Chapter 2
Green Wedges: The Resilience of a Planning Idea

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Abstract This chapter examines the development of a planning idea that has made its mark in manifold formats since its inception in the early twentieth century: the green wedge idea. The central argument theorises that the green wedge idea has morphed into different urban models aimed at answering fundamental planning questions to date. Initially, it presents precedents of planning for a balanced relationship between the city and nature. The chapter then shows how the idea emerged in discussions related to how modern cities should be planned to ensure access to nature. The contrast between the green wedge idea and that of the green belt is posed. In the sequence, the chapter analyses the green wedge models derived from the initial idea, namely the belt–wedge, the polycentric city and the corridor–wedge. Finally, the chapter argues that the green wedge idea adapted through time and space, responding to planning culture and to the needs of cities and regions. The resilience of this planning idea suggests that green wedges can adapt and, in so doing, contribute to respond to our contemporary challenges of urban growth, the need for intra-urban quality green spaces and the quest for urban sustainability.

2.1 Introduction

One of the key questions in planning has long been how to balance city and nature. If this historical duality marked Western societies in pre-industrial times, finding its spatial manifestation in the stark contrast between the urban and the rural, attempts to overcome this dichotomist view of the world can be traced back to the pursuance of universal harmony and commonwealth in the Enlightenment. Laugier, for instance, argued that cities should be looked upon as forests blending the rationality of geometry with the informality of nature (1755). Similarly, the plan for Karlsruhe (1715) and Claude-Nicolas Ledoux's *Salines de Chaux* (1773) were both rooted in the belief in a harmonic relationship between man and nature, manifested in the integration of

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the built-up areas and open spaces. Throughout the nineteenth century, the maladies brought about by industrialisation were in one way or another connected with the imbalance of anthropogenic activities and nature. Overcrowding, epidemics, deteriorated living conditions, uncontrolled growth of cities and the encroachment on the countryside were just a few of its manifestations. The quest for regaining control of the way in which we live in the world, embarked on by early modern planners, involved devising a new state of harmony largely dependent on achieving a rebalanced relationship between built-up zones and open spaces and cities and the countryside. While many thinkers opted to concentrate on the definition of new models to be applied in a *tabula rasa* situation, some did not abandon the existing city as a lost case evading the demanding task of finding ways of positively transform it. Among the former were the proposals by utopian socialists such as Robert Owen and Charles Fourier, Ebenezer Howard's garden city, Ildefons Cerdà's grid plan for Barcelona, the disurbanists views developed in Russia and Frank Lloyd Wright's Broadacre City. Reinventing the city without needing to start it from scratch was arguably a much more complicated task, as exemplified in the Paris of Georges-Eugène Haussmann, in the work of the American City Planning movement and that of the *Städtebau* in Germany. Rudolf Eberstadt's green wedge idea was one of such attempts. In essence, it faced the challenge of finding the optimum relationship between the city and nature. Soon it became evident that this approach could be applied both for existing and new cities alike.

Green wedges have been defined as wedge-like radial green spaces, bound by development areas, often linking the urban centre with the countryside. They have been shown to have a deeper history than many would expect. The idea played a crucial role in the debates regarding urban growth and the provision of open spaces for modern cities, and its significance has perdured to date (Lemes de Oliveira 2017).

The main aims of this chapter are to contribute to a transnational history of the green wedge idea through the analyses of the different planning models derived from it and examine its potentialities for contemporary planning. In times when selective amnesia regarding planning ideas in favour of often claimed 'novelty' seems to operate alongside plain lack of historical knowledge, the chapter emphasises the time dimension in contemporary discussions, anchoring the manifestations of the green wedge idea in their historical trajectories. Secondly, it offers insights into how green wedges can help in bridging the city–nature dichotomy in contemporary planning practice.

The research included a comprehensive scanning of primary planning documents and secondary sources from the first decade of the twentieth century to date that referred to or applied the green wedge idea across the globe. The categorisation of the models here proposed derives from the abstraction of plans, diagrams and textual references aimed at identifying the fundamental principles of each model. The models in turn have been analysed against the major challenges they were intended to address, with emphasis on the role of greenery. Overlaps in terms of timeframes and certain moments of temporal discontinuity have occurred, often due to the distinct processes in the transnational exchanges of ideas and needs of the locations for which

the plans were originally presented. The scale of the proposals analysed range from neighbourhood level to regional plans.

