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Structural Models of Retail Distribution: Analogies with Settlement and Urban Land-Use Theories

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Structural models of retail distribution

Analogies with settlement and urban land-use theories

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ABSTRACT. Many descriptions of the structure of retailing at both the regional and urban scale refer to concepts which have originally been formulated in connection with settlement and general land-use studies. This is epitomized in the extension of central place theory, and particularly the notion of the hierarchy, to distinguish structural size-orders in the relative importance of shopping centres. In addition, there is a strong similarity in the nature of those classifications which have been made about types of settlements, general land-use forms, and different retail configurations. While distinct similarities may be found in the methods of these studies, however, in certain important respects parallel lines of enquiry that might have been expected have not been undertaken. There has been little attempt, for example, to relate the locational characteristics of shopping centres to theoretical postulates about urban land-use patterns. This paper reviews the extent to which analogies have been drawn, and may subsequently be developed, between various conceptual models of general human occupancy and tertiary activity.

DESCRIPTION of retail patterns in recent years has been distinctive in three respects. First, it has been strongly associated with the quantitative movement and development of theory in the spatial sciences; secondly, it has been consistently related to the study of broader settlement and urban land-use patterns; thirdly, it has been mainly developed in the context of American cities and consumer shopping habits. These features are not difficult to understand. Retailing data are quite readily available in published or survey form, lending themselves to numerical measurement, and they can relatively easily be generalized in model terms. Likewise, because shops are widely distributed in rural and urban systems alike, a spatial equation of supply and demand is realized and common locational constraints identified for the centres providing retail goods and their areas of consumption. In the United States in particular, there has been active enquiry into the theory of retail patterns and, at the empirical level, tremendous changes in the retail system are seen to be taking place.

The prevailing approach to retail description may be illustrated by the following examples. From studies of shopping facilities in urban areas, B. J. L. Berry was able to identify a hierarchy of retail centres which closely resembled the hierarchy of central places in rural areas, and then advance a general theory of tertiary activity to account for both (Berry, W. L. Garrison *et al.*, 1959). In addition, in central place studies as a whole, scholars have long used retailing data as criteria by which the concept of centrality and a rank sequence of hierarchical orders for settlements may be defined (W. K. D. Davies, 1966). In planning applications, the notion of a hierarchy has long provided a conceptual basis for the organization and control of shopping centres inside urban areas (W. Burns, 1959); more lately, in the greater attention to the theory of general interaction, future expansion of shopping facilities is predicted and allocated using sub-models of a gravity-potential kind

within the general framework of a comprehensive land-use model (I. Lowry, 1964; E. L. Cripps and D. H. S. Foot, 1969).

Given these common lines of enquiry, it is perhaps surprising that, in many other respects, relationships between models of retail distribution and theories of both settlement and urban land-use have not been further investigated. Numerous other statistical regularities have been perceived for population sizes of urban areas in particular, but parallels that may be evident in the retail system have yet to be elucidated. Classical theories of mainly residential land uses have never been related to a pattern of shopping centres. This paper indicates the extent to which such settlement and urban land-use studies are relevant to retail studies. It treats mainly the fund of traditional, static and deterministic models which have been developed predominantly in the American context and which in themselves may, therefore, be questioned as viable frameworks for application in Britain. Rather than argue about their empirical validity, however, the paper seeks to relate the inherent logic of these models to the concepts of retail description.

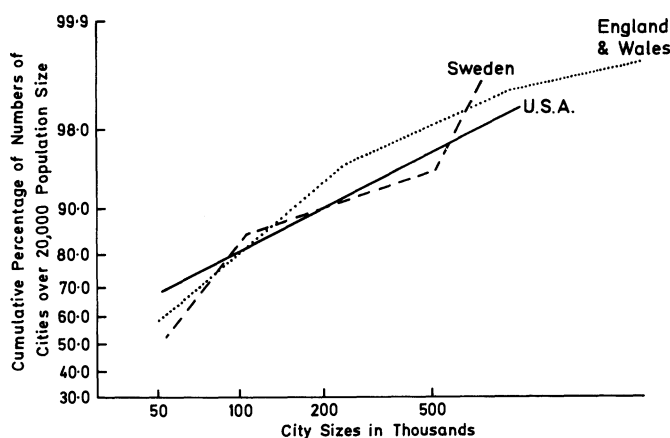


FIGURE 1. Cumulative graphs of city size distributions (after B. J. L. Berry, 1961; reproduced from *Economic Development and Cultural Change*, 9 (1961), by permission of the University of Chicago Press)

ANALOGIES WITH SETTLEMENT MODELS

There are three features of the traditional literature about settlements which have special implications for studies of retailing.

(1) There has been considerable research into the way statistical regularities may be observed when urban places (particularly the larger cities) are ranked in terms of population size. This work has commonly referred to G. K. Zipf's (1949) rank-size rule and M. Jefferson's (1939) law of a primate pattern. Berry (1961), especially, has sought to identify graph regularities in size distributions according to differences in the cultural and economic backgrounds of various urban systems around the world. While one may be sceptical about the empirical validity of precise orderly size distributions (K. E. Rosing, 1966), the findings of Berry and others suggest that certain broad differences in the gradients of summary graph lines do occur, such as in the examples of primate, s-shaped and log-normal statistical curve approximations in Figure 1.

(2) Other studies have searched for comprehensive classifications of settlements into distinct functional types. Much of the early work in location theory used a simple three-fold typology of settlements: 'central places', 'transportation-based places', 'special resource endowed places' (C. D. Harris and E. L. Ullman, 1945). Central places are settlements primarily generated by the support of surrounding trade areas; transportation-based places are settlements primarily generated by the need to transfer or process goods and materials at certain nodal positions along routeways; special resource endowed places are settlements that have grown up either because they furnish some special material requirement, as in the case of mining towns, or alternatively because of a particular prestige factor, as in the case of certain resorts.

(3) Further studies have embodied aspects of both these approaches to the description of settlement in studies of the notion of hierarchy. The hierarchy refers to an orderly sequence of relationships in size between settlements, where size is measured in terms of functional activity rather than in numbers of people. Such functional activity is usually interpreted as the range of services provided by settlements. Strictly speaking, however, the notion of the hierarchy is also derived from and equated with central place theory, in which case it would seem to be most relevant in describing functional relationships between those settlements specifically classified as central places. Since all places, nevertheless, engage in some services and hence exhibit some relative degree of centrality with respect to surrounding areas, the notion of hierarchy has been used in a broader context. In this respect, both W. Christaller (1933) and A. Lösch (1954) have suggested that various kinds of hierarchical system are likely to exist in the landscape, influenced particularly by areal differences in communication linkages and the effects of administrative boundary lines.

Each of these three approaches to settlement studies may provide the basis, albeit in varying degree, for analogous enquiries into retail activity. The potential for this is examined in terms of the structure of retailing at, first, the national and regional scale, and secondly, the urban scale of enquiry.

(A) Retail structure at the national and regional scale

(1) Regularities in size characteristics of retail activity

Graphs and statistical curve approximations of the kind suggested by Berry as appropriate for describing distributions of cities by size of population have not been used so far to describe cities in terms of retail size characteristics. In the main, this is because the overall shopping performance of any city has been traditionally linked to the number of people in its trade area rather than its own limited urban population. Where retail statistics have been plotted as graphs (for indicating levels of centrality of places), the main objective has been to find natural 'breaks' in the slope of the graph line as evidence of hierarchical orders. Much recent evidence, however, indicates that the ranking of cities by retail size characteristics often closely corresponds to rankings obtained by using size of urban population. Studies of rank correlation (R. L. Davies, 1969a; 1970) between various retail criteria and size of urban population for the largest cities in Britain and the U.S.A. yield correlation coefficients which generally exceed 0.9. Similar findings have been made in several other regional studies (P. Haggett, 1965) and refer to the relationship between retail statistics for the central area and size of urban population as well as to the relationship between retail statistics for the whole city and size of urban population.

Since such close correspondence is found between these rank size distributions in many different areas, it would seem logical that some at least of the graph regularities referred to by Berry in descriptions of urban population will also be relevant in describing the volume of urban shopping activity. Graph characteristics of the kind epitomized in Figure 1, however, can obviously be affected by the way in which size criteria are aggregated in groups, and Berry's categorizations are highly generalized. It is interesting to note in a more detailed graph of the largest places in England and Wales (Fig. 2), where size statistics are plotted for individual urban administrative units, that there is a greater irregularity in gradient form for population than for the two variables of retailing. This implies that retail activity is a better criterion than numbers of people for recognizing the existence of a primate pattern superimposed on a log-normal size relationship as described by Berry.

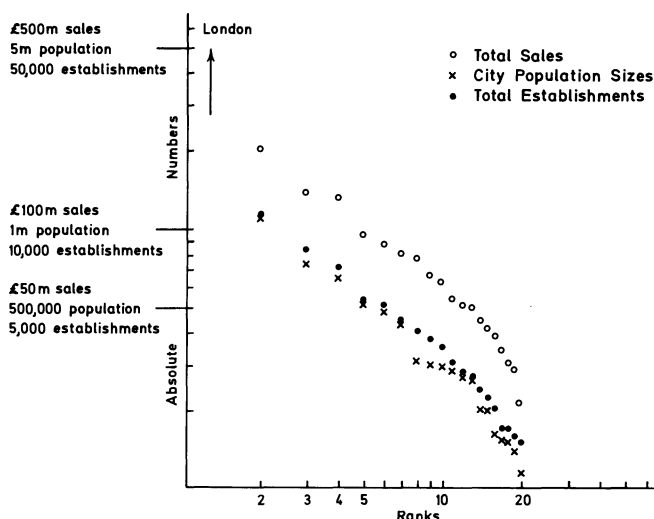


FIGURE 2. Rank-size distributions of population and retailing: England and Wales

(2) *Classificatory distinctions in modes of retail activity*

Settlements which are distinct in terms of their major economic functional roles are also likely to differ, though to a lesser degree, in the character of their main shopping provisions. Thus we would expect the shopping centre of a 'full' central place, for example, to exhibit a retail composition different from that of a settlement more typically a route centre or a special resource centre, such as tourist and industrial towns. The nature of these variations will mainly be expressed in the relative emphasis given to transactions such as personal services, motor-car facilities, repair activities, and the supply of food and drink. Several studies in Britain have also indicated that there are variations in retail sales performance (D. G. Price, 1970), in methods of retail organization and marketing practice (P. Scott, 1970) and in status of shops (R. K. Schiller, 1971) among different types of town, but there has never been a comprehensive classification of such variations in shopping activity at the national or regional scale. This is largely because such differences as may be noted from one place to another often become clouded and difficult to discern in overall assessments.

Given that distinctions in settlement types and variations in associated retail activity

may be perceived, nevertheless, a contradiction seems to emerge in much of the geographical literature concerned with descriptions of central places. The contradiction arises in two ways. In the first case, a hierarchical structure of central places is often derived for an area which is clearly made up of a mixture of settlement types, such as in the study of South Wales towns by W. K. D. Davies (1967). This kind of study, however, is less concerned with classifying the major functions of places than with identifying the strength in relative levels of centrality (or business importance) inherent in all settlements. A second contradiction then appears in that the indices used to measure such centrality are usually aggregate retail statistics (for example, numbers of establishments, total sales, total floorspace or various ratios and composites) which in themselves reflect on the special functional roles and locational constraints of each place. If the towns have grown up mainly because of factors other than trade area support, the shopping provisions of these towns will likewise relate to the particular circumstances of the local urban populations. In other words, aggregate retail statistics which are used as measures of centrality and hence indicators of trade area support are usually much more a response to the peculiar demand characteristics of the limited home market.

Two further considerations may be made in this respect. First, many studies which have defined hierarchical levels of centrality in more specific terms than indices composed of aggregate retail statistics (such as the use of selected shop types or particular sales criteria) usually show little agreement in the rank placings they assign to settlements in those instances where there has been a common area of enquiry (W. K. D. Davies, 1966). It has been shown, in fact, that most recommended functional indices are often no more appropriate for representing centrality than highly generalized statistics such as numbers of retail employees or even sizes of urban population (R. L. Davies, 1970). Secondly, most central place studies that refer to systems of small settlements, which would normally be most easily classified into distinct, separate types of place, use indices of centrality that involve general aggregates of retail statistics (mainly because of limited data sources). