetteer Editorial Board, 1997). In the early days of 'Reform and Opening-up' period, the construction of urban residential housing in Zhengzhou mostly comprised of five to seven-story housing blocks (Zhengzhou Housing and Land Gazetteer Editorial Board, 1997). The use of high-rise buildings for residential purposes only became widespread in the 1990s. Today, Zhengzhou has at least 25 high-rise buildings over 150 m tall.[6] Similarly, the early high-rise buildings in

6 https://www.163.com/dy/article/ETTFB4T20514G3TU.html

Zhengzhou were primarily slab buildings, while the later ones were mostly tower-block or a combination of slab- and tower- high-rise buildings (Figure 4. 25 and Figure 4. 26). From a spatial perspective, high-rise buildings not only emerged in newly expanded areas of Zhengzhou, but also in the old town, the inner fringe and the area developed from 1949 to 1978. As mentioned earlier, Zhengzhou has been conducting demolition and resettlement projects in the old urban area since the 1950s, but it was not until after 1978 that large-scale demolition efforts began. The rapid industrialization in Zhengzhou resulted in widespread demolition of dilapidated buildings, including old production structures, and the construction of new buildings. Initially, these were 6-story slab buildings, but later higher high-rise buildings were constructed (Zhengzhou Housing and Land Gazetteer Editorial Board, 1997).

Since the impletion of 'Reform and Opening-up' policies, especially the promotion of housing system reform, the organization of residential space in China has undergone significant changes: the *Danwei* system was gradually replaced by a community-based system, where residential neighbourhoods were established with public facilities such as kindergartens, primary schools, shops, and markets. In 1992, Zhengzhou's first commercial housing community emerged, marking the beginning of a classic landmark communities or buildings were completed in Zhengzhou, and the real-estate industry began to focus on improving the quality of housing to cater to different target groups. For instance, semi-detached and detached houses were built to meet the demands of wealthy individuals. The real-estate market in Zhengzhou experienced high-speed development for at least 30 years, from 1998 to 2018, driven by favourable policies.

As mentioned in chapter 3, another result of the housing reform is that the government has begun to provide various forms of public housing for low- and middle-income individuals. Many governments in China began implementing public housing systems from 2000, with Zhengzhou being one of the early adopters. These systems have been tailored to different target groups, with a variety of categories and features, including low-cost housing, public rental housing, and affordable housing. Initially, low-cost housing was aimed at low-income earners, while public rental and affordable housing tended to be for low- and middle-income earners. Typically, low-cost housing and public rental housing are only available for renting, and not for sale. In contrast, affordable

housing may be sold under certain conditions. Over the years, these public housing systems have helped provide access to affordable housing for many low- and middle-income individuals and families. Prior to 2007, the government provided subsidies by purchasing scattered second-hand houses to rent out to low-income families in need (Han & Liang, 2007). However, this approach proved difficult to manage and raised safety concerns, leading to the construction of specialised housing blocks to better address the housing problems of low- and middle-income individuals. Various interventions have been used to support the provision of affordable housing, including the allocation of furniture, subsidised rents for tenants, and reduced land costs through concessions to speculative housing developers. These developers are offered reduced land costs in exchange for committing to construct a certain amount of subsidised housing. Affordable housing is often located in remote urban and rural areas, while low-cost and public housing tend to be built in less remote locations. In Zhengzhou, low-cost housing units are generally around 60 m^2 in size and consist primarily of two-bedroom units (He, 2006). Affordable housing units are more diverse and typically include two- and three-bedroom units. The typical building types for public housing are slab

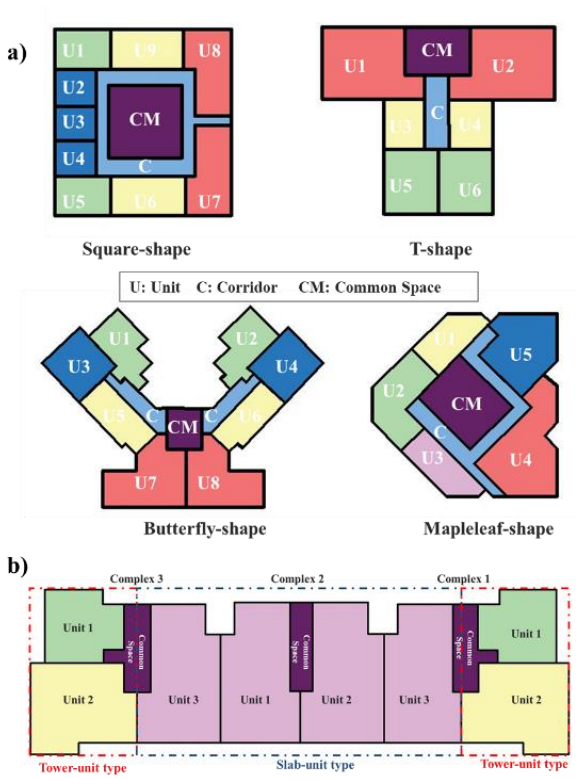


Figure 4. 25: Floor plans of tower blocks and slab-tower blocks. a) Floor plans of different types of tower blocks; b) Floor plans of slab-tower blocks (drawn by the author)



Figure 4. 26: Slab buildings and tower buildings constructed after 1978. (a) A seven-storey residential building built in 1991 at Factory 4 (The Editorial Committee of the Real Estate Chronicle of Factory 4, 1994); (b) A seven-storey residential building built in 1979 at Factory 6 (The Editorial Committee of the Real Estate Chronicle of Factory 6, 1994); (c) Slab residential buildings completed in 2015 - Shuxianghuafu community (https://zz.fang.anjuke.com/loupan/xiangce-251556/jst.html?from=loupan_view_photo###, accessed on August 31st, 2023); (d) Tower residential buildings completed in 2005 - Senlinbandao community (https://zz.lianjia.com/xiaoqu/3320024277893652/, accessed on August 31st, 2023); (e) A cluster of slab buildings and tower buildings in Jingshui District (https://opinion.caixin.com/2022-10-10/101949640.html, accessed on August 31st, 2023); (f) Unfinished building complex (https://www.chinatimes.com/realtimenews/20220908002241-260409?chdtv, accessed on August 31st, 2023)

buildings or tower blocks. In terms of external appearance, the quality of the supporting facilities and unit layout in public housing is often lower than that of commercial housing. However, there is not much difference between public housing and commercial housing, making it difficult to distinguish between the two based solely on external features. Thus, these changes have resulted in the emergence of four new morphological regions within the city after 1978. These new regions are characterised by three building types: slab buildings, tower blocks, and slab-tower buildings. Each of these building types includes both speculative and public buildings.

After the 'Reform and Opening-up' policies, Zhengzhou's greening work also resumed and developed. This was demonstrated through a greater variety of tree species, the creation of new

squares and parks, the establishment of riverside parks along the Jinshui River, and more. In 2014, the forest land area in Zhengzhou reached 236,900 ha, with a forest coverage rate of 33.36%; the total green area in the urban area reached 140 million m^2, with a green coverage rate of 40.5%. Zhengzhou was awarded the title of 'National Forest City' in 2014 (75 cities in China have been awarded the title of 'National Forest City' by 2014).[7]

The current Morphological Region I is the previous entire old town and inner fringe belt which was revitalised from the 1950s, especially in the 1980s (Figure 4. 27). This region is predominantly composed of post-1978 slab buildings (<7 storeys) but also includes tower blocks and slab-tower buildings (> 6 storeys). Morphological Region II consists of the original slab buildings (1949-1978) used for communal living in the *Danwei* period, as well as newly constructed buildings post-1978. Morphological Region III consisted of tower blocks built post-1978. Morphological region IV is composed of slab-tower buildings. In terms of spatial distribution, there are two parts. One part is located outside the previously established Morphological Region III, while the other part is a south-eastern enclave. Morphological Region V consists of slab buildings outside of the old town.

After the impletion of 'Reform and Opening-up' policies, the development of Zhengzhou also had the following characteristics: first of all, it continued the characteristics of the previous stage, which is the tendency of development to be non-contiguous. Although the boundaries of Zhengzhou have expanded in all directions compared to 1978, careful examination of the development process reveals that Zhengzhou's development strategies have taken different directions in different periods. The reason for this is that for Zhengzhou, the status of the administrative centre and the role of policies are important driving forces for its development, such as the establishment of new areas by different levels of government (Zhao *et al*., 2009).

The second significant characteristic of Zhengzhou's development process is the revolutionary change that took place. Conzen referred to 'revolutionary planning measures' (Conzen, 1969, p. 10 endnote 8), and Zhengzhou is an example of such radical change. During the urbanization process in Zhengzhou, it was extremely common for the original villages to be completely replaced with a

7 https://lyj.zhengzhou.gov.cn/zzly/910035.jhtml

new built environment, previous buildings and street systems being totally removed, making it difficult to find any traces of the former landscape in the current urban landscape.

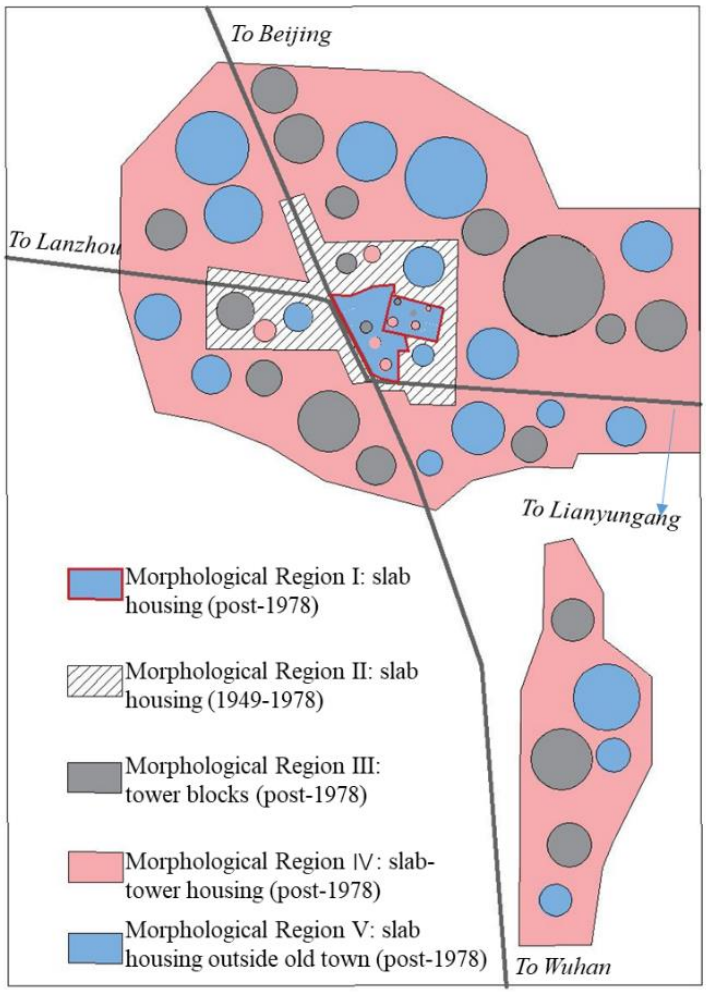


Figure 4. 27: A schematic diagram of morphological regions of Zhengzhou in 2020 (author)

This also leads to the third characteristic of Zhengzhou's development process, which is landscape monotony. Since the start of the 'Reform and Opening-up' period, particularly after the housing reform in 1980s, Zhengzhou has experienced large-scale construction activities. The significant role of large real estate companies and the fact that land is mostly owned by the state has greatly facilitated the development of this type of urbanization. As a result, similar types of buildings were constructed throughout the city in a very short period, leading to landscape similarity.

This section reviews the morphological evolutionary process of Zhengzhou and its primary building types in each morphological period from the early 20th century to the present. The evolution

of building types includes the transition from extended-family courtyard dwellings before 1949 to amalgamated slab buildings between 1949 and 1978. Following this period, there was an introduction of diversified residential types such as tower blocks and detached houses, although the latter only appeared on a limited scale. Concurrently, this process also marked the establishment and dissolution of *Danwei* system. Chapter 5 will illustrate how the urban form evolved during the establishment and dissolution of the *Danwei* system through an analysis of the Chinese case, Factory 3.

4.2 Developmental history of Birmingham

This section aims to explore the developmental history of Birmingham from the 1770s in order to put Bournville in a broader historical, geographical and morphological framework. Based on the comprehensive information provided by a large number of existing studies (e.g., Skipp, 1983; Birmingham City Council, 1989; Cherry, 1994), this part will mainly be organized from a morphological perspective, aiming to analyse how different temporal and geographical factors play and exert influence mutually on urban form. Tracing the development of building types in different morphological periods, it will investigate the predecessors, including residential back-to-back houses and bye-law terraced houses, and their successors, council housing and speculative buildings with large gardens in 20th century of Birmingham. The section will also consider the change from workshop production to large factory units. Additionally, this section will look at the location of Bournville in Birmingham by examining its geographical relationship with its surroundings and its favourable transport links. Finally, it is concluded that a variety of factors are important in explaining the morphological pattern of Birmingham's development.

4.2.1 The morphological structure of Birmingham at city level

Birmingham is the second largest city of Great Britain, with a population of 1.145 million within the city area by 2021[8](National Statistics, 2023). Located centrally, it has developed into a focus of transportation, manufacturing, shopping, and culture within the surrounding urban areas, but a

8 https://www.birmingham.gov.uk/info/20057/about_birmingham/1294/population_and_census.

geographic central location does not necessarily mean better regional transport links. Situated in the centre of the Birmingham Plateau and covered with glacio-fluvial soil, Birmingham was an impoverished area for its low agricultural productivity, poor endowment of natural resources to exchange and produce, and lack of navigable access to the sea.

During the Anglo-Saxon period, Birmingham was only a hamlet. One favourable economic turn came in the mid-12th century when the Lord of the Manor, Peter de Birmingham obtained a market charter and developed the hamlet into a successful one-street market town, and it became the third-largest town in Warwickshire by 1327 and retained that position for the following two centuries (Holt, 1985; Slater, 2016).

Since settlements on high plateaux don't have navigable rivers for transport, access with the wider region of Birmingham in medieval times was by packhorse, wagon and carriage. Such land carriage is costly, so that only light and small goods in proportion to their value could be moved profitably (Vance, 1967). Metal-working industries were specially favoured in Birmingham. A variety of goods were made, from agricultural implements like scythes, to jewellery and tableware like knives and forks, cutlery and so on. The raw material was brought from South Staffordshire and the manufacturing process was undertaken in workshops and water mills (Slater, 2016), powered by the Rivers Rea, Cole and Tame. The period from the mid-17th century witnessed Birmingham increasing its manufacturing importance through gun-making since England got involved with a number of wars firstly inside and then outside the country. By 1700 Birmingham has established itself as the fifth-largest town in England and Wales (Cherry, 1994). But soon Birmingham found itself increasingly requiring external transportation—importing raw material and exporting finished products, which raised costs substantially. Canal building offered a solution.

Before investigating the impact of the canal system on Birmingham's development, it is worthwhile to examine first the town plan prior to the 1770s, when the canal is introduced. The plan of Birmingham is an overall kite-shape in the mid-18th century (Figure 4. 28). The long street begins at Camp Hill and extends along Digbeth, passing through the Bull Ring and finally leading up the hill to the High Street. Edgbaston Street, New Street, Bull Street, and John Street have grown perpendicularly to the elongated street, with areas between them filled by buildings gradually. Park

Street, Colmore Row, and Steelhouse Lane go roughly parallel to the long street, forming the south and north developmental boundary. In the west, it is Pinfold Street and Dudley Street which defines the limit and a more tortuous border to the east. All the roads, and the space between them, forms the ‘head’ of the kite. Two arterial ribbons along Smallbrook Street and Snow Hill are notable on the map, with uneven developments on both sides. The map highlights several notable features. First, there are green spaces and agricultural residuals both within and outside the built-up area of the town. Secondly, the density of the northern section of the ‘head’ is lower than the southern, which is understandable considering the northern part is up on the hill and is thus naturally preferred by the emerging wealthy class in the town. Thirdly, the River Rea in the lower right corner of the map, along with numerous diverted leats (i.e., channels diverting water to mills), provides power for the manufacturing centres in the surrounding area.

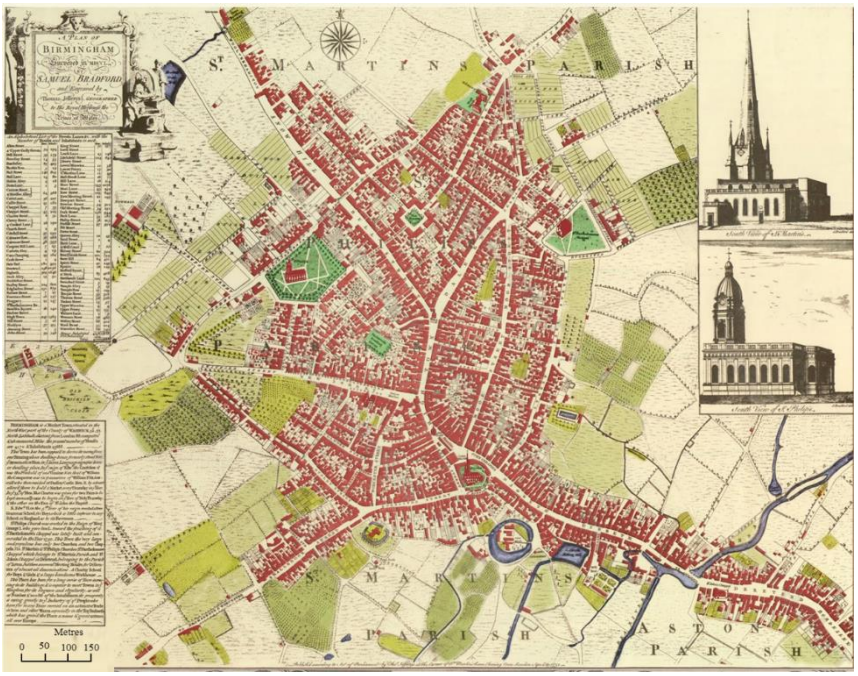


Figure 4. 28: Samuel Bradford’s ‘Plan of Birmingham Surveyed in 1750’ (source: School of Geography, Earth and Environmental Sciences, University of Birmingham). The inserted picture above is a south view of St. Martin’s. The inserted picture below is a south view of St. Philip’s. Bournville is four miles southwest of the town centre.

4.2.2 Back-to-Back houses: the morphological period from the 1770s to 1875

With more workshops locating in Birmingham, the power provided by rivers for early manufacturing was no longer able to meet the great demand. Thus, the Birmingham Canal was built to bring coal in to power the machinery in the workshops and factories. The canal was completed in 1772, linking Birmingham with the Black Country. On completion of the canal, the price of coal in the town promptly reduced by half (Cherry, 1994). During the period, a national canal network was forming. The Trent and Mersey Canal, also known as the Grand Trunk, connected the River Mersey and River Trent, and linked to the important northern ports: Liverpool in the west and Hull in the east. Meanwhile, the Staffordshire and Worcestershire Canal was constructed to connect the Trent and Mersey with the River Severn, and the Grand Junction Canal offered a shortcut from London to the Midlands (Hadfield, 1969). Later, subsequent regional canals, including the Birmingham and Fazeley Canal (1789) came through central Birmingham on the northern edge of the built-up area. At the same time, the Birmingham and Worcester Canal (1792) strengthened the connection with the Severn and Bristol. Birmingham was thereby connected with the rest of the country from all directions (Broadbridge, 1974). All of these transport developments and construction activities resulted in Birmingham being encircled by canals, with wharves adjoining important streets in the town, such that Birmingham became a national transport hub. The disadvantageous situation of Birmingham for lack of navigable access at one time had been turned on its head by technical breakthrough. The development of the canal system had made the transport of bulky goods possible and promoted the development of related industries, including iron manufacturing, brass-making, glass-making, as well as continuing gun and jewellery manufacture.

The upgraded communications created new industrial opportunities, which attracted a large number of craftsmen and unskilled workers, so that the population of Birmingham more than tripled from a figure of roughly 23,600 in 1750 to a census of 73,630 in 1801 (Cherry, 1994). The increase in population was not only due to natural growth, but immigration as well. Workers came in to work in Birmingham, especially the Irish, who located themselves to the south east of Birmingham in the very badly drained area of Park Street (Davis, 2003).

As Birmingham's working population rapidly increased from the 1770s, there arose a necessity for accommodating the growing numbers, leading to a building boom. This expansion can be observed by comparing Figure 4. 29 in 1778 and Figure 4. 30 in 1792, where the latter depicts new estates and buildings that had been constructed in every direction. The semi-enclosing canals (there was no canal crossing the south of the town) were routed roughly along the boundary of built-up area at that time, and then subsequently acted as a fixation line morphologically (Figure 4. 30), which temporarily constrained the development of Birmingham.

Upon closer inspection of Figure 4. 30, it becomes apparent that certain areas were planned outside of the bounding canals, particularly near bridges on main roads in the north and east. Additionally, new factory sites were established along the canal banks. The proximity to the coal-bearing canal led to the development of industries to the northwest of the old town, including the Soho manufactory and the workshops of the Jewellery Quarter and Gun Quarter. Moreover, there were new morphological phenomena evident in the area in Figure 4. 30. As an example, several consequent streets have been developed, such as the untitled street running parallel to the northern section of the canal to its south in the same manner as an intramural street (Conzen, 1969). Furthermore, a grid of streets was newly planned to the north-west on the Colmore estate. This and other street grids are a consequence of the underlying landownership pattern (e.g. Chalklin, 1974).

The economic transformation of Birmingham during the 18th century had a notable impact on its urban form, particularly through the gradual densification of existing built-up areas. As a result, numerous plots and streets became more densely populated within the canal limits. The plan of Birmingham in 1825 (Figure 4. 31) shows how densely occupied the plots within the canal lines surrounding central Birmingham were after half a century of development since the 1770s. When comparing Figure 4. 31 to Figure 4. 29, one can see that the green space in the plots of the northern section have all been filled with buildings. As the plots reached into their climax phase and no more buildings could be added in, a new type of building emerged known as the 'back-to-back house'. These houses were constructed in all directions within and beyond the canals, except for the south-west where the Calthorpe estate in Edgbaston was located.

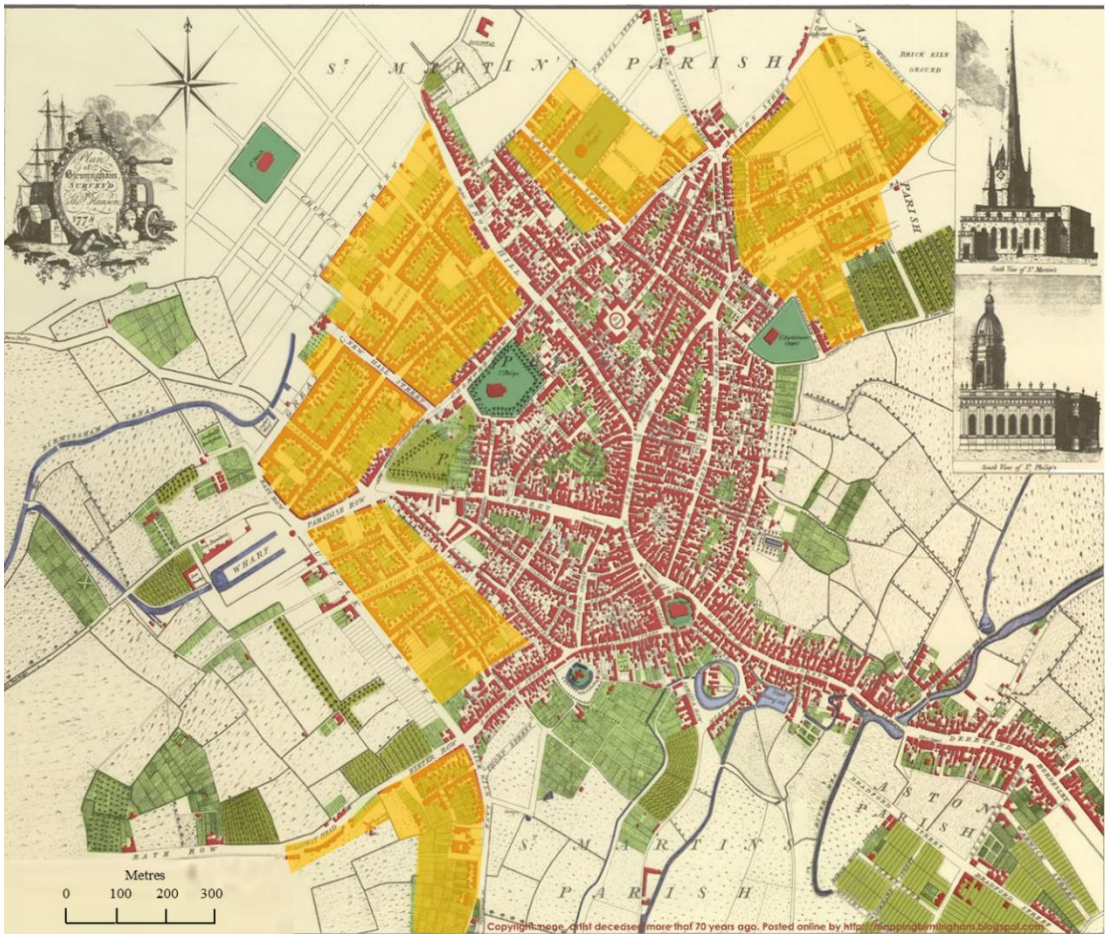


Figure 4. 29: Plan of Birmingham, surveyed by Thomas Hanson. Engraved by J. Roe in 1778 (source: The Library of Birmingham). Comparing Figure 4. 28, note the canals on the left and the emphasis given to green space. The shaded area highlighted in yellow indicates the newly constructed area as accretions. The inserted pictures are a south view of St. Martin's and a south view of St. Philip's. Bournville is four miles southwest of the town centre.

This map (Figure 4. 31) is distinctive for showing details of the very large areas of allotment gardens which surrounded Birmingham on all sides (see the extract below, Figure 4. 32). These gardens provided high-rental income for landowners and the opportunity for workers in the town centre to enjoy both vegetable growing and pleasure of flower gardening. These allotments were subsequently the next areas to be developed for housing. The only other green spaces within the town were churchyards.

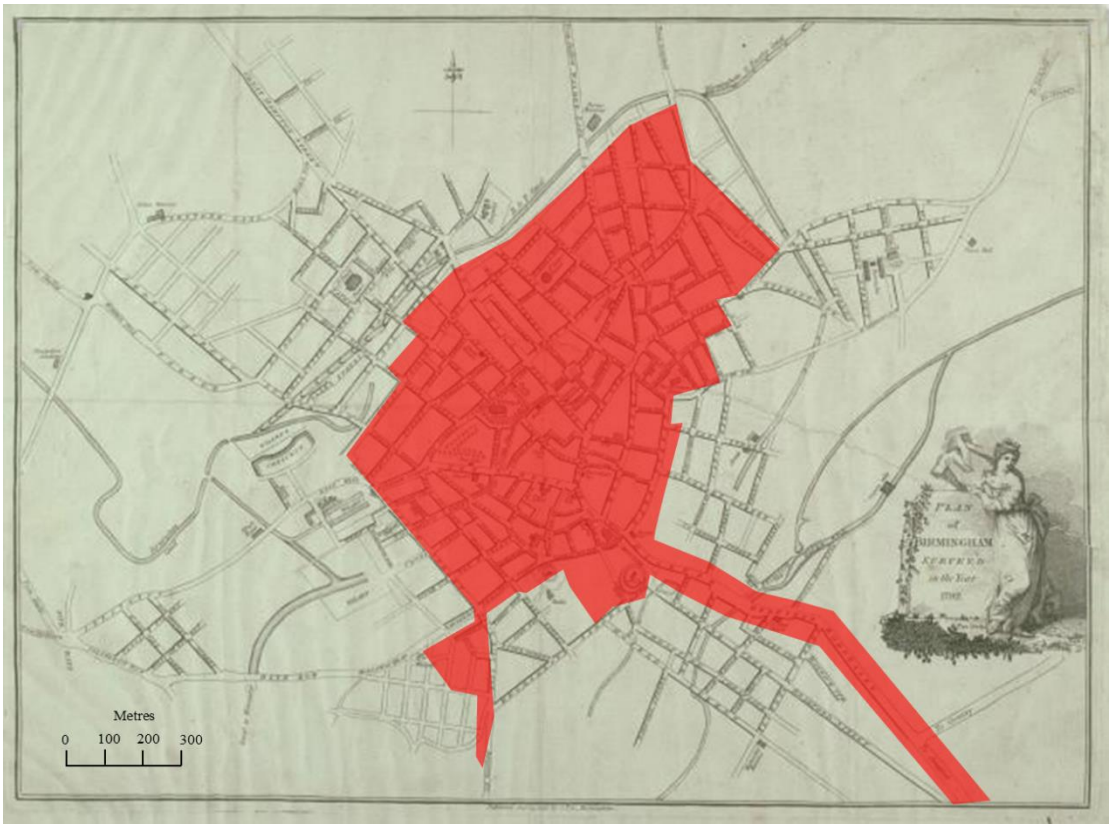


Figure 4. 30: Plan of Birmingham, surveyed (unknown) in 1792, engraved and published by Charles Pye (source: The Library of Birmingham). The red shaded area approximately indicates the built-up area boundary of Figure 4. 29.

The succeeding introduction of the railway network improved the capacity of cargo transport and the speed of industrial expansion throughout the country from the 1830s onwards. Railways rapidly linked Birmingham to other cities: the line to Liverpool was completed in 1837, that to London in 1838; and then to Gloucester in 1840, Derby in 1841 and Bristol in 1842 (Cherry, 1994), by which time Birmingham was linked to the four important English ports of London, Bristol, Liverpool and Hull. All of the railways entered the built-up area of Birmingham via the flat land from the north-east, along the Tame valley (Figure 4. 33).

The introduction of railways had significant impacts on the industrial landscape of Birmingham. There were more large factories compared with the previous small domestic workshops, and the locations of these big plants had also changed. Spatially, the intersection of the Tame and Rea provided a large area of poorly drained land to the north-east of Birmingham. It was not suitable for housing but was good for factories since it was flat and cheap. Some other factories were distributed

to the south-east in Small Heath, including the BSA (Birmingham Small Arms) factory which made guns and other armaments. In addition to its impact on the development of urban production centres, the introduction of railways also led to a substantial increase in the industrial population, further exacerbating the housing problem. By the middle of the 19th century, back-to-back houses had become one of the dominant forms of housing in large industrial cities in Victorian England (Upton, 2005).

As the name suggests, a back-to-back house consists of two one-room-deep rows of houses built back-to-back, and sharing a common rear wall. In Birmingham the characteristic form of back-to-backs was to build them in courtyards. Figure 4. 34 shows the very popular building type in the 1860s, in which two-rows of back-to-back houses built at right angles to the street, usually of three stories with entrance ways or alleyways going through from the street to the courtyard. Together with the front back-to-back houses these made up the courtyard. Shared privies and a wash-house were also provided in the courtyards.

Back-to-back houses are commonly constructed by speculative builders. Typically, a back-to-back house is three-storeys high, with a cellar for storage, kitchen on the ground floor, a bedroom on the first and second floors, and an attic in the roof (Figure 4.29). The clear functional zoning gives the impression of a tolerable living space, but in practical terms, tens of people could be housed in one back-to-back, often with one of the rooms used as a workshop. Besides, since each row of houses only had a front door and front windows, the ventilation was poor. Unsanitary drinking water and toilets soon made them notorious for health problems (Upton, 2005). In Birmingham, the driving force of accommodating a rapidly increasing industrial population made the erection of large numbers of back-to-back houses economically worthwhile for nearly a century (Figure 4. 35). The Ordnance Survey plans of 1890 shows how widespread back-to-back houses were distributed around the old city centre (examples are infilled blue on Figure 4. 36).



Figure 4. 31: Plan of Birmingham, engraved from a very detailed trigonometrical survey made in the years 1824 & 1825, J. Pigott Smith, Surveyor & Engineer, Birmingham. Engraved by W.R. Gardner, Harpur St. Red Lion Sq. London. Published 25 March 1828. (source: The Library of Birmingham). The insert in the upper left corner displays the street layout of the built-up area of Birmingham at that time.



Figure 4. 32: An extract from Figure 4.26 to show the allotment gardens.



Figure 4. 33: Plan of Birmingham and its environs, engraved & printed by J. Henshall in 1839 (source: David Rumsey Historical Map Collection). The insert indicates the plan of Birmingham and its environs, with the boundaries taken from the proposals to set up the new parliamentary constituency in 1832.

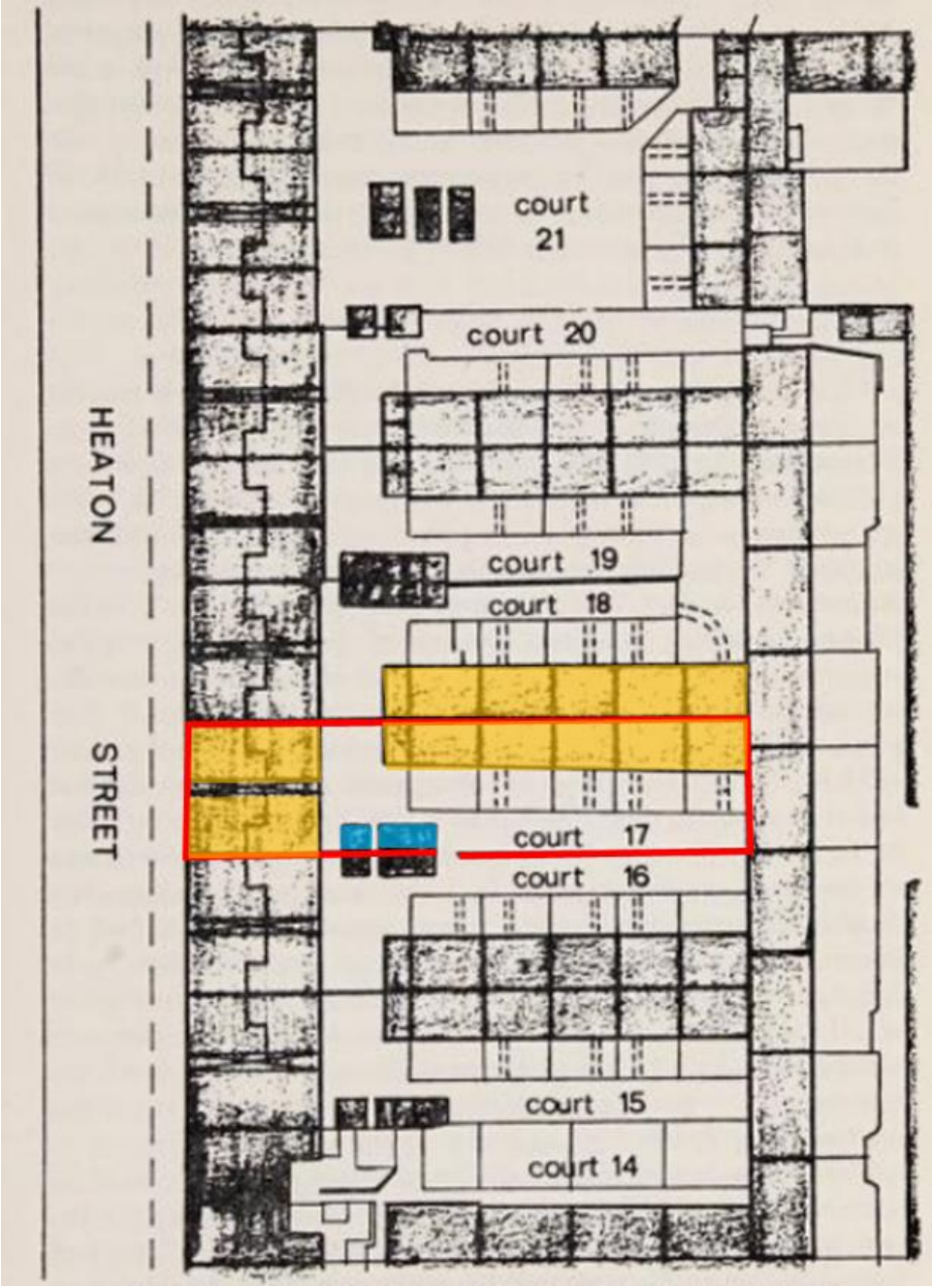


Figure 4. 34: Typical Birmingham back-to-backs, built in the 1860s (reproduced from Chapman, 1971). Taking the plot circled by the red lines as an example, the yellow shaded area represents back-to-back housing. Among them, there are two pairs of back-to-back houses facing Heaton Street, with a tunnel in between leading to the courtyard. Along the northern boundary of this plot, there is a row of houses forming another set of back-to-back housing with houses in the adjacent northern plot. The blue shaded area represents shared facilities such as privies and a wash-house.

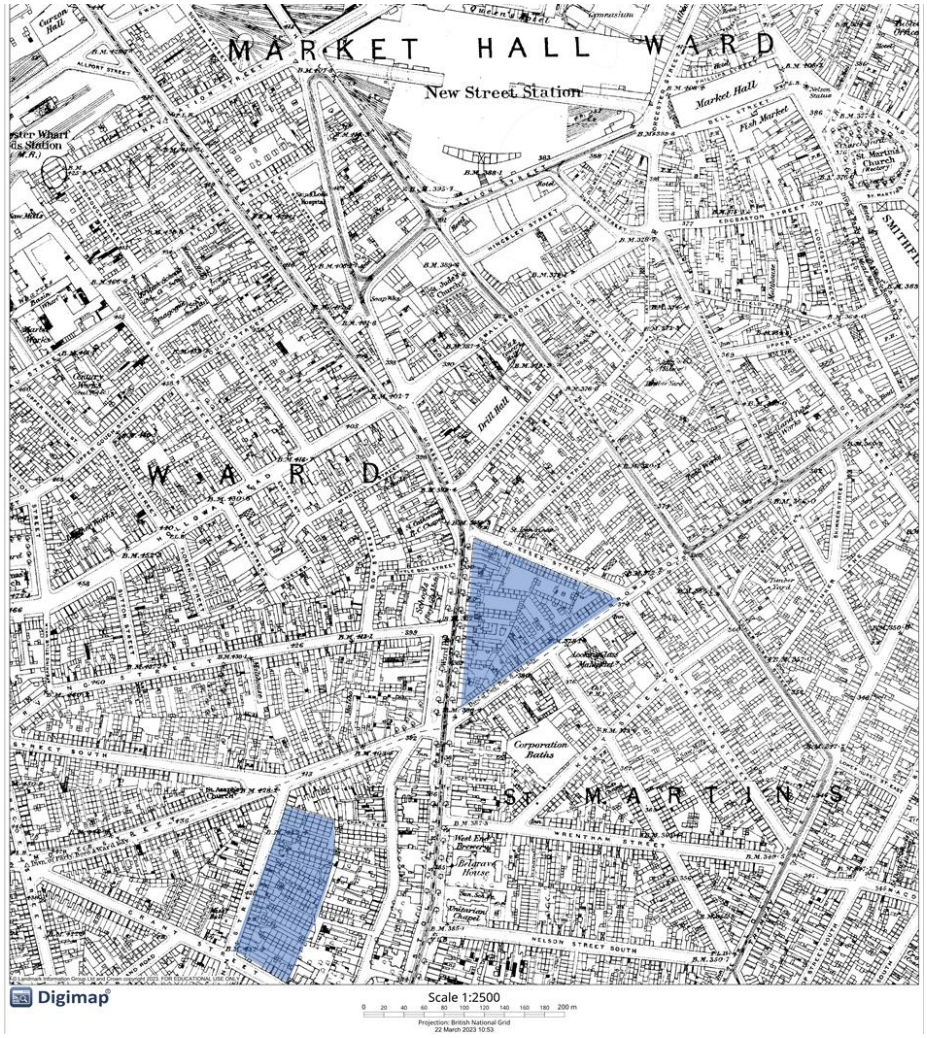


Figure 4. 35: Back-to-back houses in south Birmingham in 1890 (source: Ordnance Survey). The blue shaded areas in the picture depict typical examples of back-to-back houses in Birmingham. Back-to-back houses are constructed along the boundaries of the plots, with courts surrounded in the middle.

Compared to the dense development within the old town centre, subsequent outward extension exhibited distinct characteristics. Major roads became the focus of numerous arterial ribbons of housing and workshops. The map of Birmingham in 1825 (Figure 4. 31) is the first plan of Birmingham to extend into Edgbaston showing new streets (Bristol Street) and houses, where the upper- and middle-classes began to live beyond the boundaries of the old parish of Birmingham from the early 19th century (Cherry, 1994). In fact, it is from the 1820s when Edgbaston starts being developed, and it is very prominent on this map with villa housing for the middle classes. Under the control of the Gough-Calthorpe family from the early 18th century, the development of Edgbaston

has been shaped to a large extent by the particular tastes of its aristocratic owner in terms of urban

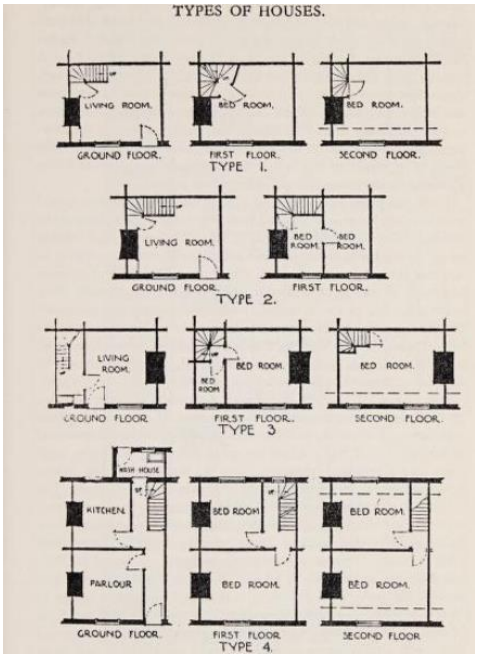


Figure 4. 36: Working-class housing in 19th Birmingham (reproduced from Chapman, 1971). Back-to-back houses are typically one room deep. However, there is also a type known as Type 4, which is two rooms deep. The black squares represent chimneys. By considering such realities as dimly lit and winding staircases, as well as the absence of a water and drainage system indoors, one can gain a better understanding of them.

form (Cherry, 1972) as well as urban politics (Cannadine, 1975). The Calthorpe family did not want working-class housing in this area, so Edgbaston interrupts the back-to-back geographical pattern with a wedge of large houses in large plots to the south-west. In addition, the south-west prevailing wind in Birmingham kept Edgbaston from polluted air, and its higher ground kept it away from poor drainage so that it soon became the ideal place to reside for the middle classes in Birmingham. There are no back-to-back houses to the south-west of the old town centre in Edgbaston, resulting in the formation of an incomplete ring of back-to-back houses. This led to the formation of three distinct morphological regions (Figure 4. 37): Morphological Region I is the 'old-town' nucleus, which consisted of the old medieval town centre, including Digbeth, St. Martin's, the Bullring, and the surrounding intensely developed burgages; Morphological Region II is the back-to-back' working-class housing, which developed under the pressure of high demand for housing since the introduction of canals; and Morphological Region III is the Edgbaston wedge of middle-class

housing. Morphological Regions I and II exhibited a dense growth, in contrast to the relatively loose development of Morphological Region III with scattered detached or semi-detached housing.

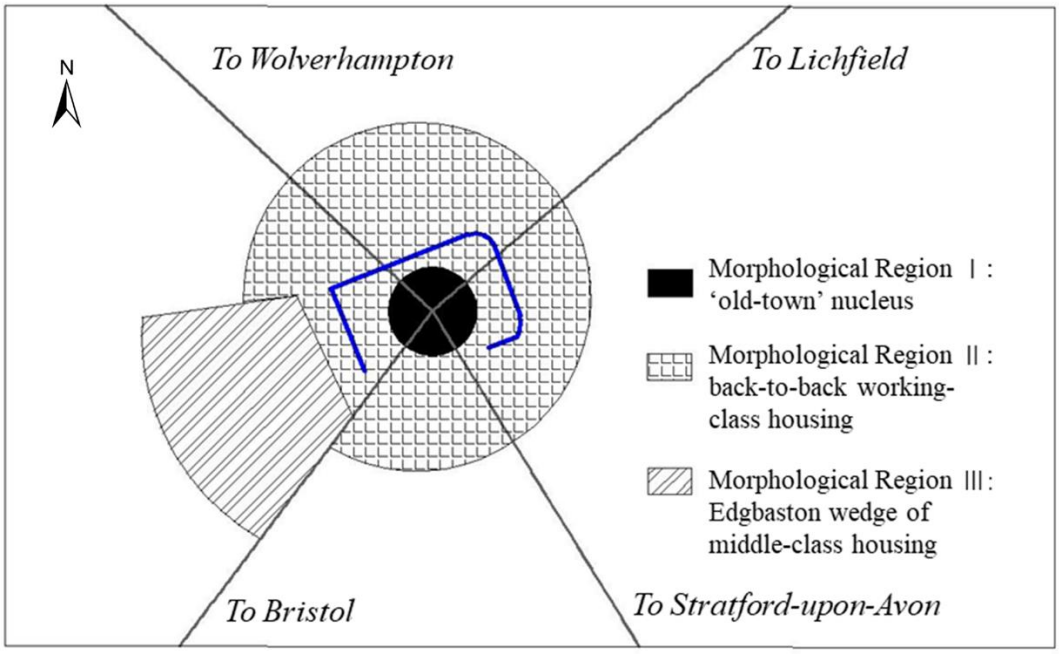


Figure 4. 37: A schematic diagram of the Edgbaston wedge in the distribution of back-to-back housing in Birmingham (drawn by the author). The blue line is part of the unclosed canal system in the city centre. The Calthorpe family refused to allow the construction of working-class housing on the Edgbaston Estate, which they controlled, resulting in a stark contrast in the landscape between Morphological Region III and other areas of Birmingham. This formation created a southwest wedge morphologically (which will be explained in detail later). Bournville is four miles southwest of the town centre.

Overcrowding and poor sanitation in back-to-backs caused significant health issues throughout the country. Large industrial cities and towns were desperately unhealthy, with death from sickness at a level not seen since the Black Death (Upton, 2005). Birmingham was an example of this. Although the Cadbury family, as successful businessmen and members of the wealthy middle class, lived in Edgbaston, where the surroundings were much better, they had some understanding of the adverse conditions of back-to-backs for two reasons. First, their early factories and shops were located in the city centre; secondly, they had the opportunity to interact with people from back-to-backs because of their Quaker religion (Harrison, 1999), allowing them to witness first-hand how people lived in such houses. The stark contrast between the back-to-backs and the houses in

Edgbaston made them realize the importance of a healthy and leafy environment in a person's growth. Therefore, when selecting a new factory site in Bournville, housing was a critical consideration, which ultimately led to the building of Bournville village.

Furthermore, it is worth noting that the introduction of public parks was a notable emerging urban element that greatly impacted the form of the town during this period. In the mid-nineteenth century, the public recreation of working-class people became a social concern for the middle class. Public parks were established as one of the recreational facilities to address this concern. Birmingham's Calthorpe Park, created in 1857, is one of the earliest public parks in the city and is now managed by Birmingham City Council (Slater, 2002). As a result, many parks and open green spaces were created on the outskirts, such as Cannon Hill Park in the 1870s and Selly Oak Park in the late 1890s (Zhang, 2018).

From the 1860s onwards, the construction of back-to-back houses improved significantly due to the implementation of national and local regulations. However, despite these efforts, unfavourable ventilation and sanitation in such houses continued to cause health problems. Consequently, the construction of back-to-back houses was prohibited from 1876, marking the beginning of a new morphological period.

4.2.3 Bye-law terraced houses: the morphological period from the 1876 to 1914

The 1875 Public Health Act granted local authorities new powers to address the various social issues associated with back-to-back houses, including the ability to purchase, repair, or establish sewers, control water supplies, and establish bye-laws to regulate the development of new streets and buildings. As a result, a new morphological period of 'bye-law terraced houses' emerged (Birmingham City Council, 1989). In compliance with the national Public Health Act of 1875, local councils were obliged to use bye-laws, to ensure that newly constructed houses met certain standards, such as improved ventilation and hygiene. These bye-laws also insisted on a minimum air space on at least two sides of each dwelling. All of these regulations prompted builders to interpret them so as to build what became known as bye-law housing, or 'tunnel-back' houses, so that it soon became

the standard house type across the country. The rear extension provided an extra bedroom and a kitchen, and there was usually a small back garden (Figure 4. 38).



Figure 4. 38: Streets of tunnel-backs or bye-law housing. It can be observed that the neatly arranged tunnel-back houses do not show any distinction in their appearance, forming a very monotonous landscape.

Like back-to-back houses, tunnel-backs are also constructed by speculative builders. A tunnel-back house typically consists of three rooms downstairs and three rooms upstairs, arranged in an L-shape within an individual house. Going through the front door, is a hallway, and the hallway goes around the staircase providing access to living room, parlour and scullery. Upstairs three bedrooms and often a bathroom were available (Figure 4. 39).

For a comprehensive understanding of the impact of bye-law terraced housing on the urban landscape, it is necessary to take into account the relocation of production centres to the city fringe where cheap land was available. As more large factories opted for open space out toward the fringe of the city, it became necessary to provide efficient transportation for workers commuting from the city centre. The implementation of a tram system in Birmingham from the 1870s greatly improved accessibility for workers commuting between the city centre and suburbs. The first tramway line between Colmore Row and Hockley was established in 1872, about 30 years after the inter-city rail

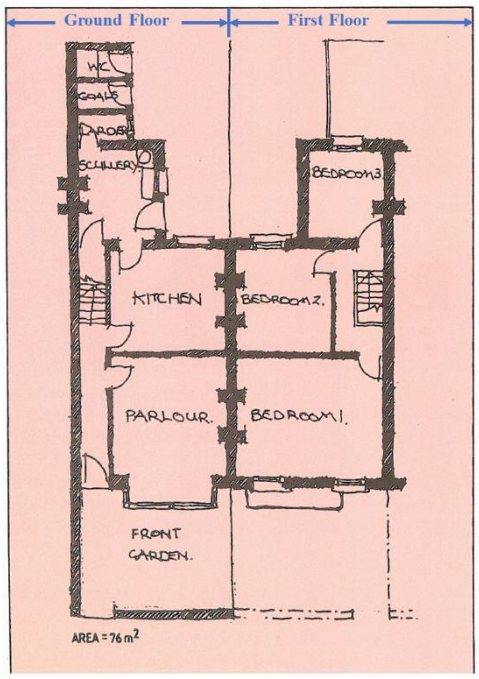


Figure 4. 39: Plan of tunnel-back houses after 1875 (source: Birmingham city council, 1989). Compared to back-to-back houses, it has much larger space and much more convenient facilities.

links were established (see text between Figure 4. 30 and Figure 4. 31). Subsequently, a second tramway line was introduced along the Bristol Road in 1876, which served the residential area located in the southern part of the city (Cherry, 1994), quickly followed by other routes. This extensive tram system proved to be a cost-effective means of transportation for workers within the city. This mode of transportation played a significant role in shaping the urban landscape, as it ran along the main roads, which were generally straight, leading to the development of nearby residential areas. Additionally, the local railway system was also being improved gradually - the construction of the Birmingham West Suburban Railway (BWSR) between 1876 and 1885 not only strengthened the south-west link but also helped to open up Birmingham suburbs to the south-west, including Bournville.

With the advantage of being at the national centre of the canal and railway system and local connectivity brought by the tram system, Birmingham flourished and gained substantial growth. Technology and the achievements of the Industrial Revolution had also helped Birmingham develop into a manufacturing city, and Birmingham was referred as ‘the workshop of the world’ with its gun-trade, jewellery trade, glass industry, and brass making. Of equal importance, Birmingham

developed into the regional commercial centre, and was called ‘the city of one thousand trades’ (Harrison, 1999). The rise of political status, becoming a County Borough in 1888 and a city in 1889, is a reflection of its strong economic position.

Improved transportation to the south of Birmingham’s city centre had a notable impact on the city’s industrial structure, with some factories being constructed in the south-western part of the city. While the major industrial complexes in Birmingham were traditionally situated in the north-eastern part of the city, particularly within the Tame valley, two notable exceptions emerged in the late 19th and early 20th centuries: the Cadbury chocolate factory and the Austin car factory at Longbridge. These factories were an important part of Birmingham’s industry in the early 20th century in terms of the production of food, drink, and motor vehicles. Over time, they have also become Birmingham’s principle industries, defining the city’s economic and cultural identity and forming an integral part of Britain’s national brand and collective memory.

The extensive emergence of a new building type had a significant impact on Birmingham’s urban form. As factories expanded, there was a growing need for more workers, which in turn led to a demand for more housing. The development of mass transportation allowed the working class to expand their housing options beyond the city centre, resulting in the construction of rows of monotonous terraced houses along streets of standard width laid out geometrically on the periphery. This architectural style became a defining characteristic of working-class neighbourhoods in Birmingham during the period and contributed to the city’s overall urban landscape. Again, the residential geography which emerged in the process was social to a large degree as well as morphological. Due to the same reason as the absence of back-to-back houses, tunnel-back houses were also not present in Edgbaston. As a result, the development of tunnel-back housing formed a ring outside the zone of back-to-back houses and Edgbaston. This development led to the emergence of a new morphological region, labelled as Region IV (Figure 4. 40), which consisted of the bye-law terraced housing ‘leaping’ over the Edgbaston.

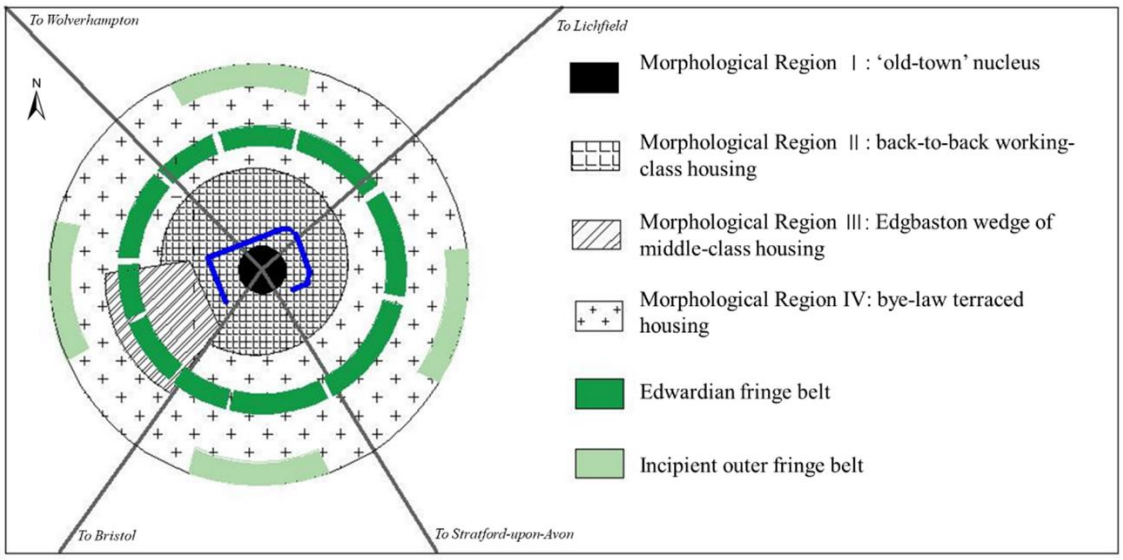


Figure 4. 40: A schematic diagram of the tunnel-backs (1875-1914) developed beyond Edgbaston, Edwardian fringe belt and incipient outer fringe belt (author). The blue line is part of the unclosed canal system in the city centre.

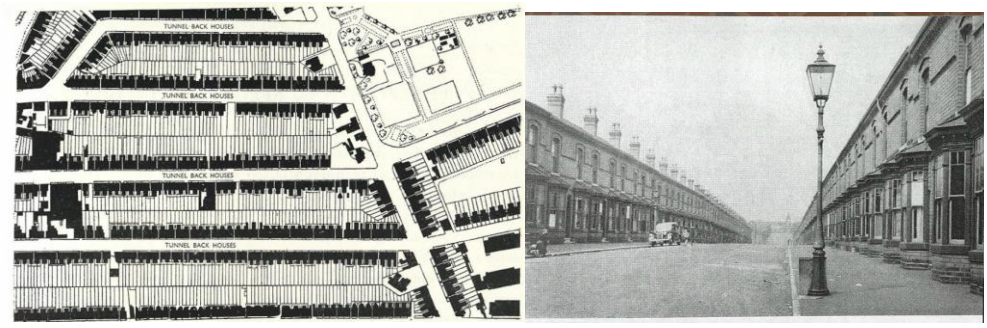


Figure 4. 41: Long straight terraces of bye-law houses (Bournville Village Trust, 2013). Refer to Figure 4.32.

The development of bye-law terraced housing rapidly spread in all directions through Birmingham. However, the monotony of these developments, coupled with the back projections of these tunnel-backed dwellings (Figure 4. 41 and Figure 4. 42) were soon criticised by later housing reformers like George Cadbury. This criticism was also one important reason that triggered Bournville. It's also worth noting that the Edwardian period's economic downturn left another morphological element intersecting with the city plan: the Edwardian fringe belt (Whitehand and Morton, 2006). This loose belt consists of mixed-functional plots, including institutions, open land, industry, and so on. In the south-west sector, it includes large institutional plots of the Edgbaston area, such as the University of Birmingham and Queen Elizabeth Hospital. Furthermore, the

undeveloped areas at the periphery form the incipient outer fringe belt (Figure 4. 43).



Figure 4. 42: The front and back of bye-law houses on Dale Road, Birmingham. (a) The back projections; (b) The street frontage of bye-law houses (photo taken by the author on 25th August 2023)

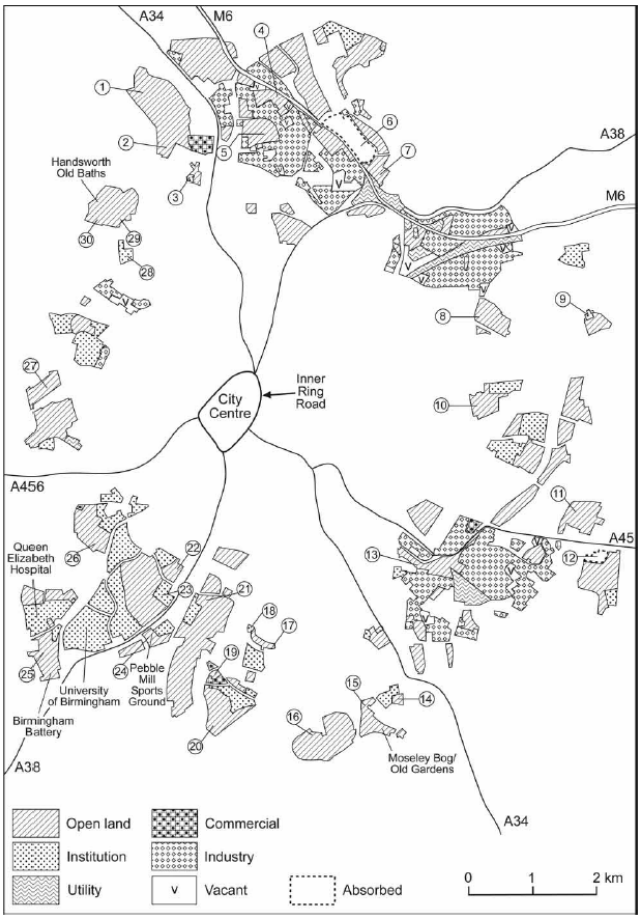


Figure 4. 43: Birmingham's Edwardian fringe belt (Whitehand and Morton, 2006)

4.2.4 Inter-war council houses and speculative houses: the morphological period from the 1914 to 1945

During the First World War, Birmingham experienced soaring growth of manufacturing, especially of military industries (Tilson, 1989). A large number of workers were absorbed into industrial production from all over the country. Women were recruited into factory work and played a major role during the war in Birmingham, which was one of the most significant national manufacturing centres. From 1918, large quantities of soldiers, sailors and airmen returning from the battlefields, resulted in a serious housing shortage. At the end of the First World War, Lloyd George's government has promised that the returning soldiers should have 'homes for heroes' for their glorious service and colossal sacrifice for the country. The architect and MP Sir John Tudor Walters was appointed to make a report on the condition of housing (Cherry, 1988). The result was the Tudor Walters Report in 1918 (Gerrard and Slater, 1996), which demanded new designs for housing, including minimum building standards and facilities. The Housing and Town Planning Act in 1919 mandated local government to deal with municipal housing, which marked the beginning of the provisions of council housing by local authorities in the 20th century. Though there had been a long history of hostility against government participation in housing, 50,000 new council houses were built in Birmingham by 1939, more than any other local authority in the country except for London (Chinn, 1999). Unlike back-to-back houses or tunnel-back houses, council housing is primarily provided by city councils. For the first time, the city council participated in progressive changes as an agent. Council housing, which was primarily intended for low-income occupants who demonstrated good habits of thrift and tidiness, was extensively located on the periphery of the city to the north, east, and south (Figure 4. 44 and Figure 4. 45). Under the influence of the Garden City Movement and Tudor Walters Report, most council housing is this period were in the form of cottages which were semi-detached or in short rows of four, with front and back gardens.

It is important to note that due to varying factors such as housing demand, land availability, urban planning policies, and community impact, the council estates encircling Birmingham were not consistently distributed. Instead, they were situated on previously existing farms that were entirely purchased by the council. No estates were constructed to the north-west due to the presence

of the Black Country boroughs. The gaps between these council estates were filled with speculative

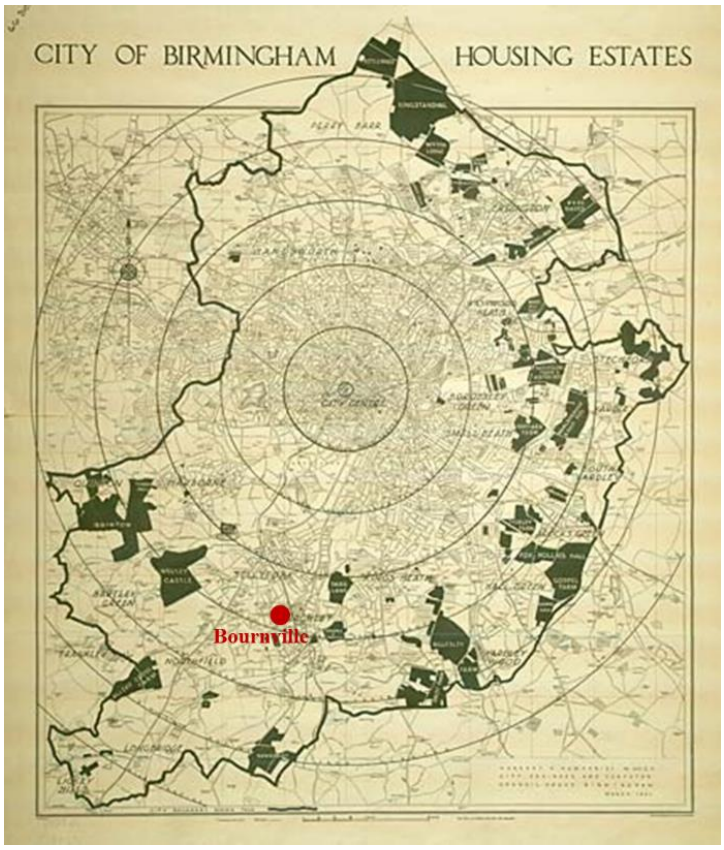


Figure 4. 44: A 1931 map of Birmingham's council estates. (The Library of Birmingham, ref 663007). The concentric circles represent circles with radii based on the distance from the city centre, ranging from 1 mile, 2 miles, and so on.



Figure 4. 45: Inter-war council houses and speculative houses. (a) Inter-war council housing in Billesley, Birmingham; (b) Inter-war speculative houses on Windermere Road, Birmingham.

housing constructed by private builders. Between 1919 and 1939, there were 54,540 houses built by

private investment, among which the most popular form were semi-detached houses built in the suburbs. Thus, during the period, both private housing and municipal housing, and both middle-class and working-class housing have occupied the fringe of the city (Gerrard and Slater, 1996). These council estates and speculative houses formed the fifth morphological region around the city. Furthermore, the former undeveloped areas at the periphery now form a middle fringe belt (Figure 4. 46).

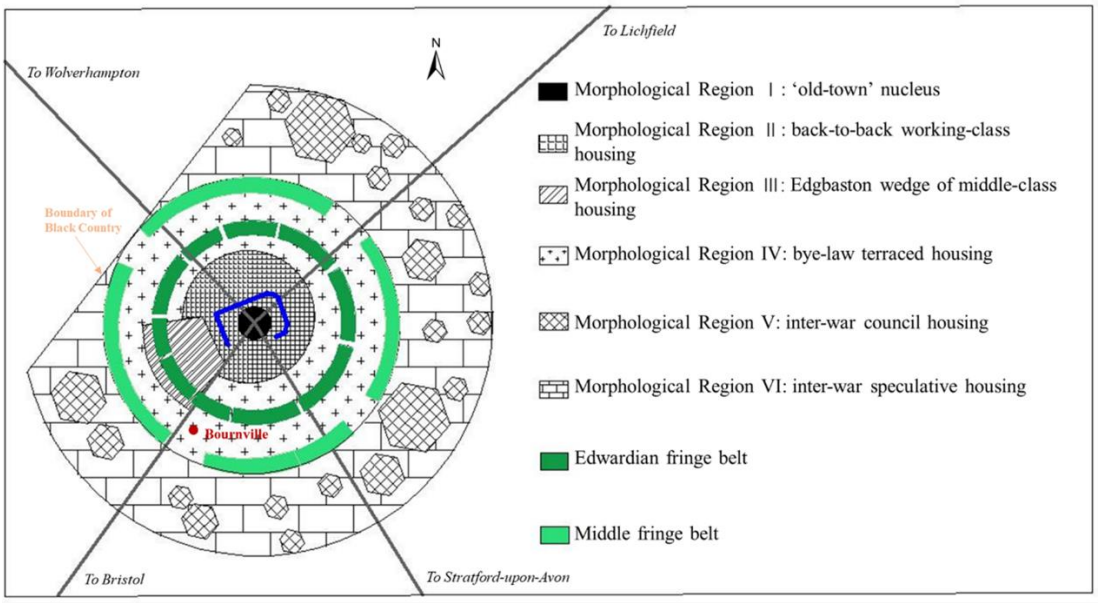


Figure 4. 46: A schematic diagram of a mix of council estates and speculative housing (1914-1939) at the periphery of Birmingham. The blue line is part of the unclosed canal system in the city centre.

In terms of green space during this period, the emergence of allotments in increasing numbers was another significant change to land use and spatial form in urban areas, although allotments themselves have a long history in Britain (Crouch & Ward, 1997). Because of the military blockade by hostile countries, Britain faced a serious food shortage during wartime, and this led to the great demand for allotments, especially during both the First and the Second World Wars. The 'Dig for Victory' campaign during wartime encouraged the public to transform their gardens into vegetable patches, and even public parks were converted into use for food production (Burchardt, 2011). In general, designated allotments serve to preserve the open nature of fringe belts and prevent them from being developed or built upon. A file of minutes during wartime show that to cultivate more

crops and vegetables, some public park land was transferred from the Parks Committee to the Allotments Committee in Birmingham.[9]

4.2.5 Slum clearance and council housing: the morphological period from 1945

Like many other British cities, Birmingham was bombed and hit severely by the Second World War (Figure 4. 47), which worsened the housing unfitness problems in the core area. After the war, despite the economic downturn, the local council was ambitious to begin slum clearance. In 1947, it compulsorily purchased five comprehensive development areas (CDAs) around central Birmingham, becoming the largest landlord of slums in the city (Smith, 1974). In fact, more development happened outside the five CDAs concerned, making the scale of redevelopment activity of Birmingham unparalleled in Britain (Cherry, 1994).



Figure 4. 47: Bomb damage map of Birmingham (reproduced from Larkham, 2016). Each point represents a bomb that fell on the city centre, resulting in significant destruction to most of the area.

9 https://www.birmingham.gov.uk/directory_record/191483/war_time_allotment_plots (accessed 24th, August, 2023)

Because of the pressure on land supply and the huge demand for new homes, and the higher subsidies for buildings above six stories, high-rise flats became the preferred form of housing provided by the local council, not only in the comprehensive development areas (CDAs), but far beyond the city centre especially towards the eastern and southern boundary at that time (Cherry, 1994; Jones, 2003). The first high-rise, Queen's Tower in the Duddeston CDA (Figure 4. 48), was opened in 1954 and soon there were many more. Both the construction of high-rise council housing and slum clearance come to an end in the early 1970s.



Figure 4. 48: Queen's Tower in Duddeston CDA. These first tower-blocks were later restored in the first decades of the 21st century. Note the mature trees from the initial landscape planting in the 1950s.

By then, 40,000 slums had been demolished and 464 high-rise buildings had been erected, in the core and peripheral areas of Birmingham, which has altered the urban landscape. A large number of council houses were also provided in this period, though in a plain Anglo-Scandinavian style (Figure 4. 49). The process of slum clearance inside Birmingham's inner-ring resulted in the creation of many council estates not only on the original back-to-back sites, but also in the eastern and southern suburbs. The process of constructing council housing in other locations was referred to as morphological correlatives in the Conzenian glossary, which was used to highlight the causal spatial relationships between different parts of urban areas (Conzen, 1969). These estates are comprised of

two-storey council houses and council tower blocks (Cherry, 1994). Meanwhile, Solihull and Sutton Coldfield were favoured by private, speculative, development. Consequently, as before the war, the housing options available in the suburbs of Birmingham catered to both the working-class and middle-class residents.



Figure 4. 49: Anglo-Scandinavian style council housing on Yardley Wood Road, Birmingham, built in the 1950s. Note the wide grass verge, originally intended to construct a dual carriageway.

Birmingham had also carried out extensive reconstruction plans within the city centre, including the construction of new ring roads and rebuilding of the Bull Ring as an enclosed shopping centre. In the 1980s, the canals were restored and The International Convention Centre constructed. The factories and warehouses along the canals were redeveloped into modern bars and restaurants (Chinn, 2016). Birmingham underwent the decline of traditional industries, including the closure and redevelopment of Longbridge. However, certain industries were retained, such as Bournville and jewellery production. As a result, Birmingham underwent a transformation from an industrial city to a service-oriented society focusing on culture, technology, exhibitions, finance, and leisure tourism. As a result of these changes, three new morphological regions were created in the city: the renovated central business district, which replaced the previous old-town nucleus; the redeveloped CDAs with their council tower-blocks, located around the city centre; and the post-war council housing and speculative housing (Figure 4. 50).

Due to the traditional preference for houses over flats in the hearts of many English people and

the social problems associated with high-rise buildings studied by scholars (Coleman, 1985), a large number of high-rise blocks were subsequently demolished. However, later research in Birmingham suggested that there may be more factors at play than just building design (Jones, 2003). As a result, by 2001, only 305 blocks were still standing. In addition, with the 'right to buy policy' from the 1980s, the ownership of council housing in Birmingham has been transferred gradually to private ownership. By 1994, the number of council-built dwellings still owned by the council was 112,000, compared with the 156,000 at its peak (Cherry, 1994).

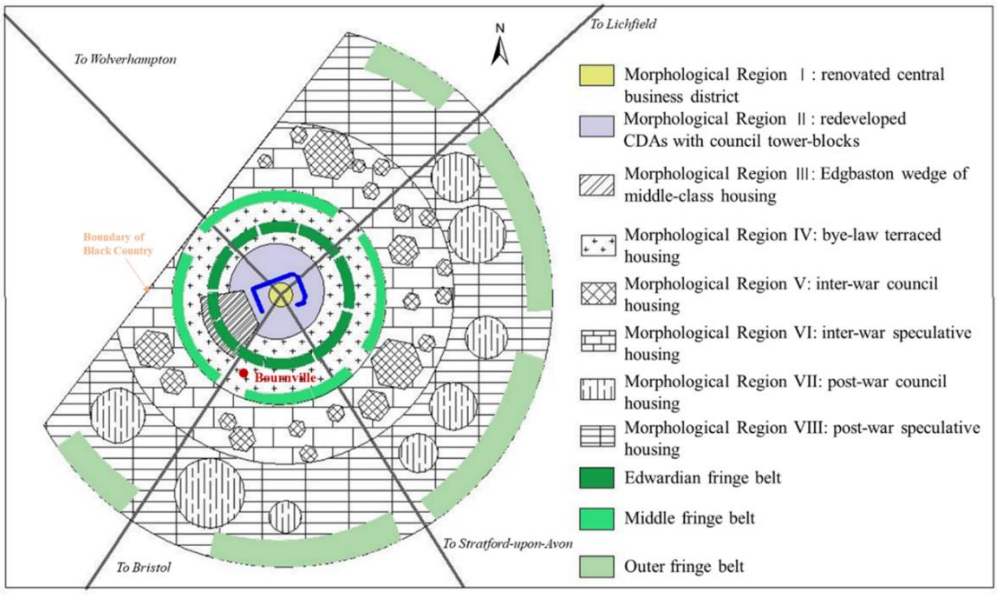


Figure 4. 50: A schematic diagram of morphological regions of development and redevelopment post-1945 (author). The blue line is part of the unclosed canal system in the city centre.

4.2.6 The morphological structure of the south-western wedge

With the city-level historico-geographical structure of Birmingham in mind, the aim of this section is to explore the morphological structure of the south-western wedge of Birmingham, focusing on the several nuclei of the area between the Middleway, Bristol Road and Pershore Road, where Bournville is located (Figure 4. 51). This section has three objectives. First, it seeks to identify the specific geographical and morphological conditions of Bournville and its surroundings. Secondly, while much research has been conducted on urban form of historical towns and city centres in great industrial cities, there remains a lack of studies on the morphological processes of multi-nucleus

urbanization beyond the city centres which became possible after the improvement of intra-urban transportation. Therefore, this section seeks to address this knowledge gap by exploring the historical urbanization process of the areas beyond the city centre of Birmingham, which is a process also common in other industrial cities. Thirdly, this part will also explore the key factors that influenced the development of urban form in these areas.

The study area is situated at the divergence of two southwest-northeast roads, that gradually part as they extend towards the southwest. Before reaching Bournville, several middle-sized nuclei can be found along the way, including Edgbaston, Selly Park, Bournbrook, and Stirchley. Despite their proximity, these areas exhibit significant morphological differences as evidenced by historical maps such as the late 19th century Ordnance Survey. As a result, the study has identified five distinct morphological nuclei or plan units, each having its own unique characteristics. The term 'plan unit' refers to a morphologically distinct area within the town plan that stands out from its surrounding areas (Jones and Larkham, 1991).

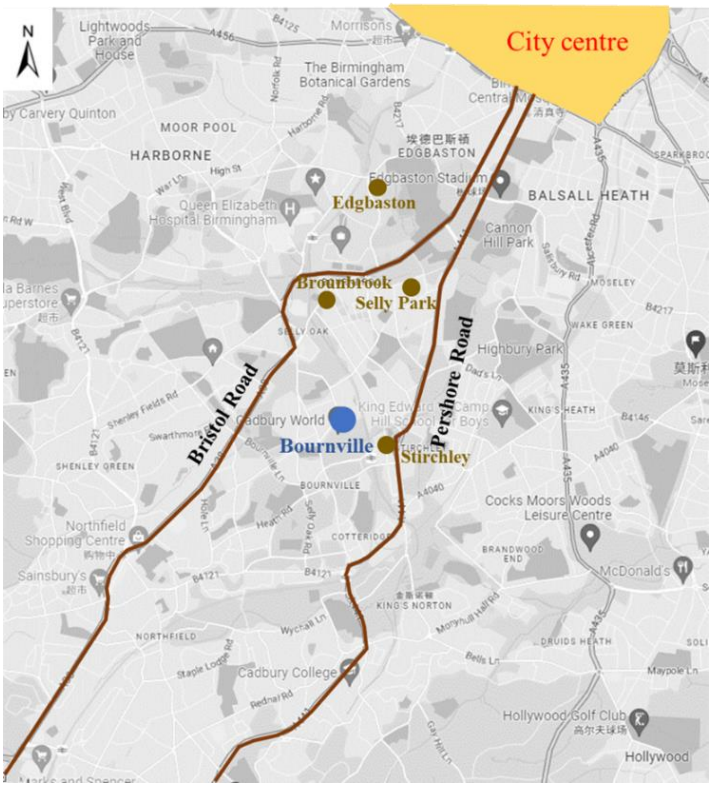


Figure 4. 51: The south-western wedge

Edgbaston serves as the first plan unit for the development of this region, with the land being

held by the Calthorpe family at least since the 18th century, establishing them as one of the largest landowners in Birmingham. Since the 19th century, the development of Edgbaston has been under the strict control of the Calthorpe estate. Thanks to the availability of leasehold agreements, Edgbaston was developed into a middle-class housing area, creating a stark contrast to the cramped back-to-back houses in the city centre during the 19th century (Slater, 2002). From a morphological perspective, the residential density in Edgbaston was notably low, and the area featured significant green spaces, mostly privately owned. The unique character of Edgbaston was further enhanced by the varied and irregularly shaped plot sizes, influenced by the presence of old plot boundaries. This, along with the low residential density and large green spaces, made it an ideal location for wealthy residents in the 19th century. Notably, it was also the home of John Cadbury and birthplace and childhood home of George Cadbury, one of the main founders of Bournville (Harrison, 1999).

Selly Park is the second plan unit of this region, situated southeast of Edgbaston with the Bourn Brook acting as the boundary between them. Its prime location on the interfluve between the Bourn Brook and the River Rea, made this higher hillside an ideal spot for residential housing development in the late 19th century. The manor house, currently serving as a convent, played a significant role in the development of Selly Park by its then owner (Birmingham City Council, 2023). Together with the parish church of St. Stephens, it is the dominant feature of the townscape and the plan unit (Fig. 5.44). The residential development began at the northern edge of Selly Park, which was closer to the city centre. The streets in this area were just being laid out in 1904, indicating that further development was soon to come. Like Edgbaston, Selly Park was also characterized by irregularly sized plots with green, leafy surroundings, but the plots and houses were much smaller. The impact of ownership on the landscape is still apparent today, with scattered middle-class detached houses and a picturesque park full of greenery. The southern boundary of this estate, Bournbrook Road, is distinctive with working-class terraced housing on one side and middle-class housing on the other (Figure 4. 52).

The intersection of the BWSR, the Worcester and Birmingham canal, and the Bristol Road provides significant transport advantages, which facilitated economic development in Bournbrook and Selly Oak, leading to the formation of the third plan unit. The plan unit was home to several

fringe-belt plots, including factories and institutions such as the King's Norton workhouse and a motor-cycle works (Figure 4. 53). However, as a result of fringe-belt alienation, where the components of the fringe belt undergo a transformation in function, such as transitioning into residential land use, numerous plots experienced conversion into residential and student residences during the 1990s. The extensive presence of factories and works in this region may explain why working-class housing was prevalent in the area. As a consequence, bye-law terraced houses were built. Bournbrook was built just at the beginning of the bye-law period, and as such displayed classic bye-law characteristics. The morphological dissimilarities between Bournbrook and Selly Park are easily distinguished. This was not only reflected by its rigid geometric street pattern, but also the identical house types like 'copy and paste'. No trees are to be found either from the Ordnance Survey in 1904 or today (Figure 4. 54), except for a few incidental street trees along Bristol Road. When it was first built, three or four tunnel backs were in little groups because builders would only build three or four at a time, but they are long terraces now.



Figure 4. 52: Different landscapes on each side of Bournbrook Road. On the left side are working-class tunnel-back houses, while on the right side are middle-class detached houses.

The transportation location of Stirchley was similarly advantageous to that of Bournbrook, as it was situated at the intersection of Pershore Road with both the BWSR and the Midland Railway

main line to Gloucester and the Birmingham and Worcester canal. As a result, Stirchley has been classified as the fourth plan unit. Given the number of industrial lands located in and around Stirchley (Figure 4. 55), it can be seen that the majority of housing in the area consisted of tunnel-back working-class residences.

Bournville, situated to the west of Stirchley and separated from it by the BWSR and the Birmingham and Worcester Canal, is the last plan unit in the area. Although it was constructed around the same time as Stirchley and Bournbrook, it stood out from its neighbouring areas due to several distinctive features. Most notably, Bournville's housing consisted mainly of cottages and houses, and the 'village' was characterized by its abundant greenery, including tree-lined streets and wooded areas. This contrast in morphology can be especially observed along Maryvale Road (Figure 4. 55), which was the southern boundary of the Bournville estate. The reason for this difference in appearance is largely due to the ownership of the land. Bournville was developed by the Cadbury family, who had a vision of creating a model village that would be an improvement over the overcrowded and unsanitary living conditions of the back-to-backs and the monotonous plan forms of the tunnel-backs. The full story will be explored in subsequent sections of this chapter.

All five of these plan units were developed on the estates of specific landowners. Selly Park was owned by John Rodway, Bournbrook by James Kerby, Bournville by the Cadbury family, and Edgbaston by the Calthorpe family. These estates grew independently of each other. As development progressed and the agricultural residuals between the nuclei were filled, the separate units eventually became part of a continuous built-up area. Throughout the process of development, the original landscape was not completely extinguished. Instead, remnants of the original rural landscape, such as road systems and prominent buildings like the manor house, were preserved (Skipp, 1997). The reasons for the differences in development can be attributed to various factors, such as geomorphology, economic opportunities arising from transportation, ownership, bye-laws, and local political administrations. This process of suburbanization is a characteristic shared by other industrial cities as well.

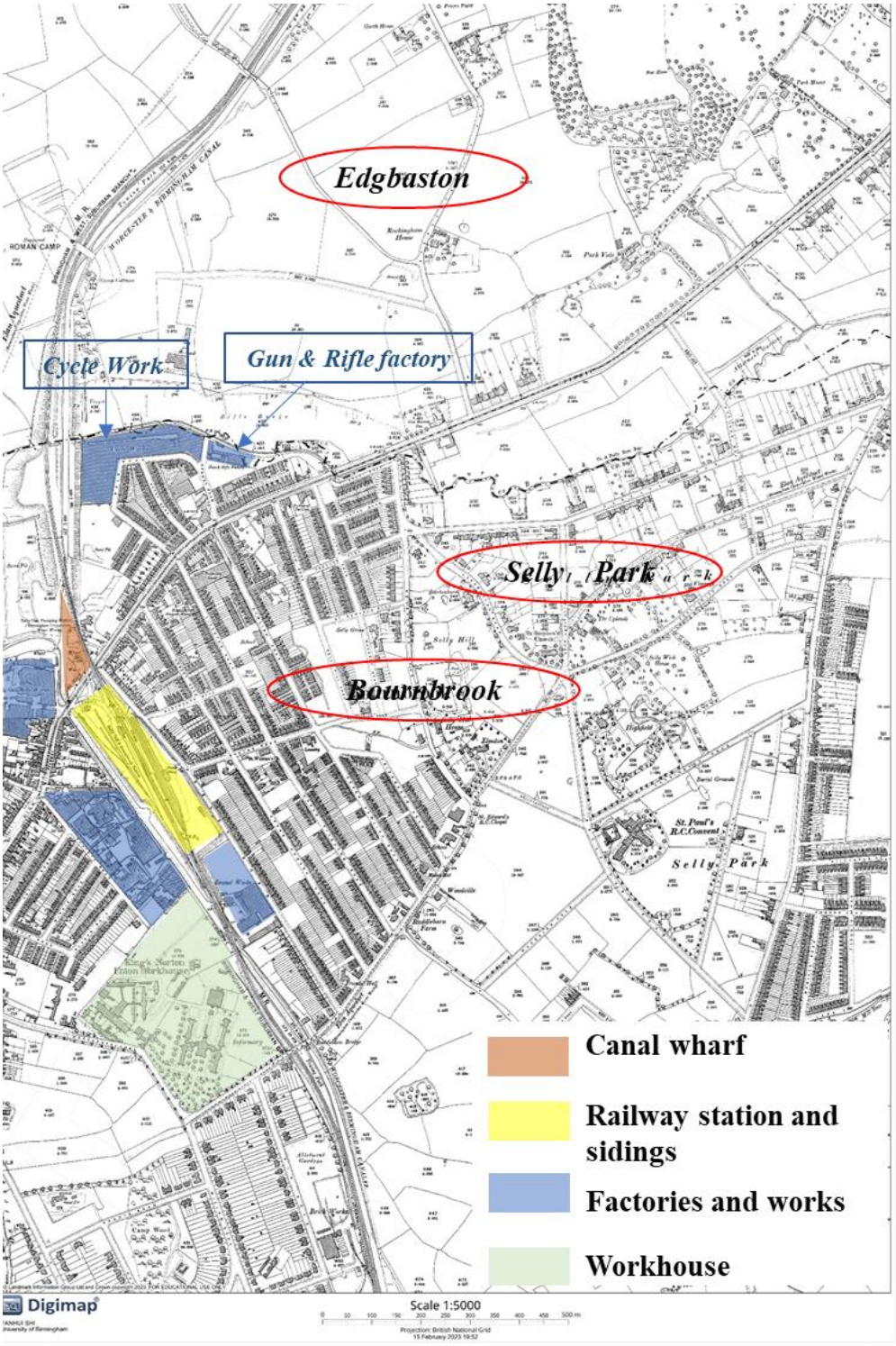


Figure 4. 53: Edgbaston, Selly Park and Bournbrook (Ordnance Survey in 1904)

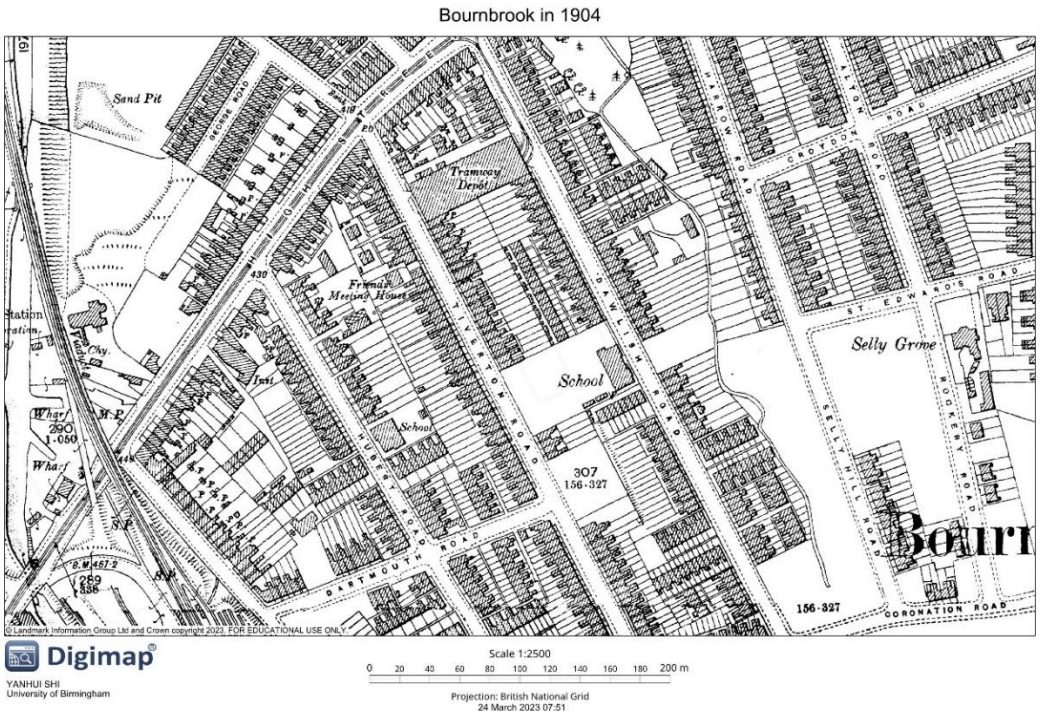


Figure 4. 54: Plan of Bournbrook in 1904 (source: Ordnance Survey). The identical building plans appear monotonous. The roads are mostly straight. There is a lack of trees on both sides, creating an impression of a scarcity of natural elements.

This section has reviewed the morphological evolutionary process of Birmingham and its primary building types in each morphological period from the 1770s to the present. The evolutionary process of residential building types includes back-to-back houses, bye-law terraced houses, and then their successors: council housing and speculative buildings with large gardens in the 20th century in Birmingham. Additionally, the section has explored the south-west section of Birmingham, where Bournville is situated, to examine the geographical relationship of Bournville with its surroundings and its favourable transport links. Based on these analyses, chapter 6 will illustrate the morphological evolutionary process of the British case, the model village Bournville.

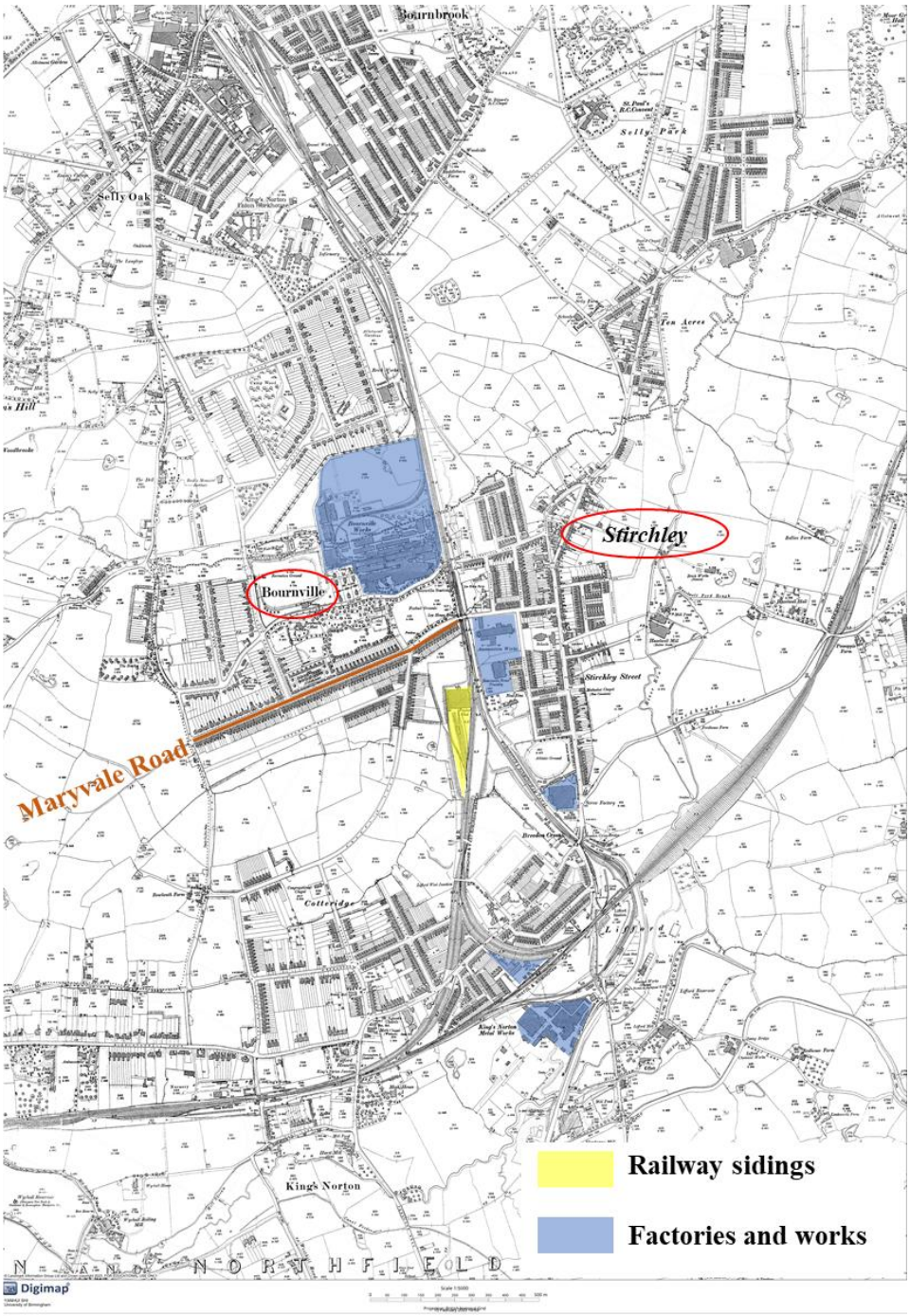


Figure 4. 55: Plan of Stirchley and Bournville in 1904 (source: Ordnance Survey)

4.3 Conclusion

This chapter has presented an analysis of the historical development processes of these two cities, namely Zhengzhou in China and Birmingham in the United Kingdom, and the emergence of new features in urban landscapes and building types across different periods. Embedded within these

processes are two interwoven aspects. First, it has explored how both countries institutionalized their pursuit of utopian visions, solidifying and striving to enact these ideals through their respective institutional systems. Secondly, it has investigated the degree and mechanisms by which these systems influenced the evolution of urban forms. The role of institutions in shaping the urban landscapes of these two cities exhibits distinct characteristics. In China, the traditional centralization of power and the socialist system naturally bestowed the government with a dominant role in urban development. In contrast, in the United Kingdom, the government's, particularly local government's, role historically tended to be more indirect, until the large-scale construction of council housing in the 20th century. Naturally, while taking these factors into consideration, it is essential not to disregard the significance of their developmental stages and geographical characteristics. Based on the exploration of these historical and geographical contexts in this chapter, the subsequent two chapters will analyse the developmental processes of the two case studies in Zhengzhou and Birmingham, respectively.

Chapter 5. Urban morphological analysis of Factory 3

This chapter focuses on conducting a morphological analysis of the Chinese case study area, specifically Factory 3. The chapter commences with an exploration of the *Danwei* system in China, which aids in comprehending the evolutionary trajectory of Factory 3. Subsequently, an in-depth historico-landscape investigation of Factory 3 will be carried out, encompassing the examination of various facets: its plan, building forms, land and building usage, and green spaces within each morphological phase. The chapter will investigate multiple factors that have influenced the evolution, formation, and development of Factory 3, leading to the formulation of pertinent conclusions. In recent years, scholars have examined the evolution of Factory 3 (e.g. Chen, Xing and Zhang, 2010; Xia, 2019; Zhou and Liu, 2022). Their research primarily relies on written records, with some morphological investigations have also focused information from fieldwork (Zhang, Chen and Gu, 2019; Gu, Wang, Zhang and Chen, 2021). Most of the information in this chapter is largely sourced from surviving field evidence and the archives of Zhengzhou Urban Construction (ZUC).

5.1 *Danwei* system

Chapter 3 provided a concise introduction to the *Danwei* system, which originated within China's socialist political system and planned economic structure. Under the *Danwei* system, individuals in the state-owned economy found their lives intricately intertwined with the organizations with which they were affiliated. In earlier studies, scholars across different disciplines have offered diverse interpretations of the *Danwei* system (e.g. Lu, 1989; Liu, 2000; Bray, 2005). In the realm of social organization, the *Danwei* system is one through which the state exercises social control, allocates resources, and facilitates societal integration. The *Danwei* system assumed multiple functions, including political governance, specialized division of labour, and the provision of essential services (e.g. Li, 1993; Li, 2002). In terms of physical space, existing research generally agrees that *Danwei*s were bounded by roads, tall walls, or physical structures, exhibiting a pronounced closed and inward-oriented spatial configuration, thereby constituting a relatively self-sustained enclosed

community (e.g. Bjorklund, 1986; Qiao, 2004; Chai and Zhang, 2009). *Danwei*s possessed the following characteristics: 1) functional unity, wherein any *Danwei* simultaneously assumed multiple roles such as economic, political, and social welfare functions; 2) Non-contractual relationships, which held two layers of meaning: first, between the *Danwei* and the state—since the *Danwei* was an extension of state administrative organizations, no creditor-debtor relationship existed between them—secondly, between workers and factories, as workers were allocated by the government's labour department according to national plans, rather than being employed through contractual arrangements in the labour market; 3) immobility of resources, indicating that once resources were allocated from the state to the *Danwei*, they became fixed within the *Danwei*, regardless of usage efficiency, and the *Danwei* did not relinquish ownership rights over the acquired resources. The origin of the *Danwei* system lacked a definitive policy document that comprehensively defined its concept. Consequently, there wasn't a unanimous consensus regarding its exact genesis. Various scholars held divergent perspectives on this matter. Some contended that the *Danwei* system emerged in the post-establishment period of the People's Republic of China, as the Communist Party extended the organizational practices developed during the revolutionary base areas to a broader context (Yang, 2006; Lv, 1997). Others extracted symbolic significance from the concept of 'walls,' drawing connections between the enclosed structure of the *Danwei* system and the traditional cultural notion of enclosed courtyards from China's pre-modern era (Bray, 2005). Nonetheless, among scholars, the prevailing consensus often centred around the pivotal year of 1949, signifying the establishment of the People's Republic of China, when investigating the origins of the *Danwei* system.

With the progressive advancement of the 'Reform and Opening-up' period, a concomitant phenomenon emerged - the dismantling of the *Danwei* system. This encompassed a comprehensive transformation of systems tied to production management, personnel organization, employment, housing, welfare, and security that were intricately interwoven with the *Danwei* system. Individuals previously associated with the *Danwei* framework embarked on a shift from being '*Danwei*-bound individuals' to assuming the role of 'social individuals,' a process labelled as 'de-*Danwei*zation' by scholars (Xiao and Chai, 2016). As previously delineated, a recalibration of the relationship between enterprises and the state took place, giving rise to the establishment of a modern corporate system

characterized by explicit property rights, well-defined responsibilities, separation of governmental and enterprise functions, and the implementation of scientific management practices (Liu, 2011; Chai, 2011). Simultaneously, within the domain of individual-employer dynamics, changes were observed in the labour system as enterprises gained autonomy in resource redistribution and labour mobility. An additional conspicuous aspect of 'de-*Danweiz*ation' involved the disentanglement of diverse services, encompassing education, healthcare, and public bathhouses, from state-owned enterprises. Gradually, these services were transferred to local governments and various public financial mechanisms (Chai et al., 2013).

Factory 3, discussed in this thesis, experienced a transition from its initial phase of *Danwei*-based management to a process of '*de-Danweization*' in the 'Reform and Opening-up' period. It also aligned with the typical characteristics of a *Danwei*-based organization. Beyond the common functions of production and residence, it encompassed a range of public life service facilities, including nurseries, schools, and dining rooms. However, there are deviations from prior research. While previous studies emphasized enclosed walls as the defining feature of *Danweis*, the author's research suggests that neither Factory 3 nor the adjacent textile *Danwei*s had enclosed walls. This particular aspect will be elaborated further in the subsequent sections.

5.2 Scope of case study

Approved by the National Planning Commission in 1953, Factory 3 embarked on its construction journey in 1954, emerging as a pivotal cornerstone within Zhengzhou's vibrant textile industry (Zhengzhou Local History Compilation Committee, 1999). During the 1950s, a series of five textile *Danwei*s were strategically founded on the western fringes of Zhengzhou, realising an impressive cadence of one textile mill inaugurated each year (Figure 5. 2). This strategic endeavour not only solidified Zhengzhou's status as one of the six pivotal national hubs for textile production but also underscored the country's commitment to rapid industrial development (Zhengzhou Local History Compilation Committee, 1997).

The designation of Factory 3 pertained to the geographical area encompassed by Jianshe Road, Tongbai Road, Longhai Railway, and Factory 4 in the subsequent content (Figure 5. 1). Factory 3

was located in the Zhongyuan District of Zhengzhou city. It was bordered to the south by Jianshe Road and to the east by Factory 4. On its western side, Tongbai Road serves as the boundary, adjacent to The First Zhengzhou State-owned Textile Factory. The northern edge abuts the Longhai Railway and is linked via a dedicated railway line for the factory (ZUC Archive 54 No.0014). Factory 3 encompasses both production and residential zones, with Mianfang Road dividing the two. Notably, during its later developmental phases, due to land constraints, Factory 3 acquired additional land north of the railway to construct housing for families. This specific land allocation falls outside the purview of this thesis.

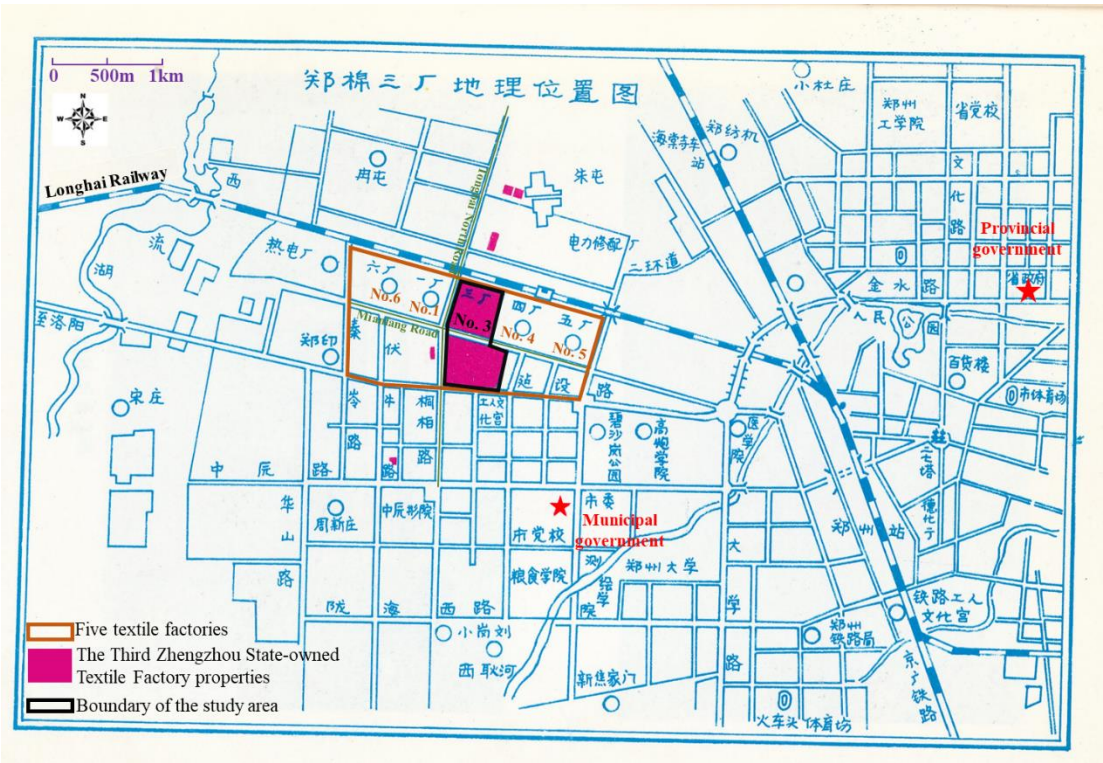


Figure 5. 1: Location of Factory 3 in Zhengzhou. The area delineated by the black lines encircling the notations with 'No.3' in the diagram is the scope of study for this thesis.

Each of these five cotton textile factories individually constitutes distinct *Danwei*s, collectively forming the combined textile *Danwei*s (Hu, 2019). They were situated to the north of the Longhai Railway, bordered by Qinling Road to the west, Jianshe Road to the south, and Songshan Road to the east (Figure 5. 2). The factories functioned autonomously, each featuring its own separate entrances and defined physical boundaries. Each factory operated under its unique management

system. However, their residential areas from neighbouring *Danwei*s were intricately interconnected at their borders. The main entrances to the residential area faced south and were located on Jianshe Road. The production areas had both southern and northern entrances. The southern were situated on Maifang Road, while the northern entrances were oriented towards the Longhai Railway. As previously described in chapter 4 (pp. 63-64), the configuration of the five *Danwei*s fell within Morphological Region 7. When viewed from a morphological perspective in Figure 5. 2, although the forms of each production area were similar—with a large shed in the middle and surrounding auxiliary buildings—the plans for the residential areas differed significantly. Therefore, there were at least five distinct plan units, and each morphological unit could be further divided into subunits for production and residential areas.

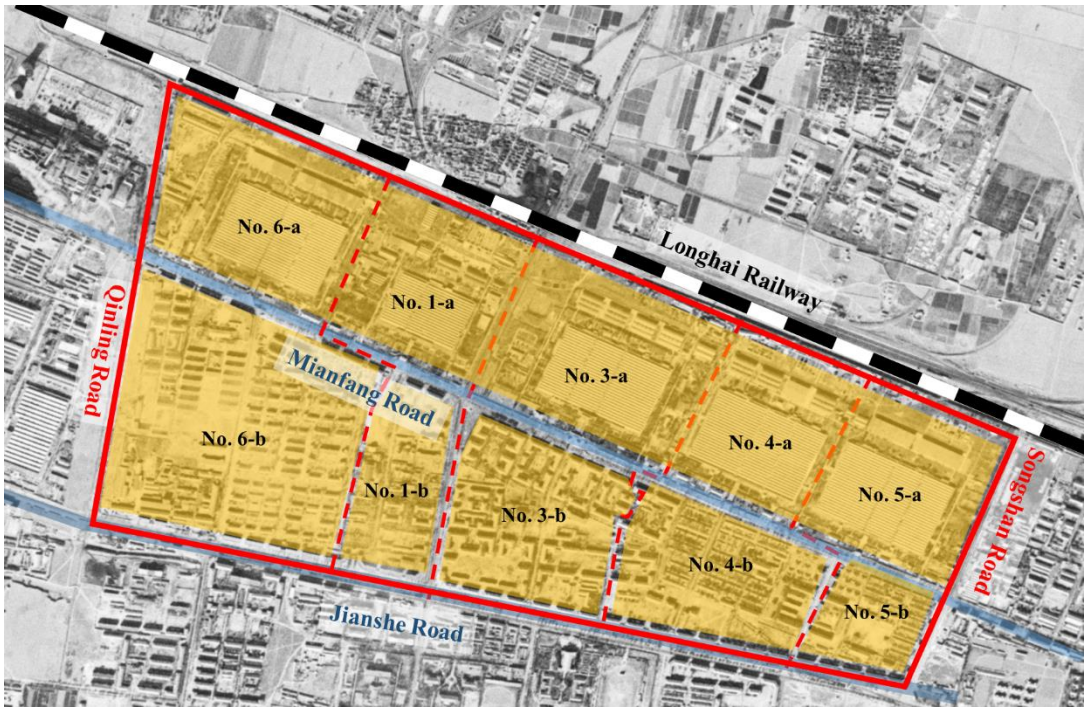


Figure 5. 2: The layout of the combined textile *Danwei*s (after Zhengzhou satellite image (1968) by USGS and adapted by the author)

5.3 Morphological evolutionary process

This section aims to explore the morphological evolution of the landscape in Factory 3, tracing its development from the agricultural landscape period to the present day. It will be divided into six distinct morphological periods, each characterized by variations in plans, building types, and land utilisations that reflect different social and material conditions at various time intervals. The

identified morphological periods are as follows: 1) Pre-urban period (pre-1953); 2) Initial construction phase (1953-1965); 3) Cultural Revolution period (1966-1976); 4) Reform and reorganization period (1978-2010); 5) Large-Scale reconstruction phase (2011-2019); 6) Heritage phase (2021-). The analysis will offer valuable insights into the diverse factors that have influenced the developments and transformations shaping the morphology of the factory across different morphological periods through its history.

5.3.1 The agricultural landscape pre-1953（-1953）

Prior to the establishment of Factory 3, the landscape in the western outskirts of Zhengzhou, where the factory was situated, portrayed a typical rural environment. Encircling the villages were expansive farmlands (Figure 5. 3), characterized by undulating terrain and dwellings constructed primarily from earthen walls and thatched roofs. Transportation was inconvenient, with the sole road being an uneven dirt road that had historical significance as the ancient 'Zheng-Luo Official Thoroughfare,' connecting Zhengzhou to Luoyang (Meng, 2004). Along this road, a sparse scattering of shops existed, and the road surface bore deep ruts from traversing vehicles, forming channels during rainfall. The reconstruction of this road began in 1953, eventually transforming into the prominent Jianshe Road, a vital thoroughfare connecting the western outskirts to the city centre. Together with the railway, these two elements were not parallel but intersected at an angle, significantly influencing the subsequent morphological evolution of this region (Figure 5. 2).

The land necessary for the construction of Factory 3 was obtained through the process of land acquisition, motivated by national development requirements. In that era, the requisition process entailed submitting essential documents, including a task book, project particulars, and site layout maps of the construction of the *Danwei*, to the city's Planning Bureau and Land Bureau for formal endorsement. Following this, field assessments were undertaken to identify suitable sites, accurate boundaries were demarcated, and issues relating to the relocation of villagers and land compensation were effectively managed (Zhongyuan Township of Zhengzhou City, 1989). The original site of Factory 3 encompassed two villages. Niuzhai village was located within the factory's production area. Before the factory's establishment, a natural gully ran from west to east in front of Niuzhai

village. This village served as a concentrated settlement for the Hui ethnic group, housing approximately 300 residents. A mosque constructed in 1915 was a prominent feature of the village's landscape (Zhongyuan Township of Zhengzhou City, 1989). In 1954, due to the construction of Factory 3, Niuzhai Village was relocated to the north-eastern corner of Dongzhai village, just north of the Longhai Railway. New housing land was allocated by the municipal government, and the mosque was also moved to the centre of the newly established village. Liuzhuang village was situated within the living area of Factory 3. As the factory came into existence, Liuzhuang village was integrated and relocated to Dongzhai village (Zhongyuan Township of Zhengzhou City, 1989).

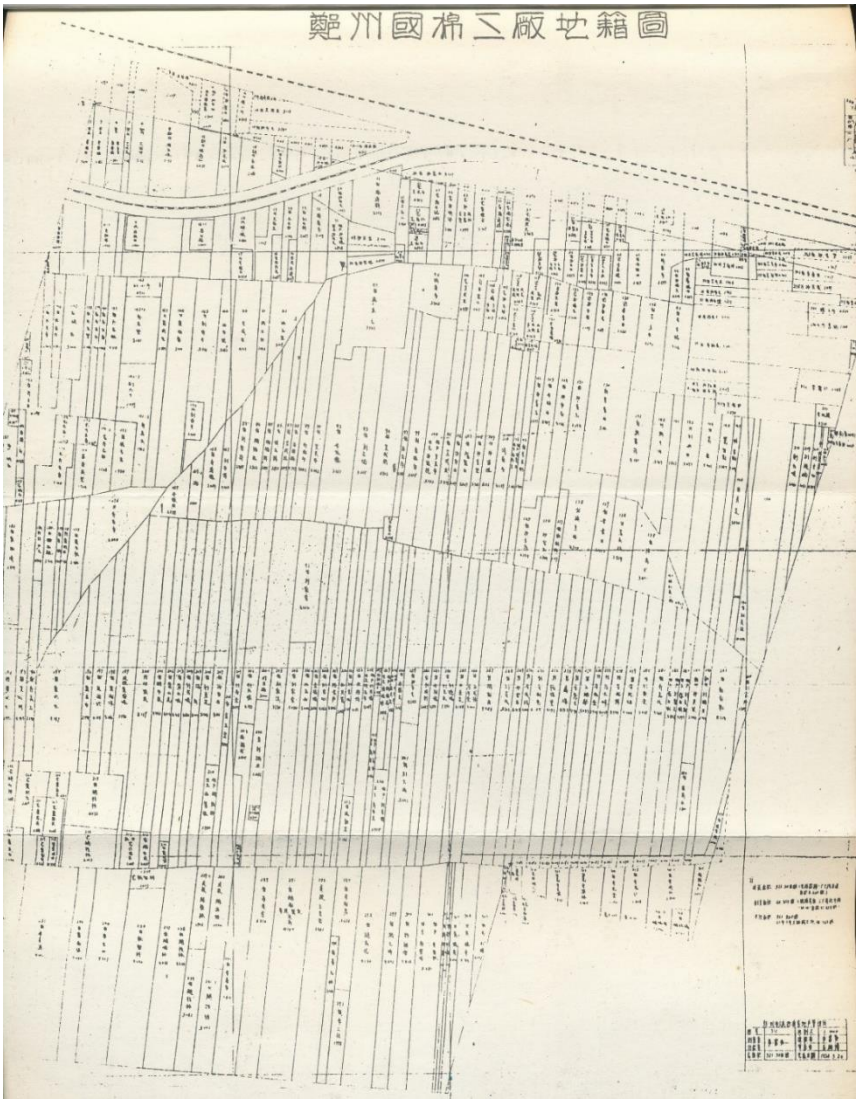


Figure 5. 3: Cadastral map depicting the location of Factory 3 before its establishment in 1953. Scale: 1:1000. The northern side is bordered by the Longhai Railway and its branch line. Note the elongated strip fields of the farmlands.

In the pre-industrial era, the Longhai Railway to the north and the 'Zheng-Luo Official Thoroughfare' to the south of the textile region stood as the elements of pre-industrialized landscape. Together, they formed the morphological framework during the establishment of the factories and subsequently constrained the morphological development of the area. Meanwhile, the gully in front of Niuzhai village was erased from the maps and filled in due to its inability to serve a purpose in the new era. To preserve religious spaces, the reconstruction of a mosque in a different location retained religious elements, becoming another remnant of the pre-industrial landscape. Furthermore, even though Niuzhai village was relocated entirely north of the Longhai Railway, the name of the Niuzhai village substation constructed on the former site of Niuzhai village, where the Factory 3 production area was situated, still echoes the traces of Niuzhai village's existence.

5.3.2 Initial construction phase (1953-1965)

Factory 3, initiated in 1953 and constructed from 1954, was completed in 1955. It operated as a state-owned enterprise under the banner of collective ownership. Initially, it adhered to a municipal-level cadre allocation system, appointing managerial roles equivalent to deputy and vice-mayor levels. After 1958, this gradually transformed into a county-level administrative structure. In terms of administrative affiliation, it was initially under the jurisdiction of the Central-Southern[10] Textile Industry Management Bureau within the Ministry of Textile Industry. In 1954, the Henan Textile Industry Management Bureau was established within the Ministry, and Factory 3 came under the purview of that Bureau. From 1955 to 1977, the enterprise operated within a centrally planned economy. Production targets were set uniformly by the state, raw material distribution was centrally controlled, and finished product reimbursements were managed collectively (The Editorial Team of the Chronicle for the Factory 3, 1987). All matters related to human resources, finances, and physical assets were under state supervision. Regarding production plans, starting from its launch in 1955, the operations of Factory 3 were formally integrated into the national plan. The process involved

10 Named as 'Greater Administrative Regions,' this administrative level briefly existed after the establishment of the People's Republic of China in 1949. These regions were positioned between the central government and the provincial level, with six regions established nationwide: North China, Northwest, Northeast, East China, Central-South, and Southwest. However, in 1953, in an effort to strengthen the central government's control, the administrative status of these regions was abolished.

the factory proposing annual suggestions based on national plan requirements. After being reviewed and adjusted by the provincial textile bureau, the finalised plan was issued to the factory as a directive within the national plan. This meant that production goals were not responsive to market dynamics but rather determined by higher authorities. The enterprise's singular production responsibility was to execute the plan handed down from superiors. Raw material supply was uniformly allocated from higher echelons, with quantity and quality decisions vested in higher authorities. Enterprise profits were earned through a 5% share of the overall wage pool, contingent upon successful plan fulfilment (The Editorial Team of the Chronicle for the Factory 3, 1987). Within this production and financial framework, the enterprise lacked autonomy and resources for addressing both production and livelihood needs. Even minor construction endeavours required approval and budget allocations from higher authorities. Under this institutional context, the development of Factory 3 progressed at a relatively measured pace (The Editorial Team of the Chronicle for the Factory 3, 1987).

The establishment of Factory 3 relied on the requisition of land from the adjacent villages, amounting to a total area of 63.56 ha (953.400 acres). Within this total area, 42 ha (630 acres) were initially devoted to wheat cultivation fields. Due to subsequent usage by other sister *Danwei*s, the final allocation for Factory 3 comprised a production area covering 23 ha (348 acres) and a residential area spanning 16 ha (240.24 acres), resulting in a combined land area of 39 ha (588.24 acres) (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Factory 3 extended approximately 950m in the north-south direction and 500m in the east-west direction. During the establishment of the factory, following the relocation of the relevant villages, a total of 3,085 *Jian* and more than 100 temporary sheds were demolished. Furthermore, the requisitioned land included 358 graves, 3,076 trees, 33 wells, and 8 waterwheels. After the demolition, the physical elements of trees, field ridges, and wells were all levelled. The relocation process affected a total of 175 households, encompassing a population of 901 individuals (The Editorial Team of the Chronicle for the Factory 3, 1987). Among the relocated households, where significant portions of their agricultural land were occupied by the construction of Factory 3, the household labour force were selectively integrated into the factory workforce based on their physical capabilities and age. This adjustment allowed them to take on roles as either long-term employees (137 individuals) or

temporary workers (47 individuals) (The Editorial Team of the Chronicle for Factory 3, 1987).

The swift and efficient construction of Factory 3 showed the meticulous control mechanisms of a planned economy, highlighting the advantages inherent in such an economic system. In terms of the vertical administrative hierarchy, each aspect of Factory 3's construction was meticulously managed by specialized functional groups within the Line system (see chapter 3). This approach aimed to achieve rapid progress and the optimal utilisation of human resources to establish Factory 3 successfully (The Editorial Team of the Chronicle for the Factory 3, 1987). The preparatory phase of Factory 3 was overseen by a preparatory group assembled by the Central-Southern Textile Industry Management Bureau under the Ministry of Textile Industry. The construction design, civil engineering, and machinery installation were respectively undertaken by the Design Company of the Infrastructure Bureau of the Ministry of Textile Industry, the Engineering Company, and the Installation Company– all of which were components of the textile systems. During the design phase, due to the limited local architectural design expertise at the time, it was a prevailing practice nationwide for many associated civil structures within different *Danwei*s to be uniformly designed using standardized national templates provided by Beijing. Resulting from this, a considerable number of newly constructed buildings exhibited a consistent architectural style. In relation to the comprehensive design plan, the design blueprints of Factory 3 were also employed for the construction of three other state-owned textile factories, situated in Beijing, Shijiazhuang, and Xi'an, respectively (Shi, 2005). During the construction and machinery installation phases, the adoption of precast concrete component technology and the utilisation of previous construction experience resulted in a remarkably swift pace of establishing Factory 3. In comparison to the construction of The First Zhengzhou State-owned Textile Factory, which was built one year earlier, the construction team completed Factory 3, which was twice the size of Factory 1, within the same timeframe, utilising only one-tenth of the manpower (The Editorial Team of the Chronicle for Factory 3, 1987).

With the objective of positioning Zhengzhou as a pivotal textile industry hub, the national authorities further embarked on establishing supplementary *Danwei*s around the combined textile *Danwei*s, thereby creating a comprehensive textile industrial zone (Figure 5. 4). In 1949, the Henan Provincial Textile Machinery Factory was established and placed under the management of the

Ministry of Textile Industry, with the aim of providing auxiliary equipment for textile enterprises. Furthermore, during that time, dyeing and printing factories, textile equipment factories, and other production *Danwei*s were also established under the umbrella of the Ministry of Textile Industry (The Editorial Team of the Chronicle for the Factory 3, 1987). These *Danwei*s were intended to complement cotton textile enterprises by facilitating activities such as dyeing and printing of the produced fabrics. Furthermore, supporting institutions and facilities were established to cater to the needs of the textile industry, such as the Henan Provincial Textile Management Bureau Hospital (now Zhengzhou Fourth People's Hospital), the Zhengzhou Cultural Palace, and the Bishagang Park (formerly Bishagang Martyrs, see chapter 4). Additionally, several comprehensive and specialized schools related to the textile industry and machinery manufacturing were also founded to provide education and training opportunities for textile workers and their families. To ensure efficient management and coordination, both provincial and municipal textile industry management bodies were strategically established in proximity. Acknowledging the prevalence of female workers in the textile sector, steps were taken to maintain a balanced gender representation. This led to the establishment of heavy industry enterprises, including a thermal power plant and a grinding wheel factory, which predominantly employed male workers. These diverse industrial enterprises effectively employed specialized railway lines for their cargo operations (Mao, 2014). This intricate logistical network seamlessly facilitated the transportation of goods across the country, passing through Zhengzhou West station (now known as Zhongyuan Railway Station) on the Longhai Railway (Figure 5. 4).

Another significant aspect of socialist production during China's planned economy era was the concept of 'national coordination', whereby production factors could be efficiently allocated throughout the nation under the macroeconomic regulation of the central government, transcending provincial and municipal boundaries. Between 1953 and 1954, a total of 414 administrative and technical personnel, including 23 medical staff, were transferred to Factory 3 (The Editorial Team of the Chronicle for the Factory 3, 1987). In response to the national initiative of 'Supporting Central China's Development', by the end of 1956, as many as 3,238 skilled workers from 16 cities and 130 enterprises in Shanghai, Hunan, Hubei, Jiangsu, Shandong, and other regions had either been transferred or volunteered to work at Factory 3. Furthermore, the advantages of the planned

economy were evident in the comprehensive training network of the textile system. In 1953, the 1,347 recruited workers of Factory 3 underwent operational and technical training in advanced textile *Danwei*s within and outside the province. To enhance workers' technical expertise, Factory 3 established a dedicated training department within a formalized training framework. Training methods included sister *Danwei*s' training and self-directed learning. Sister *Danwei*s' training involved sending workers to Shanghai, Wuhan, and other local *Danwei*s for operational and technical training. Additionally, sister *Danwei*s dispatched assistance teams to Factory 3 for collaborative support (The Editorial Team of the Chronicle for the Factory 3, 1987).

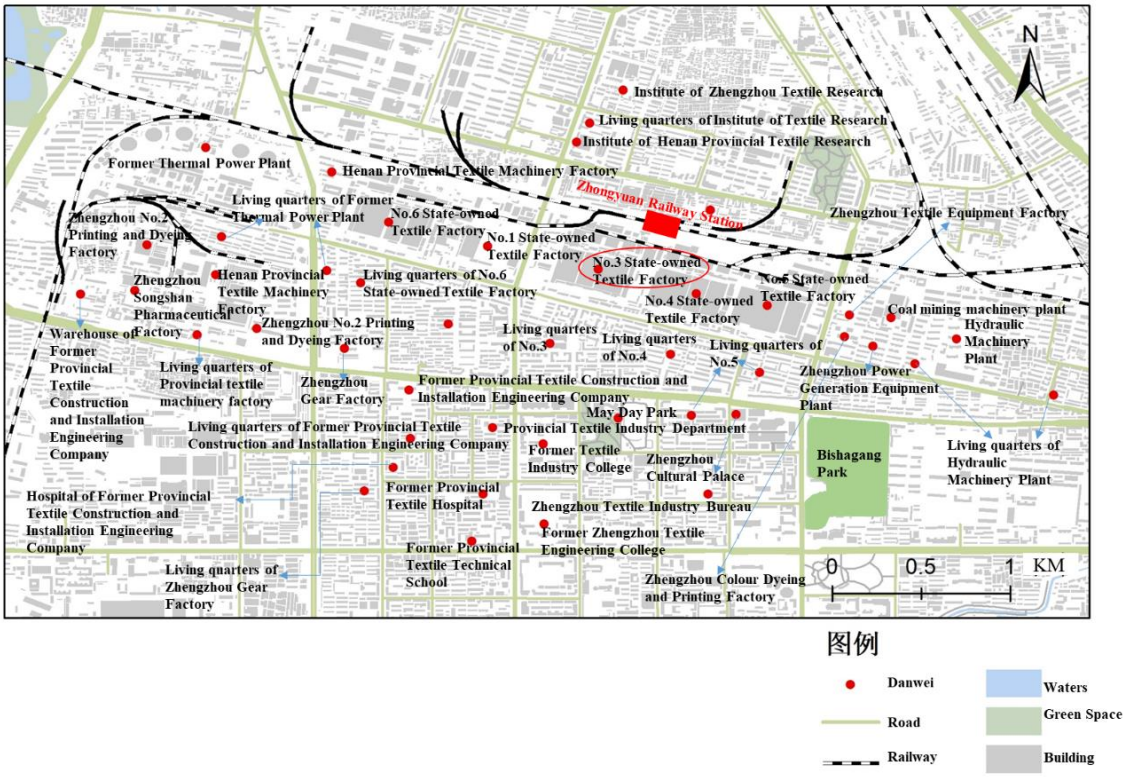


Figure 5. 4: Layout of the various *Danwei*s in the Zhengzhou textile industrial zone (after Hu (2019) and adapted by the author). Factory 3 is marked with a red ellipse. Note the various textile-related enterprises and service institutions distributed around it.

Initial land acquisition

Due to the organizational structure, where five textile *Danwei*s were managed under the Central-Southern Textile Industry Management Bureau within the Ministry of Textile Industry ('Line management' in chapter 3 and the previous context), these factories mutually referred to each other

as ‘sister *Danwei*s’. This unique ‘sibling relationship’ was also mirrored in the ownership dynamics of their respective lands and buildings. In terms of land, higher-ranking authorities would often reallocate land acquired by one *Danwei* to another *Danwei* without any monetary exchange. Concerning buildings, it was not uncommon for certain *Danwei*s to offer some of their buildings to adjacent sister *Danwei*s, free of charge (this interchange was often mutual). However, this gesture wasn’t always voluntary. Subsequently, especially during the 1960s, either for the purpose of streamlined management or due to scarcity of land and buildings (occasionally resulting in land disputes and even violent conflicts), higher-level governmental bodies would often intervene to adjust the property rights of buildings occupied by both parties. During these property rights adjustments, in relation to the land where the buildings were situated, the prevailing practice was ‘land follows the building’ (Zou, 1998). Nevertheless, there were instances where property adjustments for buildings didn’t necessarily involve land matters, necessitating negotiations between both parties and resolution through various transactional means. Moreover, the complexities of the planned economy era’s segmented ‘Line and Block’ management system (see chapter 3) introduced an additional layer of intricacy to executing these transactions. Essentially, within the framework of the planned economy era, there frequently existed a disconnect between the entitlement to use land and the ownership of buildings located on that land. This implies that the ownership of buildings on a specific parcel of land might not necessarily correspond to the practical utilisation of those structures. China’s approach during the planned economy era concerning the concept of property land parcels differed significantly from the Western model of private ownership economies. The land parcel boundaries in China exhibited a distinct characteristic of being more fluid, adaptable, and permeable. As exemplified in the case outlined in this chapter, the boundaries of Factory 3 underwent a gradual and intricate process of evolution following its construction (The Editorial Team of the Chronicle for the Factory 3, 1987). However, owing to constraints in record-keeping methods and the available level of detail, it is challenging to precisely identify the boundary shifts after each alteration. Nevertheless, based on existing textual records, cartographic materials, and data collected through on-site research, it is feasible to hypothesize about the ownership of land use rights for Factory 3 during the 1954 land acquisition and in the early 2010s, as indicated by yellow shading and the red line in Figure 5. 5.



Figure 5. 5: The speculated extent of land expropriation for Factory 3 in 1954 (in yellow)

In essence, following its construction, Factory 3 encountered encroachments from neighbouring 'sister *Danwei*s' in both the eastern and western directions. This encroachment often exhibited a reciprocal nature. During the establishment of Factory 4, in response to land scarcity, certain workers were assigned to reside in buildings situated on the north-eastern corner of Factory 3's land. Both the buildings and the land were initially owned by Factory 3 (The Editorial Team of the Chronicle for the Factory 3, 1987). Additionally, they constructed parts of their own residences on land acquired by Factory 3. Some of these residential areas were later occupied by Factory 3 itself. Subsequently, aiming to enhance operational efficiency, higher-level authorities intervened to facilitate the mutual exchange of houses. A notable instance occurred in 1965 when, in accordance with Document No. 228 issued by the Henan Provincial Textile Industry Management Bureau, Factory 4 was granted the usage rights of five buildings located within the boundaries of Factory 3, without any financial transaction (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). This practice of mutual land or residence utilisation was widespread in China during the

planned economy era (Zhang and Ding, 2017), leading to two notable outcomes. First, the boundaries of different *Danwei*s experienced ongoing shifts corresponding to different periods. Secondly, the actual boundaries of these *Danwei*s often assumed a gear-like configuration. With consideration of this dynamic, the focus of this study maintained a degree of flexibility over diverse timeframes (albeit with minor changes), predominantly encompassing the region north of Jianshe Road, east of Tongbai North Road, and west of Factory 4 (Figure 5. 5).

Plan and building form of the Danwei

For the convenience of later reading, Figure 5. 6 provides a code number to each significant building on the site. The base map is based on the structures that existed during the author's fieldwork research in Factory 3 in 2020. Tiny structures that are extensions of other buildings or temporary constructions are not numbered. Readers are encouraged to consult this map for specific building locations. Additionally, several buildings that are both constructed and share an identical layout are designated with a common identifier, such as the two '65' buildings within Factory 3 Central Garden or all buildings numbered as '123' in the Fangyuanjingwei neighbourhood (see below). The map can be electronically enlarged for easier reading of the numerical labels.

In 1955, Factory 3 underwent its initial construction. The factory was broadly divided into two main sections: a production area situated in the northern part and a residential area positioned in the southern part (Figure 5. 7). The two sections were separated by Mianfang Road. Notably, neither of these sections had reached full development at that point in time. Within the production area, pivotal structures such as the primary production workshops and office buildings were strategically situated in the central and slightly southern parts. Conversely, the construction of buildings in the residential area predominantly took place in the northern portion. This choice was influenced by its proximity to the primary working and activity spaces utilised by the labour force.

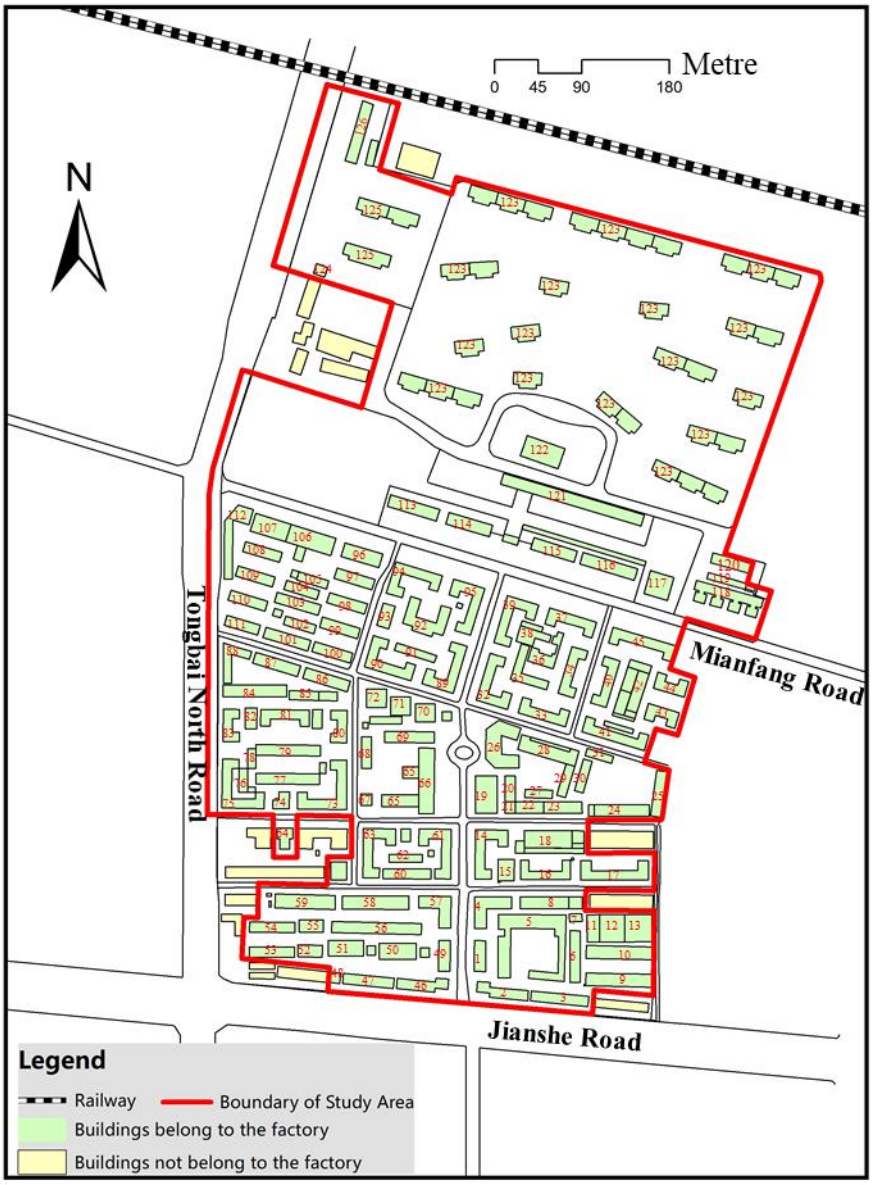


Figure 5. 6: Significant buildings with number codes at Factory 3

Examining the street arrangement (Figure 5. 7), it becomes apparent that the newly established road elements - Tongbai North Road, extending in a north-south direction, and Mainfang Road, running east-west - were constructed on Factory 3's land as part of the unified municipal road plan in 1956 (The Editorial Team of the Chronicle for the Factory 3, 1987). These developments were significantly influenced by the morphological characteristics of the pre-industrial era, particularly the presence of the Longhai Railway and Jianshe Road (Figure 5. 7). Tongbai North Road constituted the western boundary of Factory 3. Its northern half intersected the Longhai Railway at an approximately right angle, while its southern half also intersected Jianshe Road in a similar

manner. This arrangement of perpendicular intersections maximised the efficiency of land utilisation. In tandem, Mianfang Road roughly paralleled the Longhai Railway, contributing to the meticulous design of an internal road network within the factory. Within the production area (Figure 5. 7), the layout of roads, including those surrounding the office buildings and workshops, was strategically influenced by the presence of the Longhai Railway to the north. In the residential zone, northern

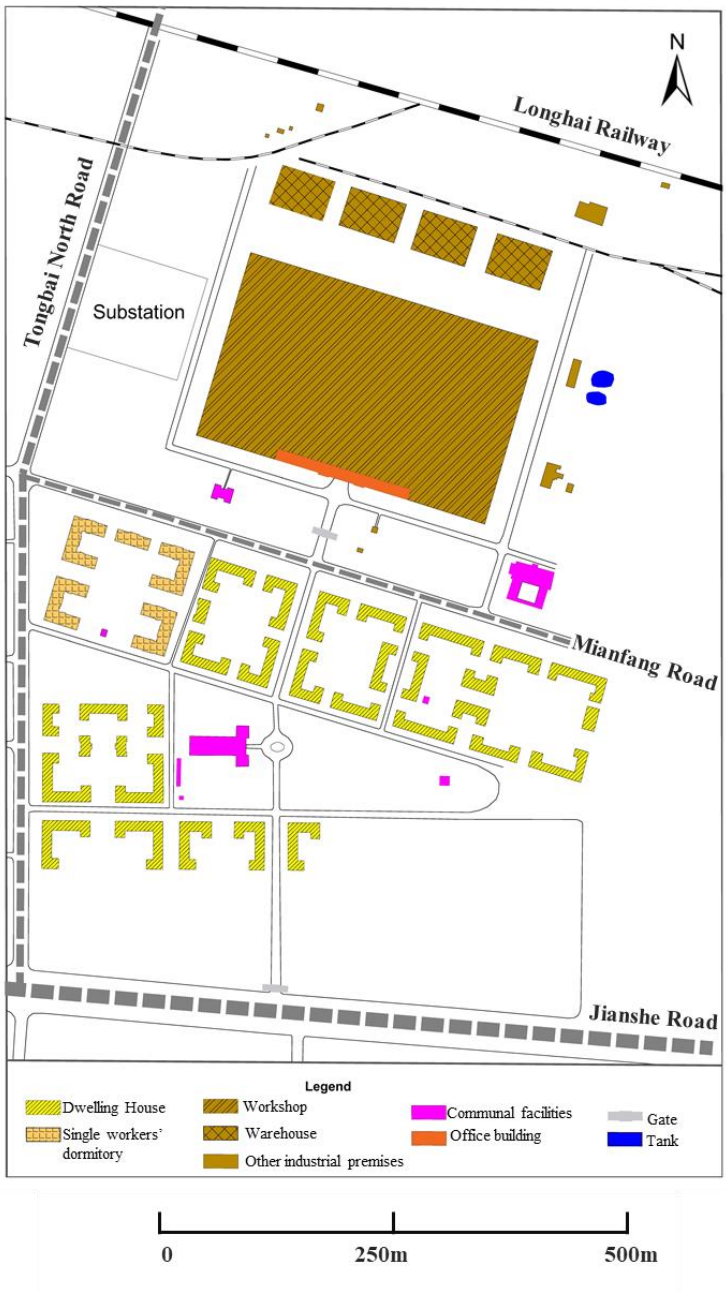


Figure 5. 7: The plan of Factory 3 in 1955. Based on (ZUC Archive 65 No.330) and (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990)

roads like Xiangrong Street aligned parallel to the course of Mianfang Road. Southern roads, including Lvhua West Street and Lvhua East Street, were intentionally designed to parallel Jianshe Road. The dashed green line with arrowheads in Figure 5. 8 represents the central axis of Factory 3. This axis originates from the monumental gate situated on Jianshe Road (Figure 5. 9). It proceeds through the central fountain landscape (Figure 5. 10) and continues to the other main gate of the residential area, eventually leading to the entrance of the office building.



Figure 5. 8: The central axis and inner street system of Factory 3 in 1955 (drawn by the author)

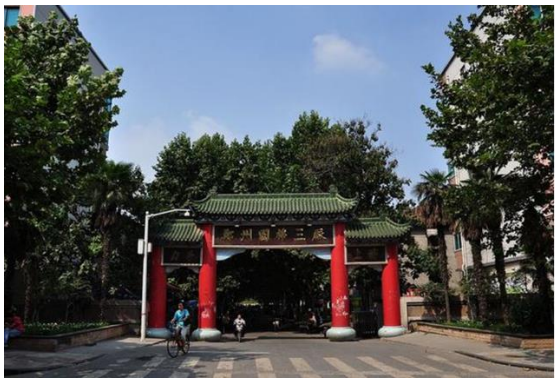




Figure 5. 9 (left): The monumental gate on Jianshe Road; Figure 5. 10 (right): The central fountain landscape in the residential area of Factory 3

The layout of the residential area of Factory 3 followed the peripheral pattern, which draws inspiration from the design approach of the Soviet Union (Hu, 2019). In this layout, buildings were positioned around the periphery of a central area, creating a relatively more enclosed environment (Figure 5. 11). The peripheral pattern constituted the predominant street and block configuration within the residential area, imparting a unified and organized aesthetic to the urban landscape. This layout also facilitated the strategic placement of communal service amenities, effectively meeting the daily needs of the residents within the enclosed community. This peripheral design approach was further manifested in the arrangement of the individual housing blocks grouped together to form a square with a central open space. This central space was originally intended for communal activities and was also left available for future housing expansions during periods of housing shortage (Figure 5. 11).

In terms of building facades, all residential buildings in Factory 3 were three-story brick-concrete structures (Figure 5. 45) with grey-brick walls, wooden doors and windows, and red-tiled sloped roofs (Figure 5. 49Figure 5. 46) with chimneys (Figure 5. 12 and Figure 5. 13). This became one of the most distinctive features of Factory 3. The tripartite facade design is similar to the Soviet style. Many people referred to Factory 3's residences as 'Soviet-style architecture.' However, guided by the design principle of 'Socialist content, national form' prevalent in the 1950s, both the residential and production area buildings emphasized the incorporation of Chinese architectural elements and decorations into their facades (Hu, 2019). Examples include the archways at the entrance of the residential area (Figure 5. 9), the imitation of swallowtail rafters, and the dougong

brackets at the production area entrance, all of which show the fusion of features from traditional Chinese architecture (Figure 5. 14).

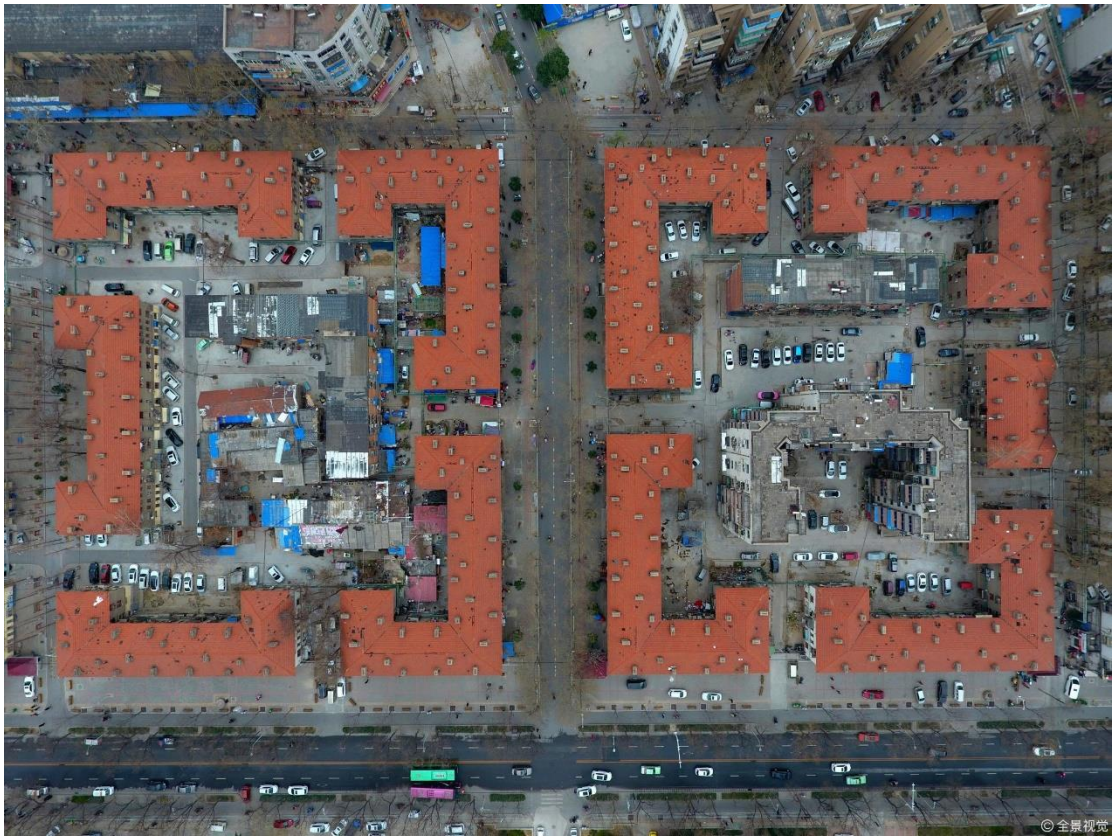


Figure 5. 11: Two groups of peripheral layout buildings in Factory 3. The buildings with red-tile roofs were constructed in 1955, while the central area was initially fallow, with the later repletion of buildings.

Within the residential area of Factory 3, the buildings were categorized into two types: bachelor dormitories and family residences (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990) (Figure 5. 7). The bachelor dormitory district, located in the north-western street block of the living area (not highlighted in colour in Figure 5.15), had a specially designed building configuration. It followed a layout of corridor apartment buildings (as shown in Figure 4.19 in chapter 4), which prevailed from the 1950s to the 1990s. These structures commonly served as residential dwellings or dormitories for students and single workers across numerous universities, factories, and institutions. The layout included an inner corridor connecting adjacent single rooms on both sides, complemented by shared washrooms on each floor. As for the family residences, the



Figure 5. 12: Soviet-style buildings characterized by their wooden windows, red roofs, and grey brick walls with prominent air conditioning units. Certain windows have partially enclosed balconies, serving different purposes: drying clothes or providing storage, and sometimes for placing potted plants that adorn the windowsills. To the left of the image, a mature tree stands gracefully (Photo from https://kknews.cc/zh-sg/history/r8ky4bo.html (accessed 21th August 2023)).



Figure 5. 13 (left): Sloped roofs and chimneys at Factory 3. These features are not commonly observed in newly constructed residences in Zhengzhou after the establishment of the People's Republic of China (Photo from https://www.sgss8.net/tpdq/20318779/1.htm, accessed 21th August 2023); Figure 5. 14 (right): Imitations of dougong brackets and swallowtail rafters made of stone.

prevailing practice involved employing 7 standard units to assemble these buildings, incorporating both corner units and straight units (Figure 5. 15). These units could be classified into three distinct prototypes: the No. 1 corner unit (which developed symmetrically into the No. 2, No. 3, and No. 4

corner units), the No. 5 straight unit, and the No. 8 independent unit designed for high-ranking officers (Figure 5. 15). With the exception of the No. 8 unit, each type maintained a consistent width for its shorter side (Figure 5. 16), allowing for versatile combinations as needed (Hu, 2019).



Figure 5. 15: Analysis diagram of combination and entrance of the standard units in Factory 3 (after Hu (2019) and adapted by the author)



Figure 5. 16: Two different short-side facades. (a) Short side without doorway; (b) Short side with doorway. Note that in (b) above the doorway, the modification to create a semi-enclosed balcony adorned with lush greenery on the doorway. This is quite common in Factory 3. (Photos from https://5g.dahe.cn/photo/20201016744367 (a) and https://kknews.cc/zh-sg/history/r8ky4bo.html (b) (accessed 31st August 2023)).

Notably, the No. 5 straight unit accommodated three households per floor, with an average living area of 27m^2 for each. Similarly, the No. 2 corner unit also provided 27m^2 per household, hosting four households per floor (Hu, 2019). The No. 8 unit offered more spacious individual living quarters, accommodating five households per floor. The room layouts typically consisted of suites with one, two, or three rooms, each equipped with a kitchen and a toilet, distributed on both sides of the corridor (Figure 5. 47). This configuration concept was in line with the Soviet approach, emphasizing individual rooms without distinct living rooms (Hu, 2019). While adopting the standardized design approach from the Soviet Union, modifications were made to adapt to the specific circumstances of Zhengzhou. For example, unlike Soviet residences that emphasized balcony design, only the No. 8 unit featured a balcony halfway up the staircase, while the other units lacked this feature. Additionally, due to China's relatively limited economic resources at the time, the per capita living area fell significantly below the Soviet standard. The standardized design and prefabricated component technology effectively catered to housing demand soon after the completion of Factory 3's construction. Upon the establishment of the *Danwei* in 1955, housing utilisation stood at 100% (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). However, from 1958 onwards, as the demand for employee housing increased, the practice shifted from accommodating one household per unit to accommodating two or even three households within a single unit. This led to situations where one room was shared by two or more families (Figure 5. 17), and three generations lived together in one room (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990).



Figure 5. 17: Three families watching television in the communal dormitory at Factory 4.

Land and building utilisation

In the northern production area of Factory 3 (Figure 5. 7), substantial construction progress had been achieved by the end of 1954. The pivotal focal point was the main workshop (Figure 5. 18), which occupied a central position within the factory complex. This facility played a crucial role as the epicentre of production activities. It facilitated the seamless flow of raw cotton from the western entrance, passing through various workshop processes, and culminating in the production of finished fabric that exited the eastern finishing workshop (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). The main workshop featured a single-story building with a reinforced concrete beam-column framework. Positioned at the four corners of this structure were strategically located distribution rooms. Adjacent to the main workshop, to its south, was the office building, creating a unified architectural complex. The facade of the brick-concrete (Figure 5. 45) office building featured a central section towering to three stories (Figure 5. 14), flanked by slightly lower wings spanning two stories each. The ground floor accommodated the entrance hall, serving as the main point of entry for both the main factory and the office building. Positioned at the building's eastern and western extremities, the dining halls provided sustenance for the workers during their shifts (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Furthermore, the ground-floor facilities encompassed distinct bathhouses for both men and women, a women's health room, a health clinic addressing minor worker health concerns, and a medical station aimed at minimizing treatment time for on-duty workers. The first and second floors of the office building were dedicated to housing administrative offices, encompassing the factory manager's workspace along with various functional departments. The area between the factory building and the dedicated railway line to the north was designated for the storage of raw materials and finished products, enhancing the efficiency of transportation logistics (The Editorial Team of the Chronicle for the Factory 3, 1987). Towards the western section of the complex, the Niuzhai substation, established by the Zhengzhou Power Bureau, supplied electrical power. In the central-southern part, the primary entrance to the production area was situated, along with a communication room and a security office. On the eastern side of the complex, a factory canteen was present, later repurposed as a club in 1962 (The Editorial Team of the Chronicle for the Factory 3, 1987). Situated to the west, a two-story day-care centre was established, replete with playrooms for children, nursing

areas, and administrative spaces. This day-care centre underwent a transition, evolving into the first kindergarten in Zhengzhou's Zhongyuan District, welcoming children under the age of 7 until 1957 (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). In 1958, with the aim of boosting women's participation in the labour force, a surge of kindergartens emerged in both rural and urban areas. The kindergarten affiliated with Factory 3 underwent a transformation, breaking away from the day-care centre setup and establishing itself as an independent kindergarten within the residential area. It was here that children between the ages of three and seven were warmly welcomed into its classrooms (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). After the completion of the factory complex, the production area witnessed a series of developments and improvements. In 1958, as a response to the nationwide 'Great Leap Forward' initiative that emphasized industrial growth, four modest-scale iron furnaces were established on the grassy area in the northwest corner of the complex (ZUC Archive 58 No.459). Although this venture came to a halt by the end of the year, it reflected the prevailing spirit of transformation during that time, as well as the extent to which the directives of the central government in China could impact the evolution of the physical landscape of local *Danwei*s. Subsequently, in the eastern and northern sections of the primary workshop located within the factory premises, distribution substations, repair workshops, and other production-related auxiliary structures were erected (Figure 5. 7). New warehouses catering to diverse purposes were established on the vacant grounds of the production area. Furthermore, at the southwest corner of the factory compound, two conservatories were constructed. During the 'Three Years of Difficulty' (The Great Famine) period that followed 1960, endeavours were undertaken to improve the living conditions of the workforce (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). A pig farm was introduced in the northwest corner, while to the north of the Niuzhai substation, a fish pond was established, housing over 5,000 fish (ZUC Archive 67 No.418). Adjacent to the fish pond, a chicken farm was set up. It's worth noting that during the construction of Factory 4 in 1954, a parcel of land measuring 108,957.6m^2 within the eastern part of Factory 3's production area was expropriated and allocated to Factory 4 for its use (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). As a result, the actual physical footprint of Factory 3's complex ended up being smaller than the initially designated land area that had been allocated for production purposes.



Figure 5. 18: Aerial view of the workshop in the production area. The viewpoint of the photograph is facing east, and the jagged single-storey building in the background is the main workshop.

In 1955, a year following, significant progress was made in completing the residential area situated to the south of Mianfang Road (Figure 5. 19). In addition to housing, this area also included various supporting public facilities, with the majority of them positioned on either side of the fountain (Figure 5. 7). By 1955, the amenities within the residential area were mainly centred around a canteen situated on the western side of the fountain (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). This canteen was equipped with functional areas for both Hui and Han cuisine, featuring separate female and male bathrooms located on the ground and first floors respectively. This canteen provided meals for all the families of the employees. Within the canteen premises, there was a barber shop and a tea stove. The tea stove served the purpose of supplying hot water to the on-duty staff in different workshops and departments, a service managed by water carriers (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). A boiler room was set up to provide drinking water for the residential area as well as water for bathing purposes. Upon Factory 3's completion, a primary school building was also present. However, it was not situated within Factory 3's residential area; rather, it was located in the north-eastern section of Factory 1's residential area (ZUC Archive 65 No.0315). Following its initial completion in 1955, Factory 3 initiated a continuous endeavour to amalgamate housing and public service facilities. The constrained dimensions and configuration of the land flanking the fountain precluded the possibility of constructing Soviet-style peripheral-pattern blocks (Figure 5. 8). Capitalizing on its central

positioning, this locale inherently lent itself to the arrangement of public service facilities. In its early stages, the development of public service facilities saw the inception of a 'cooperative' on the eastern side of the fountain in 1956 (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). This single-story structure primarily dealt in the sale of everyday essentials and was accompanied by a public playground situated to the south of the establishment. A kindergarten and an open-air stage, having been distinctively separated from the nursery in 1958 (ZUC Archive 57 No.262), found their home in the triangular space formed by the streets west of the canteen and Xiangrong Street. In 1958, following the call from the State Council for simultaneous development of national education and education within industrial and mining enterprises, various *Danwei*s across the country embarked on establishing schools. To address the insufficiency of existing primary schools in accommodating the growing number of school-age children, Factory 3 responded to the call by repurposing materials from demolished structures on the eastern side of the fountain. They used these materials to construct temporary classrooms (ZUC Archive 59 No.067) and followed the design blueprints of a nursery from 1956 (ZUC Archive 59 No.166). These were utilised as rudimentary teaching spaces. In 1965, the temporary classrooms were dismantled and replaced with a three-story teaching building, which became the new location for the primary school. Simultaneously, the original primary school building in Factory 1 underwent a transformation and was repurposed as a middle school teaching building. Established in 1953, the workers' hospital initially occupied five bungalows. However, by 1966, it was relocated to the bachelor dormitories. In 1972, a medical facility covering an area of 323m^2 was constructed east of the playground, and the medical services were transferred there. In 1982, a nearby three-story building that had formerly served as a primary school for employees' children was repurposed into medical facilities (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). This building was officially designated as the 'Workers' Hospital.' During this period, the mother-child building, designed to accommodate single mothers with infants and toddlers under three years old (Zhengzhou Local History Compilation Committee, 1999), was also situated within the bachelor dormitories. Meanwhile, the guesthouse was initially situated within two residential buildings positioned at the heart of the street blocks to the west of the canteen until 1973 (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). It provided temporary accommodation for visitors and

relatives. In 1961, warehouses were constructed in its southern part, and to the west of the canteen and east of the kindergarten, a grain store was established (dismantled in 1965 and replaced by a much larger one). Subsequently, various service buildings such as grocery stores, savings banks, and sewing clubs were erected (The Editorial Team of the Chronicle for Factory 3, 1987). These buildings were mostly single-story, small-volume structures, dispersed around the space. These service activities, encompassing tasks like nurseries, bicycle repairs, knitting, sewing, and more, played a significant role in mitigating the employment challenges faced by workers' family members (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990).

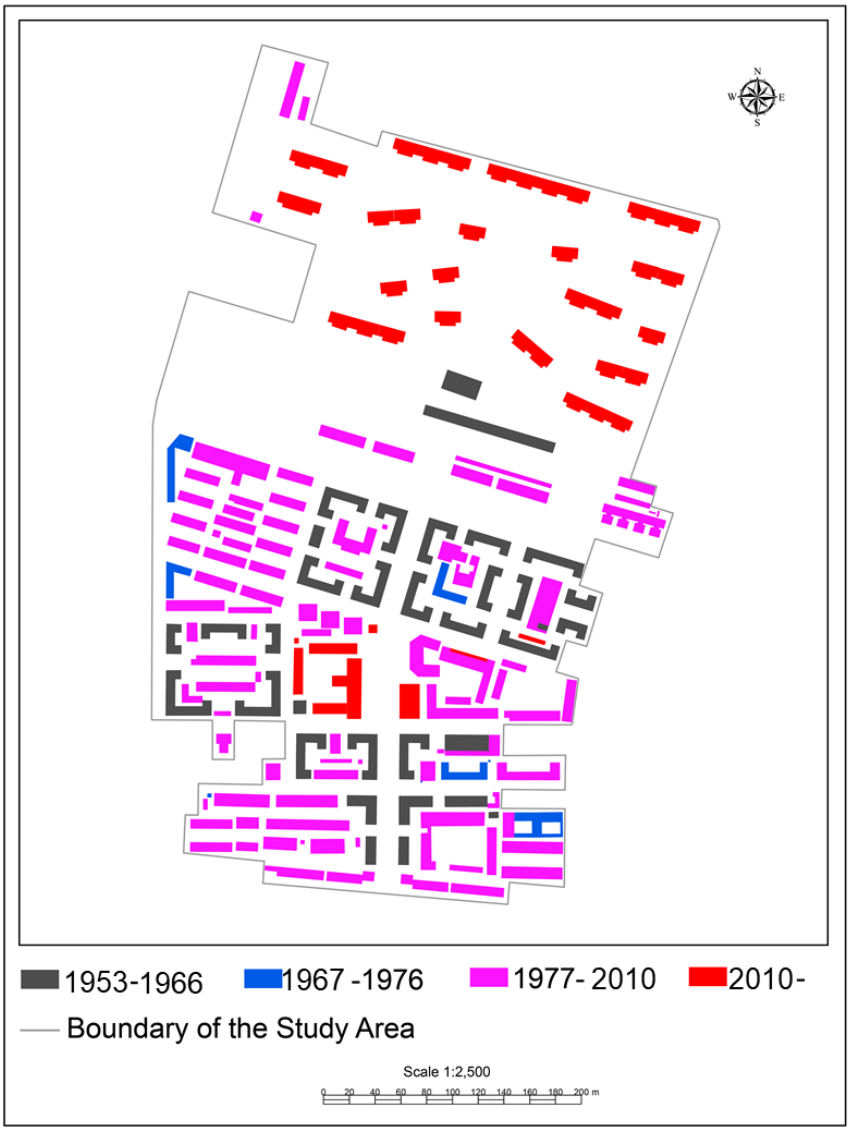


Figure 5. 19: Historical periods of buildings in Factory 3

The repletion process (Figure 5. 48) within residential areas was relatively complex. Although the factory plans envisioned housing structures spanning the entirety of the Factory 3 living area, the actual construction in 1955 predominantly concentrated in the central and northern sections (Figure 5. 15). Significant expanses of fallow land remained untouched in the southern region. In fact, the southern part never had the opportunity for construction in accordance with the initial plan. This is due to the fact that during the construction of Factory 4 to the east of Factory 3, this portion of land was transferred to Factory 4 without compensation (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Furthermore, *Danwei*s like the Henan Textile Machinery Factory occupied the southwestern land of Factory 3, along Jianshe Road and Tongbai Road. Around 1957, the aforementioned *Danwei*s began the construction of dozens of residential buildings in the southern part of Factory 3. Some of these structures still adhered to the Soviet-style architecture, while others adopted simpler architectural styles. Thus, although the visual transformation of Factory 3's living area indicated heightened construction endeavours and increased building density, the main factors driving this change were the involvement of additional construction entities and alterations in land usage rights (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). During this period, a neo-traditional-style (Figure 5. 46) private residence also constructed (No. 7 in Figure 5. 6). It was a courtyard with the main building featuring sloped roofs and being detached and single-storey (Figure 5. 47). It was said to have been specially approved for his owner, who was the prototype of the main character in the movie 'Scout Across the Yangtze,' which was filmed in 1954. To enhance management and utilisation convenience, the residential housing within Factory 3's living area underwent two rounds of exchanges in 1962 and 1965, both led by the Henan Textile Industry Bureau, without any involvement of land property rights issues. Following these exchanges, the residential houses in the north-eastern part of the living area were transferred to Factory 4's usage. Simultaneously, several residences built by Factory 4 in the southern part of Factory 3's area were allocated to Factory 3 (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Furthermore, certain residences in the southwestern part of Factory 3 were assigned for use by the Henan Textile Machinery Factory and other affiliated *Danwei*s (Figure 5. 20). By 1966, the previously fallow eastern side of the southern region witnessed the construction of nine plank buildings owned by Factory 4 buildings (Figure 5. 20). Some of these structures

followed the original developmental direction of the Factory 3, positioned more towards the northern side, while others were arranged along Jianshe Road. This arrangement resulted in an open space in the middle. Additionally, residential units in the southwestern area were spread along Jianshe Road and Tongbai Road, creating small pockets of remaining open land enclosed by the existing Factory 3 buildings (Figure 5. 20).

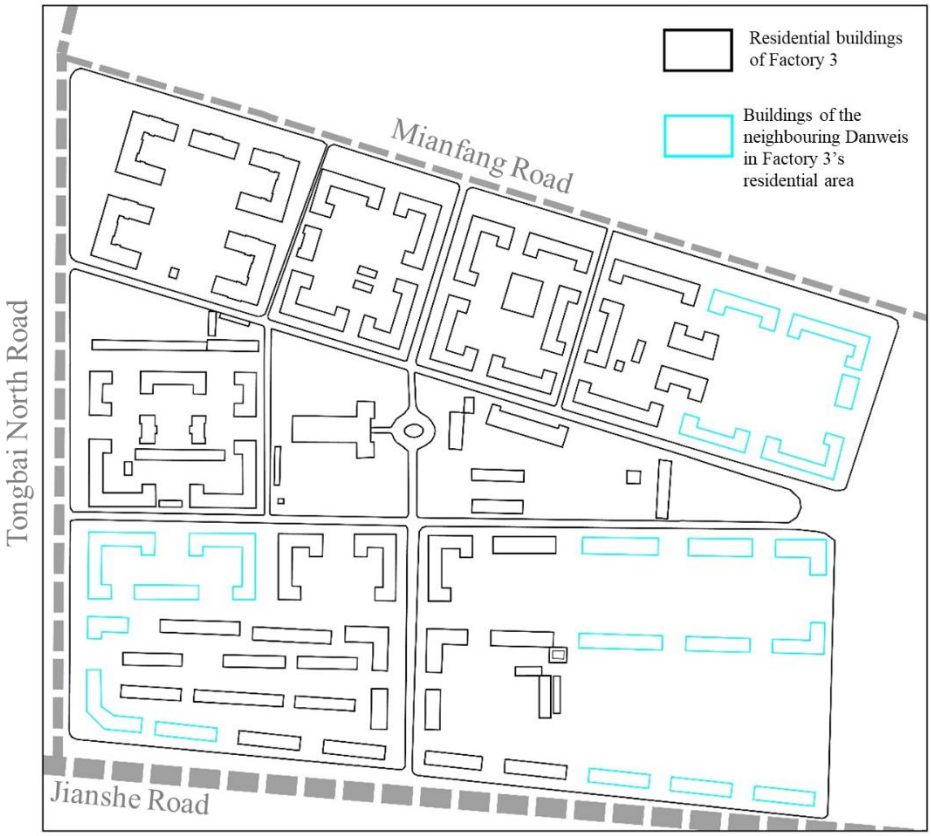


Figure 5. 20: Buildings in the residential area of Factory 3 in 1966 (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990)

Throughout this process, several key observations come to light. First, at its inception, Factory 3 exhibited a relatively modest building density. Predominantly focused on the central and eastern sections, as well as the southern flank, the production area took precedence. Residential buildings to the south of Mianfang Road were thoughtfully positioned closer to the production zone. While the southern side had been earmarked for development, it remained undeveloped, leading to the presence of expansive areas. Secondly, there was a lack of strict delineation between the factory and residential zones. Living facilities, including a day-care centre, were also present within the

production area. Thirdly, following the establishment of Factory 3, a consistent trend was the modification in the layout and dimensions of its land plots. Certain parcels of land were either assigned to neighbouring entities or acquired from them. This process diverged from the conventional concept of parent and derivative plots seen in morphological theories. Instead, it was predominantly influenced by China's prevailing land tenure system during that era. Fourthly, subsequent to the construction of Factory 3, a significant phase unfolded in both the production and residential sectors. This phase was marked by intensive development, yet its trajectory diverges from the traditional process of burgage repletion in urban morphology. Lastly, within the residential sector, communal amenities were thoughtfully positioned around the central hub. Over time, these facilities expanded, encompassing areas to both the east and west of the fountain.

Green space

Zhengzhou is located to the north of Mangshan Mountain and alongside the Yellow River. After passing through Mangshan, the Yellow River enters the easily breached mouth region known for its vulnerability to flooding. Throughout history, the area has experienced multiple shifts in the course of the Yellow River and subsequent inundations, resulting in the widespread presence of sandy terrain throughout Zhengzhou. Prior to the establishment of the People's Republic of China, the city suffered from a significant lack of green spaces (Mao, 2014). Street trees, parks, and urban nurseries were rare. The prevalence of wind and sand persisted throughout the year. Following the founding of the nation, Zhengzhou initiated efforts to combat desertification and promote afforestation. Starting in 1951, a variety of trees including willows, poplars, elms, and locust trees (*Gleditsia or Robina*) were meticulously planted along riversides and roadways. The establishment of nurseries and forested areas further facilitated the availability of resources for afforestation within the sandy regions. In 1954, following Zhengzhou's elevation to provincial capital status, extensive greening initiatives were launched in the newly developed eastern administrative and cultural districts, as well as the western industrial zone (Mao, 2014). The municipal government stipulated that trees should be planted wherever roads were constructed, and greening efforts should follow the establishment of governmental offices and factories. The completion of infrastructure projects was accompanied by comprehensive greening endeavours. This contextual background integrated environmental greening into Factory 3's overarching construction plan from its inception.

Within the production area, four flower beds adorn the front of the office building (Figure 5. 21), each graced with diverse pairs of pine trees (Figure 5. 22). On both the eastern and western flanks, symmetrically designed expansive gardens can be found, succeeded by orchards planted with apple and pear trees (ZUC Archive 67 No.418). The perimeters of industrial buildings and adjacent roads are adorned with a variety of trees including poplars, catalpas, cypresses, and hollies (The Editorial Team of the Chronicle for the Factory 3, 1987). To further enhance the environment, flower beds and greenhouses were thoughtfully incorporated. In the residential area, four distinct gardens contribute to the landscape, and the primary thoroughfares are lined with trees such as London plane trees and white poplars (Figure 5. 23).

During the 'Three Years of Difficulty' period, nearly all flower beds and gardens within the factory zone were repurposed for growing grain and vegetables. Subsequently, in 1965, the prevailing influence of an extreme 'leftist' ideology contrasted the idea of 'planting flowers and plants' with the principles of 'operating enterprises diligently and thriftily' (The Editorial Team of the Chronicle for the Factory 3, 1987). In response to instructions from higher authorities, Factory 3 relocated its entire collection of potted flowers to Bishagang Park and removed the flower beds and pine trees located in front of the office building within the production area.

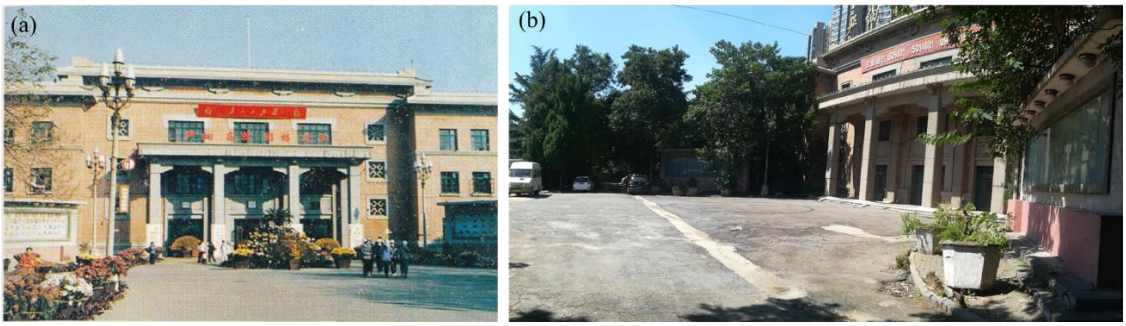


Figure 5. 21: Contrasting green space and flower beds around the office building in the 1980s (a) and 2020 (b). Note that in (a), during the period of Factory 3's good performance in the 1980s, there are lush flower pots in front of the entrance. This stands in contrast to (b), where the current state of the abandoned office building is juxtaposed with its withered surroundings. Photo (a) from (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990) and (b) taken by the author in 2020.



Figure 5. 22: Pairs of pine trees on both sides of the road in front of the office building (Photo taken by the author in 2020). Note that with the office building being deserted, garbage accumulated on the road, and numerous branches of the pine trees, requiring maintenance, remained unattended.



Figure 5. 23: Soviet-style building facade and street trees in the 1950s (Note the native white poplar trees planted along the side of the road initially, which were removed during the Cultural Revolution period)

5.3.3 1966-1976

During the era of the Cultural Revolution, the establishment of the Provincial Revolutionary Committee led to Factory 3 falling under the jurisdiction of the Light Industry Bureau within that committee. By 1967, both the hierarchical administrative structures and production directives had ground to a halt at all levels. Factory operations became reliant solely on the voluntary dedication of the workforce (The Editorial Team of the Chronicle for the Factory 3, 1987). The year 1968 witnessed a power shift as dissenting groups seized control, resulting in the formation of the Factory Revolutionary Committee. The appointed director of this committee held absolute authority over all internal affairs of the factory. Over the course of this decade, a series of established protocols were dismantled. These included systems quality management, maintenance, safety protocols, incentive frameworks, technical training regimens, and production methodologies (The Editorial Team of the Chronicle for the Factory 3, 1987). Moreover, the Workers' Amateur School, founded in 1956, which operated makeshift classrooms during the day within temporary structures adjacent to the dormitories and in the evenings utilised spaces within primary school buildings and workshop meeting rooms, was compelled to cease its operations. Furthermore, economic analysts, regarded by revolutionary factions as proponents of a 'profits-first' ideology, were restructured to operate under the Factory Revolutionary Committee's production group. This led to a diffusion of responsibilities and an unchecked escalation of costs. Despite its gradual pace, the Factory 3 managed to achieve modest strides during the tumultuous period of the 'Cultural Revolution' (The Editorial Team of the Chronicle for the Factory 3, 1987).

Plan and building form of the Danwei

Despite the obstacles encountered, construction activities persisted, both within the production area and the residential zones. The elongated space between the main workshop in the factory area and four warehouses to its north saw a gradual transformation with the addition of more production annexes. These annexes fostered specialized production services, leading to the development of a more complex road system beginning with a new east-west road between this elongated zone and the four northern warehouses (Figure 5. 24).

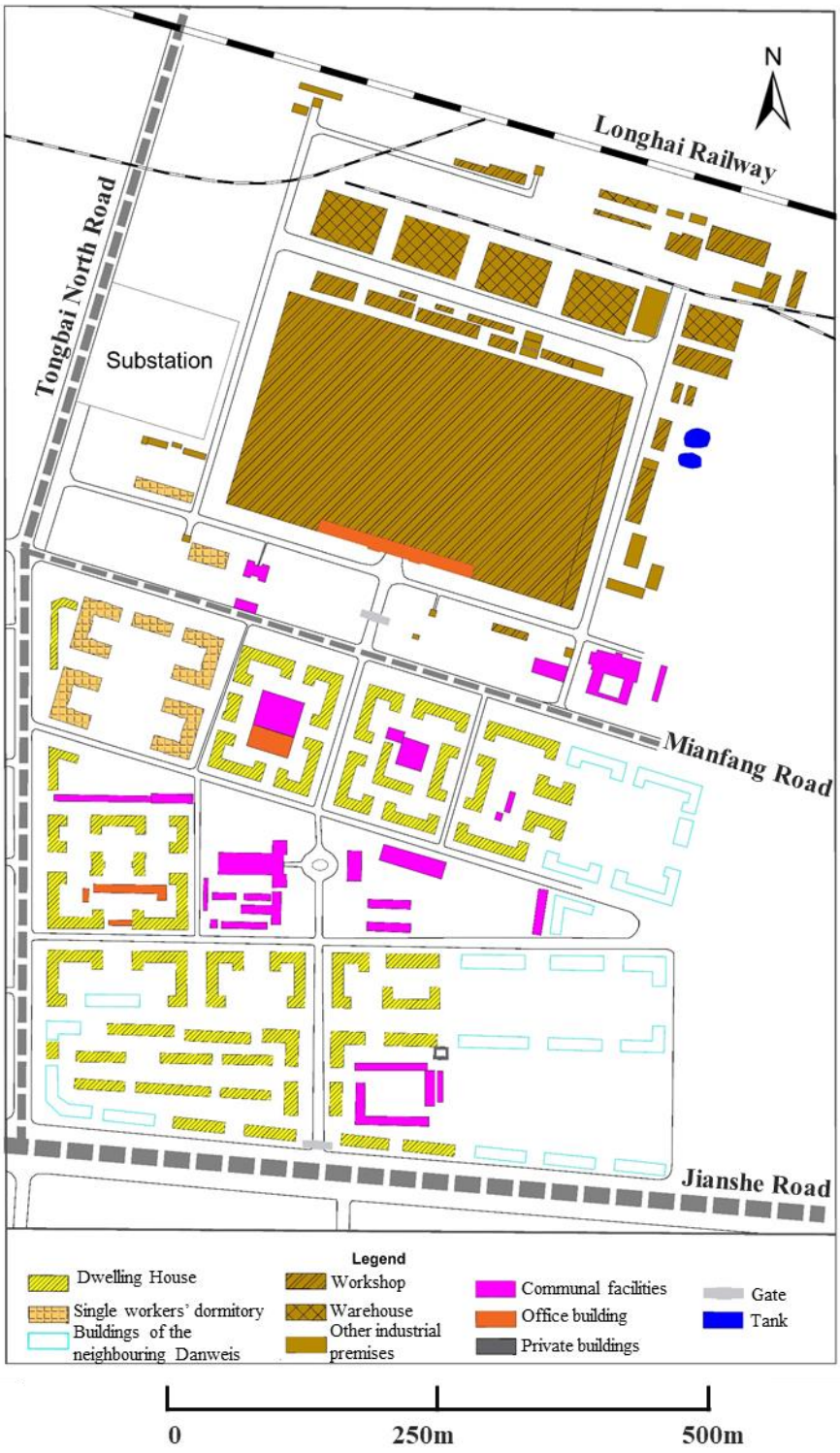


Figure 5. 24: The 1976 plan of Factory 3 and its new road system (Based on records from Zhengzhou Urban Construction archives)

The road system within the residential area saw minimal changes, while the expansion of residential buildings continued. This expansion primarily occurred in the southwest corner, where

eight three-story residential buildings were constructed in 1967, 1972 (ZUC Archive 72 No.189, ZUC Archive 72 No.67), and 1973 (ZUC Archive 74 No.574) (Figure 5. 25). Subsequently, in 1975, a four-story residential building (No. 16 in Figure 5. 6) was added to Lvhua East Street, and an L-shaped residential building (No. 35 in Figure 5. 6) was erected within the blocks surrounding Xiangrong Street (ZUC Archive 74 No.542), incorporating bomb shelters (Figure 5. 26). Furthermore, within the north-western section of Factory 3's residential area, two four-story buildings were incorporated (Nos. 88 and 112 in Figure 5. 6). These structures were intentionally designed with an L-shaped configuration to accommodate the irregular shape of the available land. This design choice optimally utilised the space for construction, ensuring efficient land utilisation. (Figure 5. 27).

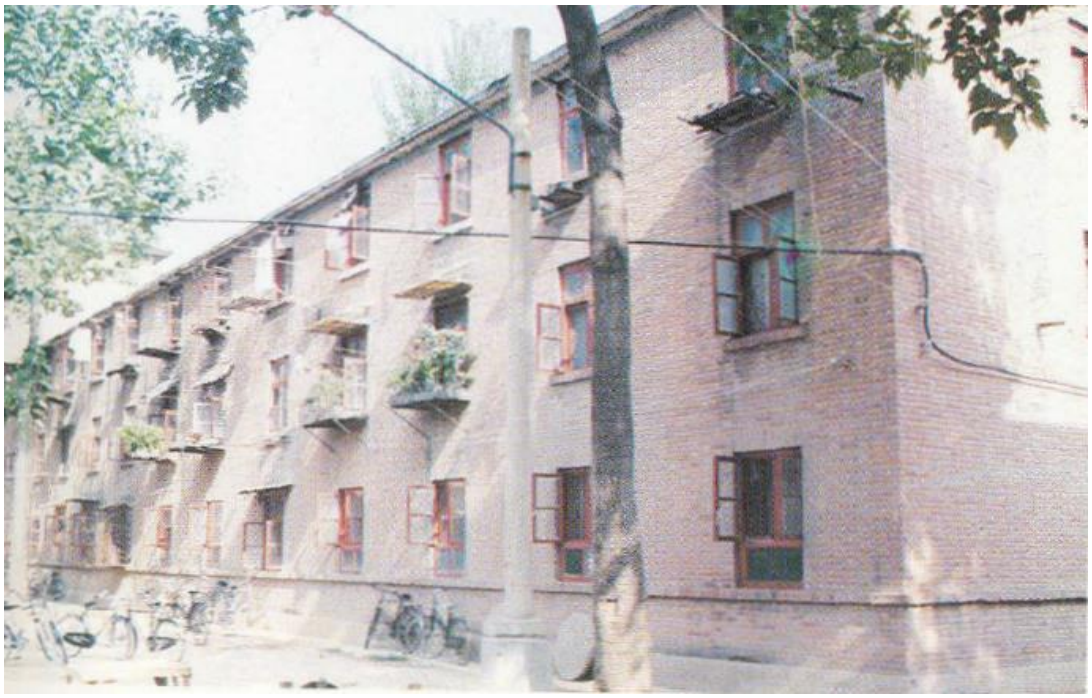


Figure 5. 25: Residential buildings built in 1967 (demolished) (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990)

The housing constructed during the Cultural Revolution was all brick-concrete (Figure 5. 45) with flat roofs (Figure 5. 49), differing from the preceding Soviet-style buildings. The eight buildings erected between 1967 and 1973 comprised one-and-a-half suite apartments, each equipped with one kitchen per unit. Therefore, from a building type perspective, these buildings were considered as simple unit apartments (Figure 5. 47). Among these, six buildings were outfitted with



Figure 5. 26: The L-shaped building situated in the centre of the courtyard, surrounded by a quadrangle of Soviet-style buildings (Photo from https://www.sgss8.net/tpdq/20318779/2.htm, accessed 31st August 2023).

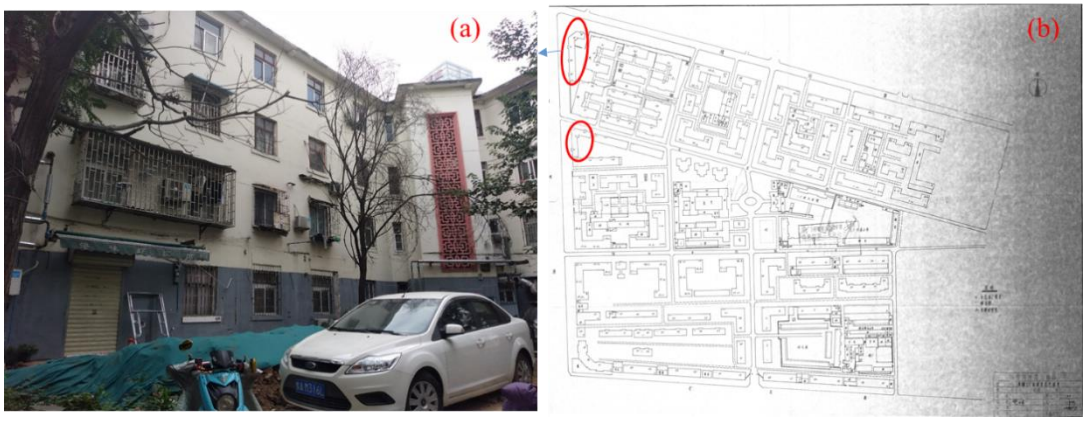


Figure 5. 27: L-shaped residential buildings in the north-western section of Factory 3's production area built in 1975. The ellipses indicate the L-shape buildings. Photo (a) taken in 2020 by the author; (b) from historical mappings of Zhengzhou Urban Construction archives.

shared toilets for both genders on each floor, while two buildings accommodated a shared toilet for

two households. Regarding the majority of the four four-story buildings completed in 1975, they also embraced the one-and-a-half suite apartment style, featuring one kitchen per household and a shared toilet serving two households (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). A minority of units were designed as self-contained apartments, equipped with one kitchen and one bathroom each.

Land and building utilisation

During the Cultural Revolution, the utilisation of land and building purposes within Factory 3 continued to diversify (Figure 5. 19). Within the industrial premises, additional production annexes were established. In 1968, a printing facility was also introduced in the southern section of the factory club area, catering to the printing needs of materials for the factory (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Responding to the city-wide initiative in 1970 to promote small-scale enterprises, a polyester filament workshop was set up within the factory premises. However, due to challenges with raw materials and equipment, production ceased in 1972. The entire equipment set was subsequently allocated without charge to Kaifeng Textile Cotton Factory in Kaifeng (The Editorial Team of the Chronicle for the Factory 3, 1987). Furthermore, a night shift building was constructed in the small garden situated in the southwest corner of the factory premises, offering a tranquil resting environment for workers during night shifts. In 1975, a three-storey mother-and-child building was erected to the west of the nursery in the southern section of the production area. The architectural design resembled that of a bachelor dormitory, featuring shared washrooms and toilets on each floor (The Editorial Team of the Chronicle for the Factory 3, 1987). Additionally, in 1975, the construction of the Zhongyuan chemical plant commenced in the north-western corner of the factory premises. This initiative aimed to generate more employment opportunities for the families of Factory 3 employees (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990).

The expansion of public facilities continued within the residential area. In 1966, a restaurant was newly constructed on the north-eastern side of the department stores Figure 5. 24. By 1968, a courtyard-style kindergarten had been constructed to the north of Jianshe Road and to the east of Factory 3 Middle Street (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990).

In 1973, the construction of the three-storey east teaching building of the elementary school was completed (ZUC Archive 72 No.597). During that same year, a dedicated guesthouse took form to the south of the canteen, adjacent to the western side of the fountain. This guesthouse featured two floors at the front and three at the back (ZUC Archive 72 No.67, ZUC Archive 72 No.247). while the previously occupied family housing structures were restored for residential use. In addition, a prominent project during the Cultural Revolution was initiated in 1969, involving the construction of an extensive underground bomb shelter system extending for a total length of 13,919.66m. This endeavour was undertaken in accordance with Mao Zedong's strategies of 'Prepare for War' and 'Deeply Dig Trenches.' In 1970, a bomb shelter management complex was established to the northeast of the fountain, situated within the blocks surrounding Xiangrong Street (The Editorial Team of the Chronicle for the Factory 3, 1987).

Green space

During the Cultural Revolution, the act of cultivating flowers and plants was subjected to critique as a manifestation of bourgeois taste, resulting in the complete dismantling of greenhouses and gardens. However, the initiative for afforestation and tree planting persisted as a priority (The Editorial Team of the Chronicle for the Factory 3, 1987). During this timeframe, the tree species initially planted during the factory's establishment were systematically replaced with superior varieties such as London plane trees, locust trees, and swamp cypresses (Figure 5. 28).



Figure 5. 28: Different pavement trees on different streets at Factory 3. (a) A street lined with London Planes on both sides. (b) A street lined with swamp cypresses on both sides. (c) Aerial view showing the trees growing alongside residential buildings and streets. (d) A street lined with locust trees on both sides. Note that the aerial view also exposes the distinct canopy shapes formed by the diverse pavement trees. Photo sources: (a) from https://5g.dahe.cn/photo/20201016744367, accessed 31st August 2023; (b) from Baidu Street View; (c) from https://www.huitu.com/photo/show/20220524/191305273039.html, accessed 31st August 2023; (d) from Baidu Street View.

5.3.4 1978-2010

After the 'Reform and Opening-up' period, there were substantial transformations in the regional industrial plans. In 1977, the establishment of the Henan Provincial Textile Bureau led to Factory 3 being placed under the joint leadership of both the provincial and municipal textile bureaus. But in 1980 the factory came under the direct jurisdiction of the provincial government. Then, in 1984, it was once again placed under the oversight of the municipal textile bureau (The Editorial Team of the Chronicle for the Factory 3, 1987). As the 1990s progressed, the textile industry encountered a

series of operational challenges. In 1991, against the backdrop of broader reforms within state-owned enterprises, the Henan provincial government approved the establishment of the Songyue Group in Zhengzhou. This conglomerate was formed by merging various textile enterprises, including Factories 1, 3, 4, 5, 6, and the Zhengzhou Dyeing and Printing Factory (Fan, 1997). The reorganization was to foster robust collaborations and establish a comprehensive conglomerate that extended beyond industries, geographical regions, ownership structures, and international markets. This ambitious endeavour aimed to propel Zhengzhou's economic development. By 1997, a pivotal reorganization occurred. The Zhengzhou Municipal Textile Industry Bureau was disbanded, and in its place emerged the Zhengzhou Textile Holdings Corporation. This newly formed entity merged with the Songyue Group, creating a unified organization to oversee and manage state-owned assets in the textiles, dyeing, printing, clothing, and related sectors (Fan, 1997). In 2002, in response to changing circumstances, the Zhengzhou municipal government decided to dissolve the Zhengzhou Textile Holdings Corporation and the responsibility for administrative management and the ambitious task of reforming Zhengzhou's large-scale textile enterprises then squarely shifted to the Songyue Group, a role that mirrored the functions previously held by the Textile Industry Bureau.

As a consequence of this broader regional transformation, Factory 3 necessarily also changed rapidly. In 1979, Factory 3 embraced the national directives. By September of the same year, the factory had proactively initiated the experimental implementation of economic reforms aimed at broadening enterprise management autonomy, a transformation that was formally realised in 1980. This progressive shift embraced a dual-track system that harmonized mandatory and advisory plans (The Editorial Team of the Chronicle for the Factory 3, 1987). While mandatory plans aligned with state-assigned tasks, advisory plans empowered enterprises with autonomous decision-making authority over certain aspects of production and sales, fostering a partial independence in these areas. Post reform, the factory also gained a measure of control over raw material procurement and the prerogative to conduct inspections based on national standards. Starting in 1979, a 30% share of increased profits was allocated to the factory, a substantial departure from prior practices. Nonetheless, the subsequent years, particularly from 1982 onward, witnessed a decline in the profit share due to factors like price adjustments (The Editorial Team of the Chronicle for the Factory 3, 1987). With expanded authority came the capacity to reinvest profits in equipment upgrades and

technological advancements, while also enabling the enhancement of employee dormitory facilities (see above). At the same time, various other systems within the factory, encompassing salary structures, incentive programs, and housing allocations, underwent corresponding reforms. These changes unfolded against the backdrop of nationwide transformations in financial, land, and educational systems, accompanied by the introduction of foreign investments. Collectively, these factors contributed to the gradual dissolution of the *Danwei* system at a national level. The institutional changes were manifested in the physical transformation of Factory 3. They guided and shaped the factory's morphological evolution in the subsequent years.

Plan and building form of the Danwei

After the economic system reform, Factory 3 had access to increased funds for productive and residential construction. Concurrently, the rising demand for housing necessitated the construction of additional residences, gradually filling both the production and residential areas. Within the factory premises, more production and ancillary buildings were erected on previously fallow land. Additionally, the introduction of foreign capital into China during the 'Reform and Opening-up' era led to the emergence of Sino-foreign joint ventures, this included the construction of factory buildings for Zhengzhou Hongrun Textile Co., Ltd. in the southwestern corner of the production area of Factory 3 (ZUC Archive 87 No.877). All these changes collectively influenced the evolution of Factory 3's physical configuration, including further changes in road system (Figure 5. 29).

In the residential area, the road system underwent a transformation, becoming increasingly intricate. It not only provided access to individual buildings but also included dedicated entrances for each housing unit. Furthermore, as the construction of additional residences and living facilities persisted, more secondary roads emerged, contributing to the development of a more complex road network. During this period (Figure 5. 19), the newly constructed residences were predominantly multi-storey brick-concrete structures (Figure 5. 45), with five or more floors (Figure 5. 30), forming complete unit apartment buildings. Each unit was equipped with a kitchen and toilet, and the vast majority also featured a living room and balcony (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990).

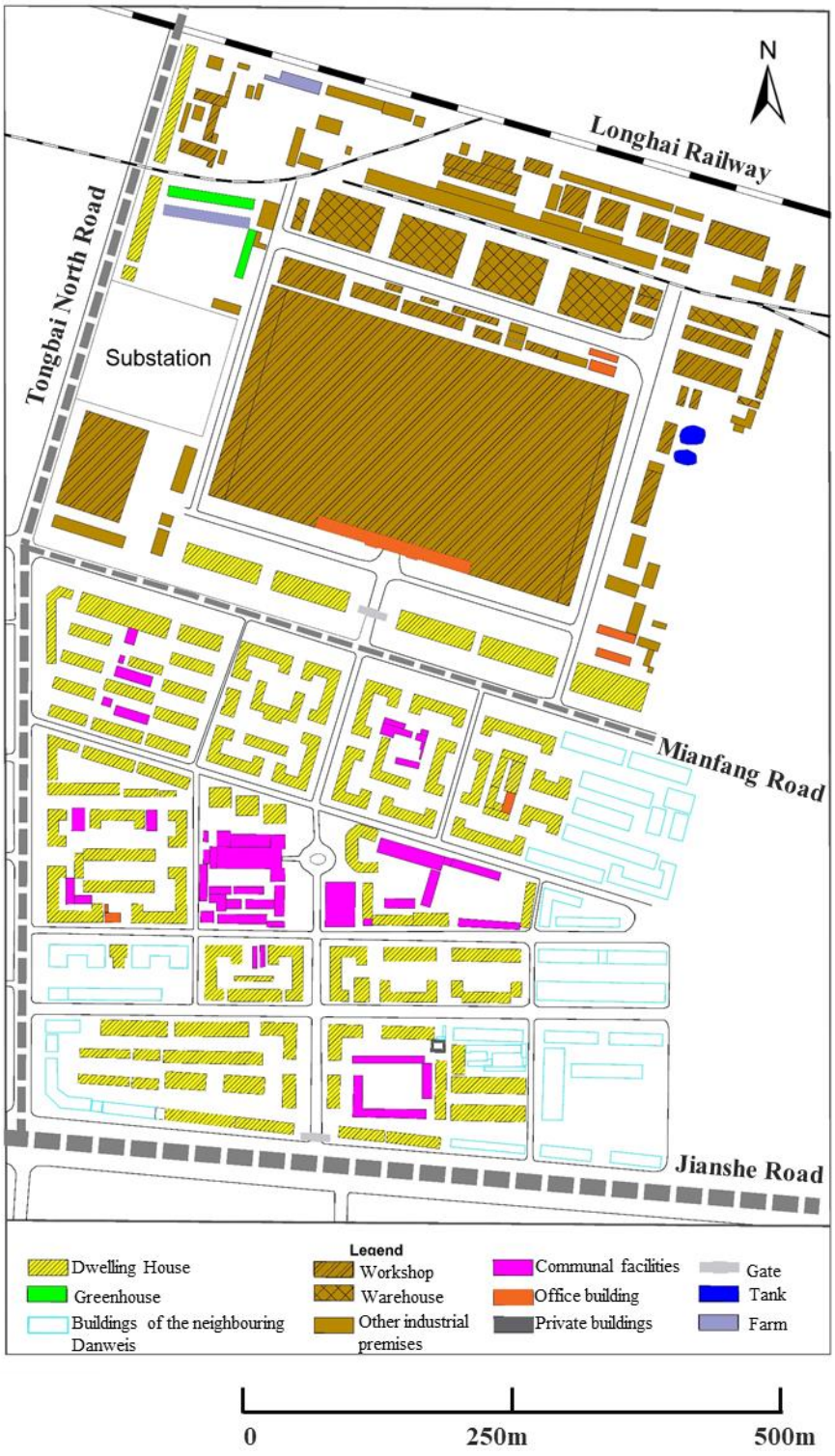


Figure 5. 29: The plan of Factory 3 in 2011 (based on ZUC Archive 85 No.209, ZUC Archive 82 No.287) and combined with historical images from Google Earth)

Regarding interior decor, the previous houses featured wooden doors and windows, while furniture like beds and desks were uniformly provided by the *Danwei*. A notable shift occurred in

the late 1980s with the construction of young workers' residences. Prior to moving into the new houses, employees often carried out certain levels of internal decoration, including floor installation and bathroom tiling. Some households even ventured into installing suspended ceilings, aluminium alloy windows, and enclosed balconies. This period marked the beginning of personal investments by Factory 3 employees in decorating their residences (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990).

Land and building utilisation

Due to the increased demand for production expansion and the bolstered economic autonomy of Factory 3 following economic system reforms, alongside the 1981 decision by the Zhengzhou Municipal Committee to cease the practice of sending educated youth to rural areas, there was a gradual return of Factory 3 workers' children who had been sent to the countryside since 1968 in response to Mao Zedong's call for 'educated youth to go to the countryside and receive re-education from poor and lower-middle peasants' (The Editorial Team of the Chronicle for the Factory 3, 1987). Consequently, repletion in both the production area and residential quarters of Factory 3 continued to take place. Factory 3 addressed the employment needs of educated youth permitted to remain in the city by establishing a labour service company. This labour service company is divided into three categories. First, established in 1979, the Labour Production Cooperative Society initially constructed a two-story restaurant for Hui people (south of the factory's canteen, ZUC Archive 79 No.42), and a second guesthouse was built to the south of the first. In 1981, Factory 3 utilised civil defence engineering to establish a resin cloth factory and it established a resin cloth wholesale department to the east of the main gate in the residential area and inaugurated a department store on Jianshe Road (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Secondly, the Hongwei Processing Factory was established in the northeast corner of the residential area. Its origins traced back to 1977 when educated youth from Nancao Farm in the Zhengzhou Guancheng Hui District, associated with Factory 3, founded it as a side line. Throughout the 1980s, it underwent gradual expansion, culminating in the construction of a new three-story building for workshops and offices in 1987 (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Thirdly, the Zhongyuan Chemical Factory, established after 1978 (see above), underwent three rounds of expansion in the northwest corner of the production area. As for the original production area of

Factory 3, in addition to further expanding the production workshops (ZUC Archive 82 No.114), a specialized gun depot (ZUC Archive 80 No.367) was established to manage the storage of weapons and ammunition. The period also saw the construction of numerous ancillary structures such as covered platforms (ZUC Archive 78 No.445), warehouses (ZUC Archive 79 No.537), observation towers, fire brigade garages, and bicycle sheds (ZUC Archive 79 No.42), all intended to support production activities. In 1990, the establishment of Zhengzhou Hongrun Textile Co., Ltd. prompted the construction of production buildings and cold storage stations in the southwestern corner of the factory area (ZUC Archive 88 No.877, ZUC Archive 88 No.918). These new structures substituted the original greenhouses and flowerbeds (ZUC Archive 88 No.859). The relocated facilities were positioned north of the chicken farm (formerly a fish pond), resulting in the appearance of two further buildings. The pressing housing shortage for employees in 1987 led to the construction of residential buildings that extended beyond the confines of the original residential area. Prior to Factory 3's restructuring, at least seven residential buildings were erected within the factory area (see below).

The morphological evolution of the residential area is more intricate. This complexity stemmed from two primary factors. First, the land ownership within the residential zone was diverse. Beyond Factory 4 and Factory 6 encroaching on Factory 3's territory, the early 1980s witnessed additional entities occupying portions of Factory 3's south-eastern corner, including the Mianfang Road Office, a coal plant, and the Yamei Children's Clothing Factory (The Editorial Committee of the Real Estate Chronicle of Factory 3, 1990). Moreover, in the central open space of the group of buildings east of the bachelor dormitory area, a processing plant named Zhongyuan Garment Factory emerged, replacing the former neighbourhood committee and sewing society. Along the Jianshe Road, shops owned by other *Danwei*s were established. The second factor is that, following the economic system reform, and in the face of challenging living conditions, the repletion and replacement processes within the residential area accelerated.



Figure 5. 30: Number of floors of buildings at Factory 3

During the period from 1979 to 1982, at least ten five-storey residential buildings were constructed (Figure 5. 30) (ZUC Archive 80 No.202, ZUC Archive 80 No.366, ZUC Archive 82 No.826), fitting into available spaces like puzzle pieces within the northwest, southwest, and southeast sectors of the residential area. This strategic placement made use of the gaps between existing structures (ZUC Archive 79 No.321). The year 1982 marked the commencement of a distinct expansion approach for Factory 3, characterized by an 'enclave-style' invasion. In this context, Factory 3 acquired and developed two neighbouring enclaves not far from it (beyond the scope of this case study). In 1986, a six-storey residential structure (Figure 5. 30) was built in the

southwest region of Lvhua West Street, catering to the accommodation needs of retired officials and engineering professionals (No. 64 in Figure 5. 6) (ZUC Archive 84 No.853). However, these newly constructed housing units proved insufficient to meet the growing demand.

The 1980s, in particular, saw a nationwide housing crisis, which predominantly impacted the younger population. This issue was largely a result of the maturation of individuals born in the 1950s and 1960s, leading to the need for separate living arrangements. The situation was particularly acute at Factory 3 and other textile factories in Zhengzhou, thus becoming a significant factor contributing to the construction of residential units at Factory 3 in the 1980s. Reports documented instances where 110 worker households resided within the 48 mother-and-child single rooms at Factory 3. Within a single room, 2 to 3 households coexisted, and occasionally, up to four households shared the same confined space. The living conditions of veterans were equally constrained, as evidenced by cases where three generations, totalling 12 individuals, squeezed into a meagre 28m^2 area (ZUC Archive 87 No.159). Drawing from an assessment of housing conditions for young workers, joint research and deliberations involving the Deputy Governor of Henan Province, the Mayor of Zhengzhou, and other relevant stakeholders led to a policy response in 1987 (ZUC Archive 87 No.160). This policy included the renovation of mother-and-child buildings and dormitories, as well as the construction of two eight-story dormitories for young workers in the north-western section of the production area (Figure 5. 30) (ZUC Archive 87 No.492, ZUC Archive 87 No.493). In this period, the impetus of development at Factory 3 was the construction of buildings for young workers and single mothers and their children.

Among these new buildings, a young worker's building (No. 105 in Figure 5. 6) was erected within the area enclosed by the bachelor dormitory buildings (ZUC Archive 87 No.488). To the north of the canteen, three identical point-style buildings (Nos. 70, 71 and 72 in Figure 5. 6) were built for young workers. Among them, one building housed the factory's television studio on the eighth floor (ZUC Archive 87 No.495, ZUC Archive 87 No.496). In 1988, two buildings (Nos. 50 and 51 in Figure 5. 6) were erected to accommodate young workers on the site where two three-story buildings along Lvhua West Street had been previously demolished (ZUC Archive 88 No.637). Furthermore, a mother-and-child building was constructed to the west of the hospital (ZUC Archive

87 No.489), and an additional mother-and-child building was added within the space enclosed by a group of Soviet-style buildings (No. 60 in Figure 5. 6) (ZUC Archive 87 No.490). Additionally, another six-storey mother-and-child building (No. 22 in Figure 5. 6) was located to the south of the hospital (ZUC Archive 87 No.491), and two more mother-and-child buildings (Nos. 6 and 11 in Figure 5. 6) were situated to the east of the kindergarten (ZUC Archive 87 No.494). During this period, newly constructed residences exhibited three distinct characteristics. First, their primary focus was on finding any available space, regardless of its size, as evidenced by their use of interior spaces within the Soviet-style group of buildings. The only exception was the construction of two seven-story buildings in 1988, while the demolition of the previous three-story buildings was primarily driven by a land dispute between Factory 3 and Factory 6. Secondly, in terms of location selection, they favoured corner areas, proximity to public facilities, or adjacency to bachelor dormitories. One reason for this preference was still connected to public ownership, as these areas, to some extent, possessed more public attributes compared to residential housing with designated occupants, thus minimizing potential disputes. Thirdly, in terms of height, buildings during this period surpassed six stories (Figure 5. 30).

Public service spaces designated for schools and clinics underwent a gradual transformation due to the expansion of residential development. For instance, the original clinic was dismantled, and a three-story residential building that had formerly functioned as an elementary school was repurposed for medical services. Subsequently, the elementary school was relocated to the eastern area and established on an empty plot on the eastern side (ZUC Archive 81 No.200). Within the production premises, in 1978, separate men's and women's bathhouses were constructed outside the entrance gate of the production area (ZUC Archive 78 No.150). These bathhouses were subsequently replaced by residential buildings in 2004 (see below, Figure 5. 48). Two eight-story residential buildings for young workers were constructed along the west side of the poultry farm, adjacent to Tongbai North Road, including mother-and-child units on the 7th and 8th floors. This development highlighted that the intensively constrained living conditions had compelled residential expansion into the remaining available space within the production area.

It is evident that several key trends have emerged. First, the need for additional dwellings has

led to a shift in the height of residential buildings, transitioning from the original three-story structures to now encompassing six or even eight stories. Secondly, the available land within Factory 3's premises has been maximally utilised, thereby prompting the adoption of a strategy that involves dismantling existing structures to make way for new ones. As a result, in 1993, the removal of a bicycle shed in the eastern section of the bachelor dormitory area paved the way for the construction of a seven-story point-style residential building. In the early 1990s, two novel housing forms emerged at Factory 3. The first entailed adding five storeys atop the original three-story mother-and-child buildings in the bachelor dormitory area, thus transforming them into eight-story residential complexes. This marked Factory 3's only instance of expanding residential housing capacity by adding extra floors (ZUC Archive 91 No.236). Thirdly, in 1993, the original department



Figure 5. 31: The first residential building to receive planning permission as a 'commercial-residential complex.' During its construction, the majority of the surrounding buildings were below 7 stories, making it stand out prominently and symbolize modernization. (Photo from https://m.thepaper.cn/newsDetail_forward_22036499?commTag=true, accessed 31st August 2023)

store located to the east of the fountain was replaced by an eight-story building (No. 26 in Figure 5. 6, Figure 5. 48). This new structure featured a ground floor designated for commercial use, while the upper floors were allocated for residential purposes (Figure 5. 31). This event marked a significant milestone for Factory 3, as it became the first newly-built residential building to receive

planning permission for use as a ‘commercial-residential complex’ (ZUC Archive 93 No.732). This development subsequently set the tone for the design of residential buildings along the street and underscored the growing prominence of commercial activities in the post reform era. This trend should be examined alongside the subsequent discussions about the varied commercial activities at Factory 3 during the same period (see below).

During the 1990s, the demand for housing continued to be intense. In order to improve the living conditions, a seven-storey building (No. 92 in Figure 5. 6) was built near Mianfang Road (ZUC Archive 93 No.397) and another seven-storey (No. 15 in Figure 5. 6) was erected near Factory 3 Middle Street (ZUC Archive 93 No.418). In 1995, a seven-storey teacher’s residence (No. 25 in Figure 5. 6) was constructed for the educators of Factory 3’s school (ZUC Archive 95 No.333), with funding provided by both the teaching staff and the enterprise’s internal resources. At the same time, on a national scale, the exploration of urban housing system reform was initiated. This initiative aimed to address the housing challenges faced by low- and middle-income urban dwellers and households with housing difficulties. In 1993, the State Council introduced the concept of the ‘Anju Project’ and subsequently issued the ‘National Anju Project Implementation Plan’ in 1995, marking the official nationwide commencement of the initiative. This initiative, alternately known as the ‘Comfortable Housing Project’ or the ‘Housing Project for Low-Income Families,’ encompassed government-led construction of socially safeguarded housing. It involved the direct sale of housing units to urban residents from low-income families at cost prices, with priority granted to those who lacked homes, resided in hazardous conditions, or encountered housing challenges (Zhao, 1996). Zhengzhou became one of the first pilot cities for the ‘Anju Project’ in the country (Yu and Ning, 1995). In the same year, the Zhengzhou Municipal Government issued a directive outlining the construction of the Anju Project. Factory 3 was allocated a floor area of 15,000 m^2 for the Anju Project, resulting in the construction of three six-story residential buildings (Nos. 56, 59 and 79 in Figure 5. 6) in 1995 (ZUC Archive 95 No.783). Additionally, another building (No. 126 in Figure 5. 6) was erected in the north-western corner of the factory premises (ZUC Archive 96 No.121), replacing the former Zhongyuan Chemical Factory after its demolition (Figure 5. 48). However, these efforts fell far short of meeting the ongoing housing needs. According to the survey results, it was revealed that in 1997, Factory 3 still accommodated 470 households classified as extremely

disadvantaged, with an average living space of less than 4 m^2 per person. Moreover, there were 800 households of workers without adequate housing (ZUC Archive 87 No.496). In light of this scenario, the municipal government allocated a floor area of 40,000 m^2 to Factory 3 for the implementation of another 'Anju Project'. This allocation paved the way for the implementation of what were termed '97 Anju Project' and '98 Anju Project.' These initiatives had a significant impact on the physical layout of Factory 3. From 1997, the traditional Soviet-style houses in the original bachelor dormitory area (excluding the aforementioned mother-and-child buildings) were wholly dismantled. A series of eight six-story residential buildings (Nos. 97~100 and 108~111 in Figure 5. 6) and two seven-story commercial buildings (Nos. 106 and 107 in Figure 5. 6) were constructed, with the latter situated along Mianfang Road (ZUC Archive 97 No.546, ZUC Archive 99 No.322). Within the factory premises, significant transformations occurred as well. The original southeast corner club and printing office were replaced by a seven-story residential building (No. 118 in Figure 5. 6, Figure 5. 48).

In 1998, following the comprehensive implementation of housing commercialization in China, the central government responded to the housing needs of middle- and low-income families, as well as households facing housing difficulties, by introducing the concept of 'economical affordable housing.' This approach involved government-backed support for housing projects that were both economically viable and practical, with the aim of providing social housing. The operational strategy included waiving various fees, such as land transfer costs, for real estate developers to reduce overall expenses. Furthermore, the government placed restrictions on aspects like selling prices and eligibility criteria. In light of Factory 3's persistent housing challenges, the Zhengzhou Economic Affordable Housing Construction Management Centre approved Factory 3's proposal for a relief plan spanning 60,000m^2. Consequently, in 2002, a total of six six-story buildings were constructed in the southern part of Factory 3's residential zone, each designated as Solution No. 1 through No. 6, respectively (ZUC Archive 2002 No.4, ZUC Archive 2002 No.11). Among these, two buildings were positioned at the southwest corner of the residential area (Nos. 53 and 54 in Figure 5. 6), two (Nos. 46 and 47 in Figure 5. 6) along Jianshe Road (with commercial spaces on the ground floor), while the remaining two (Nos. 9 and 10 in Figure 5. 6) were constructed on land

formerly occupied by a coal field and the Yamei Children's Clothing Factory[11].

In 2003, Factory 3 embarked on its final residential construction endeavour within its premises. Three six-story buildings were erected, designated as affordable housing units (ZUC Archive 2003 No.245). Among these, two buildings (Nos. 2 and 3 in Figure 5. 6) were strategically positioned along Jianshe Road, featuring commercial spaces on their ground floors. The third building (77 in Figure 5. 6) found its place south of the original bachelor dormitories, nestled within the neighbourhood. This was the last residential construction within the residential area of Factory 3 before its restructuring. Due to housing shortages for recently hired graduates and contract-based agricultural laborers, Factory 3 obtained the local government's approval to construct four new six-storey affordable housing buildings (Nos. 113~116 in Figure 5. 6) at the entrance of the factory (ZUC Archive 2004 No.245). These six-storey (Figure 5. 30) modern-style (Figure 5. 46) structures were unit apartments (Figure 5. 47), specifically designed as accommodations for young workers, effectively addressing the persistent housing scarcity. This project marked the final expansion of residential facilities across the entire premises of Factory 3 before its reorganization. As a result of this initiative, both the residential and production areas of Factory 3 achieved their highest historical building density (Figure 5. 19 and Figure 5. 29). In the past, residential buildings within the production area were limited to expanding into the peripheral edges on the east and west sides. However, the recent expansion into the space in front of the factory entrance indicated that Factory 3's role in production has indeed become weaker. This change was already hinted at by the factory's poor performance during the 1990s. This trend will also play a significant role in shaping the future physical transformation of the factory area in the next developmental phase.

Throughout the late 1980s and 1990s, there were notable expansions and new constructions within the realm of public service facilities. A significant event in 1987 involved the construction of a six-storey elevator-equipped building (No. 29 in Figure 5. 6) on the eastern sector of the hospital grounds, augmenting the hospital's stature (Archive 87 No.457). The former playground was improved by a new grandstand, administrative building, and perimeter fencing (ZUC Archive 92

[11] Following coordination with the municipal government, the City Coal Construction Corporation consented to restore the land formerly utilised by the coal yard to Factory 3, employing a combination of monetary compensation and employee housing placement.

No.444). The existing kindergarten was dismantled and replaced with a three-story educational building (No. 5 in Figure 5. 6, ZUC Archive 92 No.525). The year 1995 witnessed the replacement of the east teaching building with a new residential complex (No. 25 in Figure 5. 6) for faculty members, and the south teaching building, originally comprising three floors, underwent an extensive augmentation into a six-storey building (No. 24 in Figure 5. 6, Archive 95 No.335). In the context of concurrent residential construction endeavours, it became apparent that the evolution of public service facilities in the 1990s exhibited two discernible characteristics. First, the expansion of public service infrastructure remained notably restrained compared to the expansive scope of residential projects. Secondly, a portion of the land initially designated for public amenities underwent a transition, repurposed for residential use. This shift underscored a pronounced demand for housing during this period.

Factory 3 also witnessed the emergence of another distinctive feature – the proliferation of commercial activities. As China's 'Reform and Opening-up' policies expanded nationwide, advocating for the growth of the tertiary sector, Factory 3 actively responded to this call. The earliest record in Factory 3's planning and licensing application archives, in response to this commercial trend, dates back to 1985 when approval was granted for converting half of the ground floor of a residential building on Jianshe Road into shops and adding display windows (ZUC Archive 85 No.342). Subsequently, more ground floors of residential buildings located adjacent to the main gate along Jianshe Road and Tongbai North Road applied for the addition of display windows (ZUC Archive 86 No.447, Archive 86 No.321, Archive 87 No.89, Archive 87 No.119). As a result, an increased number of storefronts were refurbished. Following these successful initiatives, in 1993, an application was submitted to convert the entire ground floor of a residential building on Jianshe Road, spanning a length of 46m, into commercial space, which was subsequently offered for rent. The recorded reason in the archives cited 'to facilitate the development of the tertiary sector within our factory, with a portion allocated for external leasing' (ZUC Archive 93 No.294). Subsequently, outside the residential buildings along Mianfang Road, two separate one-storey commercial structures were erected (ZUC Archive 93 No.356), spanning a combined length of 147m (Figure 5. 32). Then, with the intention of promoting the growth of the tertiary sector, in 1993 an application was filed for a 'Karaoke Restaurant' (ZUC Archive 93 No.664). This establishment was erected

between two Soviet-style residential buildings on the southern side of the former bachelor dormitory area, facing Tongbai North Road. In 1997, to address the issue of re-employment for laid-off workers, the bungalows of the Second Guesthouse were also demolished and repurposed into food stores. (ZUC Archive 97 No.205). Due to the persistent unemployment problem among the laid-off workers, the ground floors of six buildings on Jianshe Road, totaling 134.4m in length, were submitted for conversion into commercial spaces (ZUC Archive 92 No.325, ZUC Archive 92 No.974, ZUC Archive 97 No.208, ZUC Archive 98 No.556). All of these instances serve as evidence of the substantial influence exerted by the unleashing of economic vitality under institutional reforms on the urban landscape and form of Factory 3.

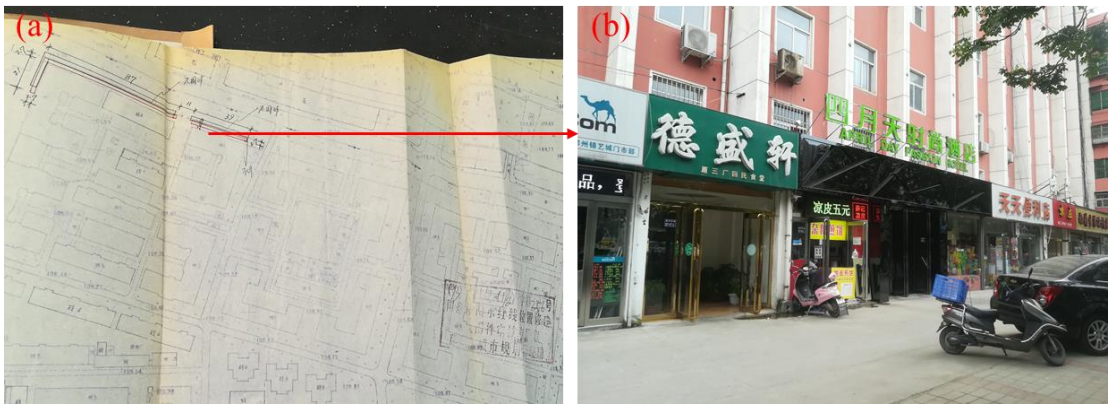


Figure 5. 32: Newly constructed commercial facilities on the ground floor of residential buildings on Mianfang Road. (a) Plan of the planning application; (b) a variety of business types on the ground floor, including a hotel, a canteen, a convenience store, and more (Photo taken by the author in 2020).

The market-driven economy breathed life into Zhengzhou textile factories during the 1980s and early 1990s, but the late 1990s brought its share of challenges. Escalating raw material costs and aging equipment triggered a downturn that led to layoffs, including those at Factory 3. In 1997, additional ground floors of residential buildings located in the southern section of the residential quarters, facing Jianshe Road, underwent transformation into commercial spaces. This initiative was undertaken to tackle the issue of re-employment for laid-off workers (ZUC Archive 93 No.20). Additionally, the bungalows of the second guesthouse to the south of the canteen were razed, making way for small food shops to provide alternative employment opportunities for displaced workers. Moreover, in alignment with governmental initiatives aimed at enhancing urban aesthetics, 1998

witnessed the renovation of the ground floor of the central dry-cleaning section on Jianshe Road, a part of the Labour Service Company of the original Factory 3. After the old storefront was dismantled, a modern storefront was constructed, featuring contemporary commercial elements such as neon lights. Concurrently with the legal endorsement of transitioning ground-floor spaces from residential to commercial use along city roads, an accompanying phenomenon unfolded within the internal landscape of Factory 3's residential quarters. A significant number of ground-floor residential units situated alongside the streets were repurposed into various establishments including shops and restaurants. The direct physical consequences of this transformation were twofold. First, the formerly uniform and neatly arranged facades of residential buildings became adorned with a multitude of commercial signs following these changes. Secondly, the windows of rooms that once overlooked the road were converted into doors, altering the configuration of rooms that formerly faced inward corridors, to open directly onto the street. This phenomenon was pervasive within the internal layout of Factory 3, particularly in the ground-floor facades of residences situated around roads, schools, hospitals, and other adjacent public service facilities, including the central axial streets (Figure 5. 33).



Figure 5. 33: Transformation of street-facing residential facades due to ground floor conversion into shops. (a) Soviet-style building facade in the 1950s; (b) After the ground floors were repurposed as residences, the original windows were transformed into doors (Photo taken in 2018 by the author).

As economic reforms proceeded, Factory 3 gradually embarked on a phase of de-*Danwei*zation. In 1999, the notion that urban enterprises should progressively transfer the oversight of their affiliated schools, hospitals, and other social service institutions to local governments for

comprehensive management was introduced centrally. Consequently, between 1999 and 2000, the kindergarten, primary school, and middle school originally under Factory 3's jurisdiction were all relinquished to the administration of the Zhongyuan District government (Zhongyuan District Local Chronicles Compilation Committee, 2008). The reform of the hospital, however, progressed more slowly and encountered challenges and has not yet been completed.

During this period, a significant morphological phenomenon emerged: within the process of replacing old structures with new ones in Factory 3, the demolition efforts were often strictly limited to buildings for which the government had received explicit planning applications. Structures outside this scope, even those situated nearby and aged, or even those deemed unsafe, were not subject to demolition. This can be explained from the perspective of property delineation under socialist public ownership. While Factory 3's assets were fundamentally publicly owned, practical decision-making did not grant individual workers absolute responsibility or rights over assets. This ambiguity in property ownership gave rise to an uncertain realm in disposal strategies.

For these old properties, no individual possessed the authority to dismantle them or claim them as their own, a phenomenon that has already been analysed by scholars (Heller, 1998). Therefore, in practice, convenience is often extended to users of neighbouring structures or those who already occupied them. For the former, adding a wall could be used to create a relatively enclosed 'private' courtyard, and such arrangements were seldom challenged. This was due to the temporal, emotional, and institutional costs involved. Thus, it led to a multitude of aged structures within Factory 3, augmenting the diversity of the landscape. The morphological changes during this period exhibit the following characteristics. First, as small factories within the original residential area, like the Hongwei Processing Plant, ceased operations, part of their production workshops were transformed into residential spaces or commercial rentals (Archive 87 No.991) Secondly, due to practicality or emotional preferences, Chinese people often favour courtyard spaces. Thus, temporary facilities were frequently added around these buildings, and they amalgamated with surrounding structures to form courtyard-style layouts (Figure 5. 34). Thirdly, owing to lower rents, these properties often became the lodging of choice for low-income urban dwellers or migrant workers, indirectly contributing to the diversity of residents from the original Factory 3 employees and their families to

a broader spectrum of social groups, both those belonging and not belonging to this enterprise (Figure 5. 35).



Figure 5. 34: Adjacent to a C-shaped Soviet-style residential building, two enclosed courtyards were formed through fencing or gates. (a) A single-story house and an added iron fence, covered with green plastic sheeting to imitate a wall, thus creating an enclosed space. (b) Within the formed courtyard, a grape pergola was set up under which even an electric car could be parked. A chair beneath the pergola indicates that residents could sit there, enjoying the shade during the summer. (c) Plan of the C-shaped Soviet-style residential building (in green, No. 39 in Figure 5. 6). (d) Another courtyard was established by adding a gate. Photo sources: (a), (b) and (d) were taken by the author in 2020; (c) from Zhengzhou Urban Construction archives.

Factory 3 also provided an intriguing case in terms of the benefits enjoyed by those who actually occupied the spaces. Figure 5. 36 depicted a small courtyard that the author encountered during fieldwork in 2020 within Factory 3 (78 in Figure 5. 6). Seeing through the red door (Figure 5. 36(a)), there was a single-story room. Behind it, there was a grey-yellow six-story residential building (Figure 5. 36(c)). The blue wall in Figure 5. 36(c) not only served as one side of the courtyard's boundary but also extended backward, connecting this small courtyard to the building

behind it. On the other side, it abutted a partially demolished one-storey structure, and then the courtyard was enclosed by a door (Figure 5. 36(a)). This door faced directly onto Tongbai North Road. Upon noticing the author taking notes, the owner of the courtyard promptly closed the door, preventing any further inquiries into the courtyard's history. However, while examining the archives, the author stumbled upon a pertinent document (Figure 5. 36(d)). This document (ZUC Archive 95 No.0070) revealed that in 1995, when the grey-yellow residential building adjacent to the courtyard

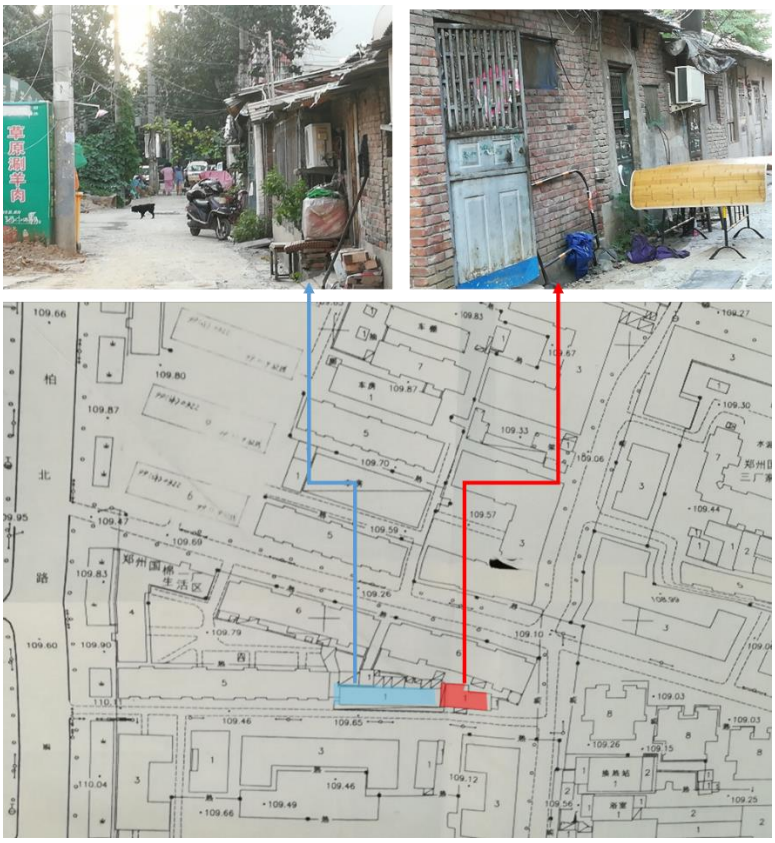


Figure 5. 35: Low-quality buildings occupied by low-income migrant workers in Factory 3

was constructed (Figure 5. 36(c)), the need for demolishing old structures to make way for this new construction made it impossible to accommodate workers during relocation. Consequently, an application was submitted to build three one-storey temporary transitional houses (highlighted by the yellow line in Figure 5. 36(d)), with a total area of 216.05m². Combining this information, the author speculates that the locations of the two northern and southern transitional houses had already been demolished when the need for new multi-storey houses arose, leaving only a portion of the central transitional house (shaded in red in Figure 5. 36(d)). After the completion of the grey-yellow

residential building (79 in Figure 5. 6), someone who was the original occupant of this space utilised the remaining portion in conjunction with the support provided by the adjacent six-story residential building and one side of the one-story transitional housing to enclose it by adding walls. They effectively transformed it into their private space and even constructed a vegetable trellis on the roof (Figure 5. 36(b)). This modest single-storey residence was thus preserved. Although the area and scale were not extensive, its subsequent evolution was quite representative, effectively illustrating that under the wave of reform, 'high-quality' assets attracted more bidders, leading to clearer property rights definitions, agent changes, and new morphological transformations. Those 'unselected' assets, due to unclear property rights, remained unnoticed by others or were deemed unworthy of dispute. Their owners had the opportunity to retain them for personal use, thus safeguarding the original buildings. Examining this process, it became evident that under common ownerships, assets with undefined property rights and comparatively poor building conditions may paradoxically exhibit stronger morphological continuity, and this resistance to change derived from the vacuum of clear ownership.



Figure 5. 36: A 'forgotten' courtyard. (a) Courtyard entrance; (b) Roof-mounted vegetable trellis; (c) A short wall connecting it to the six-story residential building; (d) Plan of the three temporary residences (ZUC Archive 95 No.0070).

Green Space

During this period, Factory 3's green spaces underwent several noteworthy changes. First, there was an increasing emphasis on green spaces. A planning application from 1999 explicitly stated that, in order to improve greenery, the irregular parcel of land at the intersection of Tongbai North Road and Mianfang Road was proposed to be designated as a centralized green area (ZUC Archive 99 No.324). Secondly, certain green spaces fell victim to residential encroachment; for example, once open green areas between buildings were predominantly repurposed for residential use. Thirdly, despite the already considerable building density, residents' affinity for greenery prompted them to adorn the areas in front of and behind their homes with a variety of trees, encompassing both ornamental and fruit-bearing species like walnut, pomegranate, and fig trees (Figure 5. 37).



Figure 5. 37: Abundantly planted trees and ornamental plants at Factory 3. (a) A large cluster of roses. (b) Two pomegranate trees (Photos by the author in 2020).

5.3.5 Large-scale reconstruction phase (2011-2019)

Unfortunately, the anticipated 'strong alliances' through the formation of the Songyue Group did not come to fruition, resulting in these significant textile factories still facing difficulties. In light of significant loans from banks, during the period around 2002, these banks adopted the role of asset management companies to acquire ownership shares in Factories 1, 3, and 4 through a process of debt-to-equity conversion. At this point, state-owned assets had not yet been divested, and the

employment status of the workers had not undergone any changes; they still remained as state-owned enterprise employees associated with Factory 3. In 2003, the Zhengzhou Municipal Government pursued a state asset withdrawal strategy. These textile factories implemented a 'land for survival' strategy, which involved relocating their workshops to suburban areas, and the land usage rights of the original factory sites were transferred to real estate developers. The proceeds from the differential land values were reinvested to upgrade equipment and re-establish a competitive presence in the market. Due to the rapid expansion of Zhengzhou, the areas surrounding several textile factories situated in the western outskirts of the city had already transformed into developed urban zones. The original land had increased significantly in value. Additionally, each Textile Cotton Factory possessed a factory area encompassing over 13 ha available for development. Consequently, these textile factories swiftly found collaborative partners. In 2006, Factory 3 became the inaugural textile enterprise in the city to take residence in the newly planned Zhengzhou Textile Industrial Park located in the suburbs. This marked another round of 'enclave-style expansion.' Notably, this expansion was motivated not by developmental needs but by a land exchange founded on differences in economic value. However, a setback occurred in May 2008 when Factory 3 abruptly halted its new facility construction in the Industrial Park just before completion. This was due to the prolonged delay of its collaborating partner in acquiring the land at the original Factory 3 site. Consequently, in November 2008, the Zhengzhou Municipal Government organized an open auction for the comprehensive property rights of Factories 1, 3, and 4. While this process may have appeared largely procedural, its underlying purpose was to ensure that the collaborating partners gained access to the land and could proceed confidently with the construction of the new factory. In the end, Factory 3 was collectively acquired by Henan Plain Holding Group and Zhengzhou Hongxing Real Estate Co., Ltd. Henan Plain Holding Group functioned as the controlling entity of Zhengzhou China-Fortune Development Co., Ltd., a local real estate enterprise. In this scenario, the partners initiated the project of demolition and reconstruction on the original site.

Due to the substantial residential population residing in Factory 3's residential area, the process of demolition would entail significant resettlement expenses. In the production area, while there were also residential buildings, they were primarily concentrated along the western and southern edges of the factory compound. The central section predominantly housed production facilities, such

as factories and warehouses. Clearly, for profit-driven real estate developers, the central part of the factory area offered a more lucrative prospect for demolition and subsequent construction returns. As a consequence, in 2011, the factory's production facilities and warehouses were demolished. It can be observed that the main office building, a section of its wings, and a small portion of the factory structures have been retained (Figure 5. 38). The reason was that Factory 3, including the main entrance, the primary office building, and its annexes, was designated as a Zhengzhou municipal-level cultural heritage conservation unit under the name 'Zhengzhou Textile Industrial Base' in 2009. In reality, the entirety of the main office building and its wings should have been preserved. Regrettably, in 2012, the developer took advantage of the weekend to unlawfully begin the demolition of the office building and its annex. However, their attempt to carry out the demolition was intercepted by journalists, ultimately leading to the fortunate preservation of the office building (121 in Figure 5. 6). Within a year, a self-contained, commercialized residential community called 'Fangyuanjingwei' emerged in the former production area, featuring meticulously designed landscapes. Within this community (Figure 5. 39), more than a dozen modernist (Figure 5. 30) steel-frame (Figure 5. 45) mixed-use residential and commercial buildings, each ranging from 25 to 30 storeys in height (123 in Figure 5. 6), were constructed. On the former site of the factory buildings, a dynamic new commercial district and real estate development project with towering structures had come into existence.



Figure 5. 38: The demolition and construction of Fangyuanjingwei community (Historical images from Google Earth in 2011, 2012 and 2020)



Figure 5. 39: Fangyuanjingwei community model. In the model, the newly constructed Fangyuanjingwei community consists entirely of high-rise buildings, with green spaces filling the areas between the structures. (Zhengzhou Urban Construction Archives for Factory 3)

It is crucial to emphasize that throughout the redevelopment process of Factory 3, the government played a significant role as an agent. In 2008, the central government initiated the Affordable Housing Project, which encompassed the transformation of shantytown areas, including state-owned forest regions. Building upon this initiative, a comprehensive urban and state-owned industrial and mining shantytown transformation effort was launched in 2010. Bolstered by a series of national policies advocating for shantytown transformation, Zhengzhou introduced the 'Opinions of the Zhengzhou Municipal People's Government on Accelerating Shantytown Transformation' in 2010. This policy document outlined incentive measures and adopted the approach of 'government leadership, market operation, enterprise-driven improvement, and policy support.' For state-owned, state-controlled, and collectively-owned enterprises (including those that had undergone restructuring, bankruptcy, or reorganization), the strategy focused on a dual approach of 'addressing hazardous housing while also renovating housing.' Under the precondition of adherence to urban planning guidelines, enterprises were permitted to carry out construction on their own land. This approach stipulated that land usage rights could not be transferred, and real estate properties were not to be sold externally.

In 2011, Factory 1 and Factory 6 were incorporated into the shantytown transformation plan as self-improvement projects. Factory 3's transformation and resettlement endeavours commenced in 2014. Adjacent to the original fountain within the residential area, a gated community named 'Factory 3 Central Garden' was established following the removal of communal facilities such as the canteen and guesthouse. This community features expansive lawns and various other landscaping elements. Two 33-story (Figure 5. 30) residential towers (65 in Figure 5. 6) were constructed for residential purposes (Figure 5. 40), with a surrounding two-story podium featuring commercial spaces (Figure 5. 41(a)). Furthermore, in 2020, the Textile Cotton Factory Road Sub-district Office engaged Yicheng Construction Project Management Co., Ltd. to undertake a bidding process for the revitalization and enhancement of the aging residential areas in Factories 3, 4, and 5. This encompassed a spectrum of enhancement activities within the communities, including sewage, electricity, gas, heating, road, wall, and greenery improvements (Figure 5. 41(b) &(c)).



Figure 5. 40: Two orange buildings stand erect in the midst of Factory 3, making a very prominent presence. (Source from https://www.sgss8.net/tpdq/20318779/2.htm, accessed 31st August 2023).



Figure 5. 41: The surroundings around Factory 3 Central Garden. (a) A two-story commercial podium; (b) Pipes with insulation waiting for installation; (c) Temporary structures used by construction workers, with figures in the image representing the distribution of dinner, and the figures have been blurred for privacy. Sources: (a) from Baidu Street View, (b) and (c) taken by the author in 2020.

Plan and building form of Factory 3

Following the redevelopment, significant changes took place in the factory area's layout (Figure 5. 42). Notably, the pre-existing dedicated railway lines within the factory premises were dismantled. The original circular road network that once encircled the factory zone underwent a complete transformation, giving way to an entirely new circular road system. In this redesigned layout, the western side retained the positions and directions of the original roads. Moving northward, the northern section features existing roads parallel to the factory's original layout but shifted to the north. This strategic shift enabled the inclusion of land previously situated north of the original Factory 3 railway line. Meanwhile, in the eastern part, existing roads maintained a parallel course

to the original layout but were shifted approximately 20m eastward. The southern side presented a more intricate scenario. A new road was positioned roughly 40m north of the original road, running parallel to it. Although the original road remains, it has lost its functional purpose, now confined to the limited confines of the retained Factory 3 boundaries. This situation led to the deconstruction and subsequent loss of functionality of the entire road system in the original factory area. The newly constructed circular road surrounds the 'Fangyuanjingwei' community, and within this area, the road network no longer follows a strictly north-south grid layout; instead, it adopts a more sinuous linear pattern.

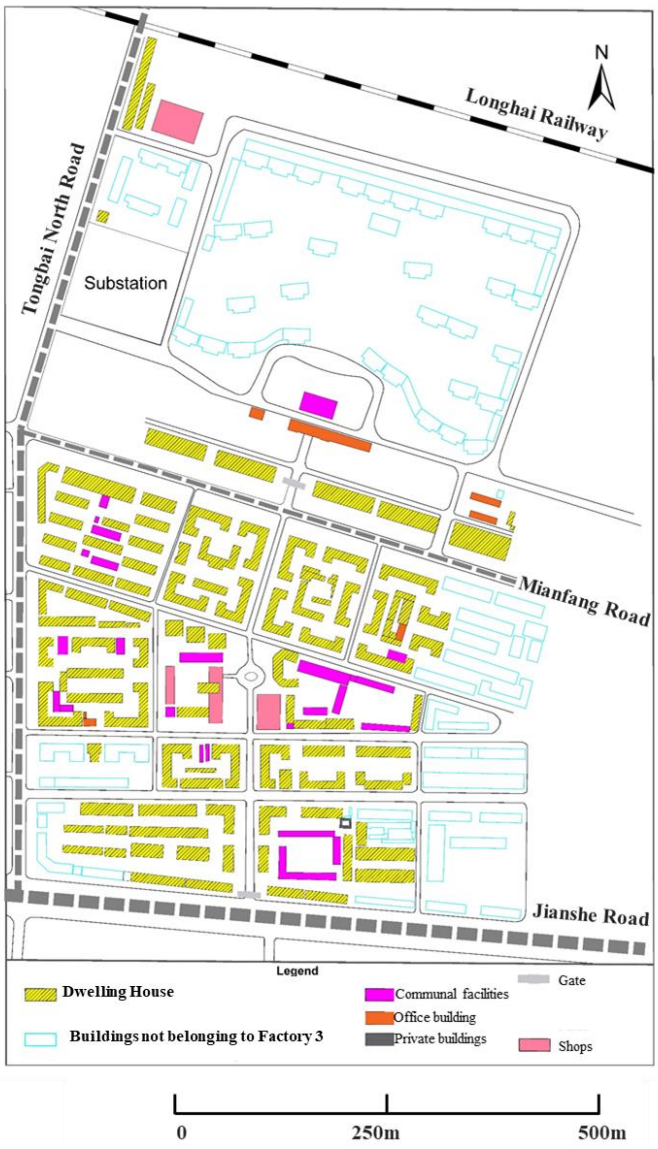


Figure 5. 42: The plan of Factory 3 in 2022 (after records of Factory 3 in Zhengzhou Urban Construction archives and combined with historical images from Google Earth)

Another intriguing road remnant was the western segment of the railway branch line that had once linked Factory 1 to Factory 3. Following its demolition, the curved portion of this line's western section vanished during a recent phase of land development. In its place, roads intersecting at right angles with Tongbai North Road were established. However, its overpass bridge across Tongbai North Road still stands, serving as a testimony to the former existence of the railway branch line (Figure 5. 43). As for the southwestern corner, the former Zhengzhou Hongrun Textile Co., Ltd., including its road infrastructure, was entirely dismantled and remained in the stage of urban fallow.

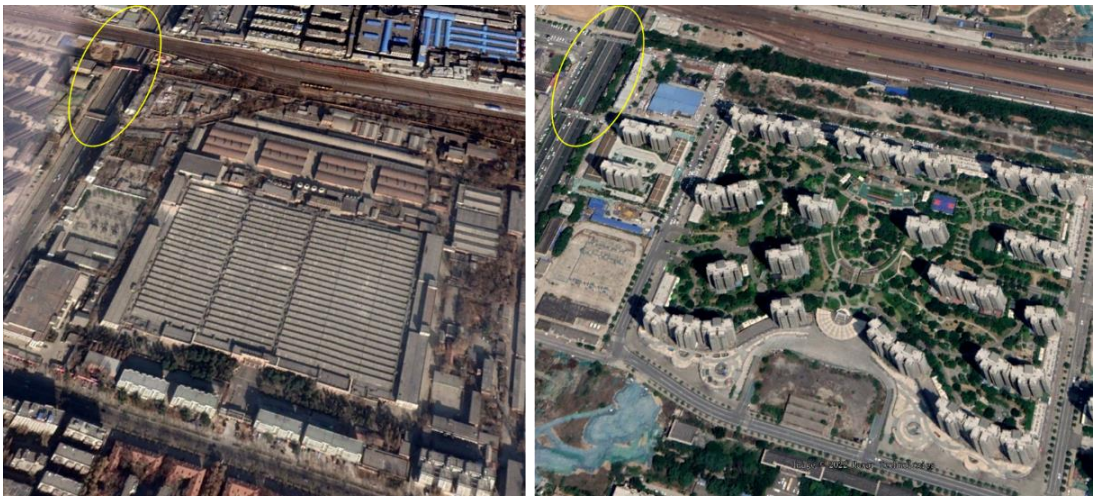


Figure 5. 43: Remnant railway overpasses (Historical images from Google Earth in 2011 and 2019)

In 2014, the residential area also experienced some limited changes. In 2012, a 'Sanmian Farmers' Market' was constructed on the fallow space east of the original fountain area (19 in Figure 5. 6), with a surrounding circular arrangement. The road layout in other parts of the residential area saw minimal alterations. During this era, both the production and residential zones saw the emergence of around 30-storey (Figure 5. 30) unit-style (Figure 5. 47) residential buildings (Figure 5. 19). Matching the orange-pitched roofs (Figure 5. 49) of Soviet-style housing (Figure 5. 46), the recently built residential structures in the living area predominantly adorned in shades of orange (Figure 5. 44). In contrast, the residential buildings within the Fangyuanjingwei community, located in the former production area, embraced the colour palette of the newly constructed residences in Factory 1. They featured various shades of grey tones, as low-saturation colours are currently trending (Figure 5. 44).



Figure 5. 44: Panoramic view of Factory 3. Note the difference between the two orange buildings highlighted by the yellow circle at Factory 3 Central Garden, and the area encircled by the red line on the right, which is the Fangyuanjingwei community (Source from https://www.huitu.com/photo/show/20220524/191931521037.html, accessed 31st August 2023).

Land and building utilisation

During this era, there was a notable transformation of land usage within both the Factory 3 industrial zone and the residential area. According to the 2020 land utilisation data for Zhengzhou, the original expansive factory area, once entirely designated for industrial purposes, has now been reduced to just the north-western and southern corners. The land encompassing the Fangyuanjingwei community has been reclassified as residential space (with a section reserved for educational use, housing a kindergarten). Meanwhile, the land previously occupied by Zhengzhou Hongrun Textile Co., Ltd. in the southwestern corner is now indicated as residential space in the urban plan; however, due to economic considerations, it currently remains undeveloped. On the north-eastern side, the land has been earmarked for commercial and service facilities. In 2011, a public bathhouse was removed and replaced with a commercial basketball court and training camp (Figure 5. 48). Around 2021, in response to significant parking challenges, this area was transformed into a parking lot (No. 117 in Figure 5. 6).

The shift in land usage within the residential area is relatively less conspicuous. A substantial portion of the land still retains its residential designation. The hospital, primary school, and kindergarten are categorized under educational, scientific, cultural, and health-related land use. In the south-eastern section, the land occupied by the Mianfang Road Office (No. 12 and 13 in Figure 5. 6) is earmarked for institutional and group news and publishing purposes. The southwestern

corner of the residential area has been transformed into rail transportation land due to the construction of a subway station. In the context of changing building uses, a notable occurrence during this phase was the government's response to the proliferation of shops resulting from the 'knocking down walls and opening shops' trend that emerged after the initiation of 'Reforms and Opening-up' policies. In the post-reform era, the government encouraged widespread entrepreneurship and sought to address the reemployment challenges faced by laid-off workers. This led to the conversion of many ground-level and even first-floor spaces within residential buildings into commercial shops. By 2012, it was estimated that tens of thousands of such 'knocking down walls and opening shops' had emerged in Zhengzhou. While this approach addressed employment issues, it also introduced negative consequences such as increased traffic congestion and safety concerns related to building alterations. In this context, the Zhengzhou government introduced the 'Opinions on Rectifying and Regulating Production and Business Premises in the Zhengzhou Urban Area' in 2012. The document proposed measures to address and standardize actions such as unauthorized changes in property usage, the leasing of residential properties for business purposes, and the utilisation of illegal structures and constructions for business operations. Following the publication of this document, the Zhengzhou city government undertook rectification efforts at the level of streets. However, the city did not ultimately achieve its goals on a citywide scale.

As of the author's research visit to Factory 3 in 2020, a significant number of similar informal shops persisted. Notably, these shops were operating outside the bounds of legality. During the author's observation of one such shop, where notes were being recorded with a pen, the shop owner picked up a glass sheet from the ground and placed it back into the window frame. This action appeared to suggest that the shop was temporarily closed for rectification. However, once the author left the vicinity, the shop owner promptly removed the glass sheet and resumed business activities. Considering the introduction of plans for the transformation of historical districts, the future trajectory of these informal shops becomes an area of significant interest for further investigation and attention.

The following maps provide a comprehensive summary of the building and land use changes within the Factory 3 study area. Their base maps are based on the structures that existed during the

author's fieldwork research in Factory 3 in 2020, including the significant buildings (numbered in Figure 5. 6) as well as any additional structures or temporary constructions in the vicinity. While the previous discussion mainly focused on the historical changes to significant buildings, this mini-atlas aims to present a more comprehensive landscape. Buildings not marked on the maps do not belong to Factory 3.

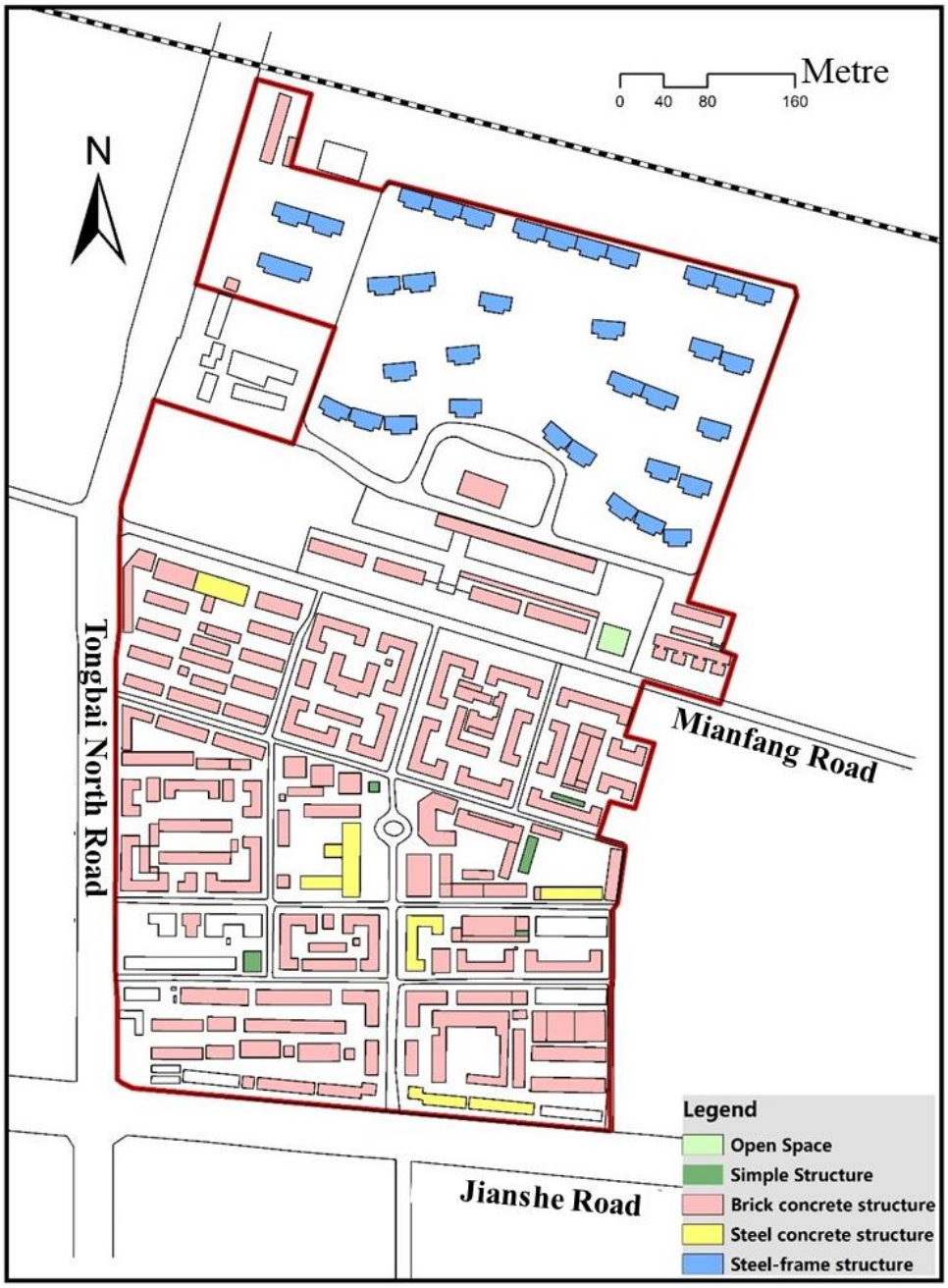


Figure 5. 45: Structure of buildings at Factory 3

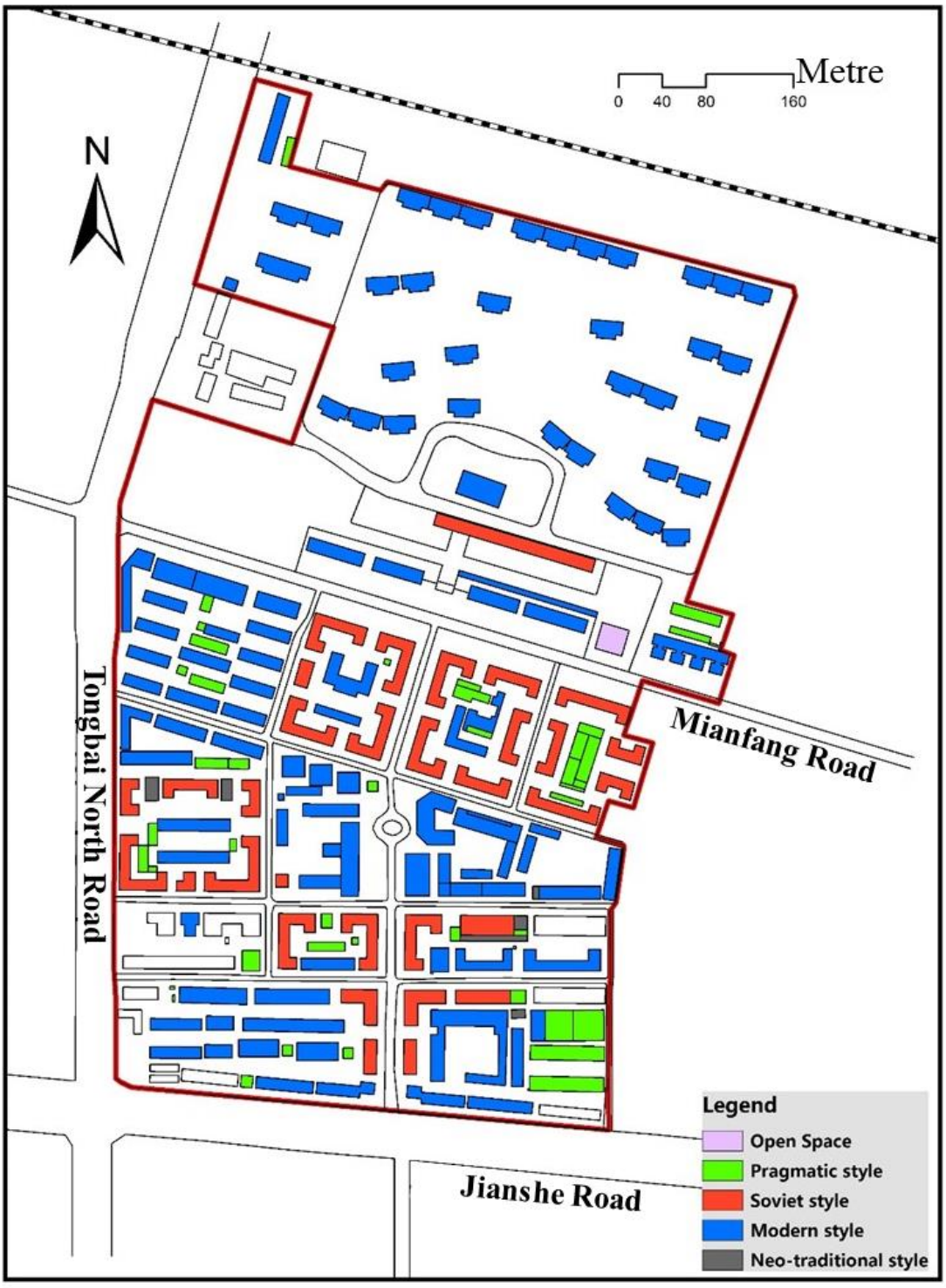


Figure 5. 46: Style of buildings at Factory 3

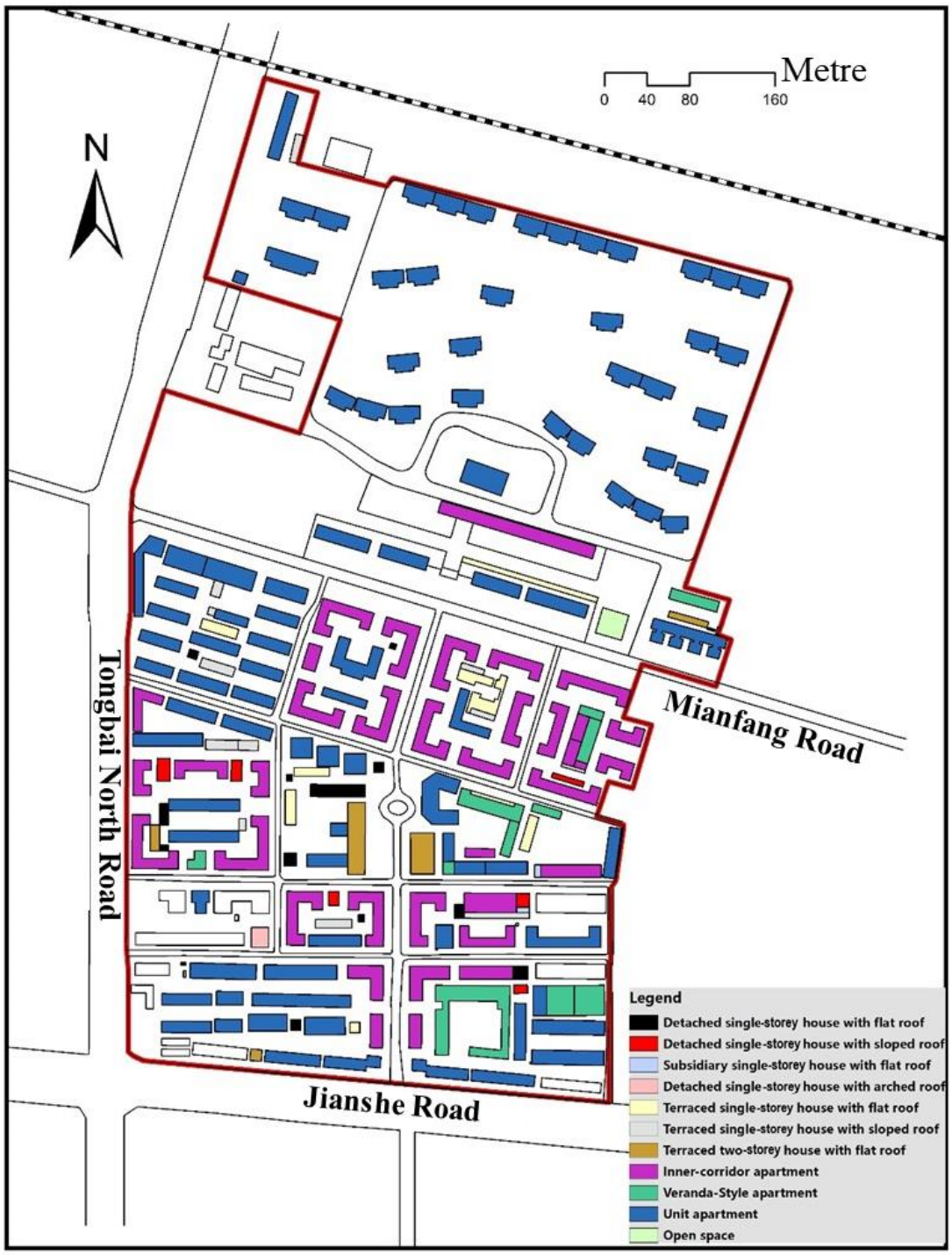


Figure 5. 47: Types of buildings at Factory 3

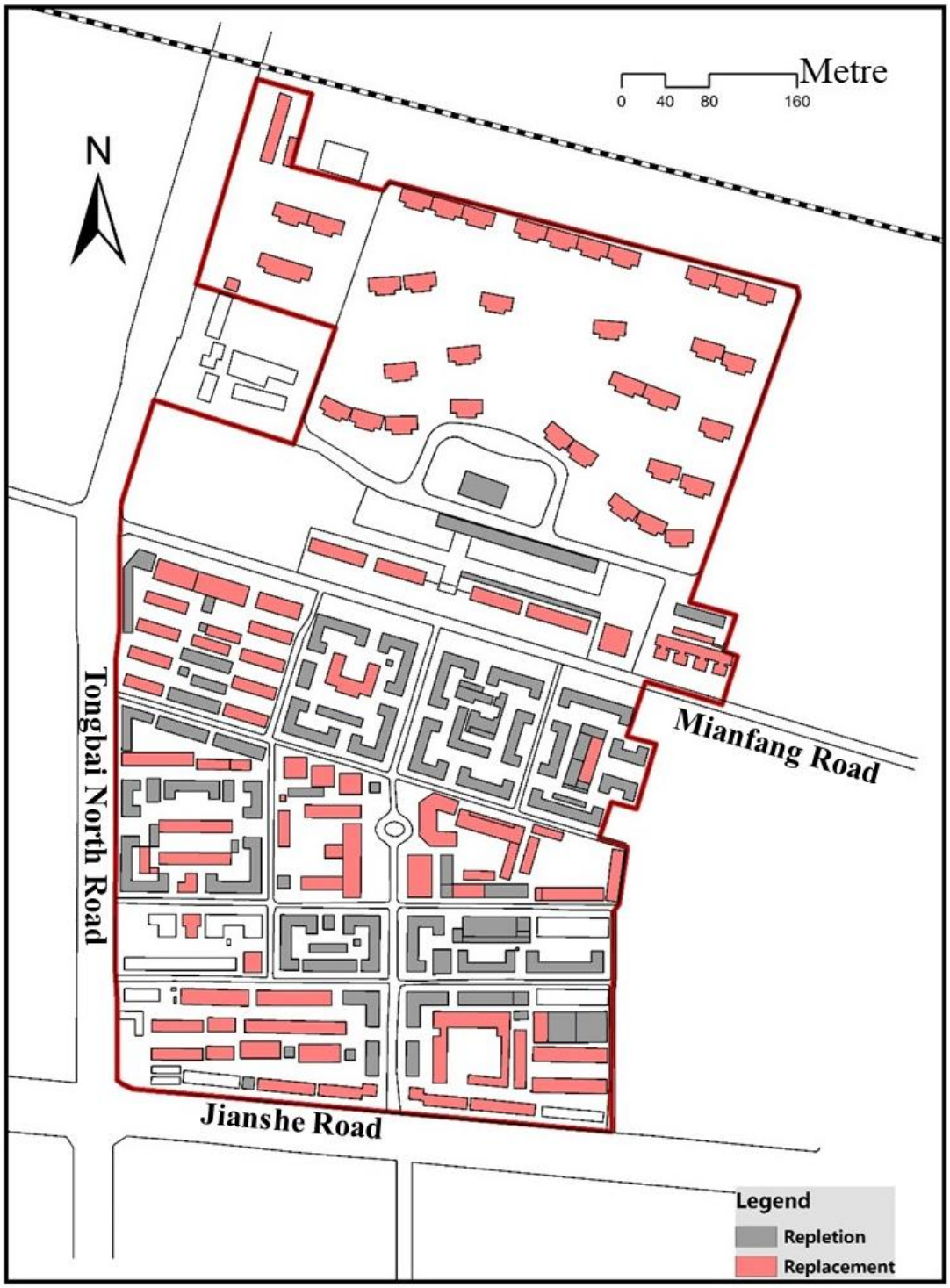


Figure 5. 48: Repletion and replacement at Factory 3

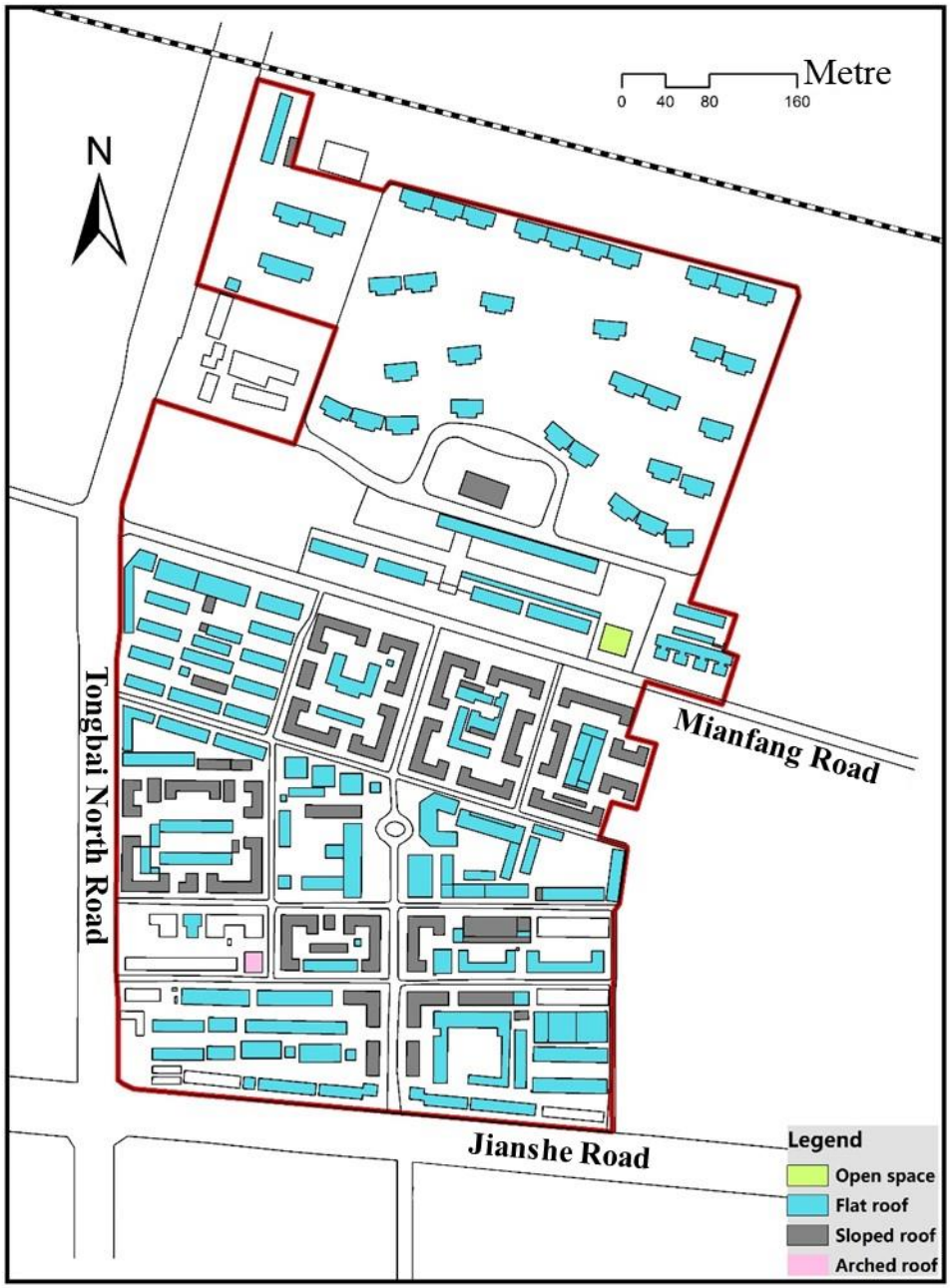


Figure 5. 49: Roof types of buildings at Factory 3

Green Space

During this period, significant changes in green spaces were primarily concentrated within newly developed enclosed communities. According to the 'Technical Regulations on Urban and Rural Planning Management in Zhengzhou' of 2013, newly constructed projects were required to adhere to green space ratios, with residential developments not falling below 30% and renovations of existing areas not below 25%. As a result, both the Fangyuanjingwei community in the previous

production area and the inner gardens of the ‘Factory 3 Central Garden’ in the residential area now encompass extensive green areas. Additionally, there has been a diversification of greenery, encompassing not only expansive lawns but also featuring plantings of crab-apple trees, holly trees, and an abundance of bonsai trees, each around 2m in height (Figure 5. 50).



Figure 5. 50: The green space and tower block within Factory 3 Central Garden. (a) Grassy area and crab-apple trees and holly trees of the public green space; (b) bonsai trees; (c) an upward view of one of the tower blocks. Photos taken by the author in 2020.

The second noteworthy feature of Factory 3’s green spaces arises from the residents’ genuine fondness for greenery, despite their limited living conditions. This fondness has spurred the proliferation of potted bonsai plants fashioned from various materials. These can be found adorning the ground in front of residences and gracing window sills, cleverly utilizing space without infringing on residential areas (Figure 5. 51).



Figure 5. 51: Green spaces in the form of potted plants on windowsills or in front of housing. Photos were taken by the author in 2020.

Thirdly, in open areas in front of residential units and atop self-constructed structures, and even extending beyond window ledges, residents have independently cultivated a variety of vegetables. This practice serves a dual purpose, not only adding greenery but also providing a source of vegetables. Additionally, a fascinating phenomenon involves the presence of imitation plants, such as bamboo made from plastic materials (Figure 5. 52 and Figure 5. 53).



Figure 5. 52: Green space in the form of edible vegetables in various places. Photos were taken by the author in 2020.



Figure 5. 53: Plastic products pretending to be bamboos and flowers (the red) in front of buildings. Photos were taken by the author in 2020.

5.3.6 Heritage phase (2021-)

In the year 2020, the Zhengzhou Municipal Government embarked on a significant endeavour known as the 'Zhengzhou Factory 3 Distinctive Historical and Cultural District Comprehensive Renovation Project,' allocating a substantial budget of 1.4 billion pounds. Concurrently, efforts were undertaken to facilitate the relocation and revitalization of Factory 3. This initiative encompassed the acquisition of properties situated on state-owned land within the enclosed region flanking both sides of the central axis, as well as the northern portion of the residential area. Compensation methods varied, ranging from monetary reimbursement [12] to property exchanges [13], thereby facilitating a range of activities including the renovation of aged structures, demolition of outdated buildings, initiation of commercial and exhibition projects, and enhancement of outdoor landscapes. During the author's research in 2020, ongoing renovation projects were observed, including demolishing illegal structures, removing walls to allow for greenery, exterior wall insulation, and

12 Compensation will be granted by increasing the assessed market value of the properties subject to expropriation by 30%.

13 There are two compensation methods in place. If the ownership certificate of the expropriated property does not specify the internal floor area, the relocation will be determined based on a 20% increase in the building area, with no valuation assigned to the increased portion. In cases where the ownership certificate specifies the internal floor area, the relocation will be calculated based on the stated internal floor area.

applying real stone paint to the exterior wall (Figure 5. 54). While the initial timeline aimed for completion by the end of 2021, the project's progress has been affected by the pandemic, leading to its continued implementation. The substantial transformation that this project is set to bring about in the landscape of Factory 3 upon its eventual completion underscores the need for continued attention in future studies (Figure 5. 55).



Figure 5. 54: Ongoing renovation project. (a) Replaced windows; (b) The exterior wall painting after updates; (c) Workers under construction on scaffolding. Photos were taken by the author in 2020.



Figure 5. 55: Renovated Soviet-style building with uniform light yellow and grey exterior and red wooden windows. Note the sealed ground floor windows and entrance. Photo sourced from https://www.huitu.com/photo/show/20220524/191659982038.html.

5.4 Conclusion

This chapter provided an in-depth exploration of the developmental process of Factory 3, spanning its inception, growth, dismantling, and eventual designation as a heritage site. This evolution was intricately intertwined with processes of *Danwei* and de-*Danwei*zation. Following the establishment of the People's Republic of China in 1949, China embarked on a rapid journey of industrialization and modernization, guided by the utopian visions of socialism. This journey was marked by achievements, setbacks, and valuable lessons, all of which were discernible through the changing landscape of Factory 3. This evolution encompassed not only its plans and building forms but also its land and building usage, as well as the development of its green spaces.

Against the backdrop of a socialist and planned economy, it became evident just how deeply governmental and institutional forces were involved in shaping the physical landscape in China. This involvement was reflected in the nationwide mobilization of workers to support the construction of Factory 3, the establishment of modest-scale iron furnaces at Factory 3 during the Great Leap Forward in 1958, and the extensive tree planting campaigns initiated in response to government calls within various *Danwei*s in Zhengzhou. Even in the post- 'Reform and Opening-up' era, the government's ability to respond swiftly was evident in the rapid submission of planning applications aimed at addressing the employment challenges faced by laid-off workers at Factory 3. This resulted in a significant transition from residential to commercial usage within a relatively short timeframe. Keeping this in mind, the subsequent chapter will examine the morphological evolution of Bournville. Through this comparative analysis, we will study how varying factors contribute to alterations in the physical landscape, and how these changes are shaped by differing institutional contexts and developmental stages in different countries.

Chapter 6. Urban morphological analysis of Bournville

In this chapter, the aim is to conduct a morphological examination of the British case study area, namely Bournville, the site of the Cadbury chocolate factory. The chapter will begin with an exploration of its ideological sources, which provided an important momentum behind the formation of Bournville. Subsequently, a comprehensive historico-landscape study of Bournville will be undertaken by examining the following aspects: its plan, building form, building and land utilisation, and green space in each morphological period. A variety of factors influencing the evolution of the formation and development of Bournville will be discussed and conclusions drawn. Bournville's archives have already been thoroughly explored by other scholars (e.g. Cherry, 1996a; Bailey and Bryson, 2007; Harrison, 1999). Therefore, what follows is primarily based on the surviving field evidence, which complements the archive evidence previously considered.

6.1 Social background of Bournville

The establishment of Bournville is intricately intertwined with the personal experiences of its founder and deeply influenced by historical and societal factors. This section aims to explore the historical roots and social context that laid the groundwork for the establishment of Bournville and seeks to address the following questions: first, what are the intellectual origins and practical precursors of the philanthropic characteristics in Bournville? How did the ideas about housing in Bournville evolve from the theories of reformers and the practical activities of practitioners throughout history? What role did religious factors play in the formation of Bournville? What were the main ideas and practices that led to the establishment of Bournville, such as the development of extensive public and private garden spaces? How were these ideas supported by specific social conditions to become a reality? It is worth noting that the answers to these questions may overlap.

6.1.1 A history of model settlements

During the industrialisation of Britain, the Victorian era experienced a remarkable phase of

economic development, which led to a significant widening of the social and economic gap between the rich and the poor. The emerging upper and middle classes amassed immense wealth, while the majority of workers found themselves reduced to the proletarian class (Thompson, 2013; Hobsbawm, 1999). The influx of workers into industrial cities resulted in housing shortages and poor sanitary conditions for the economically disadvantaged population (Pike, 1983). In response to the housing shortage, some speculative builders resorted to constructing back-to-back houses (chapter 4), which became the prevalent norm of working-class housing in Birmingham and some other cities. However, conscientious industrialists recognised the societal issues arising from these conditions and put forth proposals for social reform. After the mention of Robert Owen's New Lanark (pp. 20-22 in chapter 2), a wave of philanthropists emerged, embarking on similar experiments around their own factories. They funded philanthropic construction projects, often either out of their own pockets or at minimal profits.

These industrialists sought not only to improve the working and living conditions of their employees but also to provide them with educational and recreational facilities and other amenities. This gave rise to the idea of model villages or model communities. One exemplary instance is Saltaire, Yorkshire, constructed by Sir Titus Salt and his architect Joseph Lockwood between 1853 and 1876 (Darley, 2007). Salt made the decision to relocate his factory on the River Aire, as the neighbouring industrial town of Bradford was already heavily polluted. The textile factory, initially situated adjacent to the railway and canal, became the largest industrial building of its time. In addition to the factory, Sir Titus Salt built a workers' village beyond the railway for his 3,000 employees. It featured well-constructed housing with access to clean water, along with various institutions such as schools, hospitals, churches, libraries, and other public facilities. Furthermore, a large area of public green space, including a park on the other side of the river, was incorporated into the layout. Saltaire earned the deserved title of a 'model factory' (Jackson, Lintonbon, and Bryony, 2010), illustrating the philanthropic paternalism embraced by Victorian entrepreneurs. Inspired by Saltaire, William H. Lever, a soap manufacturer, established Port Sunlight just outside Liverpool in 1888. Similarly, Lever provided his workers with decent and affordable housing, as well as essential amenities (Hubbard and Shippobottom, 2006).

Saltaire and Port Sunlight stand as enduring testaments to the social responsibility embraced by some industrialists and their dedication to addressing the challenges faced by their workers. Cadbury unquestionably belongs to this league of industrialist icons who prioritised social responsibility. These model villages exemplify the philanthropic endeavors and paternalistic approach embraced by Victorian entrepreneurs during a period of significant social and economic transformation. By enhancing housing conditions and establishing essential institutions and public green spaces, these model communities embodied a holistic approach to the well-being of workers and left a lasting impact on urban planning and social welfare practices.

6.1.2 The emergence of civic services

When some successful entrepreneurs focused on philanthropic factory management, others actively engaged in politics to address the social issues of the Victorian era. They sought to increase government involvement in public affairs and influence policy-making. Birmingham took a leading role in this regard, and one name is closely associated with this process: Joseph Chamberlain. Chamberlain, a former successful manufacturer, with his cousin John Nettlefold, who was also highly involved in politics and social reform, accumulated substantial wealth through their screw manufacturing business (Garvin, 1951). The prevailing ideology in business at the time was laissez-faire, which advocated for free trade without government intervention (Clapham, 1950). Consequently, Birmingham's municipal affairs were controlled by businessmen who were reluctant to sacrifice their own interests to improve basic amenities. This resulted in poor civic services, such as street lighting, with the city becoming pitch black at night, refuse collection, sewer system, and a poor water supply system, forcing residents to consume dirty and disease-ridden water from open sources (Briggs, 1990).

To address these issues, George Dawson, a non-conformist preacher, proposed the concept of the 'Civic Gospel', which argued that the town council had a responsibility to provide good municipal services to its citizens. This idea had a significant impact on Joseph Chamberlain (Bartley, 2000). In 1873, Chamberlain was elected as the Mayor of Birmingham, providing him with an opportunity to implement municipal reforms influenced by the 'Civic Gospel' ideology and put his

plans to resolve social problems into action. He tackled the lighting issue, improved the water supply system, cleared slums, and constructed a new thoroughfare known as Corporation Street (Li, 1996). Chamberlain's provision of civic services and amenities not only brought Birmingham national fame but also international recognition, with Birmingham being hailed as one of the best-managed cities in the world (Cherry, 1994). His belief in state intervention laid the foundation for the increasing role of the government in society in the future (Li, 1996). Moreover, Chamberlain gained strong support and endorsement from the citizens of Birmingham, and under his leadership, the city became a practical hub for social reform. It was within this social context that Bournville emerged. Similar to Chamberlain, John Sutton Nettlefold (1866-1930), who was the first chairman of Birmingham City Council's Housing Committee, established the Moor Pool estate in Harborne (Figure 6. 1) in 1907 (Carr and Whitehand, 1996).

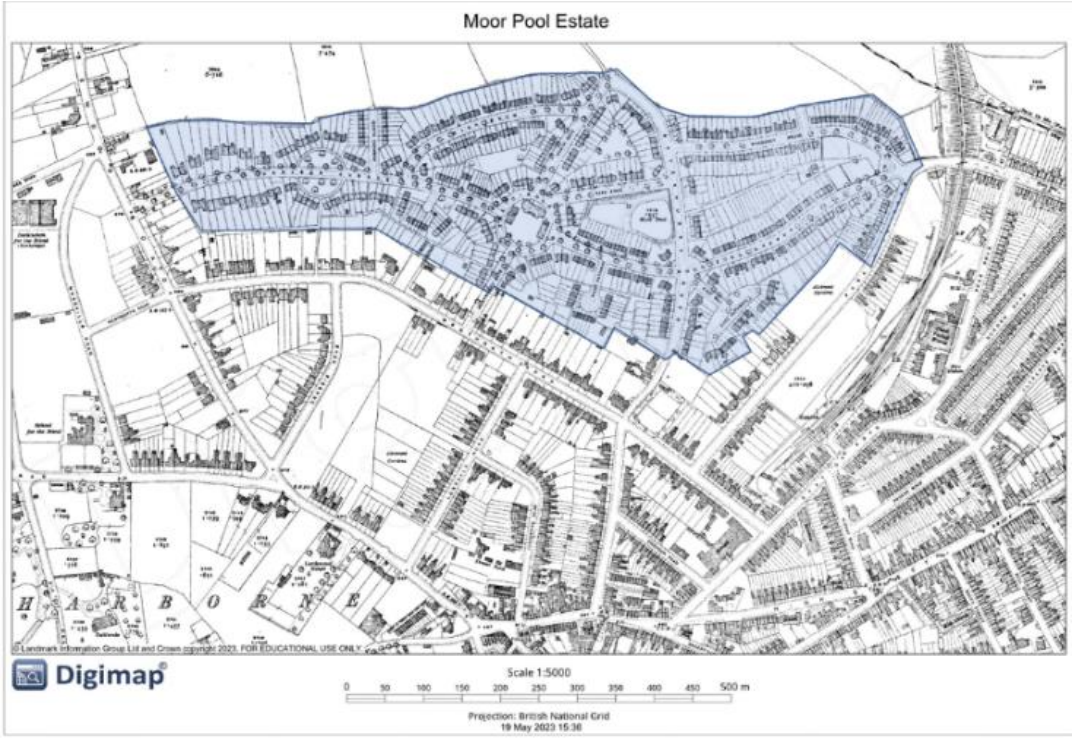


Figure 6. 1: The Moor Pool Estate in Harborne. Note: the curvilinear street pattern (tree-lined), semi-detached or short terraces of cottages and social facilities (library and meeting hall) in the central circle, and small park around the pool. (Ordnance Survey 1:5,000, 1918)

These individual and government-driven social reform initiatives, particularly between 1865 and 1875, laid the foundation for subsequent town planning efforts (Meller, 1997). The emergence

of civic services, led by figures like Chamberlain and Nettlefold, marked a significant shift in addressing social issues through local government intervention and the provision of public amenities. Their actions not only transformed the urban landscape of Birmingham but also set the stage for future town planning practices. With improved municipal service facilities, Bournville could better focus on housing and service provision.

6.1.3 Ideological origins

With its emphasis on natural and rural elements in its landscape, Bournville stands out as a distinctive feature. During its construction, careful consideration was given to preserving the original rural landscape features, such as the village green and the relocation of Selly Manor to the central triangle (The Bournville Society, 2013). This desire to incorporate natural landscapes and retain the essence of the countryside has deep historical roots in British culture and intellectual discourse.

One significant influence on the integration of natural landscapes in British landscape history was the emergence of the Picturesque theory and artistic practice in the late 18th century (Hussey, 2019; Hunt, 1992). This aesthetic movement, particularly evident in the design of Picturesque gardens in Britain, celebrated the beauty of nature and sought to create landscapes that resembled paintings (Zhu, 2006). The Picturesque aesthetic aimed to cultivate people's emotional connection and aesthetic appreciation of natural scenery, fostering a sense of harmony with nature (Townsend, 1997). In addition, the Romantic movement played a pivotal role in shaping the British perception of nature. Romantics viewed nature as an essential element in their artistic expression and promoted a profound love for the natural world through their works (Yuan, 2016). They sought to bring about social reforms through aesthetic revolution (Gao, 2004). The detrimental impact of the Industrial Revolution on the environment and the harsh living conditions in cities propelled the Romantic ideals of nature to the forefront of public consciousness. This shared appreciation for nature became a common focus for various social groups in their quest to address the social problems of the Victorian era.

The Arts and Crafts movement further contributed to the integration of natural elements in

Bournville's design. While industrialists had visions and implemented reforms in workers' housing and welfare facilities, artists associated with the Arts and Crafts movement focused on improving the form and design of housing, architectural materials, furniture, and other everyday products. Originating as a response to the industrialisation of the Victorian era, the movement sought to counter the soulless and aesthetically devoid machine-made products by combining the efficiency of machinery with the craftsmanship of artisans (Ellis, Osborne, and Barringer, 2018). Key proponents of this movement, including John Ruskin and William Morris, advocated for a naturalistic design style that aimed to integrate beauty and functionality. Morris, considered as one of the movement's influential figures, designed his own suburban residence using red brick as the building material, red tiles for the roof, and a combination of Gothic and traditional English rural styles. Known for its simplicity and practicality, Morris's designs are considered precursors to modern architecture (Greensted, 2010; Thompson, 1955). William Alexander Harvey, an early architect involved in Bournville, was influenced by these principles and applied the ideas of the Arts and Crafts movement in the design practice of the village (Harvey, 1906; Ballard, 2009).

All these ideas, practices, and visions collectively formed a powerful current within the late Victorian era's social reform movements, and Ebenezer Howard was among its proponents. It was this concern for social reform, rather than urban design per se, that constituted the original intention of Howard's Garden City theory (Meller, 1997). In response to the social issues of the Victorian era, Howard's answer was to combine the advantages of both urban and rural environments to create an ideal living environment. Howard's diagram of the three magnets addressed this question, 'Where will the people go', with the choices of 'Town', 'Country', or 'Town-Country' (Figure 6. 2). His idealised garden city would accommodate 32,000 people on a site of 6,000 acres (2,400 ha), planned in a concentric pattern with open spaces, public parks, and six radial boulevards, each 120 feet (37 m) wide, extending from the centre. The garden city would be self-sufficient, and when it reached full population, another garden city would be developed nearby (Howard, 1898).

In conclusion, the establishment of Bournville was against this background of the remarkable manifestation of the late Victorian era's social reform movements. Its integration of natural and rural elements in its landscape reflects a deep-rooted cultural and intellectual longing for the countryside.

Influenced by Picturesque theories, the Romantic movement, and the Arts and Crafts movement, Bournville sought to create an ideal living environment that harmoniously blended urban conveniences with the tranquility and beauty of nature. Ebenezer Howard's concept of the garden city, with its concentric pattern, open spaces, and self-sufficiency, further embodied the vision of combining the strengths of both town and country.

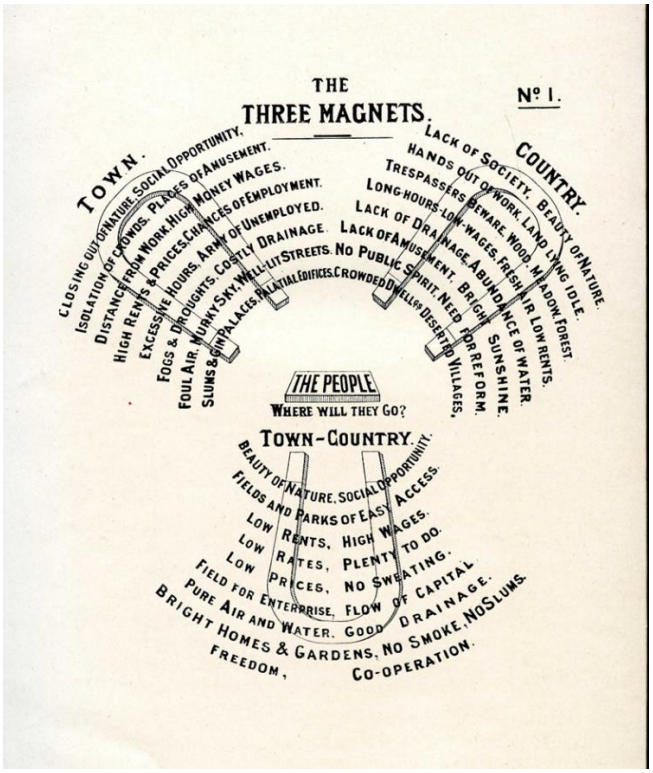


Figure 6. 2: The Three Magnets (Howard E., 1898)

6.1.4 Green space

All of these ideologies, especially the Garden City theory, acknowledge the significance of the natural environment in urban areas and its impact on the well-being of residents. This consensus has emerged as a societal response to various social issues stemming from the Industrial Revolution, including pollution, mortality rates, and diseases. Among the numerous efforts to tackle these problems, there has been widespread recognition of the health benefits associated with green spaces. In 1879 one art critic and reformer claimed that his researches in continental towns had shown that people living in the vicinity of trees always looked healthier than their neighbours, and that in over 30 years he had not been able to trace a single case of fever or smallpox in any of the streets so

planted (Gaskell, 1980). One social change resulting from this was that open space was gradually gaining recognition in this social discourse. First, it became a means of 'educating the working classes in the social values of middle-class orthodoxy' (Malchow, 1985). In the middle of 19th century, some industrialists were seeking to demonstrate the social benefits of participation in green space. One example was the Roberts Park in Saltaire mentioned above. It was part of Sir Titus Salt's plan for his model mill-town. He had chosen a site where 'the River Aire, in a most picturesque part of Airedale, runs beneath wooded banks that expand into moorland', and his workers were to have the full benefit of it. Outdoor recreational facilities would help keep them away from the demon of drink, which he saw as the root of society's ills. Saltaire believed that sport would also keep the inhabitants of the town fit (Jackson, Lintonbon, and Bryony, 2010). Another change was the introduction of public parks into cities (Bailey, 2014). In the mid-nineteenth century, a middle-class social concern about the public recreation of the working class became evident (see above section 5.1). A third change is the incorporation of green space into ordinary residential housing layouts. The history of green space in residential areas, is much longer and entails understanding a number of factors, including the social significance of green space. In fact, the 'garden' idea filters down through classes.

In the early post-medieval period, gardens were predominantly the property of the nobility or royalty. As the need for defense started to diminish in significance, so more thought was given to other environmental aspects of space. Even the small town, Alnwick, which is not far from the border with Scotland, open green space eventually became transformed from defensive space to scenic space (McDonald, 2012). By the 18th century, a style of landscape garden was spreading across Europe, replacing the more formal, symmetrical garden of the 17th century as the principal gardening style. Formal gardens gave way to naturalistic parkland, with trees, expanses of water and smoothly rolling grass. A landscape garden, containing a country house, also became a fashion for newly rich people (Spooner, 2015).

By the late-eighteenth century and the beginning of the nineteenth century, large villas in sizeable gardens were occupying the zones fringing large cities. Richer members of the business and professional classes were taking up residences in the outermost suburbs and surrounding

countryside of cities, often with gardens of 1-2 acres (Summerson, 1993). In the mid-nineteenth century, the dominant middle-class housing type, ‘the suburban villa’, formed in the suburbs of towns and cities, and their garden plots were rarely more than an acre (Slater, 1978). The furtherance of such concerns was fundamental to the development of gardens and open spaces in the last third of the nineteenth century and was promoted in the work and influence of Octavia Hill, who wanted to improve the living conditions of the poor, and was an advocate of open spaces and a co-founder of the National Trust in 1895. Red Cross Garden (in Southwark, London) was laid out in 1887 and was a key element in what is considered to be one of Octavia Hill’s finest environmental and social schemes (Baigent & Cowell, 2016). Green space was eventually incorporated into working-class housing layouts. Bournville was established and began to be developed in such a social context. Its clues of large front and back gardens, tree-lined streets and public parks incorporated all these different ideas about green space.

6.1.5 Quakers and philanthropy

Christianity has played a significant role in the provision of social welfare in Britain through history, particularly during the 19th century. It has inspired political and social reforms and has been crucial in shaping the modern democratic system in the country (Prochaska, 2006). Among the Christian denominations, the role of Quakers stands out as a significant force. As non-conformists, they were excluded from universities and political offices, leading them to put their energies into business ventures. Emphasizing serving their local communities and adhering to principles of integrity, they achieved remarkable success in business (Burton and Sinnicks, 2022), notably in the confectionery industry (Jackson, 2010) and banking sector (Ackrill & Hannah, 2001). Furthermore, Quakers integrated their business success with philanthropy and other social activities, actively engaging in public affairs and exerting substantial social influence (Angell and Pink Dandelion, 2013; Healey, 2021). Notable examples include the chocolate factories of Rowntree, and Fry, and the Cadburys (Gardiner, 2013; Vernon, 2013). The Quaker values bestowed upon George Cadbury, such as plainness, were also reflected in the later construction and design of Bournville (Bailey & Bryson), as will be elaborated in the following sections.

6.2 Scope of case study

In 1879, Cadbury's chocolate factory moved from the crowded city centre of Birmingham to its current location in Bournville (Broomfield, 2001). Alongside the construction of the factory, residential houses for the foremen were also built. Since the first cottage was built there in 1879 (Bournville Works, 1922), the village has been expanding year by year, with an increasing number of houses within its boundaries (Williams, 1931). In 1900, George Cadbury established the Bournville Village Trust, which acts as a charity and housing association, to manage the Bournville estate and provide a better living environment for its residents (Harvey, 1906). The Bournville Village Trust currently oversees a large urban area encompassing approximately 8,000 residences, a multitude of community amenities, expansive parks, and various open spaces. Furthermore, the scope of their management has expanded beyond Bournville to include various other sites in Birmingham and even Telford. Within the confines of Bournville village alone, there is now an expansive area of 1,000 acres (4 km^2) of land, accommodating an approximate population of 23,000 individuals (National Statistics, 2023)[14].

From a morphological research perspective, studying the entire area of Bournville village is highly impractical due to the plot-by-plot and building-by-building fieldwork required. Additionally, considering the cross-cultural comparative nature of this thesis, it is necessary to address the issue of comparability. For instance, the case study in China only encompasses an area of 0.5 km^2. Therefore, the research scope of this chapter aims to be limited to the core area of the original Bournville village, specifically the vicinity surrounding the chocolate factory.

The boundaries of this defined area extend northward to Raddlebarn Road, with a specific adjustment in the western half of the northern boundary to exclude houses that face Woodlands Drive. Towards the west, the boundary extends to Oak Tree Lane and Selly Oak Road, while the southern limit reaches Mary Vale Road. Finally, to the east, the boundary is defined by the presence of the Birmingham West Suburban Railway (Figure 6. 3).

14 https://www.oulsnam.net/pages/bournville-village-trust

Apart from the chocolate factory and its subsidiary facilities, the enclosed region is encompassed by the present-day Bournville Conservation Area, which was initially designated in 1971. Over time, the scope of the Conservation Area has been revised and expanded to include the surrounding areas.[15] While the chocolate factory is not officially recognised as part of the Bournville Conservation Area due to ownership considerations, including it within the research scope is more justifiable from a morphological standpoint. The factory has been instrumental in shaping the Bournville village since its establishment, and its architectural style harmonises with the surrounding residential buildings.

The study area, which encompasses a diverse community incorporating various functions such as production, residential areas, public services, and green spaces, holds significant importance. It embodies George Cadbury's housing ideals and the utopian vision of social reform that underpinned the early establishment of Bournville. Consequently, this area provides a robust foundation for conducting research, given its rich historical context and the multifaceted nature of its land uses. Therefore, it provides a worthwhile basis for conducting research. Nevertheless, it is crucial to acknowledge the limitations of the study area. Since 1925, the expansion of Bournville village has extended beyond its core areas, encompassing additional surrounding land for housing development (Harrison, 1999). However, it is important to note that the core area of Bournville has experienced minimal changes in its form, which limits its ability to reflect broader social changes at the national, urban, and even village levels. To address this limitation, the research approach will involve providing a general overview of changes in other areas of Bournville during each morphological period. This will be followed by a detailed morphological analysis focused specifically on the core area, enabling a more comprehensive understanding of its unique development in contrast to the broader context.

While the core village is officially designated as a Conservation Area, it is essential to recognise that it is a living heritage area, actively utilised for residential purposes rather than being preserved as a static museum-like entity. The urban landscape is continuously shaped by social changes, and although the core area of Bournville has undergone minimal alterations since the inter-war period,

15 https://www.birmingham.gov.uk/downloads/download/223/bournville_village_conservation_area

studying it remains highly valuable. Furthermore, the designation of the core area as a heritage site itself represents a significant morphological phenomenon that warrants further investigation.

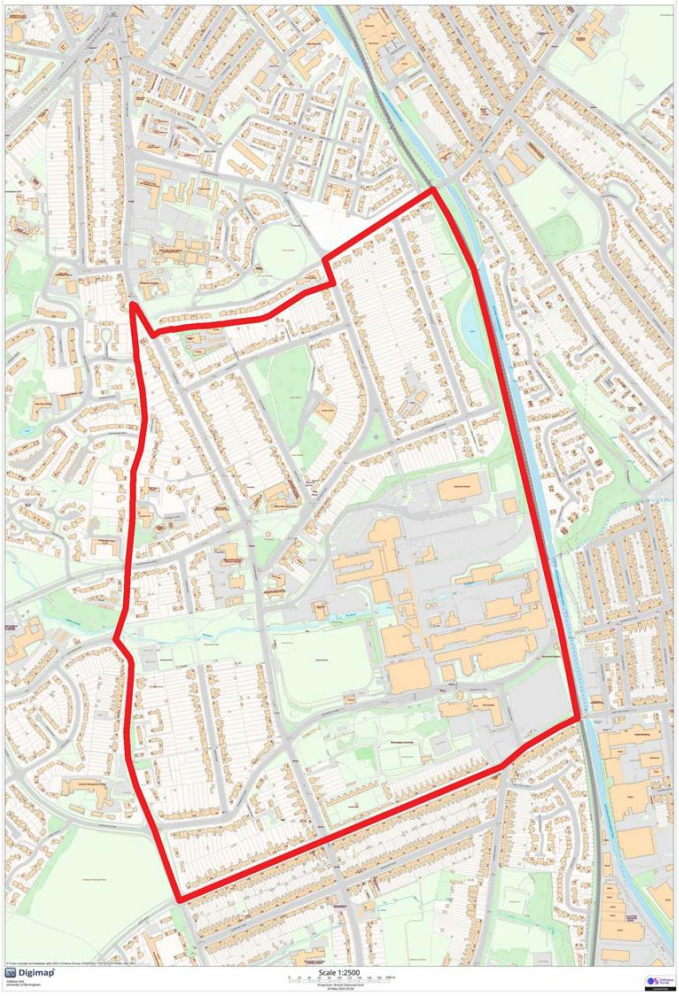


Figure 6. 3: The boundary of the study area in Bournville (bounded by a red line)

6.3 Morphological evolutionary process

This section aims to explore the morphological evolution of the landscape in Bournville, tracing its development from the agricultural landscape period to the present day. David Ward (1962) and M. J. Mortimore (1969) studied how urban features could reflect historical residues, and this part provides evidence based on the evolutionary analysis of Bournville by a series of historical Ordnance Survey and estate maps. It will be divided into six distinct morphological periods, each characterized by variations in plans, building types, and landscape elements at different time intervals. The identified morphological periods are as follows: 1) Pre-urban period (pre-1878); 2) Preparation period (1879-1894); 3) Construction period (1895-1913); 4) Inter-war period (1914-

1945); 5) Post-war to pre-conservation period (1946-1970); and 6) Conservation Area period (1971-present). Each period represents a significant phase in the evolution of Bournville's morphological evolutionary process, reflecting the unique characteristics and developments of the village throughout its history. The analysis will offer valuable insights into the diverse factors that have influenced the changes and transformations shaping the morphology of the village across different morphological periods through its history.

6.3.1 Pre-urban period (pre-1878): the morphological frame

Any urban development is impacted by the underlying landscape of roads, fields and buildings which terminologically is referred to as the morphological frame (Conzen, 1969). Based on the auctioneer's advertisement in 1878, it is evident that prior to the establishment of the Cadbury factory in 1879, the Bournville core area was characterized by an ornamental villa estate (Bournbrook Hall) (Figure 6. 4), although it only covered the southern half of the core village area. The dominant communication features include the Worcester and Birmingham Canal, and Stirchley Street station (Figure 6. 4) on the Birmingham & West Suburban Branch which is parallel to the canal. The station was opened in 1876 (Broomfield, 2001). The presence of the Bournbrook, flowing from west to east, and the east-west road known as Oak Lane (now Bournville Lane) running parallel to it, played important roles in the area. These remnants from the pre-urban period are significant transport features that have endured to the present day, serving as a vital morphological framework for future development.

Bournbrook Hall within its landscape gardens extends on both sides of Oak Lane and the trustees of its late owner, Thomas Stock Esq., saw the opportunity to make money by selling it as building estate, employing the Birmingham estate agents, James & Lister Lea & Son to sell it by auction in 1878. The hall was considered to be over 100 years old and was sold as a private residence before it was eventually sold to George and Richard Cadbury in 1895 (Broomfield, 2001). Within the park-like estate a fish pond and a wood at the north side of the Bournbrook, the former of which was used for fishing and winter skating. It was drained and filled in with ash from the factory boilers in 1922 (The Bournville Society, 2013). The area where the fish pond is located has been repurposed

for different uses over time and is one of the areas within the core area that has experienced the most

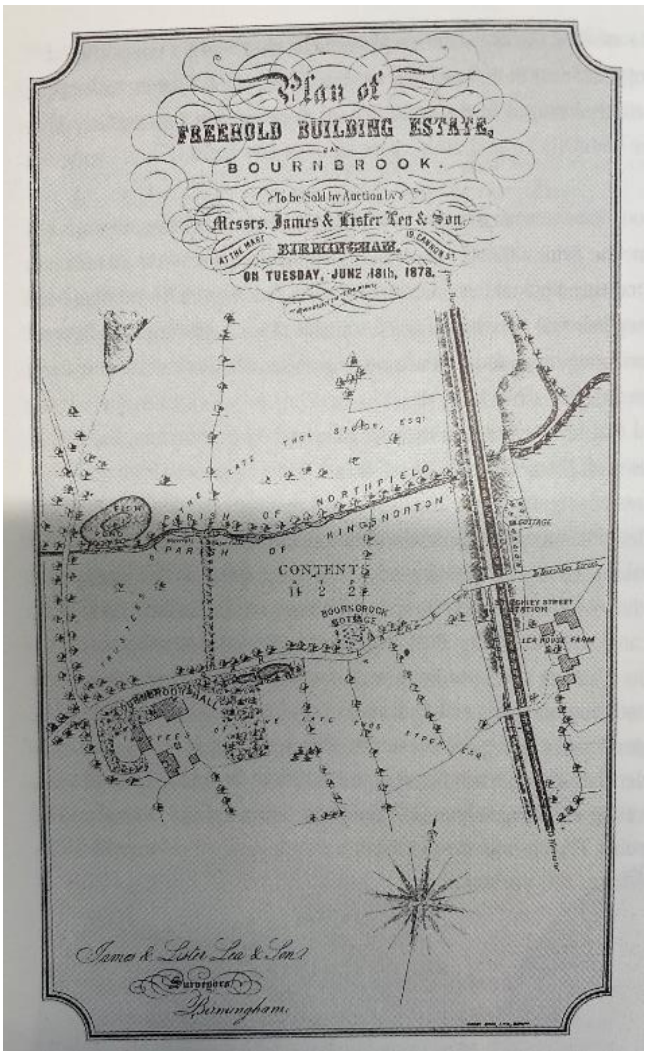


Figure 6. 4. Auctioneer's prospectus for the sale of the freehold land at Bournbrook in 1878 (The Bournville Society, 2013)

significant changes in functionality and morphology. Another noteworthy observation from the map is the presence of a number of north-south field boundaries that align perpendicularly to Bournville Lane. Along these boundaries, a significant number of ancient trees are distributed, adding to the scenic landscape of the area over the next two morphological periods, while Stock Wood remains a feature of the estate today.

6.3.2 Preparation period (1879-1894): planning for development

George Cadbury and his brother Richard Cadbury inherited their father's chocolate manufacturing works on Bridge Street in 1861. They successfully expanded the business, transforming it into a significantly larger enterprise by 1870. During this period, the workforce grew from 12 employees in 1861 to 200 in 1870 (Bradley, 2007). As a result, there was a need to further enlarge the scale of production. However, it was evident that the city centre no longer provided sufficient space for expansion. Therefore, the only option was to choose a well-connected piece of land in the suburbs.

The establishment of Stirchley station in 1876 provided Bournville with convenient water and rail connections to various locations across the country, although road connectivity in the area was inadequate. Furthermore, the decision to shift focus to the suburbs was motivated by another crucial factor. As the first factory in Britain to produce pure cocoa, their slogan 'Absolutely Pure, Therefore Best' (Dellheim, 1987) was less convincing due to the presence of industrial air pollution, impure water, and urban sewage in the city centre.

Considering the development in the surrounding areas of Bournville at that time, places like Selly Oak, Bournbrook, and Stirchley Street had already begun construction (Figure 6. 5). Prior to the relocation of the works to Bournville, the surrounding landscape mainly consisted of meadows, fields and woodlands, with the exception of Bournville Hall and a few manors located farther away (Bradley, 2007). This environment greatly benefited its advertising image of 'a factory in a garden' and also provided ample space for future development and expansion. Therefore, in 1878, George Cadbury made a significant decision to purchase a 14.5-acre parcel of land directly across from Stirchley (Harrison, 1999), adjacent to the Birmingham West Suburban Railway (Figure 6. 6). This step, despite its aforementioned advantages, was considered very financially risky at the time because all industries were concentrated in towns (Rogers, 1931). Although there were precedents like Titus Salt before this, Cadbury's move was still one of the earliest instances of relocating a factory to the suburbs or countryside areas (Bryson and Lowe, 1996).

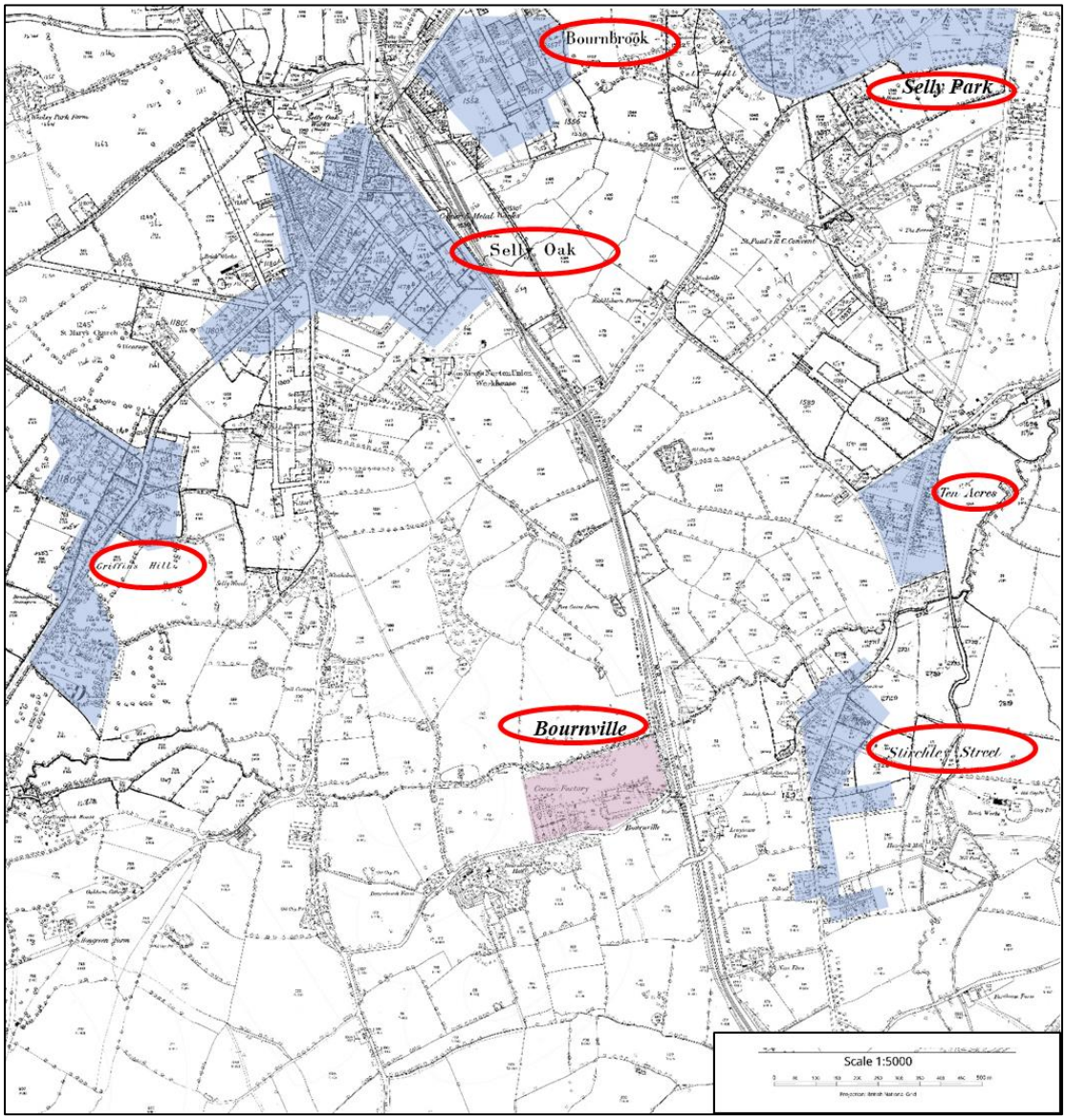


Figure 6. 5: The nuclei around Bournville (blue) in 1884 (Ordnance Survey, 1884) showed urban development and discontinuous housing projects already taking place in the surrounding areas. Bournville (pink) had ample land to the north, south and west for future expansion.

George Cadbury and the young architect George Gadd collaborated to plan the utilisation of this land and jointly designed the new factory (Bradley, 2007). In March 1879, construction activities for the new factory began. To supervise the progress of the project, George Cadbury stayed in a small cottage in Lifford during this period (Harrison, 1999). By the end of 1879, this estate began to take shape and was initially referred to as Bournbrook. However, because of the French connotations of Bournville and the perception of superior quality associated with French chocolate at the time, it was decided in October 1879 to name it Bournville (Tilson, 1989).

The Ordnance Survey map of 1884 reveals that the initial factory (orange) was situated west of the railway and canal, strategically positioned to benefit from the transportation options. It was located alongside the narrow Bournville Lane, which was connected to the factory by a short entrance lane (Figure 6. 6). To the west of the works, there were the earliest 7 pairs of semi-detached houses (green) specifically built for the factory foremen, meticulously designed by George Gadd (Figure 6. 7) (Tilson, 1989). Three pairs faced the country lane, while the rest were positioned along newly constructed access roads. This marked the beginning of planned landscape modifications on a larger scale. Notably, the map indicates that the area had already been named 'Bournville'. George and Richard brought their business to the area in late 1879 from Bridge Street in Birmingham city centre (Gardiner, 1923). From this perspective, it is evident that the early development of Bournville was primarily motivated by commercial considerations rather than philanthropy. However, this does not imply that the welfare of their workers was overlooked prior to this. In fact, the Cadbury brothers' firm, which operated on Bridge Street, was the first industry in Birmingham to implement a half-day off on Saturdays, demonstrating their commitment to improving worker well-being (Bradley, 2007). From Figure 6.6, we can also observe the changes in Bournbrook Hall. At this time, the grounds of Bournbrook Hall were heavily wooded, and the newly added sinuous paths indicate that the woodland was landscaped. To the west of the house, there was a large walled formal garden with greenhouses. Serving as the primary residence of the Bournbrook Hall estate, Bournbrook Hall originally belonged to the Izon family and was later purchased by the glass and lead merchant Thomas Stock. Subsequently, it was occupied by a family named Martin, and it was they who sold Bournbrook Hall and its grounds to the Cadbury brothers in 1893 (Broomfield, 2001). Therefore, it can be reasonably inferred that these garden designs were likely made by the Martin family. The land use and landscape to the west and north of the Cadbury factory were not influenced by the arrival of the new factory and predominantly retained their original pre-urban landscape (Figure 6. 6).

It can be noted that George Cadbury did not choose to live in the closest manor, Bournville Hall, but opted for a slightly more distant location. This was a common occurrence in the 19th century, as exemplified by Sir Titus Salt, who also did not reside in Saltaire, the village he constructed (Dewhirst, 1960). In 1881, George Cadbury and his first wife, Mary, resided in

Woodbrooke, situated near Bristol Road (Figure 6. 8). Unfortunately, Mary passed away in 1887. In 1888, George married his second wife, Elizabeth Mary, and they continued to live in Woodbrooke until 1894 when they relocated to Manor House in Northfield (Figure 6. 8). Shortly after, George Cadbury donated Woodbrooke to the Society of Friends to be used as a college, which is now one of the Selly Oak Colleges. Manor House, on the other hand, was purchased by the University of Birmingham in 1953 and subsequently adapted as a hall of residence by the architect H.W. Hobbiss. It suffered a major fire in 2014 but was restored and completed in 2021 (Foster *et al.* 2022).

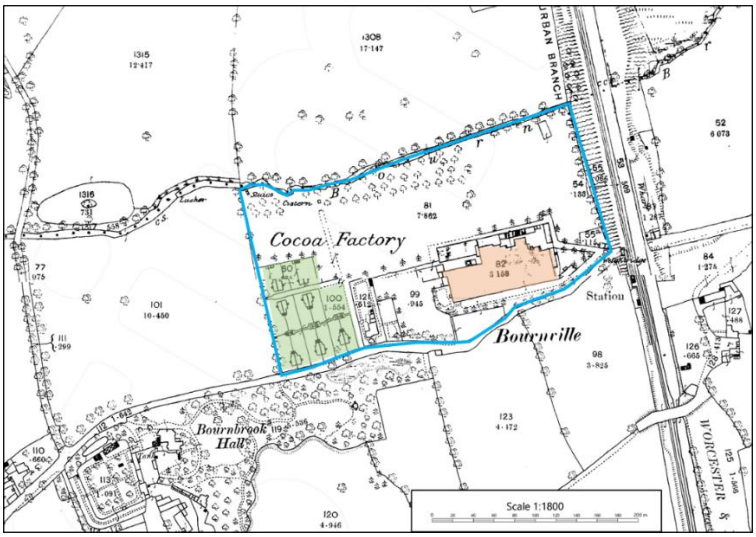


Figure 6. 6: Ordnance Survey in 1884. The area circled in blue represents the land purchased by George Cadbury in 1878. It is worth noting that this area is smaller than the initial extent of Bournville village when it first took shape in the 1890s.



Figure 6. 7: Early photos of the first houses constructed. See the large back-gardens and substantial size of the houses.

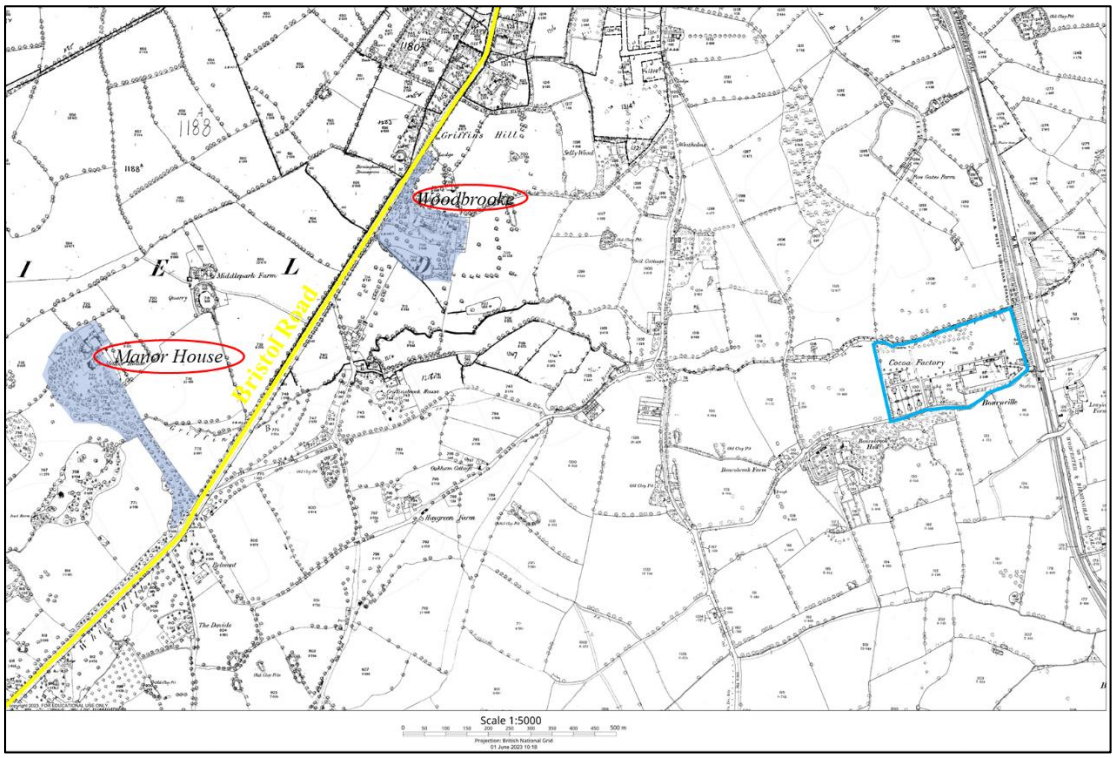


Figure 6. 8: After the construction of Bournville Village, George Cadbury's place of residence underwent changes from Woodbrooke to Manor House.

The land immediately adjacent to the west of the factory remained undeveloped. Further west still, and at the corner of Linden Road and Bournville Lane, was Bournbrook Farm (Figure 6. 9). The farm house could at least be dated back to the 1880s, was still there in the 1930s, but not in the 1960s. It was the most prominent feature of the local landscape after Bournbrook Hall before the construction of Bournville. Dell Cottage (Figure 6. 9) may be larger than its name implies, as historical photographs show that its staff included at least four maids, one cook, one coachman, and one gardener (Broomfield, 2001). Bournville Lane joined a north-south route to Selly Oak and then the city centre. A straight track running from Oaktree Lane to Bournville Hall provided a private entrance, with a lodge located at its northern end. Therefore, its width was narrower than Oaktree Lane. This track later became the main road connecting Selly Oak and Kingston Norton, and it became a part of the city's outer ring road (Slater, *ex inf.* 2023).

Oaktree Lane retains all the characteristics of an ancient thoroughfare, with squatter cottages lining its path. However, its significance diminished as the Bournville estate expanded towards the

west. To the north of the Bourn Brook, a field landscape predominates, with the exception of Stock Wood, named after its previous owner, Thomas Stock. Another noteworthy feature of the 1880s landscape can be found at the intersection of Oaktree Lane and Linden Road. Here, a pair of spacious semi-detached houses known as Westholme stood proudly, surrounded by extensive gardens adorned with wooded boundaries. Edward Cadbury, the eldest son of George Cadbury, and his wife resided in this area. However, as their residence falls beyond the boundary of the case study, further details will not be provided. The buildings of Five Gates Farm survive to the present day. In the 1880s, there was an intriguing large earthwork adjoining it to its north (Figure 6. 9). Raddlebarn Lane forms the north boundary of the Bournbrook Hall estate, purchased by the Cadbury's, beyond which was the Kings Norton Union Workhouse, which survived as Selly Oak hospital into the 21st century.

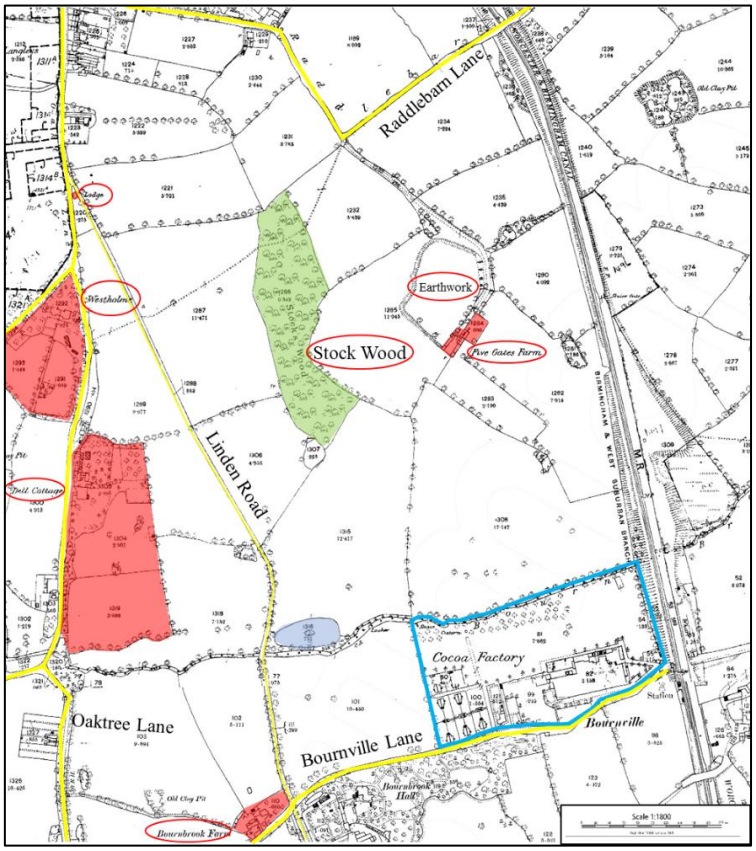


Figure 6. 9: Pre-urban elements on Ordnance Survey in 1884 (Scale: 1:1800) The area circled in blue represents the land purchased by George Cadbury in 1878. The yellow lines represent road traffic. The red shaded areas represent man-made structures. The blue represents pond. The green represents woodlands. These remnants of the pre-urban features were incorporated into the later design of Bournville Village.

Gradually, considering the following factors, the construction of housing for workers became the plan of the Cadbury brothers. First, although the new working environment in Bournville represented a significant improvement over the previous conditions in the city centre, it was far from ideal for the majority of workers, as only a few foremen were provided with nearby housing in Bournville. The biggest issue was commuting, which posed challenges for most of the workers. For those living in nearby villages such as Selly Oak or Northfield, the commute may not have been too problematic, although there were safety concerns when returning home at night (Rogers, 1931). For workers living in the city centre, which was the case for most of them, the lack of affordable trams at that time meant they had to rely on trains, thus increasing their cost of living. Although George Cadbury had made arrangements with the railway company to provide them with discounted tickets (Rogers, 1931).

Secondly, as the number of workers continued to increase, with 320 workers moving from the city centre to the new Bournville factory in 1879 and the workforce growing to 1,193 people by 1889, the idea of constructing worker housing became economically feasible (Bradley, 2007). Thirdly, George Cadbury, during his early days as a Sunday school teacher, visited the homes of his students who lived in back-to-back houses. He realized that moral education alone was insufficient and would never succeed in bringing about fundamental change in the working class if they lived in crowded and filthy environments. Thus, the idea of constructing housing for workers was always on his mind (Williams, 1931). After moving to Bournville, the Cadbury factory's business continued to thrive. Soon, the original production space became insufficient. With increasing profits, the firm had the capability to acquire more land (Rogers, 1931). In the early 1890s, George Cadbury began purchasing the surrounding land of the works. By 1894, George Cadbury had acquired enough land to lay the foundations of Bournville Village (Figure 6. 10). The initial development of Bournville Village took place on this land (Gardiner, 1923).

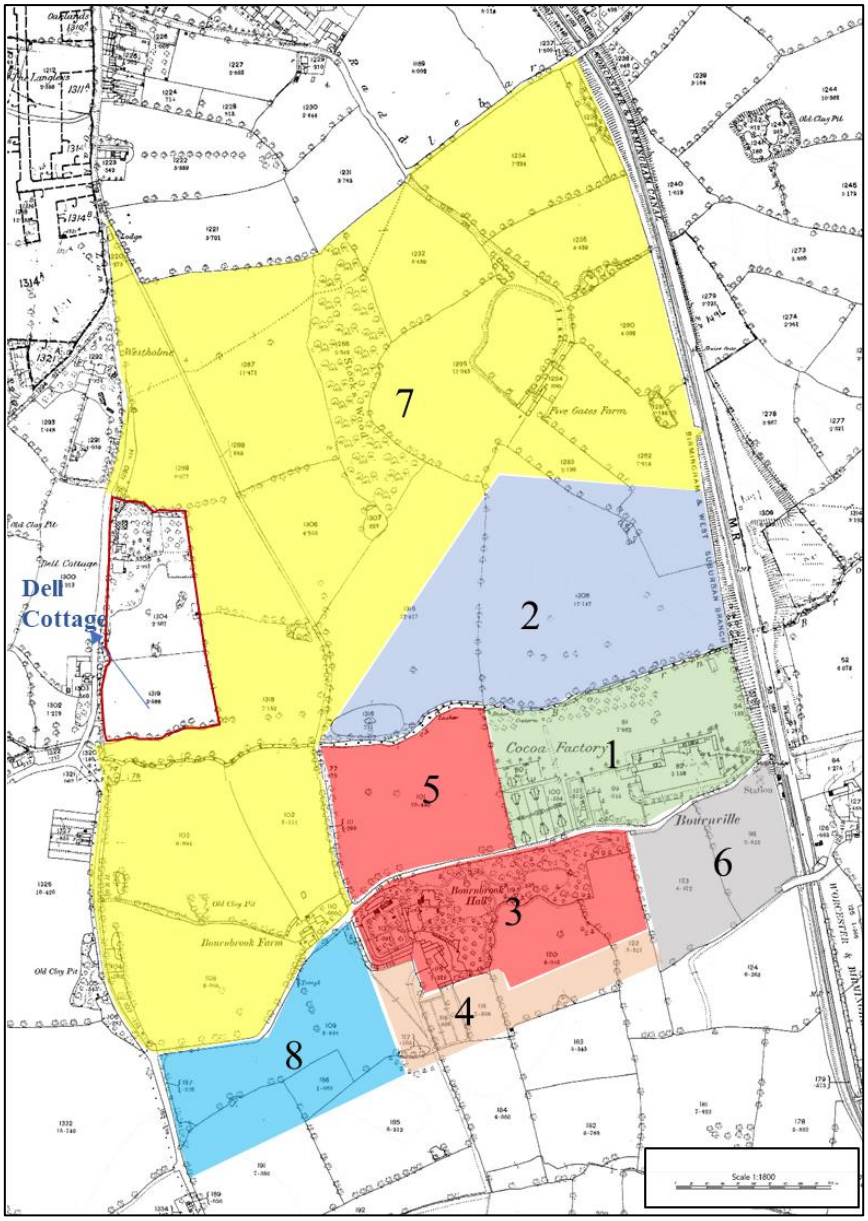


Figure 6. 10: Land Acquired by George Cadbury as of 1894. With the exception of No. 1, which was obtained in 1878, all other acquisitions took place in the early 1890s, particularly in 1893. It can be confirmed that No. 3 and No. 4 were purchased from E. S. Thackray in 1893 (the reason for colouring No. 3 and No. 4 differently is because they were subsequently controlled by different trusts). No. 7 was acquired from the Trustees of Joseph Stock (deceased) in 1893, whilst No. 8 was obtained from the same trustees in 1894. Additionally, since it is known for certain that No. 2 and No. 5 were already purchased when 7 was acquired (Broomfield, 2001), it is reasonable to infer that No. 2 and No. 5 were also acquired in 1893. No. 6 already appeared in the original plan of the estate drawn by A. P. Walker in 1894 (Harrison, 1999), suggesting its acquisition in either 1893 or 1894. Please note that at this time, the land occupied by Dell Cottage was not part of Bournville.

6.3.3 Construction period (1895- 1913): building the village (a) housing (b) institutions (c) green space

With the land acquired, George Cadbury could finally realize his vision of building decent housing for his workers to encourage qualities of independence, thrift, and self-help. George Cadbury invited A.P. Walker, a Quaker surveyor, to provide a plan to implement his ideas. In 1894, Walker presented the earliest version of the plan (BVT Archive, MS 1536). In this scheme (Fig. 9), the original Mary Vale Road, Oak Tree Lane, and Selly Oak Road formed the boundaries, serving as the main outward connections. Bournville Lane was largely preserved as much as possible in its original winding direction. Internally, the private track connecting the lodge with Bournville Hall, along with several other planned roads, constituted the new street system of Bournville village. It is worth noting that at this time, the boundaries of Bournville village were irregular (red line in Fig. 9), partly due to land ownership boundaries and also due to the distinction between Bournville village and the Cadbury Factory.

The division of lands belonging to Bournville Village and lands belonging to the Guardians of the Poor of the Kings Norton Union, and Raddlebarn Lane, formed its northern boundary (yellow line in Figure 6. 9). Oak Tree Lane and Selly Oak Lane formed the western boundary; however, due to the land ownership of Dell Cottage (shaded yellow in Figure 6. 11) not yet being acquired, there was a recess in the western boundary. The southern boundary was Mary Vale Road, and the eastern boundary was mainly the railway. The zigzag line in the southeast reflected the distinction in ownership between Bournville village and the Cadbury factory, demonstrating George Cadbury's insistence on their relative independence, despite frequent confusion (Harrison, 1999).

Figure 6. 11 also illustrates the division of plots and the proposed development of semi-detached houses in the northern part of Bournville along the proposed roads (shaded blue) though these houses were not subsequently built. The preservation of Stock's Wood was given high priority in this version of the plan. It should be noted that there was no planned development on either side of Bourn Brook, and the central area of Bournville Village, known as The Green, is not depicted in the illustration. For various reasons, George Cadbury and A.P. Walker did not adopt this version of

the plan but developed a new one several months later (Harrison, 1999). Construction activities began, and in 1895, houses were built on the north side of Mary Vale Road, marking the beginning of the Bournville estate (Hillman, 1994).

The plan of Bournville in 1897 (Figure 6. 12) demonstrates that the village had already taken shape. The implemented framework closely resembled the planned road layout in the original plan (Figure 6. 11), with three notable differences. First, the introduction of rail siding to the works in 1894 enabled direct transportation of raw materials and finished products to and from the factory. Secondly, the construction of The Green resulted in the formation of a circular loop road around it (Figure 6. 12). Thirdly, contrary to the original scheme by A. P. Walker, early development primarily took place in the southwest corner of the Bournville estate along Bournville Lane, Mary Vale Road, and Linden Road (shaded purple in Figure 6. 12). Harrison interprets this as a distinguishing feature of Bournville, as it grew from the outside inwards. Whereas in practical terms, this can be easily understood addressing the housing needs of workers emerges as a critical priority, and it was more preferable for commuting workers to be closer to the factory.

By comparing historical maps from different stages of the construction process, it becomes evident that it was not strictly guided by a master plan but rather underwent continuous updates and adjustments (Cherry, 1996a). This process itself reflects Bournville as a housing experiment. However, certain elements of the morphological frame persisted throughout history, leaving traces in the present-day landscape, including plan and building form, land and building utilisations, and green spaces, among other aspects. When comparing the estate plans in 1884 and 1904 (Figure 6. 13), it becomes evident that the development of Bournville did not completely erase pre-urban elements. Within the newly developed Bournville estate, the existing Oak Tree Lane, Row Heath Lane, Bournville Lane, and the private track (all in yellow) connecting the lodge and Bournbrook Hall formed a morphological framework that significantly influenced the orientation of the newly planned roads (in purple, Figure 6. 13). For instance, the southern end of this private track extended parallel to Row Heath Road, while Maple Road and Elm Road were laid out parallel to the alignment of the private track (Sycamore Road). Furthermore, Mary Vale Road was roughly parallel with Bournville Lane. The implementation of the new road system played a crucial role in determining

the division of plots. To some extent, this exhibits the ‘revolutionary’ changes described by Conzen (1969): the physical boundaries depicted in red on the map (Figure 6. 13) were largely eliminated, and the land was reconfigured for the newly planned street system. However, certain pre-urban landmarks, such as Bournbrook Hall, Stock Wood, and Five Gates Farm buildings (shaded in green, Figure 6. 13), were preserved.

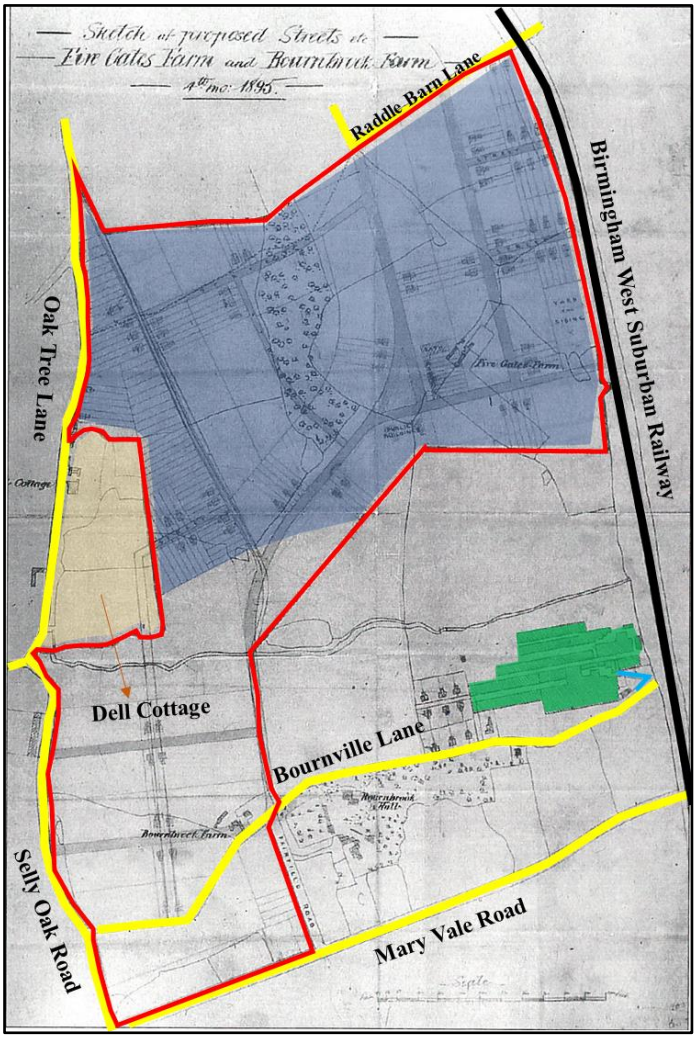


Figure 6. 11: The original plan of Bournville village by A. P. Walker in 1894 reveals expansion of the Cadbury Factory works. The original buildings of the works had doubled in size by 1889 (shaded green) (Williams, 1931). However, they were still confined to the south side of Bourn Brook in 1894, although land had been reserved for future expansion across Bourn Brook. The illustration highlights a small path connecting the works to Bournville Lane (blue line). Horse-drawn vans were the primary means of transporting goods to Lifford Station during this period. Shortly after the map was created, railway siding was introduced to the works in 1894 (Williams, 1931).

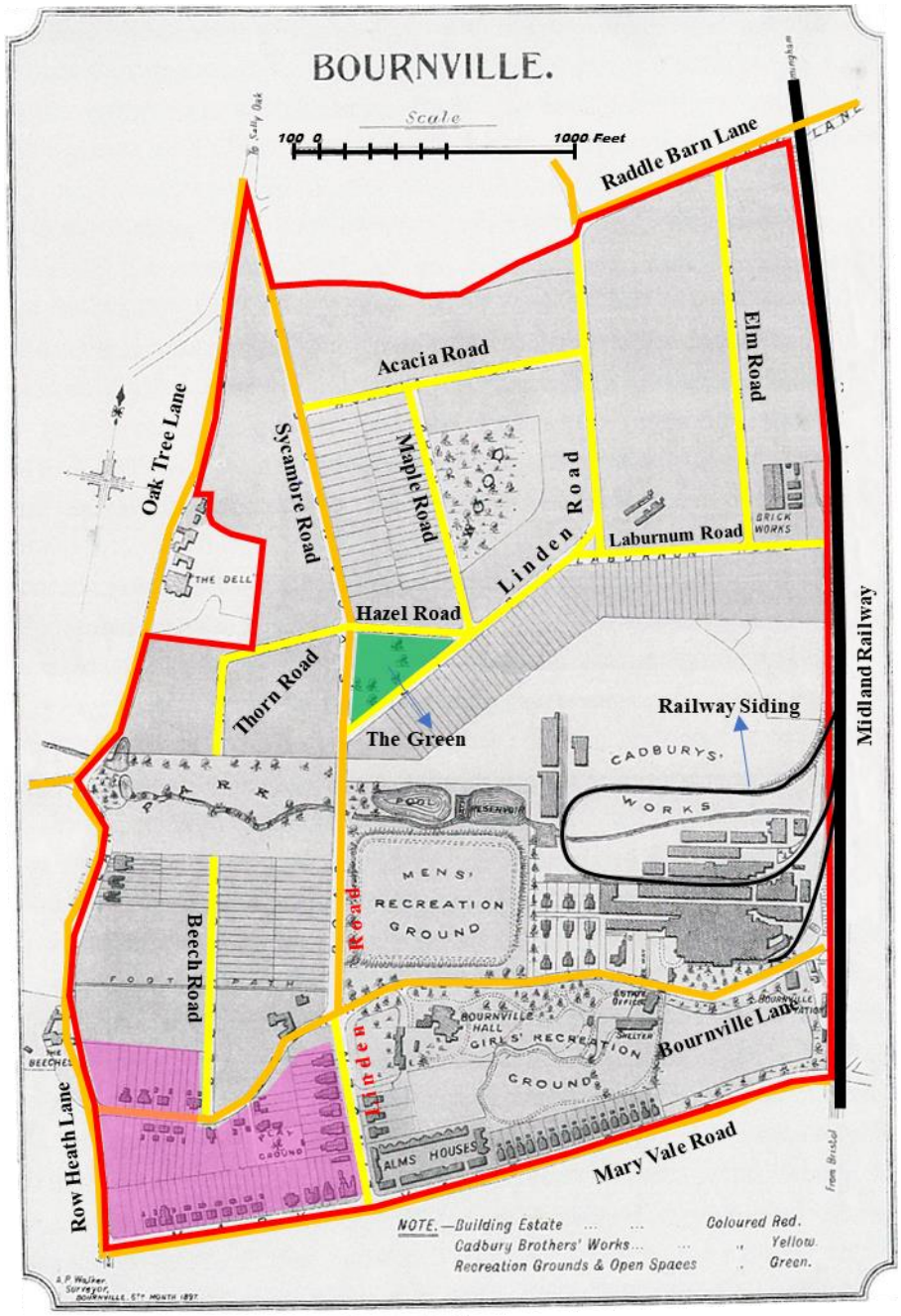


Figure 6. 12: Plan of Bournville by A. P. Walker in 1897 (adapted by author) (Harrison, 1999). Note the differences from the original plan (Figure 6. 11). The Green was developed to the north of Bourn Brook (shaded in green), although it did not have that name at the time. Additionally, note the newly constructed roads named after various trees (yellow lines). The northern section of Linden Road on the map, is now referred to as Sycamore Road, while the depicted Sycamore Road is now known as Linden Road. This was a consequence of Linden Road being originally conceived as the main through road of the estate, but the more direct route to Selly Oak provided by Sycamore Road quickly became the north-south routeway.

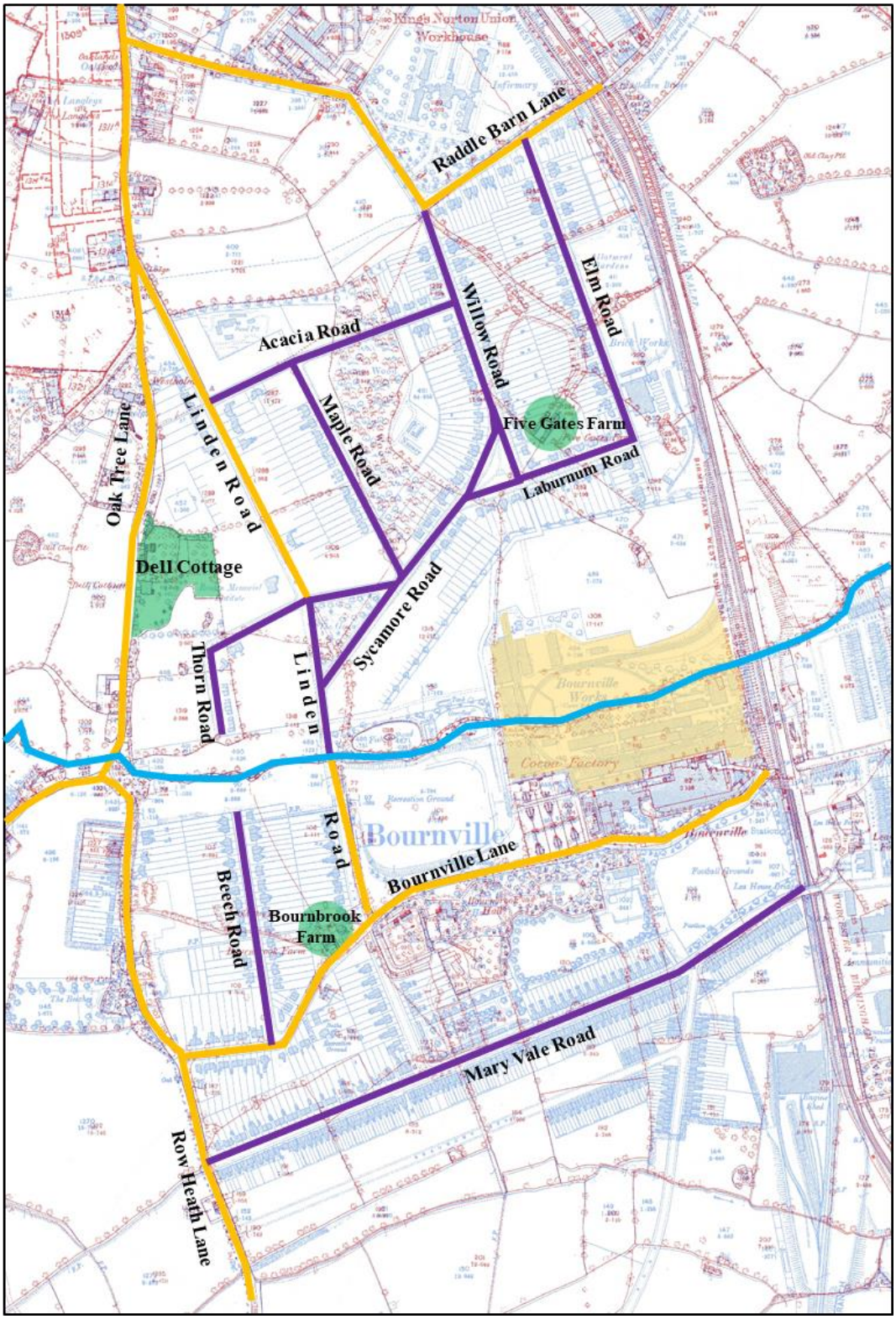


Figure 6. 13: Plan of the Bournville in 1884 (red) and 1904 (blue). Note that the yellow shaded areas in the diagram represent the newly constructed production buildings of the Cadbury factory during this period. By this time, the production facilities had significantly expanded northward, spanning across Bournbrook.

One additional notable example demonstrates the impact of plot boundaries over time. Specifically, the southern portion of the Dell Cottage grounds was integrated into the Bournville estate as early as 1895 (Figure 6. 12), while the inclusion of the northern portion occurred later in 1899 (Broomfield, 2001). The original boundary of Dell Cottage functioned as a fixation line, exerting a discernible influence on the subsequent development of the northern section in terms of building types and land utilisation. The main house of Dell Cottage served as the residence of E. S. Thackray, the head of the Buying Department of the Cadbury factory until 1909 when it then became 'Fircroft', used as a working-men's college. Despite undergoing significant expansion and modernization, it continued to serve its institutional role until the present time. In the 1960s, the smaller auxiliary buildings within the boundary located north of the main house were demolished. Subsequently, Oak Tree House was constructed in their place. It is noteworthy that Oak Tree House, unlike the other properties along Oak Tree Lane, was not utilised as a private residence. Rather, it served as an institutional retirement home[16].

Bournville village construction began in 1895, and the core village was largely completed before World War I (Figure 6. 14). Even as early as 1906, the development of Bournville had already expanded beyond the core village (Durman and Harrison, 1995). As the name implies, the design of Bournville Village embodies the essence of a traditional village. As discussed in the earlier section of this chapter (pp. 215), George Cadbury recognized, through his experience of being an Adult School teacher and his engagement with residents living in cramped back-to-back houses in the city centre, that the impact of modern industry had led to workers being confined to factory work, pubs, and substandard living conditions. Such environments failed to foster the development of individuals who were healthy, industrious, and esteemed. He believed that the root cause of this was that industrialization had led to a greater utilisation of land for industrial purposes and industrial housing, resulting in the growing detachment of people with the soil (Gardiner, 1923). Therefore, his reform concept aimed to bring the workers 'back to the land,' and it is evident that his vision for Bournville was to create a 'village' (Marsh, 1982). However, it is important to note that this idea was not unique to George Cadbury alone. In fact, following the industrial revolution and its

16 https://housingcare.org/housing-care/facility-info-8618-oak-tree-house-bournville-england (consulted 2023).

associated drawbacks in large cities and towns, the tranquil and pastoral countryside gradually became a collective emotional appeal in English minds. The English village came to embody the ideals of a 'rural idyll' or a 'village in the mind' (e.g., Pahl, 1970; Hunt and Satterlee, 1986). Defining the essence of an English village is a complex endeavour, as there is no universally agreed-upon set of criteria, whether in terms of location or morphology. In terms of location, some rural settlements were located far from large cities or towns and had managed to avoid urbanization. However, there were also settlements situated on the outskirts of major cities that had already undergone suburbanization and no longer possessed the traditional peaceful characteristics of the countryside (Yorke, 2014). Morphologically, while there was no universally established set of features that defined a village, tourists generally had certain expectations, which often included elements such as a village green, a pub, a pond, and other similar features (e.g., Muir, 1980; Hunt and Satterlee, 1986). The location of Bournville village was carefully chosen to balance the needs of factory production and product sales, making a remote location impractical. As a result, it was strategically positioned on the outskirts of Birmingham. In terms of its form, Bournville Village beautifully reflected the visionary ideals of its creator, George Cadbury. Furthermore, the influence of the Cadbury family's religious beliefs, specifically their devotional commitment to Quaker principles, was deeply ingrained in Bournville Village. This spiritual influence was notably manifested by the intentional absence of pubs or inns within Bournville, as Quakers, being pacifists and proponents of abstinence, held strong objections against war and the consumption of alcohol.

Compared to the 1904 Ordnance Survey (highlighted in blue) depicted in Figure 6. 13, noticeable transformations took place within Bournville village's structure and form over a span of approximately ten years, as illustrated in Figure 6. 14. Apart from the construction of more residences in the northern half of the estate, a more significant change occurred with the introduction of The Green and the subsequent development of various surrounding facilities. Like many traditional English villages, Bournville village also featured a village green. This green area, originally utilised for grazing purposes, was situated at the centre of the village (Figure 6. 14). Subsequently, the focal point of Bournville village's community life also shifted from the shops located at Linden Road and Mary Vale Road (No. 14 in Figure 6. 14) to this area (Harrison, 1999). The specific functional configuration and form of these facilities will be elaborated on in a

subsequent section of this chapter. The street system also underwent two minor changes. First, in order to improve Bournville village's connectivity with external transportation, the original L-shaped Thorn Road to the west of the Green was modified into a T-shaped road, connecting The Green with Oak Tree Lane. Secondly, culs-de-sac with short terraces and quadrangles were introduced to the southwest part of the estate along Selly Oak Lane. It is easy to distinguish between pre-existing roads, representing the pre-urban cadastre, and the newly constructed roads during the development of Bournville village. The newly built roads often lacked geometric sophistication. Regardless of whether they were pre-existing or newly constructed streets, both sides were planted with trees. To comply with the bye-laws, most of the newly constructed streets were 42 or 45 feet wide. Before the maturity of the trees, many commentators considered these streets to appear too wide, even somewhat bare (Durman and Harrison, 1995). In terms of plot and building plans, the orientation and size of the plots varied according to the orientation and spacing of the respective streets. The plots were predominantly rectangular in shape, and their different sizes reflected the socially mixed nature of Bournville. The houses were constructed with a density of six per acre (Bryson and Lowe, 1996). In order to ensure that each plot had sufficient space for the development of front and back gardens, the maximum footprint of any building on a plot was restricted to 25% of the total plot area. The average garden size for early plots was 600 square yards. The layout and spatial division of internal garden features will be elaborated on later in this chapter.

The diversity of building forms is a prominent feature of Bournville. In fact, the idea of constructing Bournville village emerged in response to the monotony of bye-law terraced houses (chapter 4). During the construction of Bournville village, George Cadbury continuously purchased surrounding land to prevent the estate from being overrun by speculative builders' bye-law terraced houses. Although many sources refer to Bournville as a 'model village' (e.g., Harvey, 1906; Harrison, 1999; Groves et al., 2003), recent studies have pointed to the notion that the early purpose of constructing Bournville was not explicitly aimed at creating a model village but rather a building estate (e.g., Bryson and Lowe, 2002; Bailey and Bryson, 2006). Similar to housing schemes in London during the 18th and 19th centuries, landowners could specify specific building densities, materials, and other criteria in developing an estate (Olsen, 1964). Although Bournville is now often described as a 'balanced community' (e.g., Sarkissian and Heine, 1978; Cherry, 1996a), the original

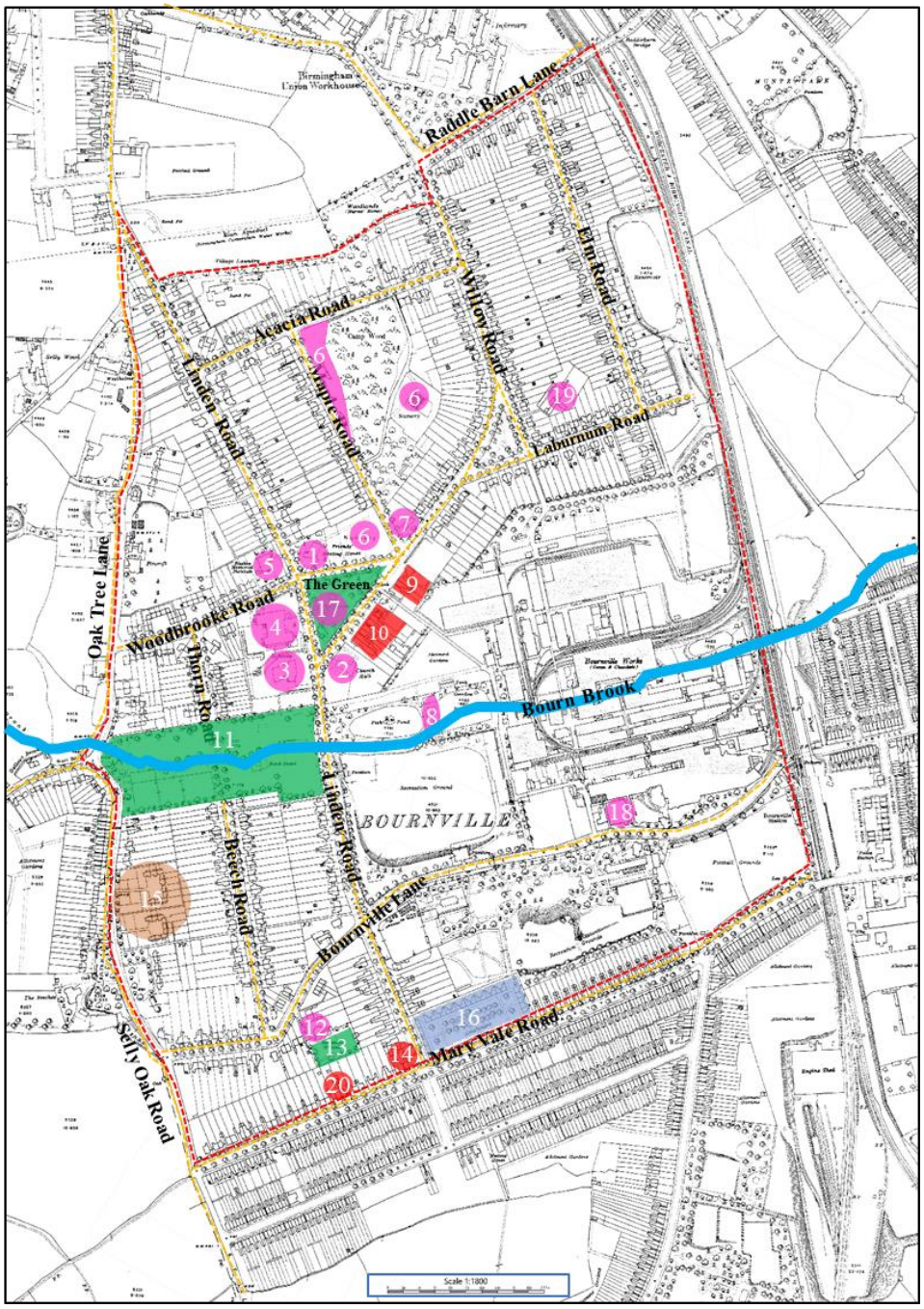


Figure 6. 14: Plan of Bournville in 1916. Note the trees planted along the roads and the shaded areas marked with numbers. 1. Bournville Quaker Meeting House; 2. Church Hall; 3 & 4. Schools; 5. Ruskin Memorial Institute; 6. Nurseries; 7. Selly Manor; 8. Men's Open Air Baths; 9 & 10. Shops, including bank and post office; 11. Bournville Park; 12. Bath House, closed in 1912; 13. Recreation Ground; 14&20. Shops in early days; 15. culs-de-sac with short terraces; 16. Almshouses; 17. The Rest House; 18. Girls' Baths; 19. BVT Direct Labour Scheme and Maintenance Department.

aim of Bournville village was to attract 'a superior class of quiet and respectable tenants' (Durman

and Harrison, 1995). George Cadbury implemented restrictive covenants, similar to those used in the Calthorpe Estate in Edgbaston, to regulate the size and cost of dwellings. All houses had to exceed a minimum size requirement and could not cost less than £150 (Durman and Harrison, 1995). Consequently, it is evident that such houses did not hold significant appeal for the broader working class as they were too expensive. In fact, during the early stages of Bournville's construction, many of the dwellings were commissioned by the Cadbury family and subsequently let out on long leases in accordance with the specific guidelines set by George Cadbury. George Cadbury initially intended to sell the sites and cottages directly, but this idea faced opposition and was not implemented due to the challenge of ensuring that the new owners would uphold the original intentions of Bournville's construction. In the subsequent implementation, the houses and land were sold on leases of 999 years during the initial five years of development. Prospective buyers who had the desire to purchase but only had partial funds were provided with mortgages to assist them in realizing their aspirations. This method facilitated the sale of 143 cottages (Chinn, 1999). However, George Cadbury soon became aware that some lessees were making a profit by selling the property, resulting in speculation, so discontinued letting on long leases for the next several decades (Bournville Village Trust, 2018). At the same time, George Cadbury was cautious about becoming excessively involved in Bournville's affairs, as it could have led to an undue sense of paternalism. Consequently, he made the decision to establish the Bournville Village Trust (BVT), which would be responsible for investing in and managing Bournville property in accordance with the provisions outlined in the Deed of Foundation. The generated profits were to be dedicated to the development and expansion of the estate (BVT, 1942). 'The object is declared to be the amelioration of the condition of the working-class and labouring population in and around Birmingham, and elsewhere in Great Britain, by the provision of improved dwellings, with gardens and open spaces to be enjoyed therewith' (Bournville Village Trust, 1900). This concern not only fostered a desire for social mixing but also explained the provision of housing specifically targeted towards individuals with low to middle incomes in Bournville, starting from 1900. To maintain strict control over the development of the estate, prior to World War I, the newly constructed houses were predominantly offered for rent. Under the governance of BVT, Bournville witnessed ongoing and rapid expansion, resulting in a total of 894 dwellings on the estate by 1914 (Durman and Harrison, 1995).

The changes in the appointment of architects overseeing the development of Bournville, as well as their personal aesthetic preferences, are also factors that contribute to the the characteristic variety of building form in Bournville through different historical periods. From 1895 the initial set of dwellings was designed by A.P. Walker, comprising three pairs of semi-detached houses situated on Mary Vale Road (Figure 6. 15 and Figure 6. 16). They were too spacious, some were of three storeys, and therefore too expensive, rendering them unsatisfactory to George Cadbury. Afterward, Walker ceased designing houses for Bournville, and he was succeeded by William Alexander Harvey, who, at the age of twenty, was appointed to the position in 1895. Harvey's early designs also included back projections for kitchens and bathrooms, but he soon changed his design style and began creating smaller-sized and plainer cottages (Durman and Harrison, 1995). Harvey emphasized the significance of the revival in domestic architecture and believed that architects should strive for the standards of 'Art and Economy'. According to Harvey, the true beauty of architecture did not rely on excessive ornamentation, but rather on achieving harmony in the composition. He believed that even if certain aspects of a building were kept simple, they could still possess beauty as long as they harmonized with the overall design. In order to attain a sense of harmony and picturesque aesthetics while preventing monotony and fostering social integration, Harvey would strategically incorporate small cottages or short terraced houses alongside larger detached or semi-detached dwellings, thereby introducing visual diversity within the street facades. Harvey's approach to achieving economy did not involve the use of low-quality building materials. He firmly believed that in light of the potential repair costs in the future, it was not economical. Instead, he achieved economy by designing dwellings of compactness and regularity. Harvey believed that aligning the size of houses with the standard sizes of available building materials would effectively prevent waste (Harvey, 1906). The blocks designed by Harvey, characterized by their simplicity and affordability, which included a living room, parlour, scullery, and three bedrooms, became the preferred housing type for council houses during the interwar period (Chinn, 1991). Harvey remained the estate architect until 1904 when he entered private practice, but he continued to serve as the estate's consultant architect and designed significant institutional buildings such as Ruskin Hall. From 1904 to 1911, Henry Bedford Tylor became the estate's architect. Due to BVT's financial constraints, Tylor had to design simpler and plainer houses. The short-terraced houses, quadrangles, and

bungalows that will be discussed later were designed by Tylor (Tilson, 1989).



Figure 6. 15: The initial houses by A.P. Walker, located at 222-232 Mary Vale Road in 1895. Note the presence of newly planted trees with protective guards, indicating that these buildings were recently constructed. The houses in the foreground are of three storeys and have generous side extension.



Figure 6. 16: A screenshot from Google Earth displaying the same pair of semi-detached houses (on the left) designed by A.P. Walker, and a neighbouring semi-detached pair (on the right) further along Mary Vale Road. Note the contrasting features between the intricate shape and wall cladding of the house on the left and the regular form, plain walls, and building structure on the right.

In terms of the specific forms of buildings, Cadbury had the objective of preserving a social

mix within Bournville, which led to the inclusion of a variety of housing types by the end of First World War. These included bungalows, larger detached houses, semi-detached pairs, as well as three- and four-house terraces and quadrangles (Figure 6. 17). Typically, affluent households occupied the larger houses situated on the periphery. In Figure 6. 17, the black plot boundaries and building plans indicate that the plot was already demarcated and the buildings were constructed in 1904. The red colour, on the other hand, represents developments that were completed between 1905 and 1916. Considering the respective tenures of Harvey and Tylor, it can be inferred that the black areas are associated with designs by Harvey, while the red areas are predominantly associated with designs by Tylor. However, it is important to note that since the time shown on the Ordnance Survey represents the year of publication (without specifying the month), and there is a time lag between surveying and publishing, there is a possibility that some red areas could also include designs by Harvey. The figure clearly demonstrates that Harvey was responsible for designing the majority of residential housing, while Tylor focused more on land parcels in peripheral areas that had not yet been developed by Harvey. Additionally, it reveals that Harvey, in his designs, ensured that each street had a minimum of two different types of buildings to maintain a diverse streetscape. Tylor continued this tradition during his tenure. Furthermore, both estate architects emphasized the significance of corner buildings. It is evident that the building types at street corners differ from the surrounding buildings. This distinction is particularly evident at the intersection of Selly Oak Road with Bournville Lane and Mary Vale Road where two single cottages are situated, while the buildings to the east predominantly consist of semi-detached houses. The following diagrams will illustrate each type separately.

As of 1916, bungalows were only present on the north side of Woodbrooke Road and in Almshouses (The bungalows of Almshouses on Mary Vale Road will be discussed later in the chapter) in Bournville (Figure 6. 18). They were designed by Henry Bedford Tylor in 1909 (Gumbley, 1991). These bungalows comprised of eight or nine single-story blocks arranged in a three-sided layout, with a central green space. Each block included a living room, a scullery, one bedroom, a tool store, and a w. c. These bungalows were primarily intended for elderly individuals and single women, contributing to the social diversity within the Bournville community (Durman and Harrison, 1995).

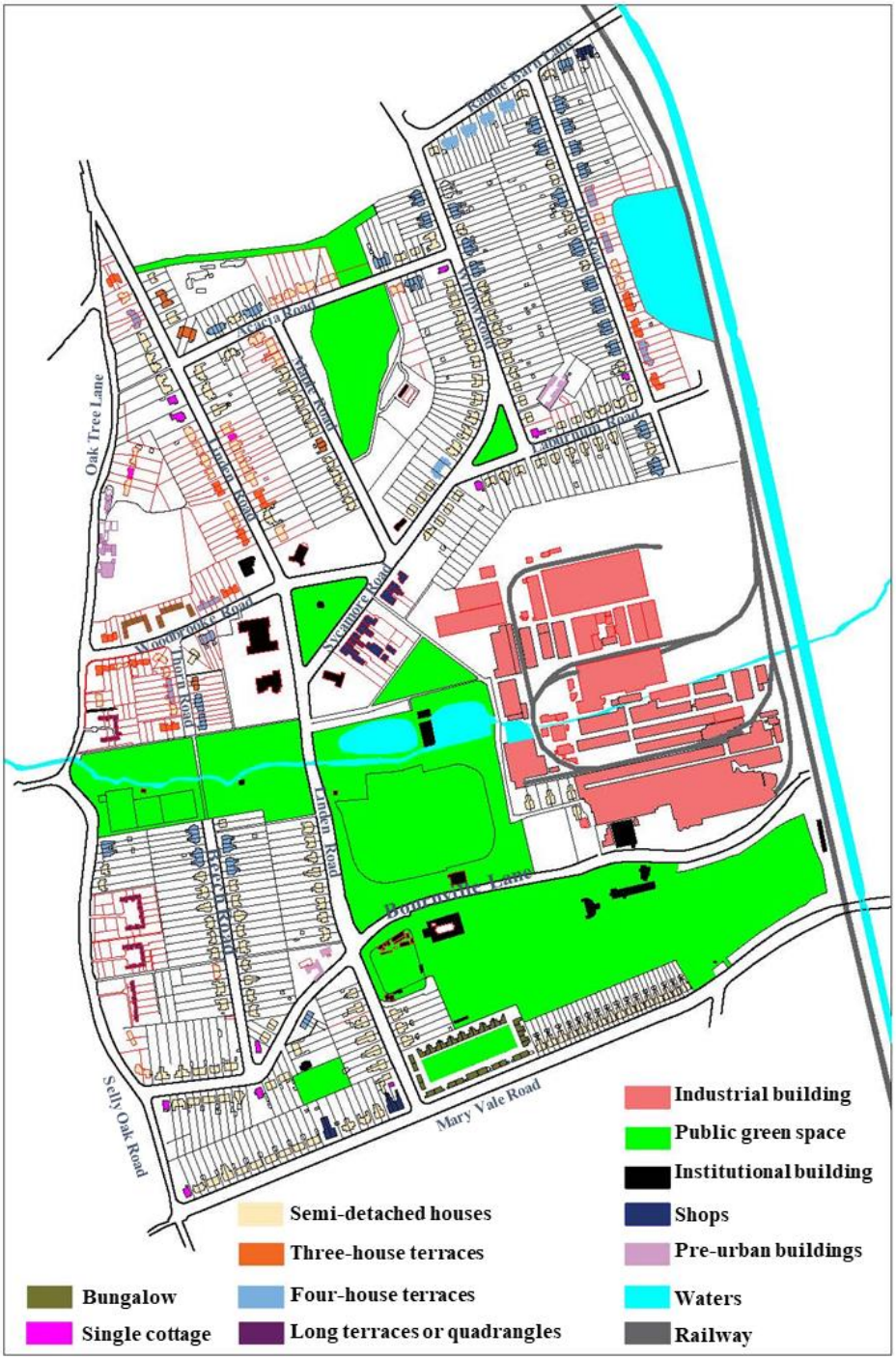


Figure 6. 17: Map of building form of Bournville in 1916. Note that by this time, the core village had been largely built up. Another notable feature is the significant proportion of green spaces occupying the land.

Detached cottages are distributed in a variety of locations within the Bournville core village. However, Harvey predominantly placed them at street corners or bends, emphasizing their presence

in prominent locations. In contrast, Tylor took a more random approach to their positioning, occasionally placing them in the middle of the street line. Taking the example of the single cottage at the intersection of Mary Vale Road and Selly Oak Road (Figure 6. 19), it was designed by Harvey and constructed between 1898 and 1899 (Gumbley, 1991; Harrison, 1999). On the ground floor, it features a porch, hall, larder, drawing room, dining room, kitchen, scullery, cloakroom under the stairs, coals, tools, and a w. c. On the bedroom floor, there are three bedrooms, a cupboard, a bathroom with hot and cold water and a lavatory. The overall appearance of the cottage is plain and rough-cast. The gable is constructed using a half-timber structure, reflecting Harvey's reference to English vernacular building elements. The roof is covered with Hartshill hand-made tiles, which have endured the test of harsh weather conditions (Harvey, 1906).

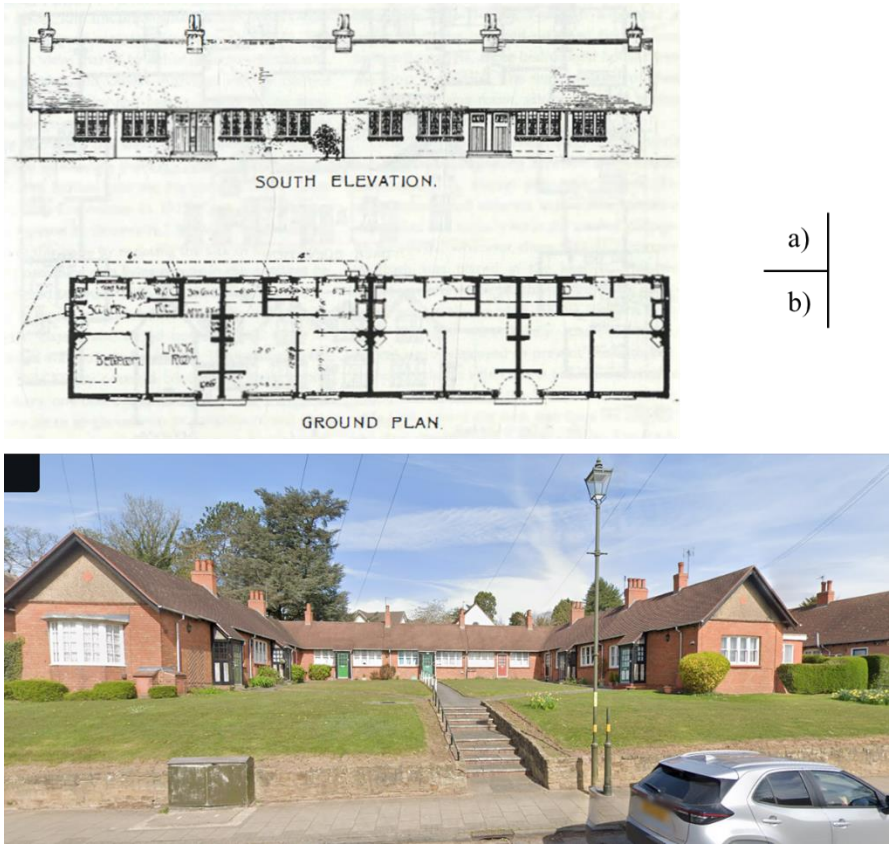


Figure 6. 18: Bungalows for elderly individuals (single women) at 18-48 Woodbrooke Road designed by H. B. Tylor. a) South Elevation of the bungalows; b) Google Maps screenshot of the bungalows. Both images showcase the modest appearance of these bungalows.

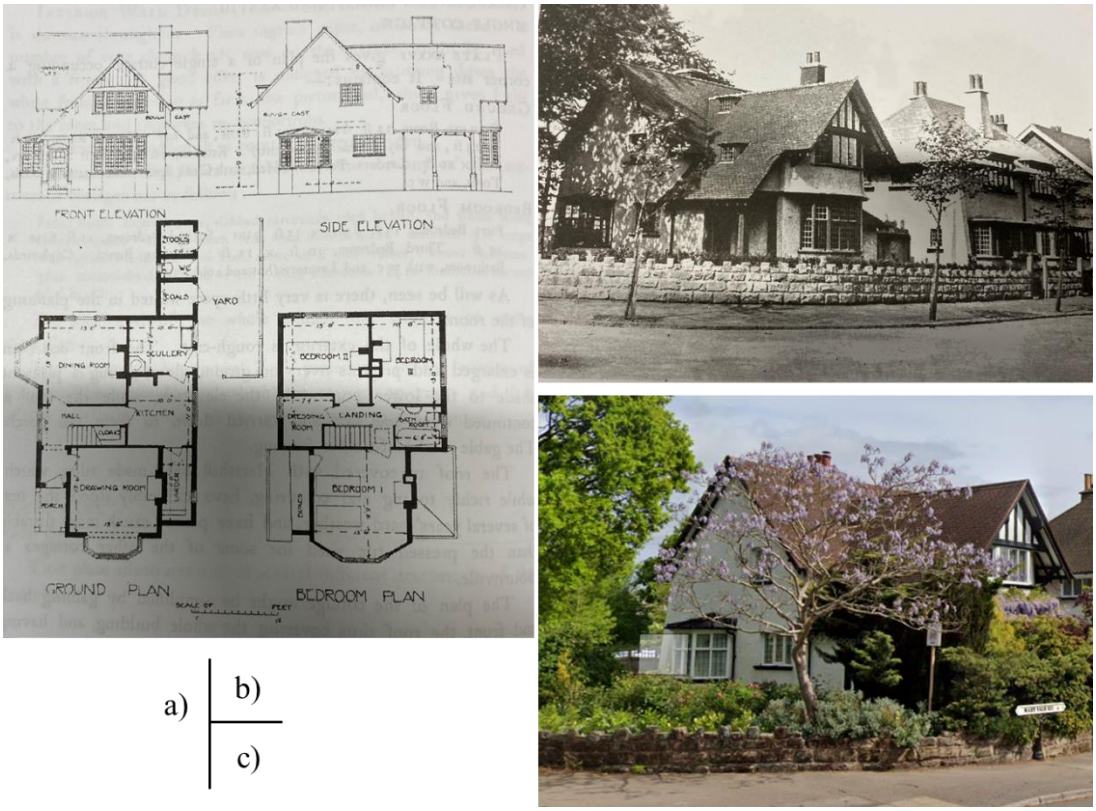


Figure 6. 19: Single cottage at 274 Mary Vale Road by W. A. Harvey. a) Front elevation and side elevation, ground plan and bedroom plan of the cottage; b) Photo from the 1900s showing the cottage; c) Google Maps screenshot of the cottage. Comparing b) and c), it can be observed that the small trees along the street depicted in the former have been cut down.

Semi-detached houses are the most prevalent building type in the Bournville core village, especially during the early stages of Harvey's designs. Taking a pair of houses on Linden Road as an example (Figure 6. 20), they feature hipped roofs covered with pantiles. Both floors include bay windows, and the chimneys are grouped in the centre. The ground floor comprises a living room, kitchen, larder, lobby, tools, coals, and a w. c. On the first floor, there are three bedrooms. Figure 6. 21 illustrates Harvey's alternative arrangement for three pairs of semi-detached houses located on a different road. These houses are based on the same plan as the one shown in Figure 6. 20. Harvey demonstrates that by making simple variations, such as adding bays or dormers, a desirable variety of building elevations can be achieved even among neighbouring cottages in the same location (Harvey, 1906).

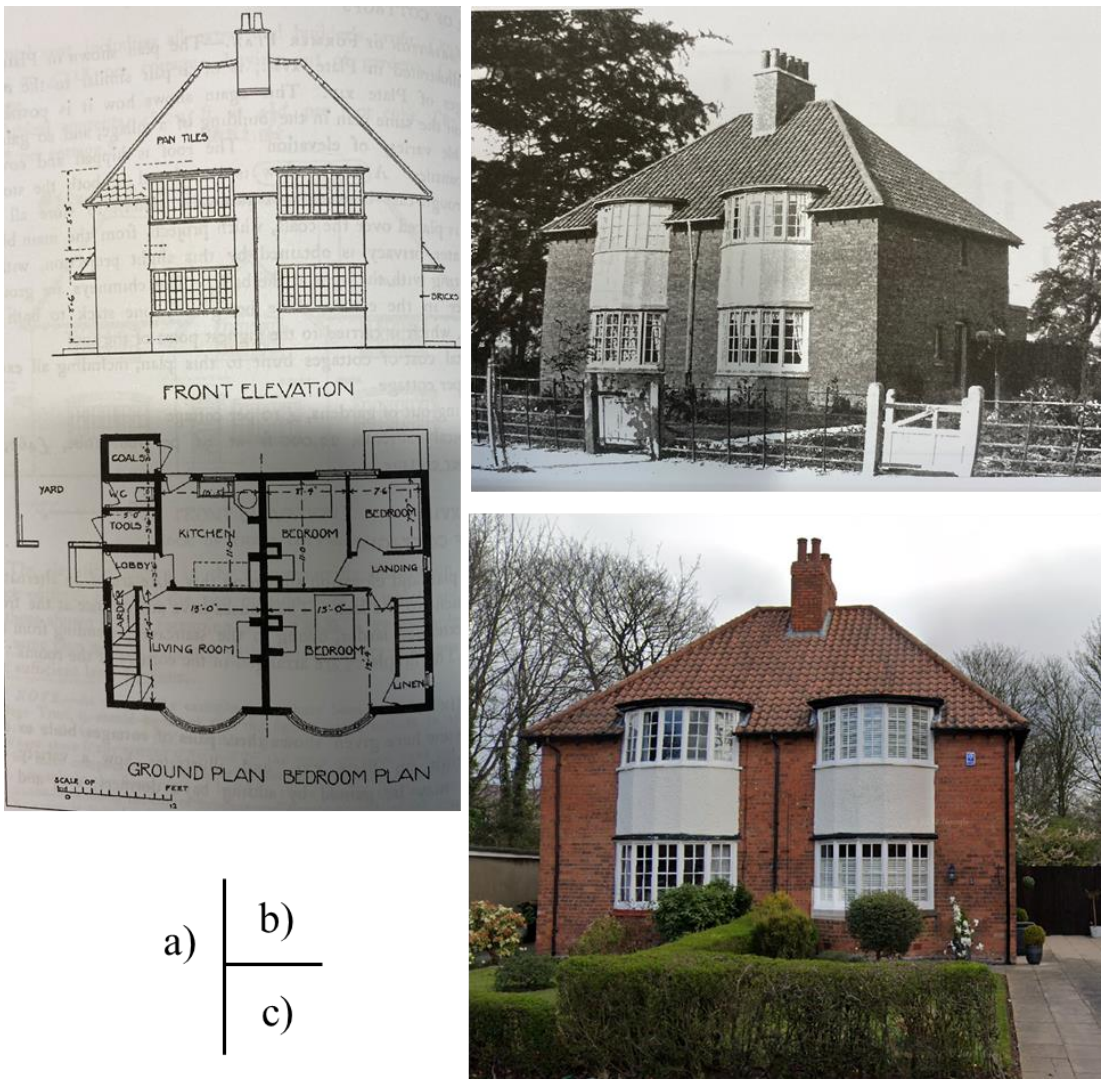


Figure 6. 20: Semi-detached cottages at 1-3 Linden Road by W. A. Harvey. a) Front elevation, ground plan and bedroom plan of the cottages; b) Photo from the 1900s showing the cottages; c) Google Maps screenshot of the cottages. Comparing b) and c), it can be observed that the front garden has undergone significant changes. The gate and fence have been removed, creating a more open space.

In comparison to Harvey, Tylor incorporated a greater number of three-house terraces in his designs. However, the specific terrace designed by Harvey at the intersection of Acacia Road and Linden Road (Figure 6. 22) stands out as an excellent example of effectively utilising the location and environment. It demonstrates Harvey's remarkable understanding of maximizing the site's advantages. The terrace is strategically oriented in a south-west to north-east direction, providing pedestrians traveling along Linden Road, one of the main roads in Bournville, with a visually pleasing perspective. The plot is divided into three equal sections, each accommodating a separate

cottage. The left and middle cottages share a similar ground floor layout, including a parlour, a living room, a bay window, a scullery, coals and tools storage, and a w. c. The right cottage offers additional advantages, featuring a kitchen and a wash-house that can be accessed from the yard. On the first floor, the middle cottage stands out by providing four bedrooms, catering to a larger family. In contrast, the two outer cottages offer three bedrooms each. The exterior of the cottages features roughcast, serving both economic considerations and enhancing the brightness of the forecourt area. The roof is covered with green Westmoreland slates, chosen to enhance visual appeal while maintaining cost-effectiveness (Harvey, 1906).

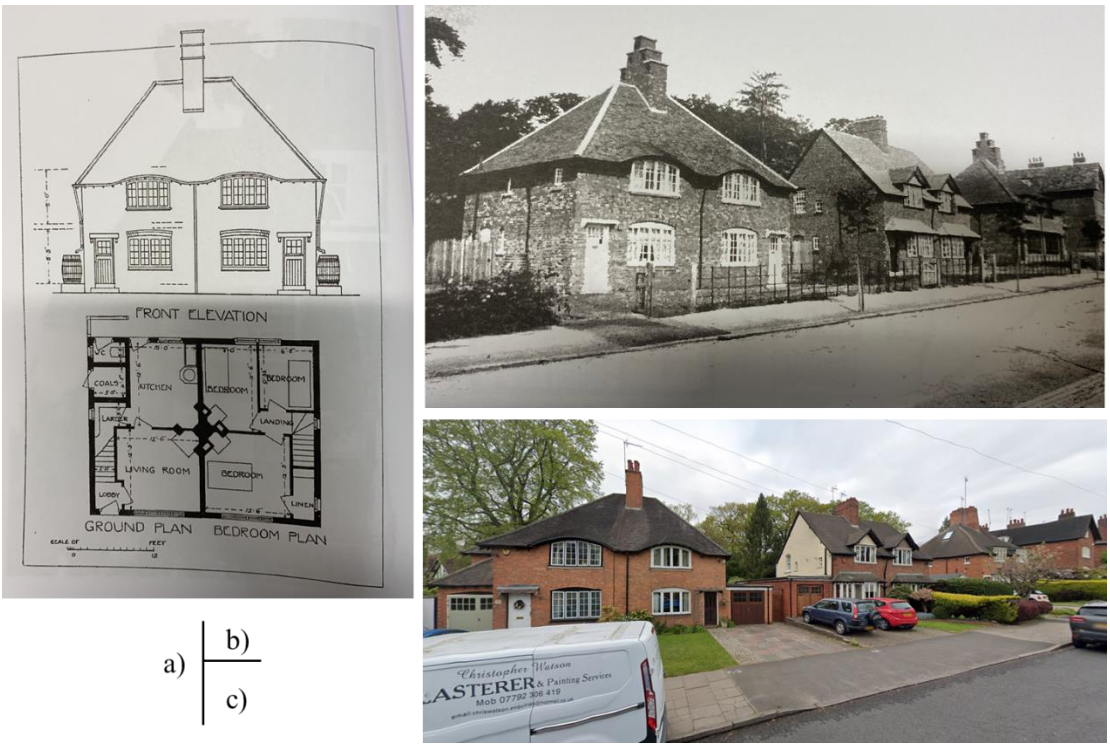


Figure 6. 21: Alternative designs of three semi-detached cottages at 20-32 Sycamore Road by W. A. Harvey. a) Front elevation, ground plan and bedroom plan of the leftmost semi-detached cottages shown in the right two photos; b) Photo from the 1900s depicting the three pairs; d) Google Maps screenshot of the three pairs. Comparing b) and c), there are noticeable changes. In addition to the mentioned modifications in the front gardens, it is worth noting that both sides of the pair in the foreground have acquired garages.

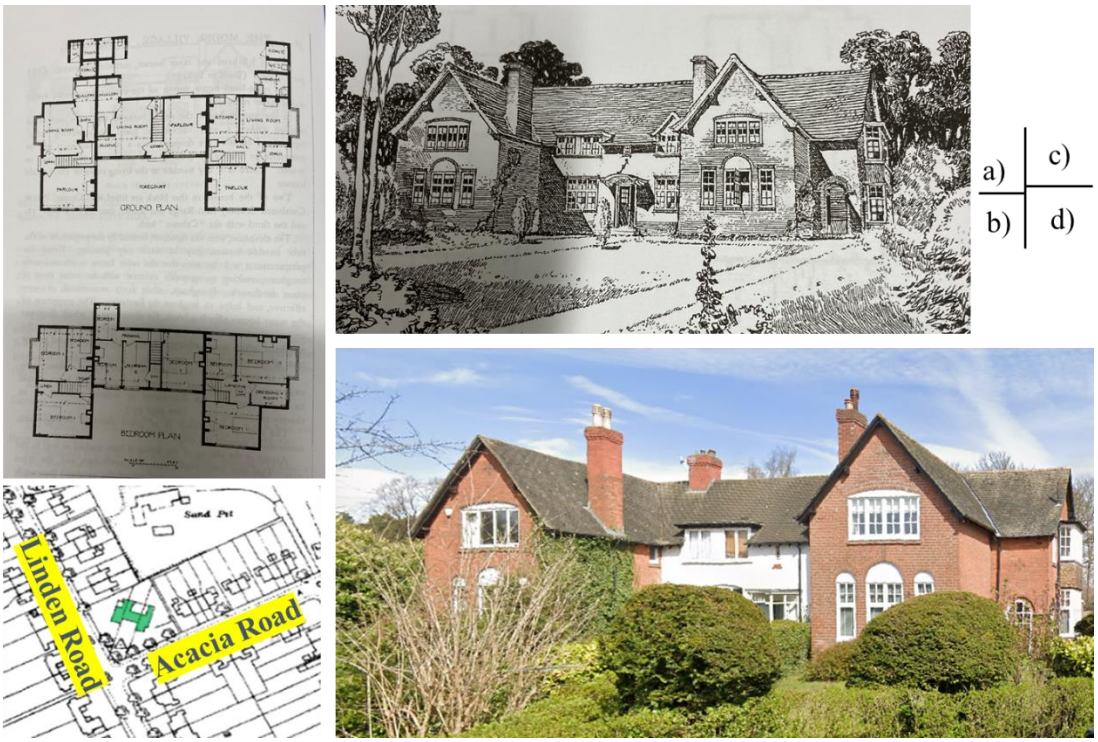


Figure 6. 22: Block of three cottages at 15-17 Linden Road and 56 Acacia Road, designed by W. A. Harvey. a) Ground plan and bedroom plan of the cottages; b) Location of the cottages; c) Photo of the cottages taken in the 1900s; d) Google Maps screenshot showing the cottages. Comparing c) and d), it can be observed that the front garden has become lush with green plants, growing to a certain height.

Both Harvey and Tylor designed a significant number of four-house terraces, distributed in various directions within the Bournville core village. However, they are most concentrated in the northeast area near Raddlebarn Lane and Elm Road. Generally, Tylor's style is more plain compared to Harvey's. Taking an example of Harvey's design on Acacia Road (Figure 6. 23), the outer two cottages have a side entrance, while the middle two cottages have a front door entrance. On the ground floor, all four cottages feature a living room, kitchen, lobby, larder, tools, coals, and a w. c. On the first floor, each cottage has three bedrooms.

Harvey did not design long terraces or quadrangles consisting of more than four cottages in the core village. Therefore, the quadrangles in the core village were primarily designed by Tylor and are mainly located on Oak Tree Lane and Selly Oak Road. There are two quadrangles on the eastern side of Selly Oak Road, with the focus here being on the northern one. In terms of form, the cluster of 10 cottages creates a cohesive architectural ensemble surrounding a central communal green

space. They are connected to the main road through culs-de-sac, ensuring privacy for the buildings. Each individual cottage features a ground floor with a living room and parlour, and a first floor with two or three bedrooms. While facing some criticism (Durman and Harrison, 1995), a comparison between these two quadrangles and the surrounding semi-detached houses in Figure 6. 24 b) reveals that they offer a higher housing density per unit area, making them more economical.

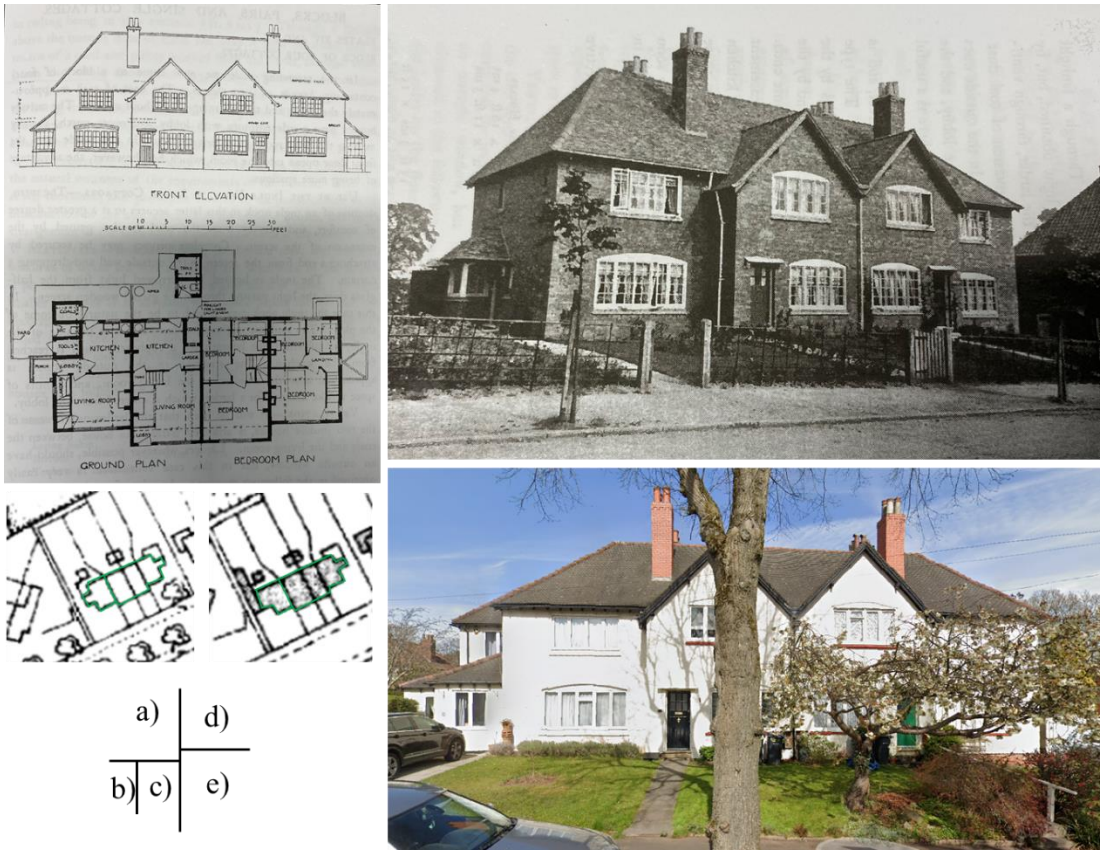


Figure 6. 23: Block of four cottages by W. A. Harvey. Located at 48-54 Acacia Road. a) Front elevation, ground plan and bedroom plan of the cottages; b) Plan of the cottages on Ordnance Survey (1916); c) Plan of the cottages on Ordnance Survey (1937); d) Photo of the cottages taken in the 1900s; e) Google Maps screenshot showing the current view of the cottages. By comparing b) and c), it can be observed that the leftmost cottage underwent an expansion towards the left rear between 1916 and 1937. This change is also evident in the comparison between d) and e).

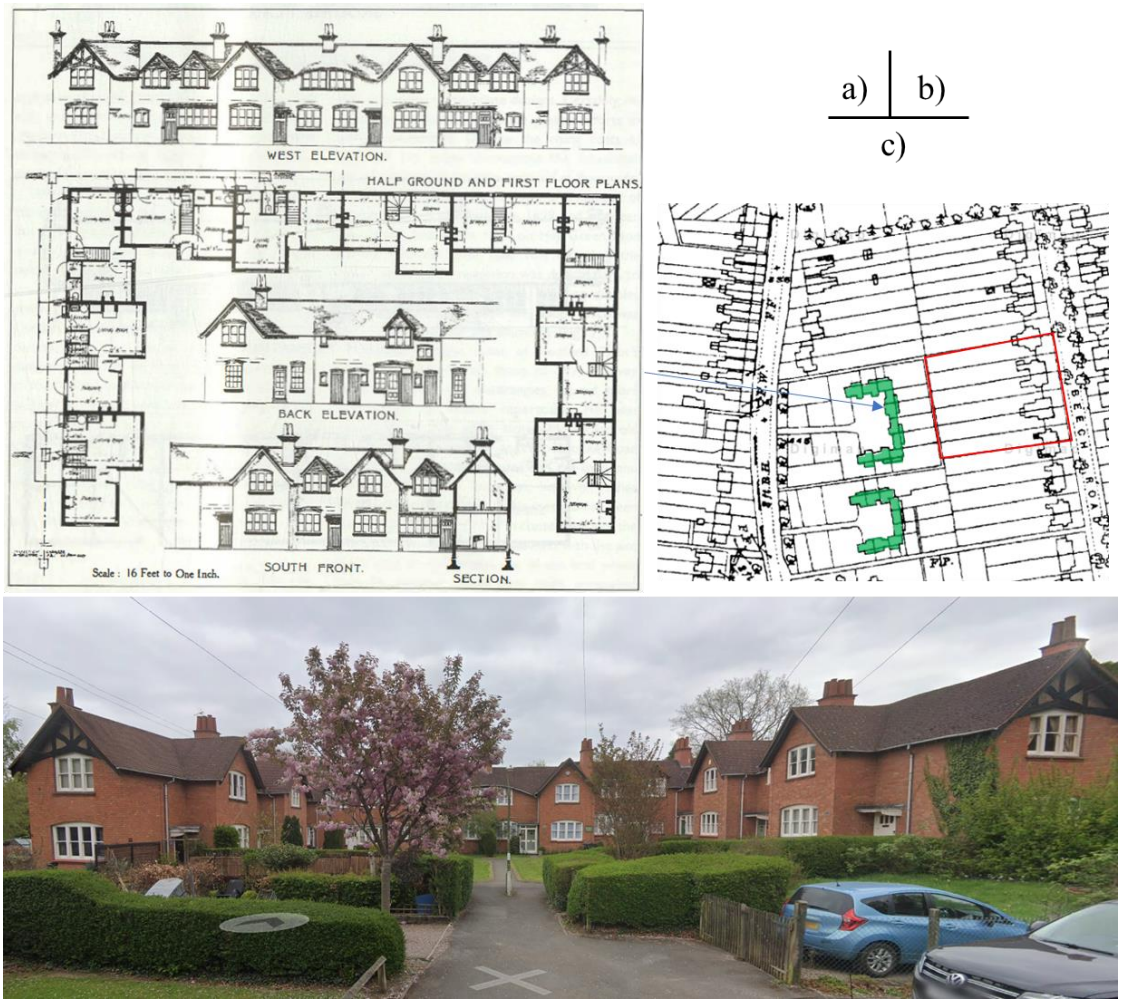


Figure 6. 24: Quadrangle at 17-35 Selly Oak Road. a) Half ground and first floor plans, west elevation, back elevation and south front of the quadrangle; b) Its plan on Ordnance Survey (1916); c) Google Map screenshot of the quadrangle. Note the additional vacant land on the west side that has been divided into more short plots even after the construction of the quadrangle, further exemplifying the design's adherence to economical principles. It might be also noticed that the equivalent number of plots on Beech Road to the east (outlined in red) contain only six houses compared with 10 in the quadrangle.

The paragraphs above discussed the village green and various facilities surrounding it, located at the heart of the core village (Figure 6. 14), creating a relatively well-functioned English village. There are two points worth noting. First, these public service facilities were constructed after the completion of residential housing, providing evidence that the idea of 'village' took shape gradually. Secondly, although the concern for housing the workers of the chocolate factory is rooted in George Cadbury's vision for the Bournville village, both the village's residential housing and public facilities are not limited to the factory workers. In fact, Bournville was the first model village to

introduce low-density housing accessible to individuals beyond its factory employees. (Bryson and Lowe, 2002).

The earliest public facilities to appear in the core village were Nos. 12, 13, 14, and 16 in the southwest (Figure 6. 14 & Figure 6. 25). No. 12, known as The Bath House in Laurel Grove (the left two photos in Figure 6. 26), was built in 1896 and was one of Harvey's early commissions from George Cadbury (The Bournville Society, 2013). Its transformation reflected the principle of the relative variability of architectural functions compared to forms in urban morphology (Conzen, 1969). Not all houses in Bournville village had bathrooms when the first batch of buildings were constructed. Therefore, this public bathroom was built to provide baths with hot and cold water. However, by 1912 all houses in Bournville had their own baths, so the demand for public baths diminished, and it was subsequently closed. The building is now used as a family home (The Bournville Society, 2013). Adjacent to the Bath House was No. 13, a children's recreation ground that was also established in the late 1890s. However, due to its limited facilities, it was not very popular among children. This factor explains the subsequent shift of leisure activities to the park in the village centre (Harrison, 1999). No. 14 is the Mary Vale Road shops, designed by Harvey in 1897 and constructed in 1898. They were the earliest shops in Bournville village. In terms of form, they are three-story half-timbered structures, housing three shops together (Figure 6. 26). They are now listed as Grade II buildings. Below the middle top window, there is a plaque that reads 'G C 1898', suggesting that in George Cadbury's original vision, this location was intended to be the village centre. This, to some extent, also explained the reason why the bathroom, children's playground, and shops were located together. After passing the 3 pairs of semi-detached houses designed by Walker along Mary Vale Road from No. 14, there is another pair of externally modest semi-detached houses (Figure 6. 26). They were designed by Harvey and constructed between 1898 and 1899 (Gumbley, 1991; Harrison, 1999). By at least 1905, they were already being used as shops. Although there is insufficient literature and historical documentation to confirm that Harvey's original design intended them to be shops, the architectural form and their proximity to the shops at No. 14 strongly suggest that they were likely intended for commercial use from the beginning. To this day, they continue to be used as shops. These buildings are also listed as Grade II buildings. No. 16 was the Almshouses (Figure 6. 27). They were designed in 1897 by the renowned Birmingham

architects E. and A.J. Harper, and construction began in 1898. They are managed by the Bournville Almshouse Trust and have also been listed as Grade II buildings. This project was one of the last projects by Richard Cadbury, as he tragically passed away from diphtheria in 1899 while on holiday with his family in Jerusalem. In terms of architectural form, the Almshouses comprised thirty-three single-story houses, each featuring its own entrance, a living room, a bedroom, and a small kitchen (Figure 6. 27). All of these houses were furnished with oak furniture and designed to accommodate two individuals, such as a husband and wife or a mother and daughter. According to the regulations, residents had to be at least 60 years old and maintain an income below a specified threshold (Williams, 1931). The Almshouses were arranged in a quadrangle layout, surrounding a well-maintained lawn dotted with trees. At the centre of this quadrangle stood a clock tower, adding a distinct focal point to the setting (Figure 6. 27). Additionally, there were thirty-eight semi-detached houses that adjoined the main structure (in orange on Figure 6. 25), with their rental income serving to support the ongoing operations of the trust (Williams, 1931).

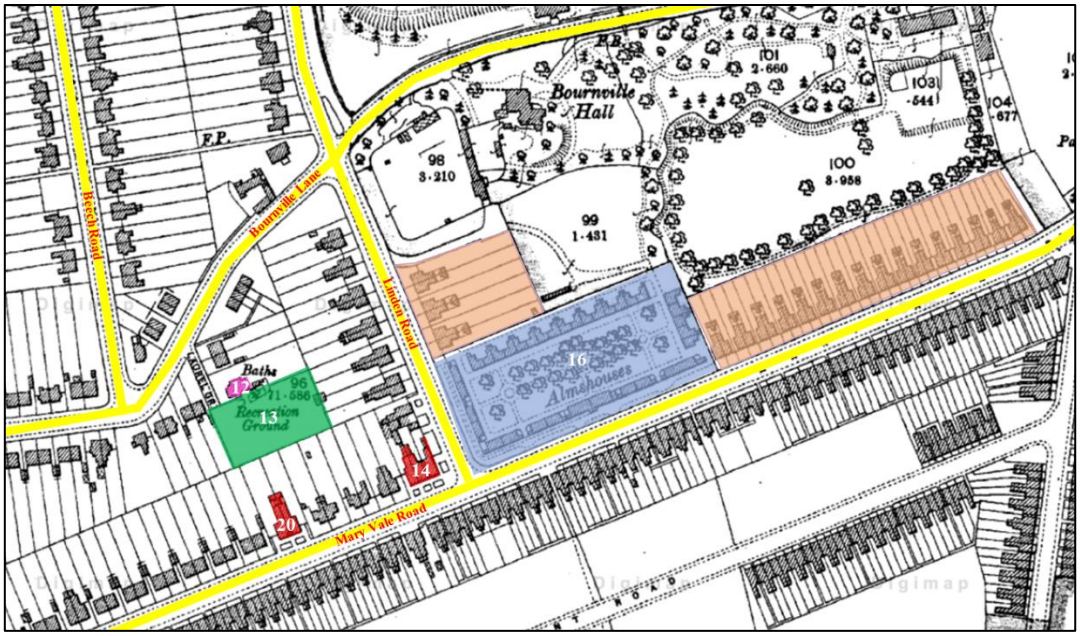


Figure 6. 25: Part of early public facilities in Bournville village. No.12 - Bath House (closed in 1912), No. 13 - Recreation Ground, No. 14 & No. 20 - Shops in early days designed by Harvey, No. 16 -Almshouses and its adjoining houses.



Figure 6. 26: The early Bath House and Shops. (a) the Bath House in 1902; (b) the current state of the Bath House; (c) corner shops in 1924, designed by Harvey, accompanied by an illustration of the advertisement of S.B. Ravenhill & Son and the Estate Stores, which occupied the corner position from the 1950s to 1960s, as featured in the Bournville Village Council Yearbook for 1952; (d) the current state of the corner shops. (e) the semi-detached shops in 1905; the current state of the current semi-detached shops. (Photos sourced from The Bournville Society, 2013 and Google Maps screenshot). (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)



Figure 6. 27: The Almshouses and the adjoining semi-detached houses. (a) the Almshouses in 1924; (b) the current state of the Almshouses; (c) the clock tower located in the centre; (d) the Almshouses on Linden Road, with the distant view showing its adjoining two-story semi-detached. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013).

Shortly after the laying out of The Green and the surrounding public facilities, the activity centre of Bournville Village gradually shifted to this area. The Green had already been established by at least 1899 (Gumbley, 1991), featuring carefully planned pathways. However, in the early 1910s, The Green was primarily utilised for grazing sheep. Nevertheless, more public facilities were erected with a particularly significant development taking place in 1913 to commemorate the silver wedding of George and Elizabeth Cadbury. Workers from the Cadbury factory worldwide joined forces to fund the construction of the Rest House for the couple at the heart of The Green (No. 17 in Figure 6. 28). This gradually transformed The Green into a dominant public space for Bournville Village, carrying deep symbolic value for the community (Figure 6. 29). Each December, the vicinity of The Green becomes the venue for the annual Christmas celebrations, further solidifying its significance. The Rest House, with its charming old-fashioned design, added a touch of historical magic to Bournville. In order to preserve its heritage, the Rest House remained unused for an extended period. It wasn't until 1997 that the decision was made to repurpose and reopen it as the Carillon Visitor Centre.

Among the public buildings surrounding The Green, the first one to be constructed was Ruskin Hall (No. 5 in Figure 6. 28). Initially known as the Ruskin Memorial Institute (shaded purple in Figure 6. 30), it was designed by Harvey in 1903 as a commemoration of John Ruskin. This Grade II listed building featured an irregular L-shaped floor plan, with a brick or stone exterior and a tiled roof. The left side of the hall (Figure 6. 30 (d)) had a lower roof compared to the right side. Originally intended as the village's social centre, it provided arts and crafts classes for the community. After Bournville's inclusion within the boundaries of Birmingham in 1911, the Local Education Authority transformed it into a College of Arts and Crafts. The hall underwent two expansions in the 1920s and 1950s (Figure 6. 30), and it is currently home to the Birmingham City University International College (The Bournville Society, 2013).



Figure 6. 28: Public facilities in the village centre in 1916. 1. Bournville Quaker Meeting House; 2. Church Hall; 3 & 4. Schools; 5. Ruskin Memorial Institute; 6. Nurseries; 7. Selly Manor; Men's open air baths; 9 & 10. Shops, including bank and post office; 17. The Rest House; 18. Girls' Baths; 19. BVT Direct Labour Scheme and Maintenance Department.



Figure 6. 29: The Rest House. (a) The Rest House in 1934; (b) The current state of the Rest House; (c) The market hall at Dunster in Somerset; (d) The Rest House during Christmas, noting the brightly lit shops and outdoor market behind it. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)



Figure 6. 30: The evolution of Ruskin Hall. (a) The plan of Ruskin Hall on the 1904 Ordnance Survey; (b) The plan of Ruskin Hall on the 1916 Ordnance Survey; (c) The plan of Ruskin Hall on the 1958 Ordnance Survey; (d) A historical photo of Ruskin Hall before 1916; (e) A current photo of Ruskin Hall. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

Following Ruskin Hall, the Bournville Quaker Meeting House (No. 1 in Figure 6. 28), was constructed in 1905 through the contributions of George and Elizabeth Cadbury. Designed by Harvey and also listed as a Grade II building, it has a Y-shaped floor plan, facing the junction of Linden Road and Woodbrooke Road. Its architectural style is influenced by The First Church of Christ Scientist, designed by Edgar Wood and completed in Manchester in 1902 (Figure 6. 31 (a)). Unlike other simpler Quaker meeting houses, its appearance clearly reflects the influence of the Arts and Crafts movement. Since it was initially intended to serve other Christian denominations as well, George and Elizabeth Cadbury donated an organ to it in 1915, making it the only Quaker meeting house in England with an organ. George Cadbury's deep-rooted Quaker beliefs and practices played a vital role in shaping the concept and development of Bournville, giving this Quaker Meeting House a special significance. Notably, a ceremonial Atlas Cedar tree was planted in 1948 to honour Elizabeth Cadbury's (George Cadbury's second wife) 90th birthday. Each year, during Christmas, it serves as a cherished symbol, adorned with festive lights and ornaments (Figure 6. 31 (d) & (e)). In September 2021, an event was held at the meeting house to raise awareness about climate change (Fig. 5.53 (f)).

To the west of The Green, south of Ruskin Hall, are the Bournville Schools. In the early days, they were known as Bournville Junior School (No. 3 in Figure 6. 32(d)) and Bournville Infant School (No. 4 in Figure 6. 32(d)). The former was founded in 1906, while the latter was established in 1910. Both schools were designed by Harvey and generously funded by George and Elizabeth Cadbury as gifts to the village of Bournville. They have both been recognized as Grade II listed buildings. In terms of their exteriors, the Junior School features red brick with stone dressings and a slate roof. It includes a square entrance tower crowned with the Bournville Carillon, which was a gift from George Cadbury to the Cadbury workers in 1906. The carillon, also designed by Harvey, is one of the largest instruments of its kind in Great Britain. The Infant School exhibits red brick with some timber-framing and plaster, complemented by a tiled roof. Compared to the local authority's school provisions, both schools were constructed to more modern standards, reflecting the donors' emphasis on education. The Junior School is equipped with a laboratory, library, and workshop and has 12 classrooms. Following George Cadbury's insistence, each classroom accommodated 45 children, instead of the suggested 55 by the Kings Norton local authority (The

Bournville Society, 2013).

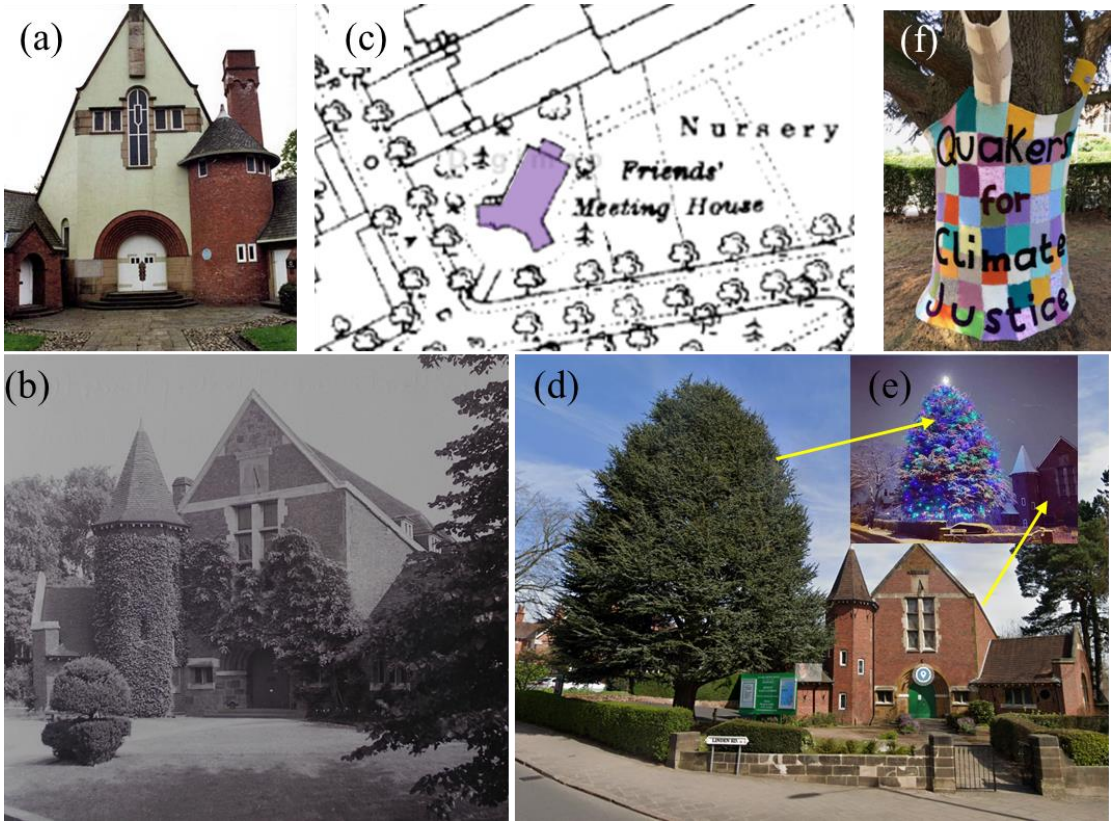


Figure 6. 31: Bournville Quaker Meeting House. (a) The First Church of Christ Scientist, Manchester; (b) Bournville Quaker Meeting House in 1949; (c) The plan of Bournville Quaker Meeting House in 1916; (d) Current state of Bournville Quaker Meeting House (Google Maps screenshot); (d) Atlas Cedar during Christmas in the yard of the Quaker Meeting House; (f) The slogan of 'Quakers for Climate Justice' in the tree. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

St. Francis Church of England parish hall, located to the south of The Green (No. 2 in Figure 6. 33(c)), was constructed in 1912, although the land was set aside for it in 1905 and preceded the construction of the parish church. Designed by Harvey, it is now listed as a Grade II building. The exterior of the hall features red brick with minimal stone dressing, and it has a round-arched door with flanking columns.



Figure 6. 32: Bournville Junior School and Infant School. (a) Bournville Junior School (in the background) and Bournville Infant School (in the foreground) in 1950; (b) The current state of Bournville Junior School (in the background) and Bournville Infant School (in the foreground) (Photos sourced from The Bournville Society, 2013); (c) Carillon with cherry trees in the foreground; (d) Bournville Schools on the 1916 Ordnance Survey. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

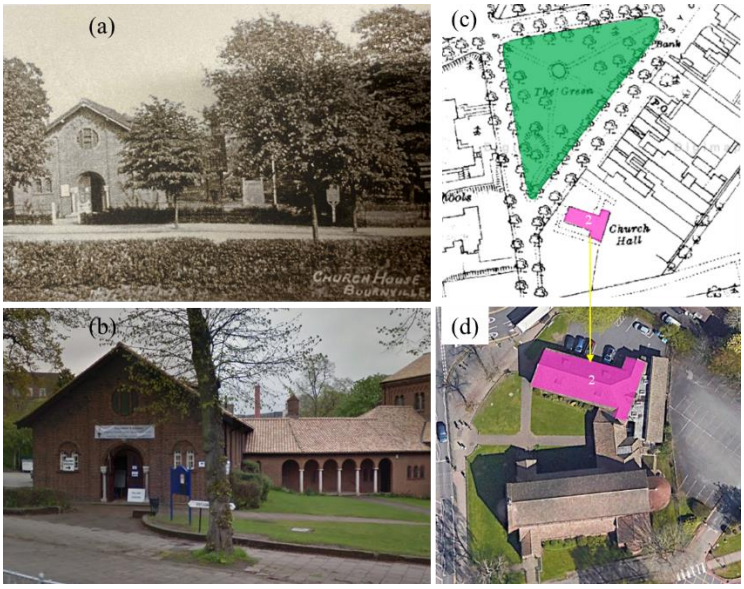


Figure 6. 33: Bournville Church Hall. (a) Bournville Church Hall in 1915 (Photos sourced from The Bournville Society, 2013); (b) Current state of Bournville Church Hall (Google Maps); (c) Bournville Church Hall on the 1916 Ordnance Survey; (d) Aerial view of Bournville Church Hall (Google Earth). (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

The shops to the south-east of The Green are grouped into two distinct blocks (No. 9 & No. 10 in Figure 6. 34(d)). All of these shops were designed by Bedford Tylor in 1908. No. 9 was constructed with a brick structure and included a branch of Lloyds' Bank (Figure 6. 34(c)). No. 10 was built in a timber-framed style. Apart from the bank, the other outlets in the area consisted of a Post Office, a butcher's shop, a greengrocer's, a bakery, a draper's, and a tailor and outfitters, among others (Pevsner and Wedgwood, 1966). Many of these shops have been owned by Quakers since the early years, with little change in ownership over the course of 100 years (The Bournville Society, 2013).



Figure 6. 34: Bournville shops on The Green. (a) the shops in 1968; (b) The current state of the shops; (c) The Lloyds Bank; (d) The shops on the 1916 Ordnance Survey. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

To the northeast of The Green, at the intersection of Sycamore Road and Maple Road, stands Selly Manor (No. 7 in Figure 6. 35(d)). Originally located on Bournbrook Road, approximately 1 mile away from its current position in Bournville, the building itself has a history spanning over 500 years. In 1907, George Cadbury purchased it, allowing Harvey to redesign, dismantle and

reconstruct it between 1912 and 1916 in the heart of the Bournville village centre (Gumbley, 1991). Standing three stories tall, the oldest parts of the manor feature timber framing and wattle and daub infill. It is also listed as a Grade II building. The relocation of such an ancient structure to this relatively new village served multiple purposes. First, it preserved a historic building. Secondly, it greatly enhanced the village's sense of historical depth and served as an evocation, inviting residents to imagine the passage of time. Lastly, it introduced elements of rural character, adding a sense of nostalgia and tranquillity to the village.

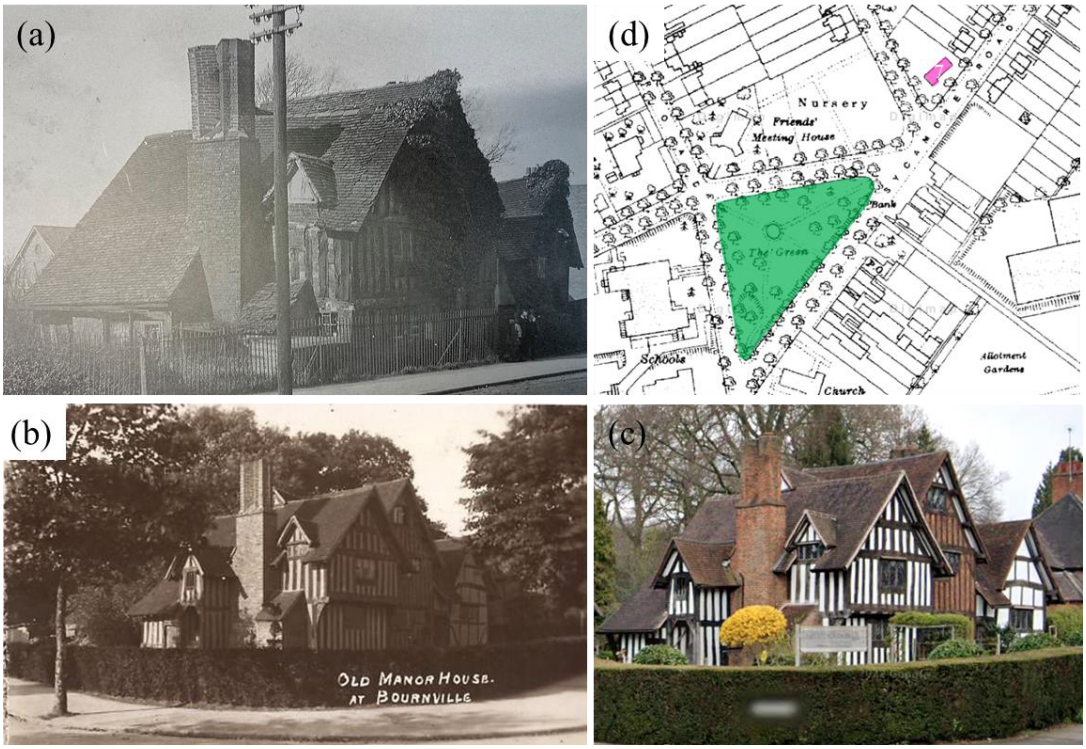


Figure 6. 35: Bournville Selly Manor. (a) Selly Manor in its original setting on Bournbrook Road, Bournbrook; (b) A postcard of Selly Manor mailed in 1933; (c) The current state of Selly Manor (Google Earth); (d) Selly Manor on the 1916 Ordnance Survey. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

Five Gates Farm (No. 19 in Figure 6. 36(c) & (d)), which originally functioned as farm buildings in the pre-urban period, later became the location for The BVT Direct Labour Scheme and Maintenance Department and, subsequently, Bournville Propertycare Services, providing maintenance services for the houses and tenants in Bournville. Additionally, two other noteworthy public facilities, although owned by the Cadbury factory, are the Men's open-air baths (No. 8 in

Figure 6. 28 & Figure 6. 37) and Girls' baths (No. 18 in Figure 6. 28 & Figure 6. 37). The former has been present since at least 1898, while the latter was designed by G.H. Lewin and completed in 1904. The Girls' baths are currently listed as a Grade II building.

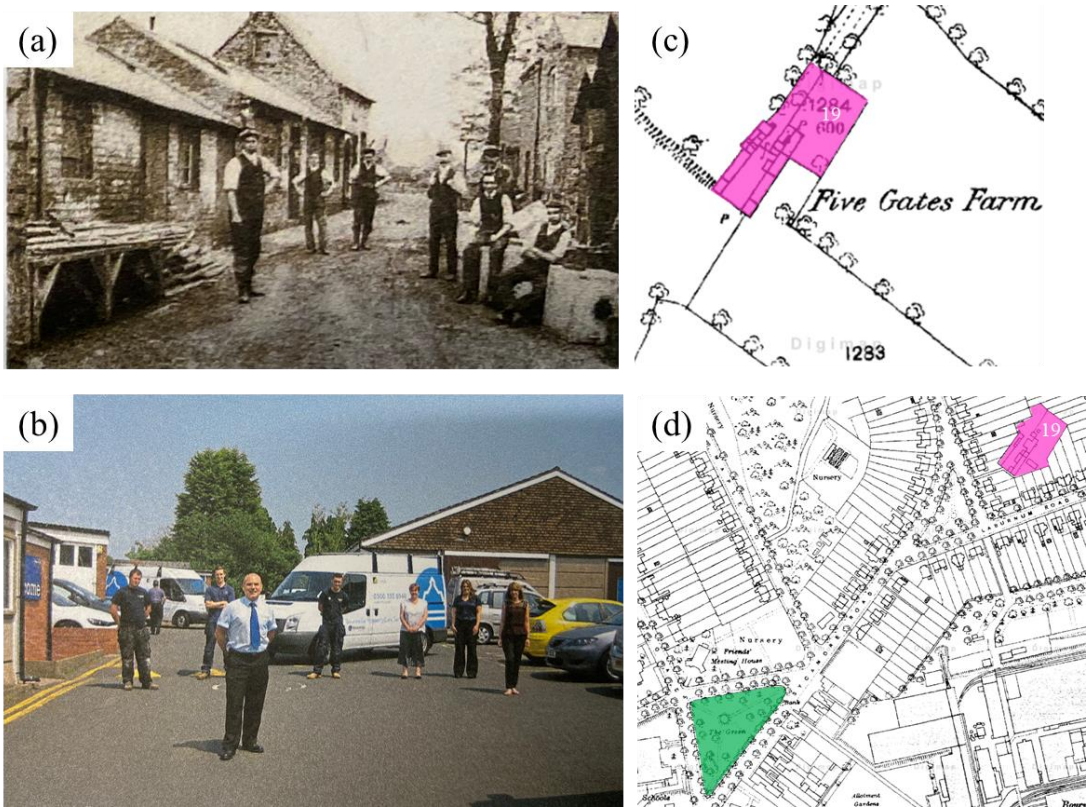


Figure 6. 36: Bournville maintenance department. (a) Workers standing in front of the farm buildings in 1912; (b) Propertycare team in 2013, showing the modern buildings which replaced the farm buildings; (c) The Five Gates Farm on the 1884 Ordnance Survey; (d) Five Gates Farm on the 1916 Ordnance Survey. The buildings were preserved, as seen in the comparison between (c) and (d). (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

Green space is a prominent feature of Bournville. One important reason for the diverse and abundant variety of gardens in Bournville is the presence of a public gardening department within BVT, along with extensive nurseries. It seems probable that the future site of the 1960s' Bournville Garden Centre to the south-east of Camp Wood with its greenhouses was the nursery garden of the gardening department (No. 6 in Figure 6. 38(b)). The nursery to the west of the Camp Wood may possibly have been a tree nursery. The head gardener, trained at Kew, was always ready to assist anyone seeking advice. The nursery provided free booklets on gardening, offering recommendations

on the best and most suitable shrubs and trees, along with a free library of gardening books for people to consult at any time (Miller, 1913).



Figure 6. 37: Men's open-air baths and girls' baths. (a) Men's open-air baths, taken in 1898; (b) The current state of Men's open air baths; (c) the Men's open air baths and Girls' baths on the 1916 Ordnance Survey; (d) The current state of Girls' baths. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)



Figure 6. 38: Bournville Garden Centre. (a) Potted plants sold at Bournville Garden Centre; (b) Bournville Nurseries on the 1916 Ordnance Survey.

Bournville's green space can be categorized into six types: front gardens, back gardens, public parks and greens, woodlands, street trees, and green space within institutions. It is evident that trees play an important role within Bournville's green space. In urban morphological studies, the lifespans of trees and other vegetation have rarely been considered. However, in reality, green space is not merely an 'empty' space in contrast to the focus on buildings in traditional urban morphology. It is a vital space, and the relationship between buildings and green space evolves over time. Due to the significance of green space in Bournville, this section will explore the characteristics of green space based on the 1916 Ordnance Survey. A comparative analysis of its subsequent evolution will be conducted at the end of this chapter.

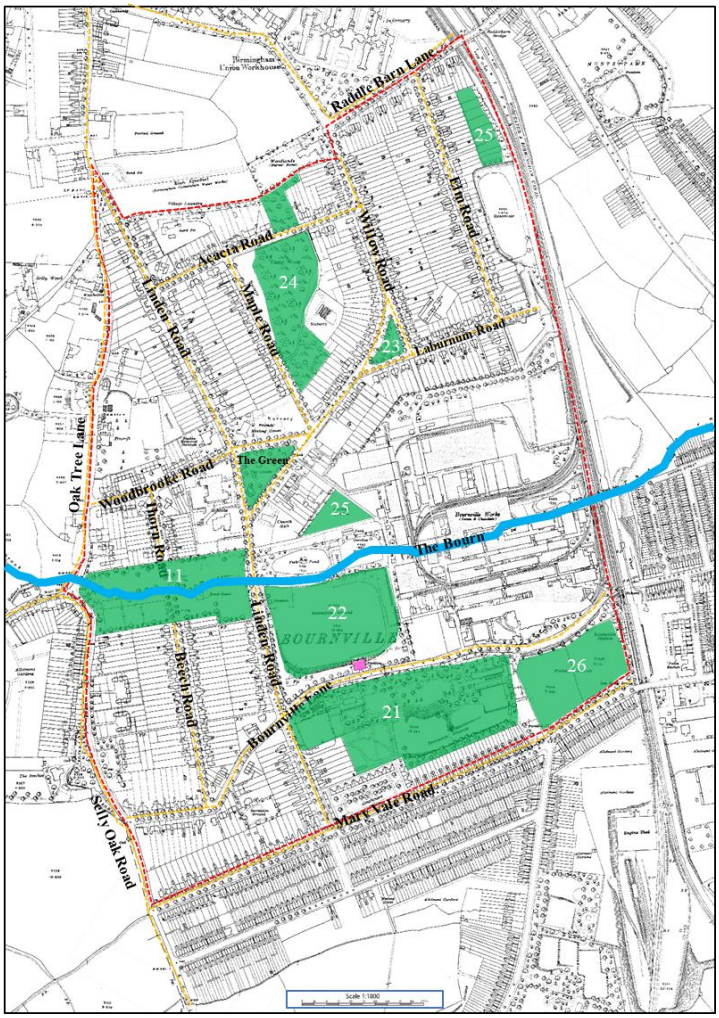


Figure 6. 39: Public green space in Bournville. 11. Bournville Park; 21. Cadbury Girls' Recreation Ground; 22. Cadbury Men's Recreation Grounds; 23. The Triangle; 24. Camp Wood; 25. Allotment Gardens; 26. Football Ground.

In Bournville's green space, the oldest element is Camp Wood (previously known as Stock Wood), located north of The Green (No. 24 in Figure 6. 39), and described as thick with old forest trees (Harvey, 1906). The actual preserved area of Camp Wood is larger than depicted in Walker's 1897 survey map (Figure 6. 12). The form of Camp Wood largely follows its original shape (Figure 6. 40), although Acacia Road divides it into a larger southern portion and a smaller northern portion. Among the earlier established parks are Cadbury Girls' Recreation Grounds (No. 21 in Figure 6. 39) and Cadbury Men's Recreation Grounds (No. 22 in Figure 6. 39). Despite belonging to the Cadbury factory rather than Bournville Village (Broomfield, 2001), these two recreation grounds (Figure 6. 41) significantly impact the landscape of Bournville Village. The two grounds are located west of the Cadbury factory, on both sides of Bournville Lane. The Men's Recreation Grounds include a ten-acre cricket ground and a spacious pavilion (shaded magenta in Figure 6. 41), erected as a commemoration of the Coronation of King Edward VII. It is equipped with a gymnasium, baths, and other amenities. The Girls' Recreation Grounds provide a sixteen-acre area with a well-timbered garden, a cricket field, tennis courts, and so on (Gardiner, 1923). Apart from these two recreation grounds, there were football grounds to the east of the Girls' Recreation Grounds (No. 26 in Figure 6. 39).



Figure 6. 40: Bournville Camp Wood. (a) Camp Wood on the 1884 Ordnance Survey; (b) Camp Wood on the 1904 Ordnance Survey; (c) Camp Wood on the 1916 Ordnance Survey; (d) Composite map of Camp Wood between 1884 and 1904, with red indicating 1884 and blue indicating 1904; (e) Photo of Camp Wood in the 1920s. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

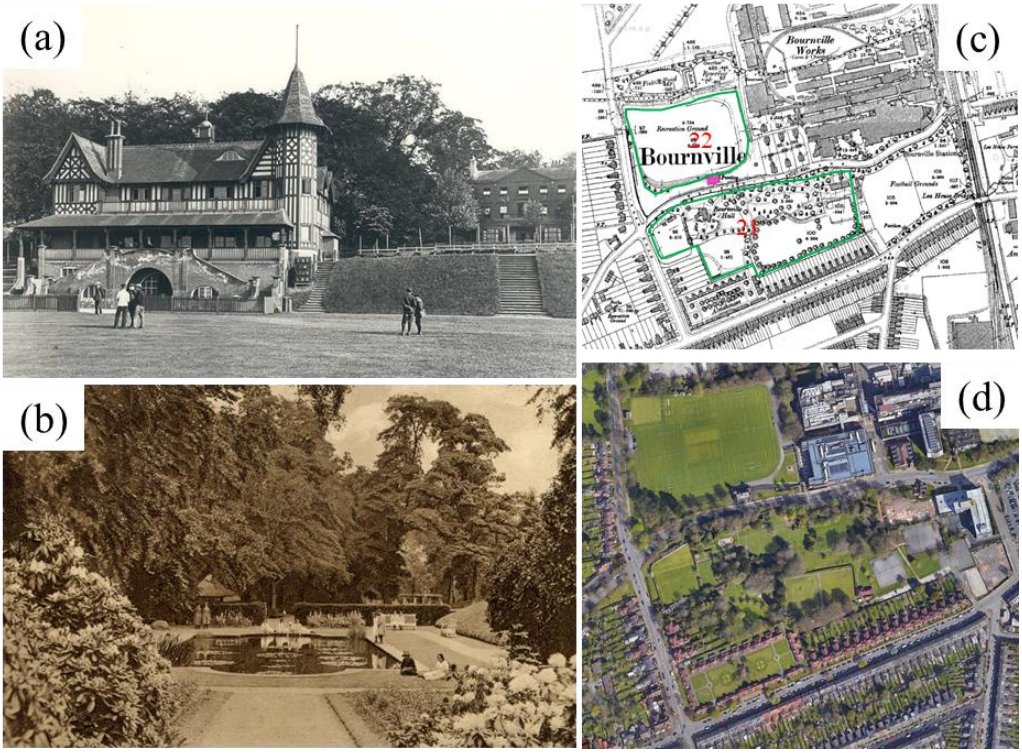


Figure 6. 41: Cadbury Men's Recreation Grounds and Girls' Recreation Grounds. (a) Pavilion on Men's Recreation Grounds in 1902 (b) Italianate lake in Girls' Recreation Grounds in the 1920s (c) Cadbury Men's Recreation Grounds and Girls' Recreation Grounds on the 1904 Ordnance Survey (d) The current state of the recreation grounds (Google Earth). (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

Bournville Park, on the other hand, serves as a public green space for the village residents. George Cadbury valued green space to such an extent that there was a requirement in the Deed of Foundation that 'One-tenth of the whole estate was to be devoted to public open space' (Harrison, 1999). Situated on both sides of The Bourn, Bournville Park was deemed unsuitable for building due to the fluctuation of the river (Figure 6. 42(b)), making it the least valuable land but ideal for a park. This 7-acre park was established in 1907. Two foot-bridges (shaded yellow in Figure 6. 42(c)) were constructed to cross the Bourn. The eastern foot-bridge connects Thorn Road and Beech Road. There was a band stand on its eastern side (shaded magenta in Figure 6. 42(c)), and three tennis courts on its western side, with the rest being a large recreation ground dotted with trees.



Figure 6. 42: Bournville Park. (a) A historical photo of Bournville Park; (b) The flood in Bournville Park in 1908 (sourced from Gumbley, 1991); (c) Bournville Park on the 1916 Ordnance Survey; (d) The current state of Bournville Park. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

Northeast of The Green, there is another public green space called the Triangle (Figure 6. 43). Initially serving as a public green space, its significance grew after the establishment of a war memorial in 1923 (Figure 6. 43(d)). Additionally, Bournville featured allotment gardens (Nos. 1 & 2 in Figure 6. 44), initially located east of Bournville Village near the railway (Figure 6. 44(a)). Later, the northern section remained as allotment gardens. As for the southern section, some of the land was used for building houses, while the rest was transformed into a reservoir. Further allotment gardens were located closer to The Green (Figure 6. 44(b)). Street trees are also a significant feature of Bournville (Figure 6. 45), with all newly planned roads having street trees since the village's inception. Many street trees were later removed, and this evolutionary process will be discussed in the subsequent 'evolution of green space' section later in this chapter.



Figure 6. 43: Bournville Triangle. (a) A postcard of the Triangle around 1910; (b) The current state of the Triangle; (c) The Triangle on the 1916 Ordnance Survey; (d) War memorial in the Triangle. By comparing (a) and (b), it is noteworthy that the visual relationship between the trees and the houses has changed. As the trees matured, they effectively concealed the houses within the foliage. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)



Figure 6. 44: Bournville allotment gardens. (a) Allotment gardens on the 1904 Ordnance Survey; (b) Allotment gardens on the 1916 Ordnance Survey. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

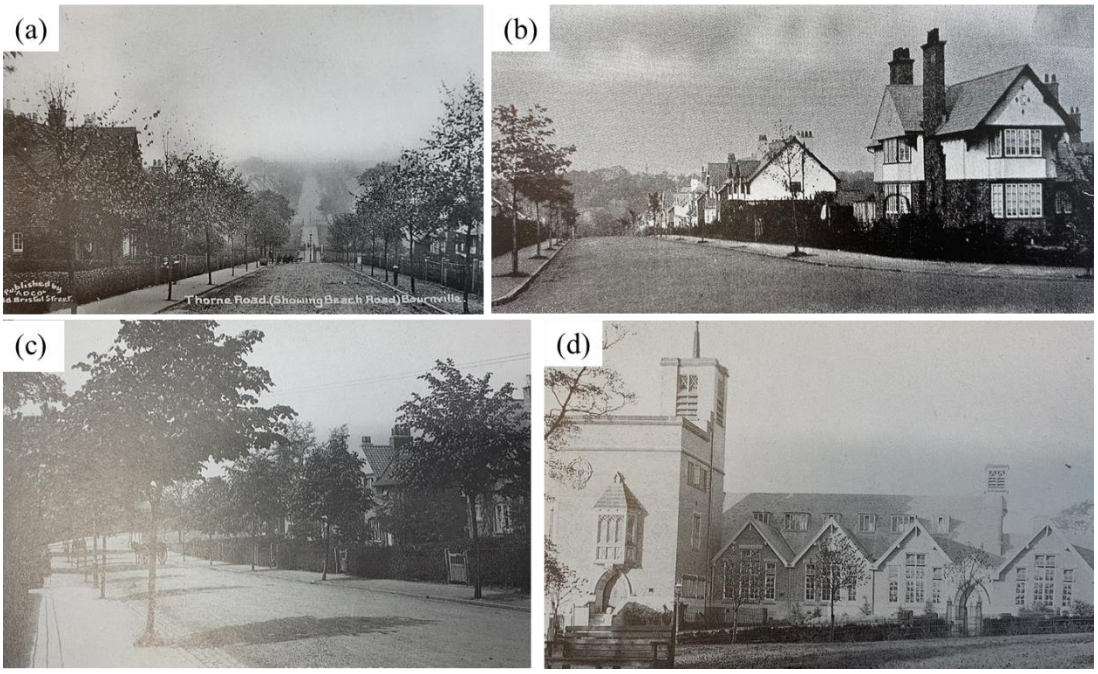


Figure 6. 45: Bournville street trees. (a) A photo of Thorn Street trees on a postcard posted in 1913; (b) A photo of Beech Street trees on a postcard posted in 1903; (c) A photo of Woodbrooke Road trees in 1899; (d) A photo of trees in front of Bournville school around 1909.

Apart from public green spaces, an important feature of Bournville's green space is the spacious gardens of residential houses. Due to the fact that only 25% of the plot area was allocated for buildings, the gardens were quite large. Early houses could have gardens reaching up to 600 square yards, a size considered convenient for most men to cultivate (Harrison, 1999). Each front garden was separated by hawthorn hedges with a uniform height of about three feet, creating a neat street landscape while allowing for diversity in the variety of flowers planted within (Miller, 1913). This effectively avoided the monotony of street views. Back gardens, on the other hand, embody George Cadbury's vision of green space shaping people's character and lifestyle. Before residents moved into their new houses, all back gardens were laid out in a similar manner, with hedges serving as boundaries and beds already prepared (Figure 6. 46 (b)). Fruit trees were planted at the ends of the gardens, not only for fruit production but also to act as a screen between houses. Vegetables were grown in the gardens, and some even raised poultry. Paths and the placement of plants were carefully planned to ensure that the shadow of adjacent hedges did not fall on the plants but on the paths instead (Harvey, 1906). In addition to the front and back gardens, Bournville also employed a

different set of climbers, such as English Ivy, to decorate buildings instead of relying on architectural ornamentation. This contributed to the diversity and appearance of houses (Miller, 1913).

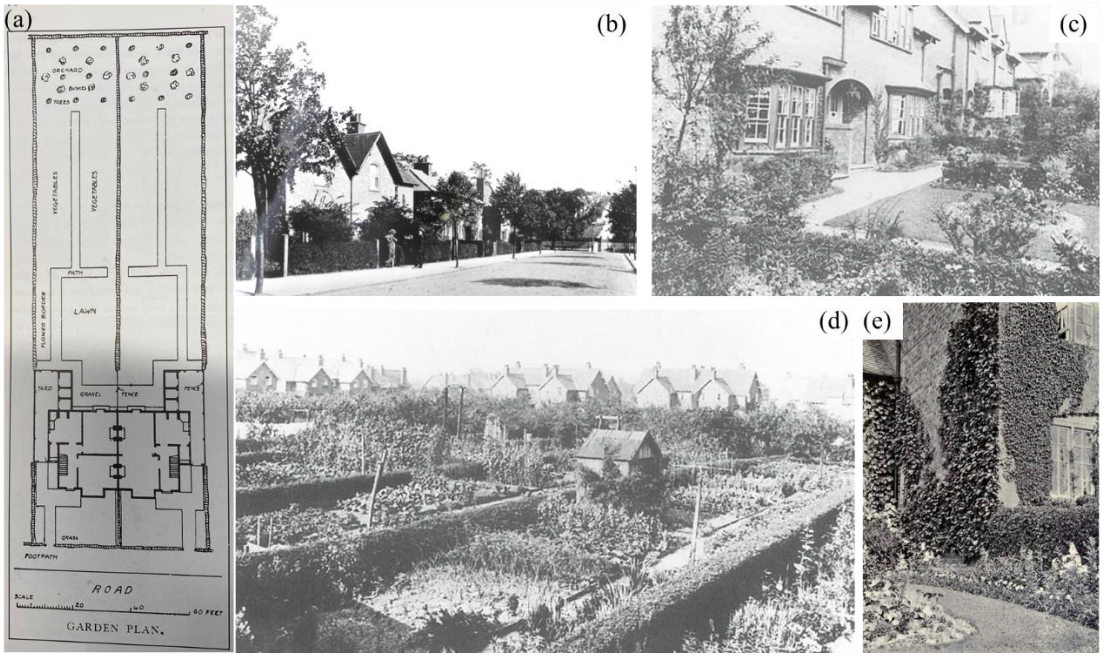


Figure 6. 46: Bournville gardens. (a) Plan of Bournville standard back gardens; (b) Hedges in front gardens in Thorn Road from 1906; (c) Bournville front gardens; (d) Bournville back gardens; (e) vines on Bournville dwellings.

The construction process of Bournville reflects the journey from vision to reality of the Cadbury brothers' ideals for the living environment of workers. Despite its proximity to the Cadbury factory, the village was designed with features reminiscent of traditional English villages, such as the layout of The Green, churches, and the Selly Manor. This design aimed to create a traditional rural atmosphere, reflecting the Cadbury brothers' reflection and response to the disruption of traditional ways of life by industrial civilization at that time. The configuration of public facilities, including educational facilities, and the absence of pubs, expressed the social ideals and humanitarian care of the Cadbury brothers or, more broadly, the Victorian upper-middle-class society's emphasis on educating the working classes (Bailey, 2010). In the functional categorization during the construction process of Bournville, the extensive presence of public open green spaces and domestic gardens stands out, reflecting their importance in George Cadbury's consciousness. The green spaces were created because Cadbury desired gardens and green spaces for the people

living in Bournville. In fact, this idea was not unique to Cadbury but rooted in the broader social and cultural context (Gaskell, 1980). In this sense, Bournville serves as an excellent example for the garden city movement. Consequently, the first conference of the Garden City Association was held in Bournville in 1901, significantly enhancing Bournville's reputation and influence. As a model of a garden village, Bournville also demonstrated the possibility of realizing the garden city movement and contributed to the emergence of town planning (Gardiner, 1923).

6.3.4 Inter-war period (1918-1939)

During the inter-war period, the core village had already experienced significant development in earlier stages, resulting in limited available land within the village itself. As a result, the primary focus of change in Bournville Village during this period shifted towards the continued acquisition of land for further development (Figure 6. 47). Notably, unlike in other areas of Birmingham where development was predominantly funded by local authorities and private developers, Bournville stood out with its primary agents being Public Utility Societies (e.g., Harrison, 1999; Skilleter, 1993). Despite the absence of major changes, the undeveloped sporadic spaces within the core village of Bournville continued to be utilised. First, the Cadbury factory underwent further expansion to the north and south of its earlier buildings. The northern expansion encompassed the remaining reserved factory space, while the southern expansion encroached upon the original football ground (highlighted in red in Figure 6. 48(a)) on the western side. This expansion led to the construction of several factory administrative buildings, with the remaining space transformed into allotment gardens (Figure 6. 48(b)). In response to the insufficient food supply during the First World War period, undeveloped peripheral lands were also converted into allotment gardens. For instance, a small piece of land situated north of the reservoir, adjacent to the railway line in the northern part of the village, was developed into additional allotment gardens. Moreover, crops were cultivated on the central green space of almshouses (The Bournville Society, 2013).

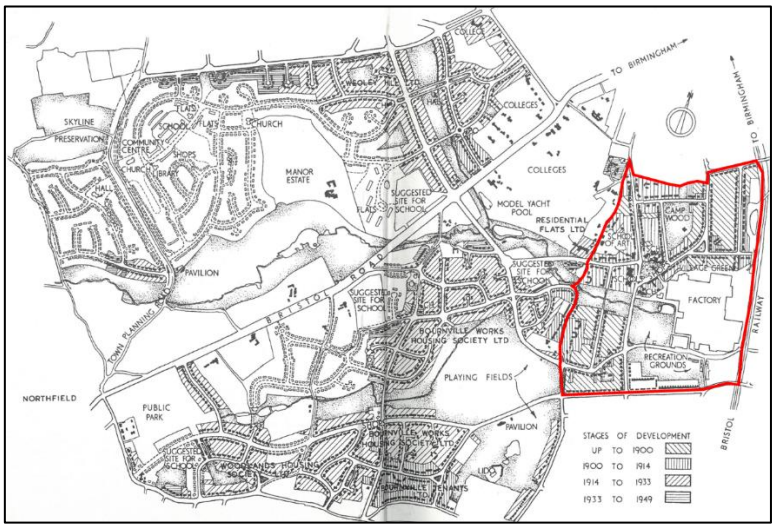


Figure 6. 47: Plan of Bournville in 1949. The red lines encircle the original core village. It can be observed that there was significant expansion towards the west.



Figure 6. 48: Part of the inter-war development in Bournville Village. (a) & (b) depict new developments on the football ground south of the factory during the inter-war period; (c) &(d) illustrate the development of a small plot of land for housing on Sycamore Road; (e) & (f) showcase the development of a small plot of land for housing at the eastern end of Laburnum Road.

The remaining scarce land within the core village was gradually infilled. Two pairs of three-terraced houses were constructed on a small plot of land to the east of the village centre's shops (Figure 6. 48(c) & (d)). Similarly, another two pairs of three-terraced houses were built on a vacant plot of land at the eastern end of Laburnum Road, located south of the road (Figure 6. 48 (e) & (f)). Concurrently, the number of institutional buildings in the area increased. Despite George Cadbury being a Quaker, he did not oppose the establishment of an Anglican church in Bournville Village. During George Cadbury's lifetime, a church hall was erected to the south of The Green. Following his death, St. Francis of Assisi, Bournville parish church was constructed in 1925 (Figure 6. 49).



Figure 6. 49: St Francis of Assisi church. (a) An early photo of the St Francis' church; (b) The current state of St Francis' church showing its neo-Romanesque style; (c) The western apse of the St Francis' church; (d) The St Francis' church on the 1937 Ordnance Survey showing the vestries connected to the church hall.

Designed by Harvey to a basilican plan, the church features a pantile roof and today is a Grade II listed building. Similarly, in 1925, the Day Continuation School (Figure 6. 50) was built to the

north of The Green. S. A. Wilmot designed the school, which boasts tiled hipped roofs, a brick exterior with stone dressing, and a semi-circular arch entrance. The main building consists of two storeys with symmetric single-story wing buildings on each side (Figure 6. 50). This educational institution provided the opportunity for all Cadbury employees under the age of 18 to dedicate one day per week to continue their general education. Over time, the school evolved into a college in 1949 and eventually became known as Bournville College of Further Education from 1963. Presently, it is part of Birmingham City University (The Bournville Society, 2013).



Figure 6. 50: The Day Continuation School. (a) An early photo of the Day Continuation School; (b) The current buildings of part of Birmingham City University used for international students; (c) The plan of The Day Continuation School on the 1937 Ordnance Survey. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

Adjacent to Selly Manor, Minworth Greaves (Figure 6. 51) was constructed to the north of The Green. This timber cruck-framed building dates back to the 13th century (Gumbley, 1991) and was originally located in Minworth, near Sutton Coldfield. In 1911, it was acquired by George Cadbury, carefully dismantled and rebuilt in 1932, and now serves as a museum in the village along with Selly Manor. It is now a Grade II listed building. Behind the two groups of bungalows on Woodbrooke Road, the original Dell Cottage faced an increased threat of higher building density, prompting the construction of two institutional buildings, namely Dame Elizabeth Hall and the Social Centre.



Figure 6. 51: Minworth Greaves. (a) An early photo of Minworth Greaves showing its cruck construction; (b) Minworth Greaves today; (c) The plan of Minworth Greaves on the 1937 Ordnance Survey; (d) Minworth Greaves (left) and Selly Manor (right).

In terms of amenities, new institutions were established. At the northern edge of the core village, the former sand pit (Figure 6. 52) was transformed into Bournville Village steam laundry in 1922 (Figure 6. 52(c)), which ceased operations in 1969. The site is now occupied by Hollier & Sons garage (Figure 6. 52(d)). With the growing popularity of motor-cars, starting from the 1920s, the house on the west side of the earliest shops on Maryvale Road was converted into a garage with petrol pumps (Figure 6. 53). During this period, recreational facilities also expanded. The original fish pond on the northern bank of The Bourn was filled in the 1920s and transformed into tennis courts. In the late 1930s, the Men's Instructional Baths were built on part of the site of these tennis courts (Figure 6. 54). However, by 1937 new tennis courts had been established at the western end of the park. A social club was constructed on the recreational ground in front of the bath house in Laurel Grove. As for the Cadbury factory, one notable change during this period was the demolition of the six pairs of semi-detached houses originally built for senior workers (Figure 6. 55), making way for the construction of Bournville Works dining hall in 1927 (shaded magenta in Figure 6. 55(a) &(b)). It provided seating for up to 500 staff, catering for the dining and recreational needs of its

employees. This facility was deemed as ‘the latest evidence of the firm’s regard for their worker’s wellbeing’ (Hindson, 2023).



Figure 6. 52: The Village Laundry. (a) An early photo of the laundry; (b) The plot is now used as a garage; (c) The plan of the Sand Pit on the 1904 Ordnance Survey; (d) The plan of the Sand Pit on the 1937 Ordnance Survey now surrounded on two sides by houses leaving a narrow access drive off Acacia Road. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)



Figure 6. 53: The garage west of the earliest shop in Maryvale Road. (a) An early photo of the garage; (b) The garage has now been converted back into a home;(c) The plan of the garage on the 1937 Ordnance Survey; (d) The plan of the current use as a home use on the current Ordnance Survey. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)



Figure 6. 54: The fish pond on the north bank of The Bourn. (a) The plan of the fish pond on the 1916 Ordnance Survey; (b) The plan of the tennis court on the 1937 Ordnance Survey;(c) A photo of the railway that transported ash to the fish pond; (d) A photo of the current car park. (Source: The Bournville Society, *Bournville Through Time*, Gloucestershire, 2013)

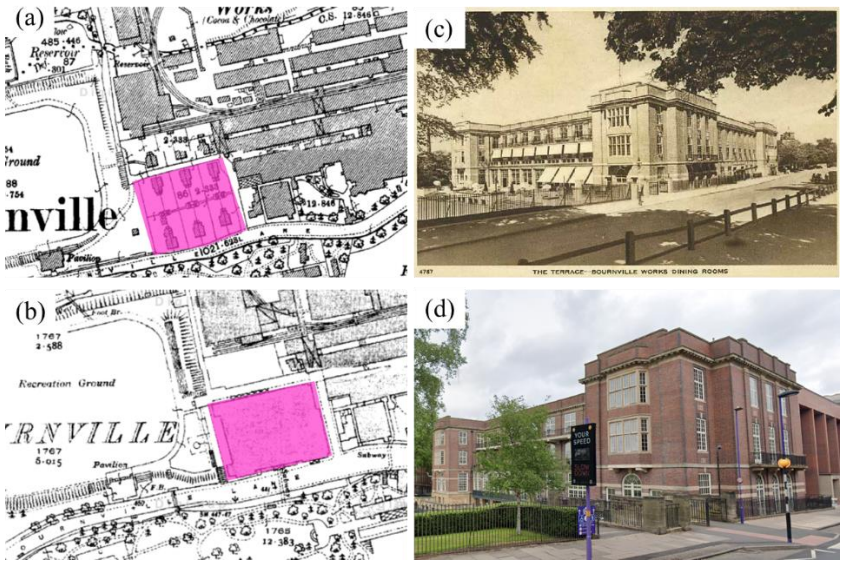


Figure 6. 55: Bournville Works dining hall. (a) The site occupied by the six pairs of semi-detached houses on the 1904 Ordnance Survey; (b) The completion of the dining hall as shown on the 1937 Ordnance Survey; (c) A photo of the dining hall taken around 1950; (d) The current state of the dining hall (Google Maps).

6.3.5 Post-war and pre-conservation period (1946-1970)

After WWII, the development of Bournville continued with ongoing expansion, extending its western boundary to Shenley Fields Road in the 1970s (Figure 6. 56). The increasing demand for housing and the changing needs of the era continued to shape the land use and landscape within the core village. One significant change was the construction of new residences (highlighted in magenta in Figure 6. 57). With the retirement of many factory workers, a significant proportion of the newly built housing consisted of bungalows designed specifically for residents aged 60 and above. An example of these bungalows can be seen in Figure 6. 57(a), which now occupies part of the site where Dell Cottage once stood. A group of bungalows with culs-de-sac were built on the northern part of Camp Wood. Furthermore, on the westernmost side of Figure 6. 57(a) stands Oak Tree House, a retirement housing complex completed in 1964. This establishment comprises 17 flats, including studio apartments with 1 or 2 bedrooms. Oak Tree House operates as a not-for-profit venture dedicated to providing a caring residential community.

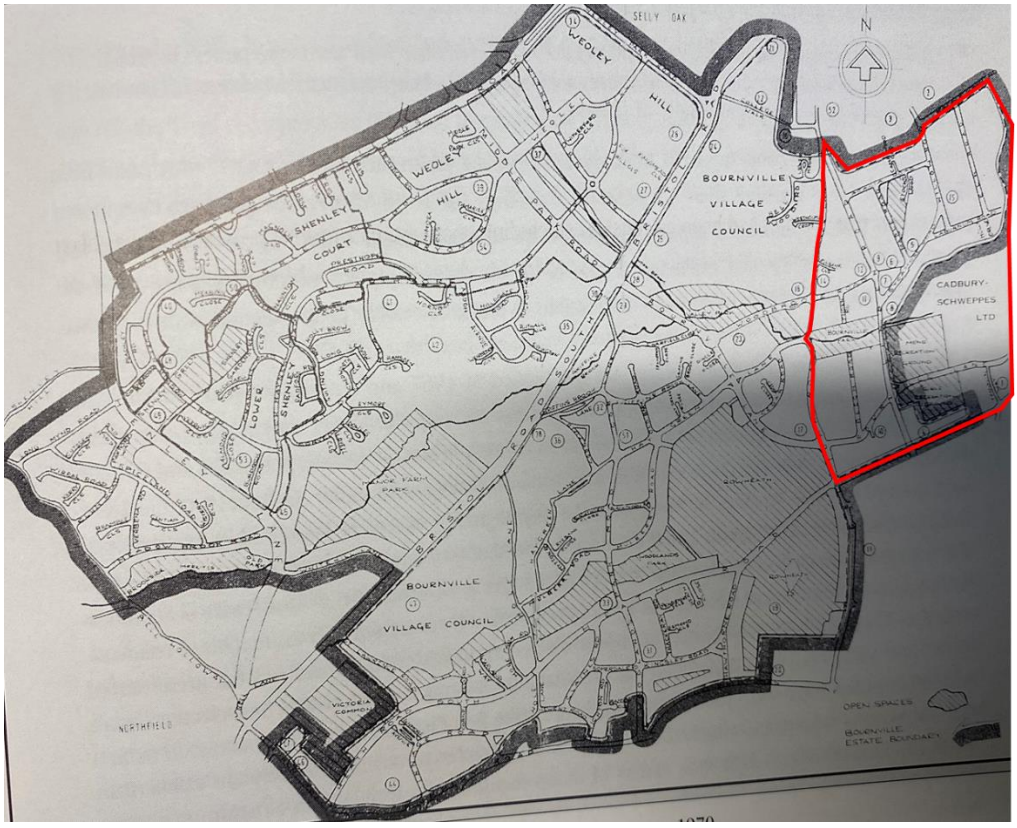


Figure 6. 56: Plan of the Bournville Estate, 1970. The red line encloses the original core village.

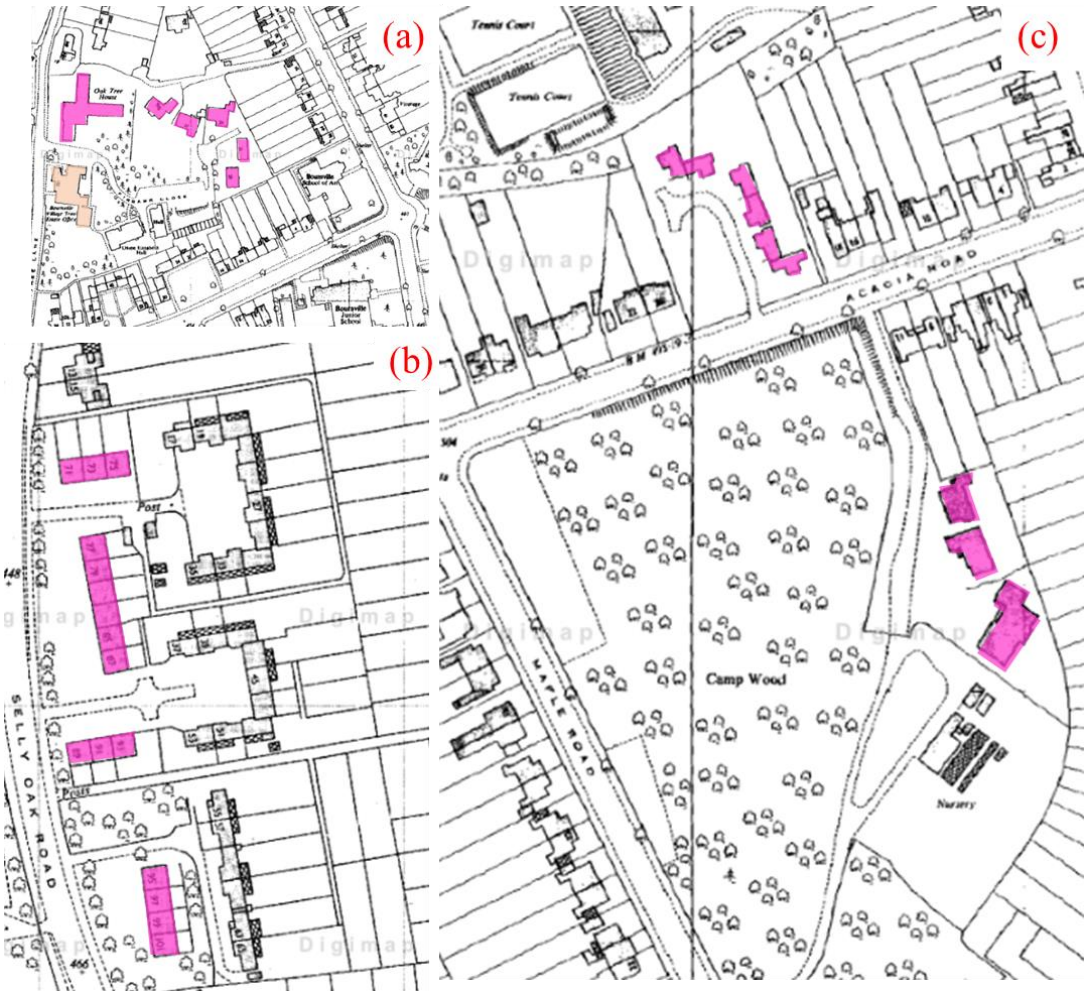


Figure 6. 57: New housing built in the post-war Bournville core village. (a) New housing on the site of the former Dell cottage; (b) New bungalows along Selly Oak Road; (c) Culs-de-sac to the north of Acacia Road and new buildings around Camp Wood.

There were two notable institutional changes in this period. First, the former Bournville farm buildings underwent remodelling by Harvey in the early 20th century, and they remained mostly unchanged until the 1940s. However, in the 1950s and 1960s, significant expansion and transformation took place, converting the buildings into a hotel that aimed to meet the accommodation needs of tourists. Aside from its original purpose as a farm, the Bournville Farm also served as a treatment facility for workers with minor injuries during the early days after the Cadbury factory was established (Broomfield, 2001). The extensive buildings located behind the hotel, which were eventually demolished in the 1950s, were utilised by various social groups. During the 1950s, the farm buildings were extended (shaded magenta in Figure 6. 58). Secondly, Dell Cottage underwent expansion and served as the office for the Bournville Village Trust Estate

from the 1950s to 2016, facilitating the management and administration of the estate (shaded magenta in Figure 6. 59). The post-war period also witnessed an increased demand for leisure facilities, as indicated by the growing number of tennis courts and bowling greens such that Bournville Park and its surroundings featured at least three tennis courts and three bowling greens (Figure 6. 60). The post-war period also witnessed a further rise in private car ownership. To accommodate the needs of car owners, several public car parks were established, both to the north and south of the Cadbury factory, as well as on the northern bank of The Bourn.

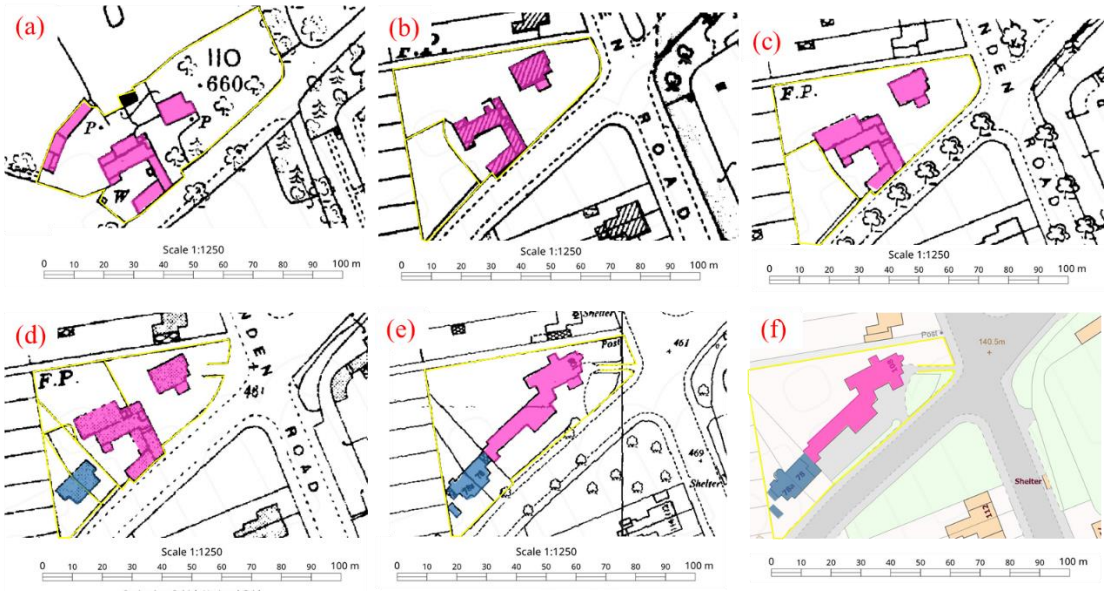


Figure 6. 58: The evolution of Bournville Farm from the 1880s until today. (a) The plan of Bournville Farm in 1884; (b) The plan of Bournville Farm in 1904; The farmhouse has been demolished and a new farmhouse constructed to the north-east; (c) The plan of Bournville Farm in 1916; (d) The plan of Bournville Farm in 1937 two new houses have been constructed to south-west of the farm buildings; (e) The plan of Bournville Farm in 1966 showing the hotel incorporating the former farmhouse; (f) The plan of Bournville hotel today (All maps from succeeding editions of the Ordnance Survey).



Figure 6. 59: The evolution of Dell Cottage from 1937 until today. (a) The plan of Dell Cottage (now called Fircroft) with Dame Elizabeth Hall to the south-east in 1937; (b) The plan of Fircroft with the new estate office attached and the social centre building east of Dame Elizabeth Hall in 1966; (c) The plan of Elizabeth Court (located on the site of Fircroft) today (All maps from succeeding editions of the Ordnance Survey).

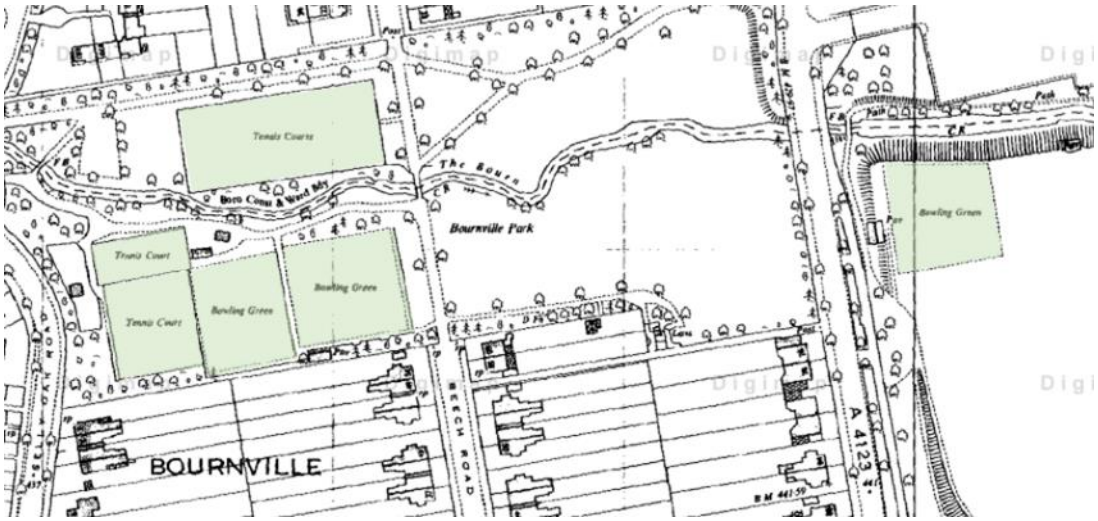


Figure 6. 60: Tennis courts and bowling greens in Bournville Park.

6.3.6 Conservation area period (1971-)

Due to its significant historical and architectural value, Bournville was designated as a Conservation Area in 1971 only four years after the Civic Amenities Act of 1967. This designation encompasses almost the entire core village, except for the Cadbury factory (Figure 6. 61). Many of the important

institutional buildings in Bournville have been statutorily listed, further ensuring their conservation. It is important to note that Bournville is not preserved as a museum-like entity, but rather as a living community. In this period, there have been some changes in Bournville. In 1990, one of the former Cadbury factory buildings was repurposed as a visitor centre, becoming one of Birmingham's most popular attractions with around 500,000 visitors annually. This transformation allowed the factory to be appreciated by the public and contributed to its continued relevance. Another significant transformation occurred in 2016 when Fircroft was demolished and replaced by Elizabeth Court (Figure 6. 59(c)), a retirement housing complex consisting of 21 flats, including 1-bedroom and 2-bedroom units. Unlike Oak Tree House, which offers rental accommodations, Elizabeth Court operates on a leasehold basis.

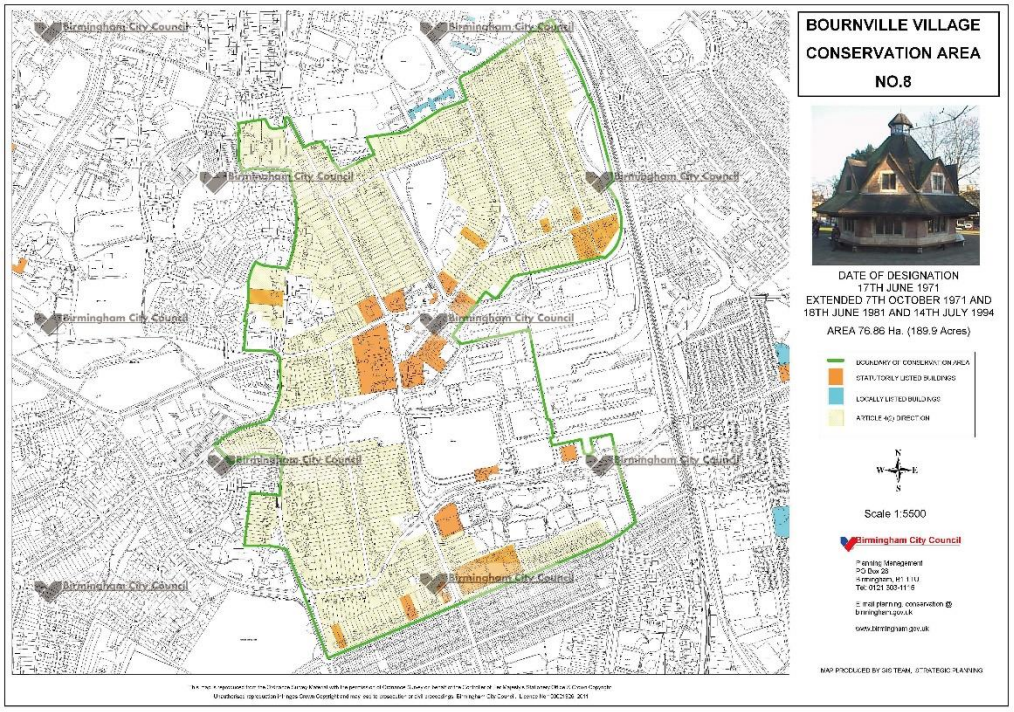


Figure 6. 61: The Bournville Village Conservation Area.

Bournville has undergone smaller-scale changes in this period, particularly in terms of micro-morphological alterations. The predominant building type in the core village of Bournville are small Arts and Crafts style houses in semi-detached pairs or short terraces and served as a precursor to inter-war council housing. The houses designed by Harvey along the northern side of Maryvale Road (Figure 6. 62) show an early transitional form from their bye-law predecessors. We can note

the structures containing coal storage and lavatories located in the rear yards and symmetrically distributed along the plot (circled in red dashed lines in Figure 6. 62(a) & (b)). Access from the street to the rear yard was facilitated by passageways from the street frontage (Figure 6. 62 (e)), some of which have remained unchanged and retained their original form. This architectural feature represents a significant departure from bye-law houses that relied on back-alleys for access. From the early 1950s, with the widespread adoption of cars, one noticeable change in residential housing was the widespread addition of garages to properties. One way this change was implemented in these houses was by inserting garages on the sites of the outside lavatories where access drives were wide enough (Figure 6. 62, changes on the left side in (d) and on both sides in (f)). In the 1980s to 1990s, glass and plastic conservatories were a feature for extending houses to the rear without planning permission (Figure 6. 62, changes on the left side in (d)).



Figure 6. 62: The introduction of new functions in the back-garden structures of housing along Maryvale Road. (a) The plan of the houses in 1884; (b) The plan of the houses today; (c) Addition of a conservatory on the left side; (d) Conversion of the left side into a garage; (e) Retention of the original short wall and door; (f) Conversion of both sides into garages.

Within a few years, the houses built on in the core of the estate in Sycamore, Acacia and Laburnum Roads were built on longer and wider plots, resulting in houses being limited to two

storeys and wide spaces between the pairs of houses enabling garages to be built beside the houses or in the back gardens. In Willow Road this process has led to the joining of pairs of garages, while one or two of the garages have an additional living room on the upper storey and more recently garages have been converted into living rooms. Another common micro-morphological change is the creation of enclosed porches at front doors (Figure 6. 63). The same kind of change has also occurred on Elm Road. Another distinctive feature of Elm Road is that, due to its close proximity to the railway, the Trustees aim to make a good impression on the travelling public. As a result, houses on Elm Road are constructed in large blocks, and the gaps between houses are also more spacious. This ensures that even on one side, two cars can easily be parked, effectively reducing the demand for garage extensions. Apart from garages, there are still numerous early wooden sheds visible between the houses (Figure 6. 64).



Figure 6. 63: Houses in Willow Road. (a) From the left a well-constructed new garage in post-conservation era; an old garage (green door) before conservation era; an original open porch with attractive columns; a pre-conservation plastic and glass enclosed porch; (b) From the left an original open porch and an inter-war garage (pale blue doors) beside the house; an extension (bright blue) integrating a new porch, front entrance, and garage, probably pre-conservation era; (c) A four-house terrace (the entrances to the end houses at the side). The house on the left has a garage with an additional room over, possibly pre-conservation era.



Figure 6. 64: Houses in Elm Road. (a) From the left, an enclosed porch; an original open porch; two cars parked on one side of the plot boundary; and a wooden shed; (b) Note the well-constructed new garage added on the right side before conservation status; (c) Note the symmetrical distribution of small windows on both sides of the houses, which probably light the staircase; note the well-constructed brick garage on the right side.

Another notable change is the addition of dormer windows on the rear roofs and extensions in the back gardens (Figure 6. 65). Taking the houses at Nos. 124 and 130 on Linden Road as examples, in response to the mounting housing pressure, the utilisation of attic spaces has become a prevalent solution, necessitating the installation of dormer windows on the roofs. However, due to the area's protected status, regulations prohibit the addition of windows to the street-facing side of the roofs. Consequently, the dormer windows are primarily added to the rear, as observed in both houses at Nos. 124 and 130 (shaded magenta in Figure 6. 65(c)). If the demand for additional space persists, homeowners proceed to construct further extensions in their back gardens, such as the westward extension at No. 124 and the southward extension at No. 130. A less frequent change is the conversion of residential properties into businesses. For instance, Lucre Recruitment Solutions (LRS), a consulting agency specializing in Hospitality, IT, and Health, now operates in Holly Grove.

The General Architecture Company Ltd, located on Laburnum Road, provides architectural services, particularly in the design of house extensions.



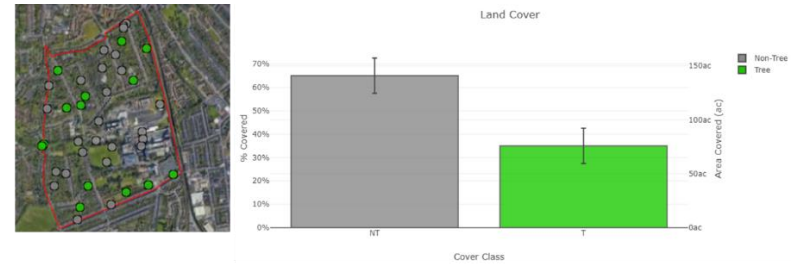
Figure 6. 65: Micro-morphological changes in Bournville. (a) The plan of Nos. 124 and 130 on Linden Road in 1966; (b) The plan of Nos. 124 and 130 on Linden Road today (All maps from succeeding editions of the Ordnance Survey); (c) Aerial view of Nos. 124 and 130 (Google Maps).

During this period, one significant event that had a profound impact on Bournville and the entire British confectionery industry was the acquisition of Cadbury Bros Ltd. by Kraft Foods in 2009, which was later acquired by Mondelez International. While this acquisition had potential commercial benefits for the firm, it generated opposition from local residents who were concerned

about the symbolic loss of a cherished British chocolate brand to an American corporation. Nevertheless, the historical significance and collective memories associated with Cadbury remain intact. The Conservation Area status and the preservation efforts in Bournville reflect the community's commitment to honouring its heritage while adapting to changing needs and dynamics.

6.3.7 Changes in green space in Bournville

A customary impression of Bournville is its strikingly large number of trees and green spaces. In 2017, a group of scholars and staff from the Centre for Sustainable Forestry and Climate Change conducted a survey of the canopy cover of England's towns and cities using a software called i-Tree canopy (https://canopy.itreetools.org/). This software provided an estimation of tree cover for a given area through a random sampling process that enabled the classification of ground cover types. The survey revealed that only a small number of towns have a canopy cover that exceeds 30% (Doick et al., 2017). For Birmingham, the figure is about 20%. However, in the ward of Bournville and Cotteridge, the canopy cover is 28.2%, which is significantly higher than the Birmingham average. Using the same method on Bournville resulted in a canopy cover of 35% (Figure 6. 66).



Abbr.	Cover Class	Description	Points	% Cover ± SE	Area (ac) ± SE
NT	Non-Tree	All other surfaces	26	65.00 ± 7.54	140.61 ± 16.34
T	Tree	Tree, non-shrub	14	35.00 ± 7.54	75.82 ± 16.34
Total			40	100.00	216.64

Tree Benefit Estimates: Carbon (English units)

Description	Carbon (T)	±SE	CO_2 Equiv. (T)	±SE	Value (USD)	±SE
Sequestered annually in trees	103.50	±22.30	379.51	±81.77	$30,960	±6,675
Stored in trees (Note: this benefit is not an annual rate)	2,599.31	±560.06	9,530.81	±2,053.63	$778,012	±167,641

Currency is in USD and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Amount sequestered is based on 1.366 T of Carbon, or 5.095 T of CO_2, per ac/yr and rounded. Amount stored is based on 34.281 T of Carbon, or 125.697 T of CO_2, per ac and rounded. Value (USD) is based on $299.31/T of Carbon, or $81.63/T of CO_2 and rounded. (English units: T = tons (2,000 pounds), ac = acres)

Figure 6. 66: Tree canopy coverage in Bournville. As indicated by the red rectangular box in the table, the proportion of tree cover in Bournville is approximately 35%.

During the transformation of Bournville from an early rural landscape to an urban landscape, significant changes occurred in the tree population. A comparison of large-scale Ordnance Survey plans from 1882 and 1904 reveals that many field boundaries that were not integrated into the suburban landscape had trees cut down. However, some new trees were also planted. There were

two types of new tree planting: street planting, where trees were added along newly-planned streets, and planting in the factory area. Only a decade later (in 1914), numerous existing streets had trees planted along their margins (Figure 6. 67).

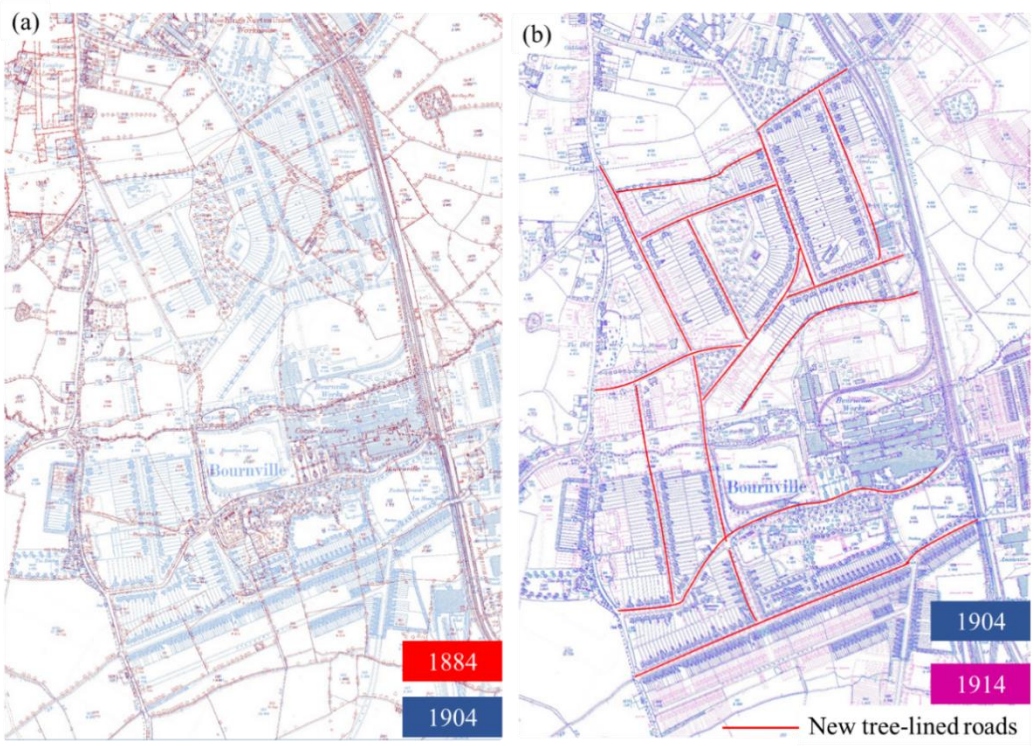


Figure 6. 67: Comparison of historical plans for Bournville. (a) The red colour represents the Ordnance Survey of 1884, and the blue colour represents the Ordnance Survey of 1904. From the two comparative maps, it can be observed that some trees along the boundaries of certain land parcels were cut down during the establishment of Bournville. (b) The blue colour represents the Ordnance Survey of 1904, and the magenta colour represents the year 1914. The red-lined areas indicate newly constructed tree-lined roads, demonstrating that almost every newly built road had trees planted on both sides.

During the gradual urbanization of Bournville, the street trees and other green spaces experienced a decline, as evident from comparisons between historical photographs and recent Google Street Views of the same scenes. The first example is Bournville Lane between the Men's Recreational Ground and Bournville Hall (Figure 6. 68). The trees in both images are similar, but the street trees now appear to be almost adjacent to the street instead of being behind a fence, indicating that road widening has occurred. This demonstrates the impact of 20th century road

widening programmes on tree cover (Figure 6. 68(a) & (b)). Another example is Linden Road (Figure 6. 68(c) & (d)). About 100 years ago, there were semi-mature trees on the east side and new plantings on the west side. However, currently, there are no longer roadside trees in front of the houses on the west side, though some trees remain in front of open spaces. On the east side, there has been some thinning, with some trees being cut down. It is possible that the loss of trees was a result of the widening of this road to accommodate its new function as part of the city's outer ring road.



Figure 6. 68: The trees along Bournville Lane and Linden Road. (a) A postcard of Bournville Lane around 1904; (b) The current trees along Bournville Lane (Google Maps); (c) Linden Road around 1910; (d) The current trees along Linden Road (Google Maps).

In the Edwardian-era, the young blossom trees, situated very close to Maryvale Road, are no longer evident in the current scene (Figure 6. 69(a) & (b)). A possible reason for their removal could be attributed to their relatively short natural lifespan. A number of trees near Selly Manor have been felled, while the retention of the hedgerow is apparent (Figure 6. 69(c) & (d)). The sole surviving lime tree, now positioned inches away from the road, serves as an illustration of the maintenance challenges arising from both aging trees and the urban road network, particularly when dealing with

mature forest trees. Regarding the street trees within the shopping centre, superficially, they may appear identical in both photographs. However, a more detailed examination reveals that they are not the same trees (Figure 6. 70). In the earlier photograph, the trees were originally planted too close to the edge of the roadway, potentially leading to interference with underground utility services such as gas, water, and electricity. To address these concerns, replacement trees have been planted at a more considerable distance from the road.



Figure 6. 69: The trees along Maryvale Road and Linden Road. (a) A postcard of Maryvale Road around 1922; (b) The current trees along Maryvale Road (Google Maps); (c) Selly Manor around 1933; (d) The current trees around Selly Manor (Google Maps).

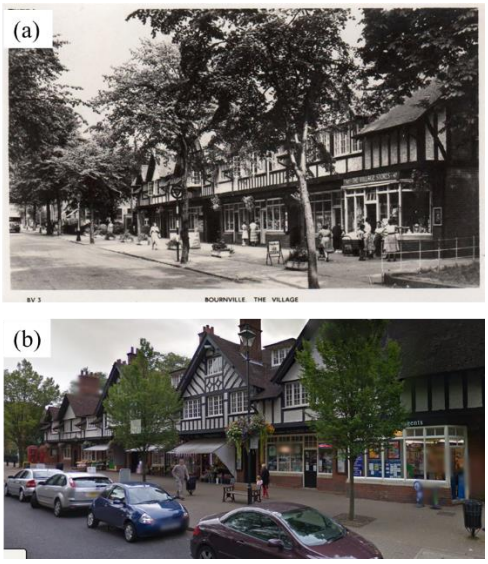


Figure 6. 70: The trees along Sycamore Road in front of the shopping centre. (a) The shopping centre around 1956; (b) The current trees around the shopping centre (Google Maps).

The trees that once adorned the offices within the factory grounds, standing in front of the office buildings, have now been felled (Figure 6. 71 (a) & (b)). However, in the distance, the pine tree appears to have matured more compared to the earlier photograph. Interestingly, the trees next to the dining hall have managed to survive. One of the significant functions of these trees was to act as a natural screen for the factory building. In the current scenario, new trees have been planted to screen the car park area (Figure 6. 71 (c) & (d)). This transformation highlights the importance of the maintenance and preservation of trees within factory grounds, as they play a crucial role in ensuring a harmonious blend of nature and industrial infrastructure.



Figure 6. 71: The trees around the offices and dining hall within the factory grounds. (a) The offices around 1907; (b) The current trees around the offices (Google Maps); (c) The dining hall around 1932; (d) The current trees around the dining hall (Google Maps).

In the case of The Triangle, the trees that were originally planted along Sycamore Road no longer survive. In contrast, the trees on the southern side of The Triangle, along Laburnum Road, are still standing (Figure 6. 72(a) & (b)). The hedgerows that once adorned the front gardens have now been removed (Figure 6. 72(c) & (d)). As a result, the entrances to the houses have become less private than before, and more significantly, they have been widened with brick paving or asphalt to accommodate domestic car parking. Some house entrances have been widened sufficiently to

accommodate two cars since most households in Bournville are now two-car households. This trend is reflective of a broader urban process where front gardens are sacrificed for car parking leading to increased rainwater run-off and loss of biodiversity. As fences and hedgerows are removed, much of Bournville has been transformed from enclosed front gardens to open-plan front gardens. The primary green spaces have been largely converted to lawns for ease of maintenance. These developments indicate the evolving urban landscape and the impact of modern lifestyle demands on green spaces and residential areas.



Figure 6. 72: The green space changes around The Triangle and front gardens along Sycamore Road. (a) The Triangle around 1908; (b) The current trees around The Triangle (Google Maps); (c) Front gardens along Sycamore Road around 1904; (d) The current front gardens along Sycamore Road (Google Maps).

Back-garden trees in Bournville have also undergone significant changes (Figure 6. 73). Prior to residents moving into their houses in Bournville, the gardens were carefully laid out, and fruit trees were planted at the bottom of each garden to provide fruit and act as a natural screen between houses that backed onto one another. However, from the aerial photographs taken on three different dates, it is evident that some back-garden trees have been removed over time, while new trees have been planted in certain areas.

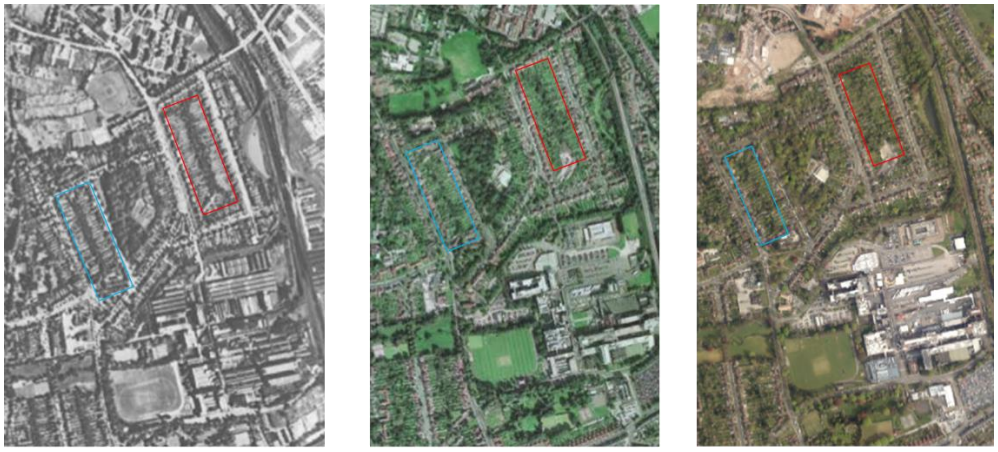


Figure 6. 73: The evolution of back-garden trees in Bournville. (a) Bournville back-gardens in 1945 (Google Earth); (b) Bournville back-gardens in 1999 (Google Earth); (c) Bournville back-gardens in 2019 (Google Earth).

Based on this comprehensive analysis, it can be firmly concluded that the construction and evolution of Bournville were intricately intertwined with the changing pattern of green spaces. After approximately 1900, the estate took the initiative to plant trees along the roads. However, the creation of the suburb led to a reduction in the number of trees, primarily due to the removal of field boundaries. Despite this, a few field boundaries managed to survive, as seen along Bournville Lane, and the roadside trees matured over time. As the suburb continued to develop, several factors contributed to the decline of certain trees. Road widening initiatives impacted some trees, while others were lost due to their substantial size in relation to the relatively small scale of roads and gardens. Moreover, natural causes led to the demise of several trees. Additionally, the interference of certain trees with underground services necessitated their removal. Front garden trees suffered significant losses as part of efforts to simplify maintenance and make room for domestic car parking. This transformation altered the landscape significantly. Similarly, back garden trees were not immune to losses, especially in the case of fruit trees.

6.4 Conclusion

In this chapter, I investigated the establishment of Bournville, thoroughly examining its historical context, the process of its creation, and the subsequent micro-morphological transformations it

underwent. The Victorian era in Britain was marked by rapid urbanisation and a slew of social challenges. In response, various segments of society, including socially conscious entrepreneurs, embarked on initiatives to address these issues. One notable manifestation of such efforts was the creation of model villages, each with its unique utopian vision.

Bournville stands as a shining example among these model villages, boasting remarkable achievements. However, attributing these accomplishments solely to the benevolent inspiration of a single entrepreneur would be an oversimplification. As previously discussed, the establishment of Bournville was intricately tied to the enduring role of Christianity in British charitable history, particularly the Quakers in this context. In addition, Bournville's aesthetic values were shaped by the Romantic yearning for rural landscapes, heavily influenced by the Arts and Craftsman movement. Alongside the Garden City movement, Bournville played a profound role in shaping urban development in 20th-century Britain and even globally.

Bournville also stands as a valuable example of the development of the British welfare state. The Cadbury factory not only provided improved working conditions but also addressed the broader well-being of its workers. This commitment extended to the creation of high-quality almshouses and bungalow courtyards for retired individuals, as well as the provision of various welfare facilities within the village centre. While Bournville has been criticised for its paternalistic aspects, it is crucial to avoid exaggeration. Both in its inception and subsequent evolution, economic considerations were integral to the Cadbury vision. Furthermore, when compared to the *Danwei*-based systems of planned economies in China, Cadbury's influence was relatively limited, affording residents a significant degree of personal freedom. The evolution of Bournville and the surrounding urban nuclei highlights the significant influence exerted by landlords in the development of land plots, distinguishing it from the characteristics of Factory 3. The next chapter will provide an in-depth comparative analysis between these two cases.

Chapter 7. Comparison and Conclusion

Chapter 1 and chapter 2 of this thesis have introduced the research objectives, research methods, and background. In chapter 3 and chapter 4, there was an exploration of the broader institutional, historical, and cultural context in which the two case studies are situated at the national and city levels. Building upon this foundation, an analysis has been carried out in chapter 5 and chapter 6, encompassing the plans of two cases, patterns of building forms, patterns of urban land and building use, and the utilisation of green spaces. In an interview, M. R. G. Conzen once stated, 'You are the ideal researcher if in every individual case you can see both the individual as well as the general.' [17] Similarly, the renowned Chinese poet Guowei Wang, in his famous work *Human Words*, mentioned, 'A poet must immerse in the universe and human life, both delving into its depths and stepping outside to observe. Immersion enables them to write, while detachment allows them to observe.' While these words originally referred to the poet's need to both immerse and detach from real life for the purpose of experiencing and observing it, they also reveal a similar principle, which aligns with the perspective presented in chapter 2 of this thesis: that things possess both assimilations and differentiations (pp. 11), and a proficient observer must be capable of simultaneously perceiving the individual and general aspects.

The nature of cross-cultural comparison in this thesis imbues both individuality and commonality with dual significance. Within their respective countries, these two cases represent their unique qualities and the shared landscape characteristics under the same national institutional system. However, when compared side by side, they both reflect utopian efforts from different cultural backgrounds in addressing poverty and providing housing for their people. Therefore, in the following sections of this chapter, we shall address several questions. First, what were the processes of morphological evolution for the two cases, and to what extent and in what aspects do they incorporate characteristics of their respective national institutions? Building upon this, what are the differences in the mechanisms of landscape evolution in the two countries? Furthermore, on a broader level, in terms of ensuring the survival of vulnerable populations and providing housing

17 https://www.youtube.com/watch?v=g8tZ3aXjeP4&t=1358s

for workers in industrial countries or cities, what commonalities do these mechanisms share? Based on the exploration of these questions, the chapter will conclude and provide some reflections.

7.1 Analysis of the physical form and morphological evolutionary process of Factory 3

Chapter 5 described the morphological evolutionary process of Factory 3 from its origins as a pre-industrial landscape to its establishment in 1953 and its subsequent development. Before 1953, the area where Factory 3 was located was characterized by a typical rural landscape, consisting of two villages and the surrounding farmland. At that time, north of Factory 3's location, the Longhai Railway, and to the south, the 'Zheng-Luo Official Thoroughfare' (later Jianshe Road) connecting Zhengzhou to Luoyang, were among the few remnants of the pre-industrial landscape. After the establishment of the factory in 1953, the land was divided into two zones, with the factory zone to the north and the residential zone to the south, separated by Mianfang Road. The official buildings were situated next to the factory workshops in the official zone, and this area was subsequently designated as the official zone in the analysis. Notably, production structures began and were completed before the development of the residential area, highlighting the significance and urgency of production at that time. The initial architectural layout of the residential area was peripheral, reflecting the centralization and cohesion principles of socialism. When the residential buildings were completed in 1955, they were originally placed as close to the production area as possible, primarily along Mianfang Road, emphasizing the centrality of production within the overall function of Factory 3. During this period, Factory 3 operated under the *Danwei* system, a unique system in China during the planned economy era, where the *Danwei* provided its residents with various facilities needed for daily life, as evidenced by the comprehensive facilities available at that time.

After the 'Reform and Opening-up' policies were initiated in 1978, planned market economics began to be gradually introduced into various systems, leading to their own transformations in Factory 3. The result of this transformation was the gradual dismantling of the *Danwei* system. The formerly unified state-owned asset, Factory 3, began to disintegrate step by step, with these separated assets being introduced to market economic principles. In the development process of

Zhengzhou after 1953, Factory 3's geographical location gradually shifted from the outskirts of the city to a bustling urban area. Consequently, the land became highly profitable. Taking into account the costs of demolition, in general, the order of replacement was, first, the production zone, followed by the official zone, and finally the residential zone. In the case of Factory 3, there is a slight deviation from this general process. Due to its relatively high cultural and heritage value, the Zhengzhou municipal government designated Factory 3 as a city-level heritage site in 2009.

In 2012, over 95% of the production zone was the first to be demolished. When developers attempted to secretly dismantle the official buildings during weekends, they were promptly stopped by journalists. The partial demolition of the official buildings also underscored the fierce competition between the high economic value of the land of Factory 3 and its heritage value. In 2013, a commercial residential area was constructed on the previous production area in the north. Although heritage objectives were established in 2009, preservation of newly valued heritage buildings remained largely at the planning stage. Before 2020, the preservation concept developed for Factory 3 consisted of preserving the remaining small portion of factory buildings and some official buildings as an exhibition area for Zhengzhou's textile industry museum, as well as protecting Soviet-style residential buildings in the residential zone as a historic and cultural district. During that period, for various reasons, the official buildings lay in a state of abandonment, while the residential zone remained unchanged. It wasn't until 2020, under the initiative of the Zhengzhou municipal government, that the houses in the Soviet-style residential area began to be repurchased by the government and transformed into a historic and cultural district. The official buildings underwent renovation and were given a new purpose, serving as the Textile Industry Museum (Figure 7. 1).

From the plan of Factory 3, it was easy to see that it was a well-planned community. In terms of the road system, as described in chapter 5, due to the angle between the Longhai Railway and Jianshe Road, Factory 3's roads were not entirely parallel but rather formed two consequent streets in two different directions. Regarding the concept of plots, Factory 3 differed significantly from the typical British understanding due to China's land tenure system. This distinction was crucial for understanding Factory 3's morphological changes. In China, urban land was owned by the state,

and different entities held land use rights rather than ownership. This ownership and usage rights structure may have borne some resemblance to the British leasehold and freehold system. It was at this level that Factory 3 could be approximated as a plot in morphological analysis. However, the land rights structure of Factory 3 was fundamentally different from the leasehold and freehold concepts of plots in the United Kingdom. First, in terms of acquisition, this land was allocated rather

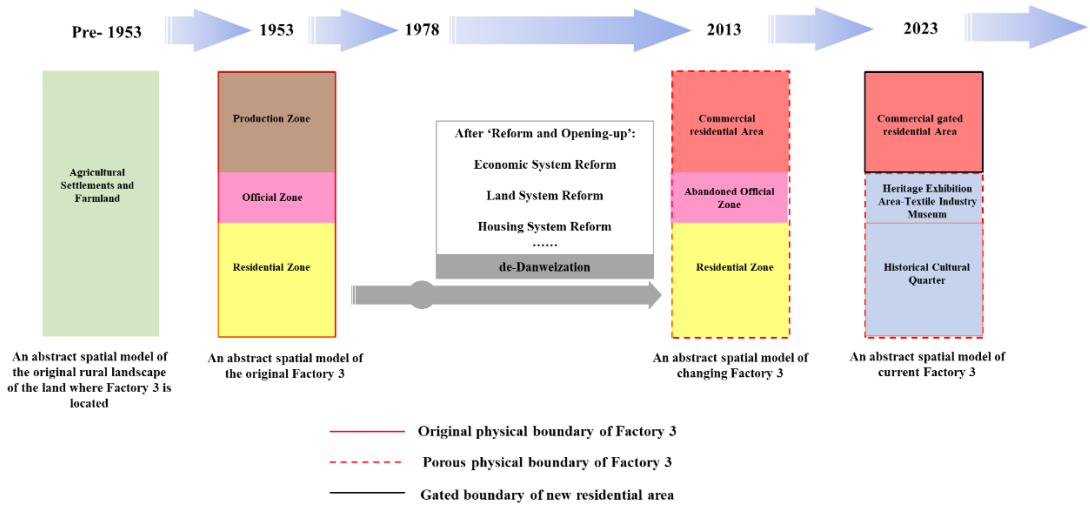


Figure 7. 1 Model analysis of Factory 3's morphological evolutionary process.

than acquired through commercial transactions. Secondly, at least during the planned economy era, as users, the entities holding land use rights did not possess complete rights; they essentially played the role of executors, implementing the ideas and will of the state. Thirdly, in certain cases, the boundaries of *Danwei*-owned assets, including land, reflected the power of higher-level administrative authorities. For example, in the case of Factory 3, neighbouring *Danwei*s obtained land through administrative allocation and all belonged to the same higher-level organization. Consequently, there were often voluntary or involuntary land and property exchange activities. This also resulted in Factory 3 lacking some typical characteristics of other *Danwei*s, such as a self-contained community with a high physical boundary relatively isolated from the outside world. While there were fences separating Factory 3 and neighbouring textile *Danwei*s, Xiangrong Street provided a connection between the residential areas of the two *Danwei*s. The planned nature of Factory 3 was also clearly demonstrated by the strategic placement of public service facilities like schools, healthcare centres, and restaurants around the fountain in its residential area, showcasing the distinctive attributes of a well-designed community.

In terms of building form, initially, all of Factory 3 consisted of three-storey Soviet-style residences with red roofs and grey brick walls. The last Soviet-style residences were constructed in 1958. Subsequently, new constructions mainly featured red-brick buildings with more than three storeys, some with flat roofs. After 2010, high-rise buildings exceeding 30 stories were constructed. The discontinuation of Soviet-style architectural development after 1958 may be partly attributed to political factors, as tensions between China and the Soviet Union escalated in the late 1950s. Additionally, increasing housing demands necessitated the construction of taller red-brick buildings with quicker turnaround times. From the perspective of land and building usage, the morphological changes of Factory 3 reflect the influence of institutional changes on building functions and, consequently, building forms. In the late 1980s, with the introduction of a market economy, the ground floors and even the first and second floors of street-facing buildings within Factory 3 gradually transitioned to commercial use, including restaurants, clothing stores, and hardware shops. This transition significantly altered the architectural form, as street-facing windows were transformed into shop doors.

Factory 3's incorporation of green spaces was not merely an aesthetic choice; rather, it also mirrored the institutional ethos that shaped its development. The Zhengzhou municipal government displayed a profound commitment to environmental sustainability during the factory's construction, ensuring that construction and landscaping progressed hand in hand. Notably, the government went to great lengths by dispatching specialized landscaping teams to actively support and enhance the green initiatives in *Danwei*s in Zhengzhou, including Factory 3. This proactive approach underlined the significance of ecological considerations in the factory's evolution. The historical context of the Cultural Revolution added a layer of complexity to Factory 3's landscaping efforts since criticism labelling landscaping as 'bourgeois taste' during that tumultuous period highlighted the intricate political dynamics influencing Factory 3's journey and underscored the deliberate decisions made regarding its green spaces, which were different from those seen in Bournville.

7.2 Analysis of the physical form and morphological evolutionary process of Bournville

Unlike Factory 3, Bournville was not initially intended to be developed as a planned model village. In 1879, when the Cadbury brothers decided to relocate their chocolate factory from the city centre of Birmingham to a location four miles southwest of the town centre, they initially purchased only a small piece of land near the railway and canal. Initially, this area was primarily focused on production. While there were indeed seven pairs of semi-detached houses from the earliest stages, these were specifically constructed for the factory foremen. It wasn't until the mid-1890s that the Cadbury brothers gradually acquired the surrounding land and began to develop it into a model housing area. During the construction process, efforts were made to preserve elements of the pre-urban cadastre. This preservation extended not only to linear features like Bournville Lane and Bourn Brook, which were inherently resistant to change, but also to elements like Bournbrook Farm and Five Gates Farm. These elements were primarily preserved based on their land boundaries and positions. In terms of the distribution of production and residential areas, Bournville's production zone was situated near the railway, on its western side, while the residential area surrounded the production zone to the west of the railway. The core village of Bournville was not constructed in a single effort, and even its central hub of life was not initially established at The Green.

Subsequently, this land within the core village was essentially fully utilised, Bournville therefore experienced changes that were markedly different from Factory 3. It no longer focused on gradually increasing building density within its internal boundaries but instead continued to expand in terms of space. Subsequently, the morphological changes within the core village were relatively minor compared to Factory 3. However, this is not to say there were no changes at all. The changes primarily manifested in two aspects. First, smaller, irregularly shaped plots of land were developed into new residences based on their specific locations and shapes, reflecting a high demand for housing. Secondly, the morphological changes were more micro-morphological in nature, especially after it was designated as a Conservation Area in 1971. This included converting attics into new rooms, adding rooms in the backyard, enclosing previously open porches, and constructing new garages, among other alterations.

From the plan of Bournville, it was evident that the Bournville core village embodied the characteristics of a planned community while also employing design strategies to maximize landscape richness. Regarding the road system, although the newly planned roads were generally quite straight, the presence of street trees lining these roads significantly enhanced landscape diversity and vitality. Additionally, the pre-existing road, Bournville Lane, had been intentionally retained in its original direction to mitigate the potential monotony that could result from a strictly artificial road network. In terms of property rights, among privately-owned properties in Bournville, there was a growing trend towards freehold ownership. However, in its early stages, Cadbury chose to implement leasehold agreements, drawing inspiration from those used by the Calthorpe family. This strategic decision aimed to prevent speculative developers from transforming Bournville into a place resembling other monotonous landscapes. When considering the size of the plot parcels, it is important to note that Bournville's land plots, comparative with the plots of bye-law terraced houses, were only a little larger.

Turning to the building blocks, it became evident that the houses in Bournville were characterized by their compact and economical designs. The diversity of building types in Bournville exemplified an essential principle of ensuring a diverse range of social attributes among its residents. The village featured bungalows primarily designed for elderly residents, and single cottages catering to those with slightly higher economic means, predominantly located at the edges and road intersections. Semi-detached houses were among the most common housing types, with three-house and four-house terraces predominantly situated in the northern part of the village. Additionally, longer terraces were available for residents with slightly lower economic means. Bournville prided itself on the rich variety of building forms it offered.

As elaborated in chapter 6, Bournville encapsulated a rich cultural heritage, deeply rooted in Picturesque theories and the Romantic movement, with a particular emphasis on the ideals of the Arts and Crafts movement. William Alexander Harvey, the chief architect, was profoundly influenced by the movement's principles of 'simplicity and practicality,' which he diligently applied in shaping the village's design. Moreover, the architects displayed a keen focus on both landscape and architectural diversity. Even when constructing two buildings based on the same building block

plan, they employed straightforward design techniques to ensure distinctive external appearances. Concerning the functional aspect of the buildings, Bournville's structures did not undergo a significant transformation from residential to commercial purposes, in contrast to the extensive 'residential to commercial' conversions observed in Factory 3. Nevertheless, recent years have seen the emergence of small-scale (two-person) companies operating within some of the residential properties.

One of Bournville's most prominent features was its expansive green spaces. Not only were these areas of considerable size in places, but they also encompassed a wide variety of landscape types. These green spaces constituted a paramount legacy bestowed upon Bournville by the Cadbury brothers. Their inspiration was drawn from contrasting experiences—a positive one in the leafy area of Edgbaston, their previous home, and a less favourable one in the working-class back-to-back housing of the city centre. It is essential to acknowledge that the gradual introduction of green spaces into ordinary British residential areas reflected the culmination of efforts spanning generations and represented the diffusion of the 'garden' concept across different social classes in the history of British residential development.

7.3 The morphological differentiations between Factory 3 and Bournville

When examined from a physical landscape perspective, the morphological differences between Factory 3 and Bournville are so significant that comparing them directly becomes challenging. Rather than directly comparing the two, various general characteristics of urban landscapes were abstracted from them for comparison. Factory 3 primarily consisted of collective housing, while Bournville was predominantly composed of single-family houses, with a few exceptions like the newly constructed Elizabeth Court in 2016 (see chapter 6). While the appearance of housing in Factory 3 underwent significant changes from the 1950s to the present, at specific stages, buildings often exhibited striking similarities, emphasizing the characteristics of equality prevalent in socialist countries. In contrast, the design of housing in Bournville deliberately resisted this uniformity, reflecting a response to the monotonous urban landscape created by the 1875 Public Health Act.

Throughout its construction and development, Factory 3 consistently exemplified the pursuit of modern industrial civilization, while Bournville's design reflected a longing for a rural landscape. The majority of buildings in Factory 3 were three stories or higher, whereas Bournville predominantly featured two-story structures. Bournville boasted a variety of green spaces, while the green spaces in Factory 3 were mainly represented by street trees and scattered small patches of land surrounding residential buildings, often planted with vegetables or potted plants.

Numerous factors have contributed to the starkly contrasting urban landscapes of Factory 3 and Bournville. First, divergent cultural backgrounds played a pivotal role. In the English ethos, the adage 'An Englishman's home should be his castle' (Lowenthal and Prince, 1964) ingrained a cultural preference for single-family houses in Britain. While it's worth noting that before 1949, Chinese households also primarily consisted of single-family homes, this leads us to the second critical factor: varying stages of development between the two countries. The concept of a time lag is an undeniable element when comparing not only urban landscapes but also other societal aspects between China and Britain. As outlined in chapter 1, Britain had achieved a 50% urbanization rate by 1851, whereas China reached this milestone only in 2011. China's historical trajectory in the century leading up to 1949 was marked by continuous wars and poverty rather than a process of unhindered development. Consequently, in 1949, China lacked the capacity to provide its citizens with single-family homes. Moreover, a century-long history of humiliation compelled both the governing authorities and the populace to recognize that modernization and accelerated production were imperative to avoid subjugation. This leads to the third factor: divergent development strategies. During the construction phase of Factory 3, the prevailing spirit in China's urban development was 'production first, then living,' signifying that living conditions were considered secondary and auxiliary to production. This is evident in the fact that the production area in Factory 3 was completed before the residential area. In contrast, during the construction of Bournville, the social context was the late Victorian era, characterized by the zenith of the Industrial Revolution. As material wealth amassed, it also gave rise to various social issues. All societal strata were striving to uphold 'social conscience' (Roberts, 2002), including the construction of various model villages. The economic conditions and social milieu enabled the Cadbury brothers to make concerted efforts to improve housing for the working class. While as it is often said, 'a skilled cook cannot prepare a

meal without rice,' the economic constraints and challenges faced by the Chinese government at that time seemingly rendered any alternative perspectives inconsequential. However, prior to the construction of Bournville, its ideological underpinnings, such as the Romantic movement and Arts and Crafts movement, coupled with other notable design influences, made Bournville an exceptional endeavour. It's essential to underscore that Bournville, alongside the Garden City movement, unleashed a transformative force that reverberated through global history and urban planning, leaving an indelible mark on New Town construction across numerous countries in the 20th century.

Finally, institutional factors, which are the central focus of this thesis, play a pivotal role in shaping the landscape. Institutions, in essence, lay the foundation for the mechanisms driving landscape evolution. In the construction and subsequent development of Factory 3, the superiority of the socialist system in organizing industrial production and urban construction was evident. In the design phase, Factory 3 utilised standardized blueprints shared with three other state-owned textile factories in other cities. This standardized approach allowed for the swift creation of diverse building forms by combining seven standard units, facilitating rapid blueprint design. During the construction phase, various aspects of Factory 3's construction, including planning, design, civil engineering, and installation, were efficiently managed by specialized groups within the textile system. This approach optimized the utilisation of human resources and ensured the expedited completion of Factory 3. In comparison, Factory 3 required only one tenth of the workforce to construct a facility twice the size of Factory 1, built just a year earlier. Concerning labour resources, Factory 3 exemplified how the planned economy era enabled the allocation of production resources across the nation, transcending geographical and administrative limitations. A workforce of 3,238 textile technicians and workers was mobilized from 16 cities across China to support Factory 3. Additionally, the textile system's nationwide training network facilitated the rapid development of a skilled textile workforce. At the urban level, deliberate efforts were made to balance the significant female workforce in the textile industry. Zhengzhou government responded by establishing new heavy industry enterprises in the vicinity, which primarily employed male workers. To complement the growth of the textile industry's supply chain, ancillary production *Danwei*s such as printing and dyeing factories and textile equipment factories were strategically located in the surrounding area. Throughout this process, the state, as the primary agent, exerted widespread influence over the

production and transformation of industrial landscapes nationwide. The scale and depth of this influence would have been unattainable in capitalist countries, particularly those predating the era of the welfare state.

In contrast, Bournville owes its existence primarily to the concerted efforts of the Cadbury family. The remarkably well-preserved landscape and environment of Bournville exemplify a profound respect for private property rights within a market-driven economy. As previously mentioned, the Cadbury brothers drew inspiration from the leasehold agreements pioneered by the Calthorpe family. This enabled them to establish a robust regulatory framework over the Bournville landscape. Additionally, they founded the Bournville Village Trust, which operates as both a charitable organization and a housing association. This trust is responsible for the management of the Bournville estate and its surrounding environment, including restrictions on what householders can do with their front gardens, boundaries, and drives. While this model village community has occasionally faced criticism for its perceived paternalistic management style, it is crucial not to overstate this aspect. In reality, Bournville's residents enjoy a significant degree of autonomy concerning their land and houses, allowing them to make reasonable modifications as they see fit. This autonomy is facilitated by the clarity of property rights inherent in the private property system. For example, within Bournville, homeowners have more freedom to make alterations to their back gardens compared to the front elevations of their houses. This distinction arises because front elevations are subject to stricter preservation regulations as designated heritage sites. The transition from the public space of the street to the semi-public space of front gardens and to the private space of back gardens, empowers homeowners with greater authority to modify the rear of their properties. This is in stark contrast to Factory 3, where the ambiguity surrounding shared property rights resulted in distinct morphological phenomena and different patterns of evolution. Due to the lack of clarity in property rights, shared ownership effectively translated to common ownership, with no single entity having absolute possession. Consequently, certain poorly maintained buildings endured throughout the landscape's evolution, sometimes outlasting their well-preserved counterparts. Another significant institutional disparity between Bournville and Factory 3 relates to the role of religion in their respective formation and development processes. Indeed, as detailed in chapters 2 and 6, religion played a pivotal role in Britain's charitable history and the establishment of the

welfare state. The Cadbury brothers' Quaker faith and religious commitment played a vital role in shaping Bournville. This is evident in the deliberate placement of the Bournville Quaker Meeting House and St. Francis Church on opposite sides of The Green, occupying the most prominent positions within the village. Furthermore, for Chinese scholars seeking a comprehensive understanding of the distinctions between British and Chinese landscapes, it is helpful to examine several urban nuclei in the area together for their different ownership characteristics. These include Edgbaston, Selly Park, Bournbrook, and Stirchley. Unlike the morphological similarities observed between Factory 3 and its immediate surroundings, these nuclei exhibit strikingly distinct features. Edgbaston, for instance, boasts exceptionally low residential density and an abundance of green spaces, with landscape diversity further accentuated by irregularly shaped plot sizes. Selly Park, situated on a higher hillside than Bournbrook, enjoys an ideal location for residential housing due to its favourable topography. Like Edgbaston, it features irregularly shaped plots and ample green spaces, albeit slightly smaller in size. The 1875 Public Health Act initiated the construction of bye-law terraced houses, and Bournbrook began its development during the early stages of this phase. It exhibits typical characteristics such as a rigid geometric street pattern and identical house types. While bye-laws also contributed to landscape homogenization nationwide, it is essential to distinguish this from the mechanisms of planned economies. In this context, the state primarily mobilized private entrepreneurs through bye-laws and policies, as opposed to directly participating as an agent in the industrial production process and shaping industrial landscapes, as seen in planned economies. Similarly to Bournbrook, Stirchley due to its excellent geographical location (adjacent to railways and canals), was suitable for the development of working-class residential areas, primarily characterized by tunnel-back working-class residences. These distinct morphological features in these nuclei highlight the influence of various factors on urban landscapes in the United Kingdom, including ownership, geomorphology, bye-laws, and local political administrations.

The stark disparities in urban landscapes between China and Britain stem from the contrasting socio-political backgrounds and institutional frameworks of these two nations. In recent times, China has grappled with a recurrent concern that all modern housing development look the same—often referred to as 'cookie-cutter cities.' To address this issue comprehensively, we can analyse it from various angles based on the insights gleaned from the previous discussion. First, especially

during the nascent stages of planned economies, numerous local entities and *Danwei*s in China operated under state ownership or direct the government control. Consequently, the institutional framework vested considerable influence in the hands of the state. While government involvement in urban housing has a precedent in the United Kingdom, such as the construction of council housing, the scope and prevalence in China, where land is state-owned, are significantly more extensive. This has facilitated swift and dramatic changes in urban landscapes. Secondly, the government's ownership of land in China enables it exclusively to dictate the direction of urban development. As a result, many Chinese cities have seen rapid expansion, often driven by government-led initiatives, including the relocation of government offices to stimulate development in new areas. Thirdly, as evidenced by the comparison between Factory 3 and Bournville, Bournville made a conscious effort to preserve remnants of the pre-existing landscape during its development. In contrast, China tends to preserve very few elements beyond its road systems. This is evident in the radical transformations witnessed during the renovation of older urban areas, often involving the complete demolition of entire neighbourhoods. The dominant development pattern in China primarily revolves around high-rise structures. Fourthly, an integral element in this process is technological innovation and advancements in production factors. The evolution of British urban landscapes spans centuries, predating the emergence of major corporations. Private speculative development was common during this period, characterised by small-scale, incremental projects, with profits from one property often reinvested into the development of the next—a 'piece-by-piece' approach. Subsequently, with the advent of prominent real estate firms, land ownership systems helped regulate the scale of development. Conversely, in China, a handful of major real estate developers hold nationwide sway. The structures they build are predominantly high-rises, contributing to the uniformity and sameness observed in the urban landscapes of many Chinese cities.

7.4 Morphological similarities of Factory 3 and Bournville

When we abstract away the specific morphological details of the two cases, we can identify several commonalities. First, in terms of community organization, both Factory 3 and Bournville comprised spaces for production, offices, and residences. The production spaces were strategically located in proximity to the railway, followed by office areas adjacent to the production zones, and finally,

residential areas. Secondly, the presence of green spaces is discernible in both Factory 3 and Bournville, underscoring the appreciation urban inhabitants hold for verdant environments. Remarkably, the requirement for green space was embedded in Bournville's construction from its inception, explicitly articulated in the regulations of the Bournville Village Trust. In the case of Factory 3, despite being collective housing, residents did not have their own front or back gardens; however, they adorned their surroundings with potted plants, fruit trees, ornamental trees, or vegetable gardens in front of and behind their houses. Some restaurants even utilised plastic products resembling green bamboo to enhance their ambience and attract customers. This underscores the intrinsic value urban residents place on green spaces. Thirdly, this reflects how industrial cities address the housing needs of their workforce, or at least one of the approaches employed. In 1949, upon the establishment of the People's Republic of China, urban infrastructure was significantly underdeveloped. Many large factories were situated in former rural areas. Consequently, to meet the pressing production demands of the time, as production spaces were established, living spaces had to be rapidly constructed at the same time. In terms of location, given the higher priority placed on production requirements, living spaces were positioned in proximity to the production areas to maximize production efficiency. This approach is prevalent in various regions of China and underscores the belief of the socialist planned economy that providing jobs and housing for residents is a societal imperative, despite housing conditions being relatively modest by today's standards. In contrast, Bournville was a product of Cadbury's reflection on back-to-back and terraced houses. It had already transitioned from a phase of demand for housing quantity to one emphasizing quality. During its design and construction, Cadbury deliberately controlled the budget, aiming to provide a model for other agents. They demonstrated that aesthetics and economy in housing could coexist. Bournville indeed influenced the design of council housing during the inter-war period.

Fourthly, as mentioned in chapter 2, these two cases epitomize two distinct forms of utopian ideals and practices, reflecting two different countries' solutions to addressing the housing needs of their impoverished populations and organizing their production and lives through distinct institutional designs. Housing is a fundamental necessity regardless of the era or social system. With the emergence of the working class as the majority population, their housing needs were brought

into the foreground. The question of how to address the housing problem of the impoverished working class prompted the formulation of specific ideologies or visions in different societal contexts. Reformers and philanthropists continually explored better housing forms and institutionalized them through social systems. As elucidated in chapter 2, the pursuit of enhanced living environments and revolutionary utopian ideas, thoughts, and visions engender a structural analogy evocative of the DNA double helix. Within this framework, material landscapes and social ideologies engage in a dynamic and symbiotic interplay. Cultural, social, and institutional underpinnings function as conduits that expedite the exchange and integration of these two domains. The significance and value of institutions lie in the protection of vulnerable groups and teaching them self-preservation methods, as demonstrated by the shared historical process in both of my cases. It is the pursuit of a utopian vision and the protection of the weak that drive continuous societal progress. Each one of us is a beneficiary of this pursuit. In light of these commonalities, there arises an opportunity to transcend geographical and institutional boundaries on a global scale, allowing for the pursuit of innovative, human-centred solutions to contemporary global challenges, notably in the realm of housing. The humanities have increasingly embraced the examination of global socio-economic scenarios for the future within a unified framework in recent years (e.g., Hunt, Lombardi et al., 2012; Chermack, Lynham and Ruona, 2001). The improvements in living conditions experienced in the evolution of these two cases, which are strongly influenced by their respective institutional and policy contexts, hold the potential to yield invaluable insights into fundamental societal issues. The fifth noteworthy commonality lies in their classification as heritage sites. The preserved material landscapes serve as reflections of what each respective country deems significant and which historical periods merit preservation and commemoration. The prevailing governing ideologies in both countries may appear divergent from the spirit of the government or philanthropists providing housing for workers, as exemplified in these two cases. However, the act of designating them as heritage sites carries profound implications. When we endeavour to preserve these two locations as legacies, it transcends mere material aspects; it embodies a more profound essence with far-reaching implications for the preservation of utopian ideals and the spirit of concern for vulnerable populations.

7.5 Conclusion and Outlook

This thesis engages in a cross-cultural examination of the morphological developments in two utopian case studies located in China and the UK. It systematically explores their commonalities and disparities by incorporating a nuanced analysis of institutional elements, thereby elucidating the distinct mechanisms that underlie their evolution. The following conclusions are derived from this analysis: First, the extant material landscapes represent tangible artefacts of historical and societal progress. They encapsulate the evolving conceptual paradigms of diverse social strata across various historical epochs. Simultaneously, these material landscapes serve as a reflective canvas of the dynamic institutional transformations that have occurred within this overarching trajectory.

Secondly, it is imperative to underscore that the analysis of physical landscapes cannot be disentangled from an exhaustive examination of the intricate institutional frameworks that underpin them. This is especially pertinent in the context of cross-cultural comparative studies. Often, it is the institutional backdrop that acts as the driving force propelling profound morphological shifts. Overemphasizing apparent agents can inadvertently lead to the oversight of more fundamental institutional determinants. This distinction becomes particularly salient in the Chinese context, where the omnipresent role of the state as a formidable agent necessitates careful consideration when juxtaposing urban morphologies between China and the UK.

Thirdly, it is essential to acknowledge that any given phenomenon invariably exhibits dual inclinations, encompassing both assimilative and differentiating tendencies. This fundamental principle manifests itself conspicuously in the two case studies at hand and, by extension, in the two nations involved. Discarding preconceived notions may reveal that the similarities shared between these cases outweigh the apparent disparities. Throughout history, utopian visions emphasizing the welfare of vulnerable populations have consistently acted as catalysts for societal advancement. In the contemporary milieu, it is incumbent upon us to diligently sustain and nurture this ethos. Lastly, it is worth noting that, in terms of future prospects, this thesis predominantly focuses on aspects related to morphology and institutions. In forthcoming research endeavours, the author aspires to intricately interconnect these findings with other spheres of inquiry. This includes conducting

comparative analyses between Birmingham's morphological regions and local climate zones (Demuzere, Bechtel, *et al.*, 2019), as well as embarking on an exploratory investigation into potential future scenarios, as previously alluded to.

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Appendix

Britain

(1) Medieval (c. 1070 - c. 1500)
(2) Tudor and Elizabethan (c. 1500 – c. 1600)
(3) Early Classical (c. 1600 – c. 1730)
(4) Georgian and Regency (c. 1730 – c. 1830)
(5) Early and mid-Victorian (c. 1830 - c. 1875)
(6) Late Victorian and Edwardian (c. 1875 - c. 1914)
(7) Inter-war (c. 1918- c. 1939)
(8) Post-war (post-1945)

China

Xia (c. 2070 BC - c. 1600 BC)
Shang (c. 1600 BC - c. 1046 BC)
Zhou (c. 1046 BC - c. 221 BC)
Qin (c. 221 BC - c. 207 BC)
Han (c. 202 BC - c. 220)
Three Kingdoms (c. 220 - c. 280)
Jin (c. 265 - c. 420)
Sixteen Kingdoms (c. 304 - c. 439)
Northern and Southern Dynasties (c. 386 - c. 589)
Sui (c. 581 - c. 618)
Tang (c. 618 - c. 907)
Five Dynasties and Ten Kingdoms (c. 907 - c. 979)
Song (c. 960 - c. 1276)
Liao (c. 916 - c. 1125)
Xixia (c. 1038 - c. 1227)
Jin (c. 1115 - c. 1234)
Yuan (c. 1271 - c. 1368)
Ming (c. 1368 - c. 1644)
Qing (c. 1644 - c. 1911)
Republic of China (c. 1912 - c. 1949)
People’s Republic of China (c. 1949-)