The remainder of this paper is structured as follows. The first section delineates the process in which the green wedge idea emerged in radical opposition to that of the green belt. Following this, it examines the way in which the original model became associated with the green belt concept during the first half of the twentieth century. In the sequence, the focus is on the adaptability of the idea in face of the debates regarding the creation of new centralities at neighbourhood and district levels, as well as satellite towns. The subsequent section analyses the definition of polycentric corridor–wedge structures in the 1960s and 1970s. The final section reflects on the resilience of the green wedge idea through time suggesting its continuous relevance to contemporary planning. In a period when mitigating the impacts of climate change and tending to the need to equate urban population growth with maintaining, or enlarging, the presence of intra-urban green spaces have become pervasive preoccupations, an enhanced knowledge of the potentialities of green wedges to help address these challenges is timely.

2.2 The Green Wedge Idea

The green wedge idea emerged from an empirical observation of the way in which industrial cities tended to grow. If until the nineteenth-century walled settlements expanded by the addition of concentric rings of development, the obsolescence of this form of military protection and the advent of mechanised modes of transport saw the proliferation of urban sprawl along radial traffic lines—namely the railway and tram lines—and around stations (Hall 1982). Consequently, several planners soon argued that radial planning was the backbone of modern city building (Eberstadt 1910; Lanchester 1911; Robinson 1911; Stübben 1890).

Planning against the problems arising from uncontrolled urban growth involved the definition of park systems and was often driven by them. However, although cities were craving for intra-urban green spaces, the open areas between development along traffic arteries were barely considered in city plans. The insight to include these leftover voids into the positive planning of cities transformed the potentialities of park systems. It is with Rudolf Eberstadt, Richard Petersen and Bruno Möhring's runner-up entry to the 1910 Greater Berlin Competition that these spaces became structuring forces of planning. Their proposal was an application of a new integrative planning model aimed at balancing urbanisation and nature, in which green wedges were devised in tandem with built-up areas. The articulation of appropriate zoning with transport and park system planning was seen as essential. Green wedges' main roles were to provide interconnected intra-urban green spaces near residential areas as well as to establish a direct connection to the countryside for inner-city dwellers. Furthermore, green wedges would funnel fresh air, greenery and sunlight into the urban core, flushing pollution out in turn. Their wedge form would allow them to expand in the periphery in relation to urban growth (Eberstadt 1911). The green

wedges' sanitary roles were crucial, given the murky and unhealthy conditions of industrial cities. Eberstadt's defence of the green wedge as the most adequate means of modern green space planning led to the definition of a model that would be replicated and adapted for many years to come (Lemes de Oliveira 2014).

At this inaugural moment, the green wedge idea is positioned in direct opposition to that of the green belt (Fig. 2.1). A prominent feature of Howard's garden city concept from 1898, the green belt was conceived as an instrument to avoid urban expansion, to provide a buffer zone between cities and to safeguard agricultural land. Although it is undeniable that Howard attempted to equate urbanisation and nature by suggesting the inclusion of a variety of urban green spaces in the city—such as a central park, large front and back gardens and tree-lined streets—the largest of them, the green belt, was ultimately conceptualised as a non-urban regional feature. This was severely criticised by partisans of the green wedge idea, not only for stifling urban growth, but above all for keeping most of the green spaces available outside the city, away from where people actually lived. Because of this, the potential recreational and sanitary benefits of such an approach were seen as compromised if compared to the green wedge model. The latter would bridge city and regional scales, considering town and country planning conjointly (Eberstadt 1911; Hegemann 1911; Lanchester 1908; Mawson 1911).

The sanitary dimension of planning in its formative years has been widely covered by the literature (Benevolo 1967; Hall 1996; Sutcliffe 1981), although the substantial contribution of green wedges in this regard is understudied. This aspect, which was clearly at the core of Eberstadt's preoccupation, also permeated the broader German *Städtebau*. Examples of this can be seen in Gustav Langen's diagram (1927) further breaking down the mass of development compared to Eberstadt's original diagram and in Wagner's (1915) thesis defending the hygienic importance of green spaces for large cities and suggesting the implementation of green wedges. The focus on achieving a harmonious relationship with nature also manifested itself in the metaphorical use of leaves and flowers as references for how cities should develop. This is clear, for instance, in Patrick Geddes' recommendation that the footprint of cities should resemble 'star-like flowers' (1915) and in Fritz Schumacher's concept for Altona and

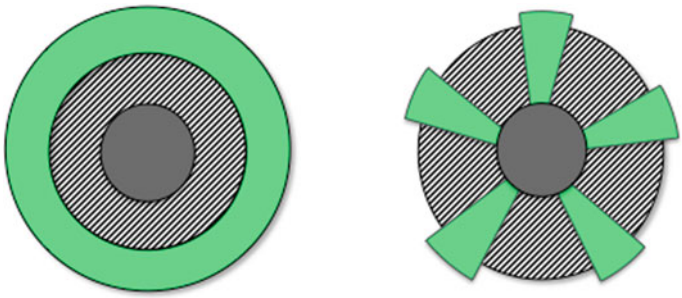

Fig. 2.1 The Green belt and the green wedge models

Hamburg (1919) and for Cologne (1923). Other notable proposals that could be classified within this model include Konstantin Melnikov's 'The Laboratory of Sleep' (1929) (Colton 1995) and plans for post-war London such as those by Lanchester's (1941), Tubbs' (1942) and Trystan Edwards (1943).

2.2.1 The Belt–Wedge Model

The initial opposition between concentric and radial planning approaches, green belts and green wedges, was soon to be examined. The question of how to deal with population growth and urban sprawl persisted as some of the most pressing planning issues in the inter-war period. Living away from the polluted and congested urban centres and in closer contact with nature, facilitated by improvements in public transport, was appealing to many. This trend to escape from the inner city to the healthier suburbs fuelled the discussions about the importance of town and country planning and the protection of the countryside (Hall 1982).

If, on the one hand, the advantages of embedding continuous green spaces within the urban fabric leading out to the countryside remained valued, on the other hand, the green belt was often employed in expansion plans and proposals for new cities where urban growth was to be avoided (Freestone 1986, 2003; Ward 1992). Green wedges continued to be used to enhance the dwellers' living environment by increasing their proximity to green spaces, offering pleasant routes out to the countryside and improving the sanitary conditions of cities. By doing so, they would contribute to keeping residents within the inner city and potentially counter the tendency of leapfrog development. In turn, a green belt would contain the urban area, preventing sprawl into the countryside.

The amalgamation of these two concepts led to the second iteration of the green wedge model, now incorporating the notion of a green belt and thus resolving the initial opposition between belts and wedges (Fig. 2.2). The green belts would be transitional zones between the wedges and the countryside beyond. With this solution, large-scale green spaces would exist within and outside the city, further intensifying the expectations placed on green space planning to transform the people's living environment. This model spread to the four corners of the world. Examples can be seen in Sulman's diagram for Australian cities (1919) (Freestone 1986), in Martin Wagner and Walter Koeppen's General Development Plan for Berlin (1929) and in the first and second reports of the Greater London Regional Planning Committee (GLRPC 1929, 1933). Soviet planners also found in it a potential solution to the ambition to dissolve the oppositions and contradictions between town and country, as can be seen in Shestakov's and Strumilin's plans for Moscow (Colton 1995).

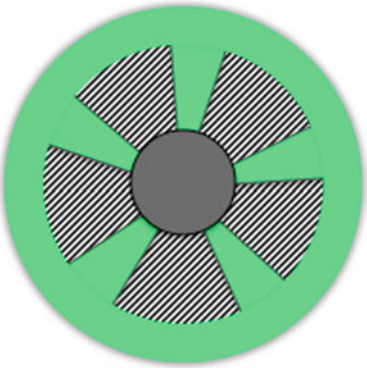

Fig. 2.2 The Belt–wedge model

2.2.2 The Polycentric City

Firstly conceived for a largely monocentric urban area, the green wedge idea had to be revised to better respond to developments in planning theory in the middle of the twentieth century. The integration between built-up areas and nature, or the countryside, was high on the planning agenda and would be a direct manifestation of adequate town and country planning. Such balance was seen as the necessary foundation for social values to flourish (Abercrombie 1945; Domhardt 2012). The belief that cities should be constituted of neighbourhood units and districts in order to achieve better social cohesion was then pervasive internationally. Planning spaciously and reducing densities became ubiquitous tenets (Larkham 2011).

