

Much current research in the morphogenetic tradition stems from the seminal work of Conzen (1960),³ who divided the urban landscape into three main elements of town plan, building forms and land use, and demonstrated how each reacted at a different rate to the forces of change:

1. *Land use* is most susceptible to change.
2. Since *buildings* represent capital investments and are adaptable to alternative uses without being physically replaced, change occurs at a slower rate than with land use.
3. The *town plan* or street layout is most resistant to change.

Conzen also introduced the concepts of the **fringe belt** and **burgage** cycle to aid analysis of urban change. The existence of a fringe belt and associated fixation line reflects the fact that urban growth is cyclical rather than continuous, with periods of outward extension alternating with periods of standstill (marked by a fixation line) due to a downturn in the building cycle. A succession of fringe belts can be identified around most towns, related to phases of active growth (Figure 7.1). The burgage cycle indicates the way in which land use on a single plot develops over time.

These concepts have been developed by Whitehand (1991)⁴ into an approach that seeks to identify the decision-making behaviour underlying land-use change. This is based on the premise that the town plan at any one time is the outcome of the perceptions, principles and policies of individuals (e.g. landowners) or agencies (e.g. local planning departments) which exercise the necessary power. The westward extension of the city of Glasgow in the eighteenth century illustrates both the economic power of landowners and the influence of the burgage-plot pattern of land-holding on urban form (Box 7.1). More recent evidence of the influence of landowners, developers and planners on urban structure is provided by Whitehand's (1992) study of residential infilling in Amersham in Berkshire, in which he explores the decision-making processes underlying urban change, focusing on negotiations between developers and the local planning authority.⁵ In similar vein, Moudon (1992) has studied the evolving residential morphology of the North American city.⁶ These attempts to explore the backgrounds, motivations and actions of the major agents in the creation of **townscapes** at the local level represent a major advance on the earlier descriptive classifications of town plans. However, the difficulty of undertaking such detailed investigations increases as one looks further into the urban past.

ECOLOGICAL MODELS OF THE CITY

According to the ecological perspective developed by the Chicago school of human ecology, the significant processes underlying the spatial configuration of the growing American industrial city were analogous to those found in nature. Hence, *competition* among land uses for space resulted in the *invasion* of the most desired parts of a city and eventually the *succession* of existing land uses by a more *dominant* activity (as in the expansion of the **central business district** (CBD) into the surrounding transition zone). Under free-market conditions, certain parts of the city would be occupied by the function

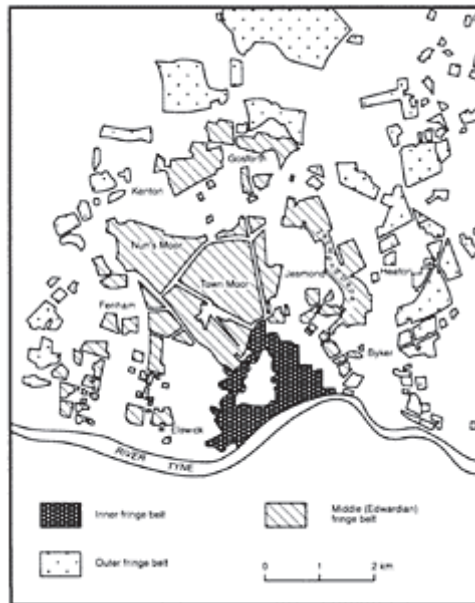


Figure 7.1 The fringe belts of Newcastle upon Tyne

Source: J.Whitehand (1967) Fringe belts: a neglected concept of urban geography *Transactions of the Institute of British Geographers* 41, 223–33

that could maximise use of the site, and in due course **natural areas** would evolve, distinguished by their homogeneous social or ethnic character (such as a slum or ghetto). On the basis of this tendency for ecological processes to sort similar households, Burgess (1925) derived his general concentric zone model of residential differentiation.⁷ Figure 7.2 shows Burgess's interpretation of the land-use structure of Chicago (on the left of the diagram) and the general model arising from it (on the right of the diagram). The characteristics of the five zones are described in Box 7.2. Burgess maintained that the city tends to grow outwards in annular fashion from Zone I to Zone V.