Plans for the post-war period tended to integrate the functionalist discourse proclaiming the importance of sunlight, fresh air and greenery, adaptations of Howard's garden city idea and Perry's (1929) neighbourhood unit concept (Lemes de Oliveira 2017). The roles and functions of green wedges developed previously were carried forward in the new model developed for the polycentric city. In addition, green wedges were used as zoning tools to demarcate neighbourhoods and districts and as buffer zones along traffic arteries. As such, and in particular in consolidated urban areas, wedges presented formal flexibility to accommodate existing conditions (Fig. 2.3). Furthermore, green wedges were also considered to be open-land reserves to be used for food production in times and escape zones in the event of air strikes.

Numerous proposals for the post-war period exemplify this approach. Its clearest manifestation is perhaps Patrick Abercrombie and John Henry Forshaw's County of London Plan, which according to the authors was 'a practical application of the theory of the green wedges' (1943, p. 43). Further examples can be seen in the plan for Manchester (Nicholas 1945), the General Plan of Stockholm (Stockholms Stad 1952) or in various plans for post-war new tows, such as Gibberd's proposal for Harlow (1947).

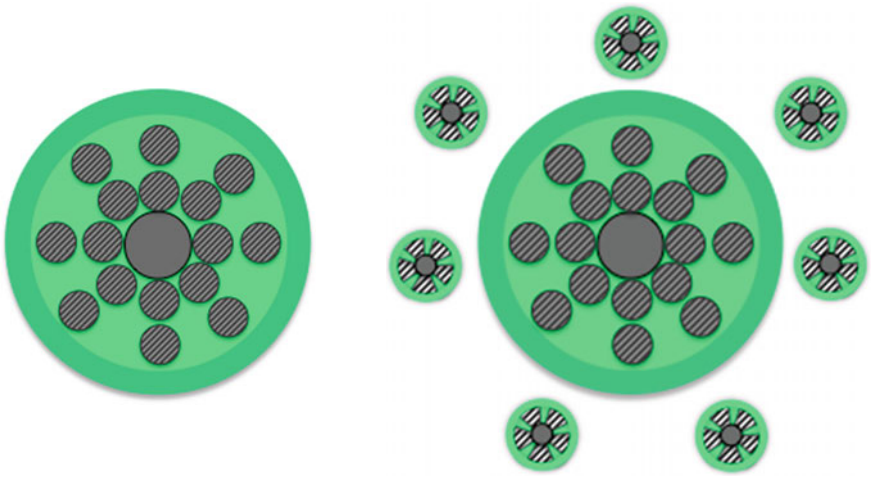

Fig. 2.3 Green wedges and the polycentric city and model with satellite towns

In cases, polycentrism involved satellite towns or regional centres. It is in this perspective that Patrick Abercrombie's *Greater London Plan 1944* defined yet a variant model. The plan expected that Greater London's population would not increase above the 1938 figure of about ten million people and that decentralisation should occur by relocating a million people from the inner ring to expanded towns and to eight new satellite towns. London would be graced with a park system marked by belts and 'interpenetrating wedges of varied open land' (1945, p. 103; Lemes de Oliveira 2015), with the overspill population located in the surrounding new towns. Soon after publication, the Greater London Plan became a fundamental reference for regional planning across the world (Osborn and Whittick 1969; Purdom 1949).

2.2.3 The Corridor–Wedge

The corridor–wedge model was enunciated in the *Copenhagen Finger Plan 1947* and further pursued internationally in the 1960s and 1970s. It attempted to address the need to accommodate an expected large urban population growth and associated requirements such as housing, mobility and access to green spaces at regional scale. The model comprised of a major urban centre connected to minor urban areas along rail traffic lines with interspersing green wedges (Fig. 2.4). Such transport axes would be the backbone of corridors of development to be consolidated over the years.

This approach meant a significant shift upwards in scale for green wedges, which started to comprise comparatively larger tracts of land. Their agricultural function becomes prominent. Green wedges also started to assume a function that traditionally belonged to green belts: that of buffer zones between towns, in this case located

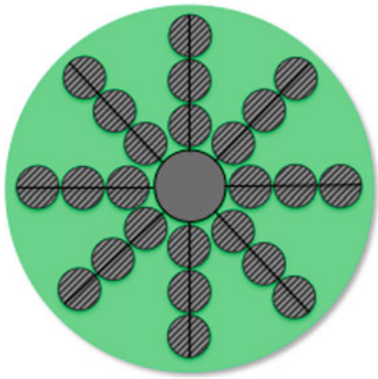

Fig. 2.4 The corridor-wedge model

between and across the corridors of development. At the time, planning needed to have a regional dimension, which not only meant that it had to include the countryside in its remit, but also that it needed to consider other nearby urban and rural settlements. In addition, the consolidation of polycentric city regions expanded along with comprehensive public transport routes potentialised a renewed form of relationship between the urban and the territory.

This structuralist approach became a reference of efficiency in dealing with metropolitan growth. Examples of applications of this model can be seen in the Year 2000 Plan for Washington, D.C. (1961); the Metrotowns *for* the Baltimore Region (1962), the *Schema Directeur d'Aménagement et d'Urbanisme de la Région de Paris* (SDAURP) (1965), the Regional Development Plan of Ruhr (1966), the Strategy for the South East (1967) in England and Melbourne's Framework Plan (1971). This model is the foundation of contemporary approaches such as transit-oriented development (Cervero and Sullivan 2011; Schneider 1981) and city-region plans, as can be seen in Copenhagen (Knowles 2012), Stockholm (Stockholm County Council 2010) and Melbourne (The State of Victoria 2014).

Recently, a large body of research has been presented affirming the multiple benefits of the presence of nature in urban areas. In this context, green wedges' potential for an integrative green–grey approach cannot be overlooked. Beyond their well-established dimensions, such recreational and aesthetic values, the growing importance of ecological and environmental concerns has lead green wedges to acquire new functions and uses in contemporary plans, such as the definition of urban forests and ecological corridors, nature conservation, combat to urban air pollution, reduction of heat island effect, CO_2 storage, clean energy generation, sustainable urban and large-scale agriculture, thermal regulation, the implementation of sustainable urban drainage systems and protection of water tables, among others. Not only can notable examples be found in European cities such as Stockholm, Helsinki and Hamburg, but also in Australia, such as the case of Melbourne; in Brazil, as can be seen in Goiânia's Macambira Anicuns Park; and in China, such as in the plan for Songzhuang Arts and Agriculture City (Lemes de Oliveira 2017). Further amalgamation of models and

consideration of their implementation at multiple levels are leading to new hybrid models endeavouring to help cities enhance their relationship with nature, especially considering expected environmental changes.

2.3 Conclusions

This chapter evidences that the green wedge idea has played a fundamental role in the planning of cities and regions across time and space. It morphed into different urban models aiming to answer fundamental planning questions posed throughout the period from the city to the regional scales. The question of how to accommodate growth while finding effective ways to provide green spaces for urban dwellers has been a constant planning concern, forging the base of the formulation of the green wedge idea and its multiple models. Green wedges' main roles remained largely associated, firstly, with balancing urban development with access to green spaces. In so doing, they brought sunlight, fresh air and greenery to the inner parts of the city. Secondly, they have been used as direct links from urban centres to the open country. At times, they were also allegories of the search for a balanced society in harmonious contact with nature. As the models developed, they in turn framed planning debates by evidencing the potentialities of radial planning, showing that balancing green and grey urban spaces was attainable and by presenting varying alternatives to the question of how the city and the countryside should relate to each other.

This chapter also evidenced the adaptability and resilience of a planning idea through many decades and across different geographical and cultural conditions. The green wedge idea's constant process of updating in order to address the demands in place for cities and regions across history demonstrates its capacity for reinvention. Contemporary plans have been able to capitalise on established green wedge characteristics as well as to develop new layers of meaning, functions and roles. As the United Nations New Urban Agenda recently committed to promote the creation and upkeeping of well-connected, multifunctional, accessible and quality green spaces that are also intrinsic parts of resilient and sustainability strategies (2016, p. 11), it is expected that green wedges will play even greater roles in the planning of healthy, more sustainable and resilient urban futures.

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