It is important to recognise that the concentric-zone model was proposed as an ideal type, not as a representation of reality. Based on the study of one city (Chicago) at one point in time (the 1920s) it offers a description of urban development as this would occur if only one factor (radial expansion from the city centre) determined the pattern of urban growth. Burgess was able to point to many examples of invasion and succession underlying the changing occupancy pattern of different zones in Chicago in the early twentieth century as successive waves of immigrants worked their way from their initial quarters in the zone of transition out to more salubrious neighbourhoods. In the model (Figure 7.2)

BOX 7.1

Land-ownership and the development of the street pattern in eighteenth-century Glasgow



Between 1710 and 1780, eight new streets were developed as the town spread west from Glasgow Cross. The influence of the medieval pattern of land ownership based on burgage plots exerted a controlling influence on these developments. As the street plan shows, whereas a single plot or rig provided sufficient space to form a narrow wynd or vennel, the wider and longer streets were formed by the purchase and amalgamation of several plots. Miller Street (constructed by John Miller, a maltster and town bailie, or magistrate) required eight plots. The large profits to be gained by capitalising on the appreciating land values are confirmed by the fact that the cutting of the street obliged Miller to demolish half his newly built mansion.

The first of the new streets, Virginia Street, was opened in 1793 through two acres (0.8ha) of cabbage plots. Virginia Street was a furrow long (furlong, about 200m). Although the plot was evolved for the convenience of tillage, its size and shape were well suited to the speculative builder's goal of maximising the number of properties fronting on to the new streets. These developments on what had been the old burghal tillage lands set in motion a shift in the focal point of the city west from the Cross. It also signalled the emergence of a marked socio-spatial segregation as the upper classes moved away from the crowded conditions of the old town.

Source: M. Pacione (1995) *Glasgow: The Socio-Spatial Development of the City* Chichester: Wiley

this is shown by how some of the early immigrant groups (e.g. Germans) have 'made it' to the superior accommodation of Zone III, replacing second-generation American families who had moved out to settle the outer residential zone, Zone IV. Burgess was

not unaware of the many other factors that influence city growth. (For example, in a less well-known model he postulated a relationship between residential status and altitude in 'hill cities'.)⁸ Although Burgess maintained that his model would apply to the then-contemporary American city, he did not expect any one city to be a perfect example of the theory.

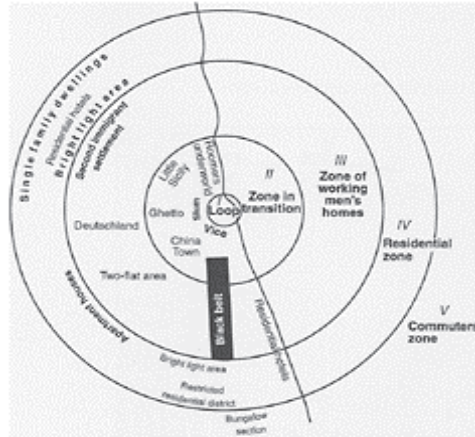


Figure 7.2 Burgess's concentric-zone model of urban land use, applied to Chicago

Source: R.Park and E.Burgess (eds) (1925) *The City Chicago, IL*: University of Chicago Press

TABLE 7.1 ASSUMPTIONS AND PRINCIPLES OF THE CONCENTRIC-ZONE MODEL OF URBAN LAND USE

1. Cultural and social heterogeneity of the population
2. Commercial-industrial base to the economy of the city
3. Private ownership of property and economic competition for space
4. Expanding area and population of the city
5. Transport is equally easy, rapid and cheap in every direction within the city
6. The city centre is the main centre for employment and near this centre space is limited; competition for this space is high, and therefore it is most valuable. The opposite is
7. true of peripheral areas No districts are more attractive because of differences in terrain
8. No concentrations of heavy industry
9. No historic survival of an earlier land-use pattern in any district

Subsequent attempts to apply the model have often been less than successful, partly because they failed to recognise its limiting assumptions (Table 7.1). For example, the model is based on the concept of a city with a large population undergoing rapid



Plate 7.1 The high-rise central business district of San Francisco CA provides a backdrop to the low-rise high-status neighbourhood of Nob Hill

expansion, with much of the population increase assumed to be due to the arrival of ethnically diverse immigrants from overseas. Both assumptions were met in Chicago, which from 1860 to 1910 increased its population almost twentyfold. The Burgess model was also formulated on the basis of a particular set of economic and political circumstances. In particular, the model assumed private ownership of property and the absence of any city-planning constraints on the use of private property. Under these circumstances, property owners were free to develop their land as they wished. It also

meant that only the wealthy could afford to live in the better locations away from inner-city slums. These conditions were again met by the Chicago of the 1920s. But in most Western societies today, government has intervened in the housing and property market (see Chapter 8). As a result, the slum housing of the model's zone in transition has been replaced, in many cases, by public redevelopment schemes. Further, around every major British city there are large estates of council housing provided by the government for people who would be unable to compete for such locations in the open market envisaged by Burgess. The general applicability of the model is further reduced by the gentrification of some inner-city slums, and by the continued

BOX 7.2

Burgess's concentric-zone model of urban land use

Zone I

The first and smallest zone is the *central business district* (CBD). This is the focus of the commercial, social and cultural life of the city, and the area where land values are highest. Only activities where profits are high enough to meet the rent demanded can locate in the area. The heart of the zone is the downtown shopping area with large department stores and the most exclusive shops. The area also contains the main offices of financial institutions, the headquarters of civic and political organisations, the main theatres and cinemas, and the more expensive hotels.

The CBD is the most accessible area in the city. It has the greatest number of people moving into and out of it each day, and the main transport termini are, therefore, located there. Forming the outer ring of the central area is a wholesale business district with warehouses, light industries and, perhaps, a market. The CBD contains the original nucleus of the settlement, but only scattered pockets of residences remain.

Zone II

Immediately adjacent to the CBD is the *zone in transition*. Early in the history of the city this formed a suburban fringe that housed many of the merchants and well-to-do citizens. With the growth of the city, however, industries encroached into this zone from the inner zone, and the quality of the residential environment deteriorated. The inner margins of the zone in transition are industrial and its outer ring is composed of declining neighbourhoods. The once fashionable town houses have been converted into flats, furnished rooms and even small industries. The population of the zone is heterogeneous and includes first-generation immigrants as well as older residents. It is also an area frequented by vagrants and criminals, and rates of crime and mental illness are the highest in the city.

Those who own property in the zone are interested only in the long-term profit to be made from selling out to businesses expanding from the central area, and in the short-term profits that accrue from packing in as many tenants as possible. As a result, property is run-down. The zone is characterised by a highly mobile population. Not surprisingly, as people prosper they tend to move out into Zone III, leaving behind the elderly, the isolated and the helpless.

Zone III

This is termed the *zone of independent working men's homes*. The population consists of the families of factory and shop workers who have managed to prosper sufficiently to escape the zone in transition but who still need cheap and easy access to their workplaces. The zone is focused on factories, and its population forms the bulk of what may be termed the respectable working class. Unlike in the 'childless' zone in transition, all age groups are represented.

Zone IV

This is an area of *better residences*, a zone of private housing or good apartment blocks. It is the home of the middle class. At strategic locations, subsidiary shopping centres have developed as mini versions of the downtown shopping area.

Zone V

Still farther out from the inner city is the *commuter belt* within thirty to sixty minutes' journey time of the CBD. This is essentially a suburban dormitory zone characterised by single-family dwellings.

Beyond these five main zones Burgess sometimes recognised two additional areas comprising:

Zone VI

The surrounding *agricultural district*

Zone VII

The wider *hinterland* of the city.

association between high social status and inner-city residence in many European cities.⁹ The value of the concentric-zone model is therefore limited historically and culturally. The model cannot be applied universally, and even within the USA it has become dated. Nevertheless, while the explanatory power of the model is limited in today's world, some of the constituent land-use zones can still be recognised, and it remains a useful pedagogic device against which to test real-world cities.

The earliest constructive criticism of Burgess's model emerged from an analysis of the internal residential structure of 142 American cities by Hoyt (1939).¹⁰ By mapping the average residential rent values for every block in each city, Hoyt concluded that the general spatial arrangement was characterised better by sectors than by concentric zones (Figure 7.3). The resultant model of urban land use starts with the assumption that a mix of land uses will develop around the city centre, then, as the city expands, each will extend outwards in a sector. In this manner the high-rent neighbourhoods of the wealthy follow a definite path along communication lines, on high ground free from flood danger, towards open country, or along lake or river fronts not used by industry. Conversely, low-income groups with limited housing choice consume the obsolete housing of the wealthy, now converted into apartments, or occupy less desirable zones. The sectors undergo growth and change over time but according to the model, outward change occurs only

within sectors. The whole sector may not be geographically or socially similar at any one time, with, for example, better-quality housing moving towards the periphery, leaving decaying housing nearer the centre. A major contrast between the models of Burgess and Hoyt is that whereas residential change is stimulated on the *demand side* in Burgess's model, with immigrants competing for inner-city housing, Hoyt stresses *supply-side* mechanisms, with the construction of new housing for the middle classes on the urban periphery (and subsequent **filtering** of vacated dwellings) being the catalyst for socio-spatial change. Hoyt's model does not replace the concentric-zone scheme but extends it by adding the concept of direction to that of distance from the city centre. A major weakness of the theory is that it largely ignores land uses other than residential, and it places undue emphasis on the economic characteristics of areas, ignoring other

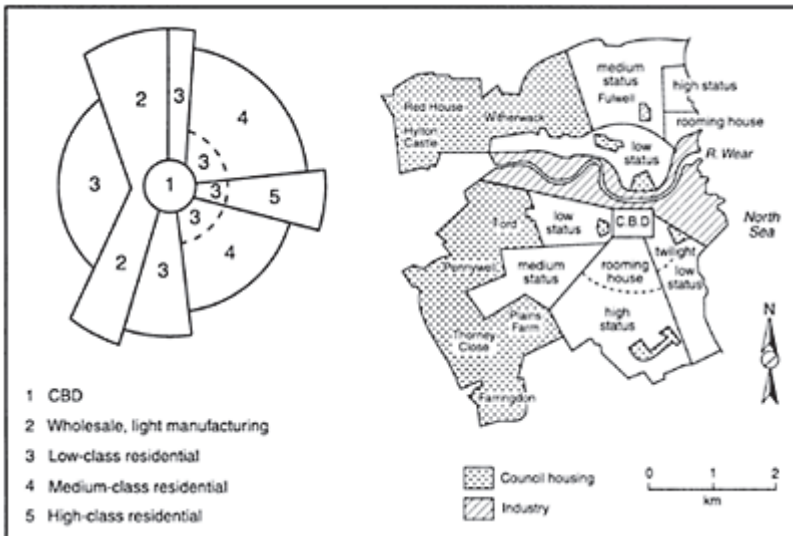


Figure 7.3 Hoyt's sector model of urban land use, and its application in Sunderland

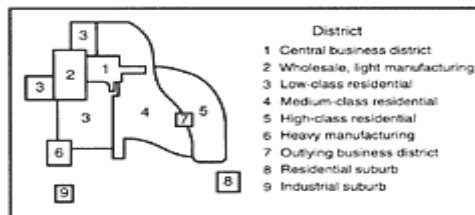


Figure 7.4 Harris and Ullman's multiple-nuclei model of urban land use

important factors, such as race and ethnicity, which may underlie urban land-use change.

The excessive simplicity of the concentric ring and sector models of the city was addressed by Harris and Ullman (1945), who observed that most large cities do not grow around a single CBD but are formed by the progressive integration of a number of separate nuclei¹¹ (Figure 7.4). The location and growth of these multiple nuclei are determined by a number of controlling factors:

1. Certain activities require specialised facilities and congregate where these are available. Industry, for example, requires transport facilities and is often located close to railway lines, major roads or port facilities.
2. Similar activities group together to profit from external economies of association, leading to the emergence of specialised legal districts or financial quarters.
3. Some activities repel each other owing to negative externality effects, as seen in the separation of high-income residences from industry.
4. Some activities which could benefit from a central location in or near the CBD, but which cannot afford the high rents demanded, must locate elsewhere. Warehousing or grocery wholesaling are examples of activities that require large structures and would benefit from a central location but are forced to 'trade off space for accessibility' (Box 7.3).

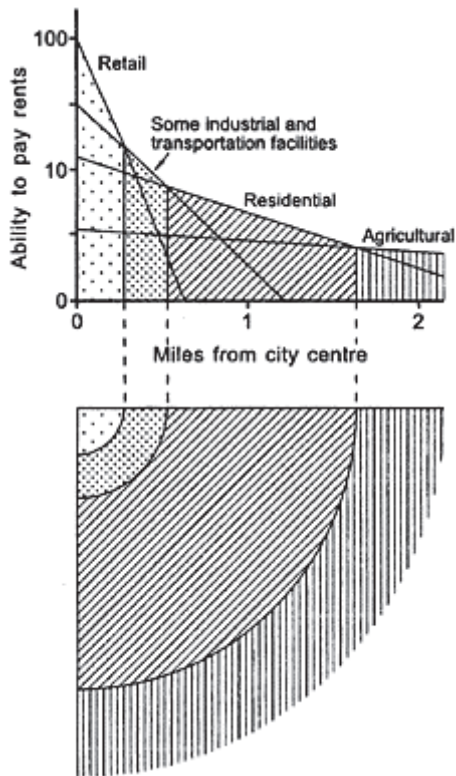
The value of the Harris and Ullman model lies in its explicit recognition of the multinodal nature of urban growth. Furthermore, they argue that land uses cannot always be predicted since industrial, cultural and socio-economic values will have different impacts on different cities. While the Burgess zonal pattern and, to a lesser extent, the Hoyt sectoral pattern suggest inevitable predetermining patterns of location, Harris and Ullman suggest that land-use patterns vary depending on local context. Hence the multiple-nuclei model may be closer to reality. In practice, elements of all these models may be identified in many large Western cities. In London, for example, the annular rings of growth reflect Burgess, and a clear distinction can be drawn between an older and poorer inner city and more affluent and modern outer suburbs. Superimposed on this is a pattern of sector development with a zone of local authority and workers' dwellings from the latter part of the industrial revolution extending from the East End to Dagenham and beyond. To the north and west an affluent residential sector extends from Mayfair to St John's Wood into Hampstead and on into the 'stockbroker belt' of the Chiltern Hills. Finally, multiple nuclei can be found at various scales, the most evident being the financial centre of the City or the concentration of medical services around Harley Street.

One of the most severe criticisms of the 'classical' models of urban land use referred to their economic bias and consequent neglect of cultural influences on urban land-use patterns. In an early study, Firey (1947) demonstrated that neither the concentric zone nor a sector theory was adequate in explaining land-use patterns in Boston MA, where non-economic considerations, centred on 'sentiment and symbolism', lay behind the spatial juxtaposition of the fashionable residential area of Beacon Hill and an area populated by low-income immigrants and their descendants.¹² Firey's work was significant in illustrating how social values could override economic competition as the basis for socio-spatial organisation. Firey recommended a 'cultural ecology' approach instead of urban ecology in order to take into account specific cultural and historical factors influencing a city's land-use patterns. In this he anticipated many of the arguments of postmodernism.

Subsequent refinements of the ecological approach have set aside the crude biotic analogy but have retained useful concepts such as natural areas, albeit reformulated as 'social areas' or 'neighbourhood types' (see Chapter 18). Other work on ecological patterns in cities has sought to reform the traditional models to provide concepts of more direct relevance to contemporary urban society. Four of these merit further consideration.

BOX 7.3

The trade-off model of urban land use



The mainspring of the concentric-zone model of urban land use is the expansion of the inner zone outwards. This movement is triggered by excessive demand for central city land. The neo-classical economics 'trade-off' model employs the concept of bid-rent curves to explain why demand for land, and therefore land-use patterns, vary across the urban area. The basis of the model is the relationship between accessibility and land rent. The more accessible a location the greater the demand for it, which is reflected in the distribution of land values. In the model the city centre is assumed to be the most accessible and therefore most valuable location. Since some land uses place greater importance on accessibility, they are prepared to pay higher rents for central locations.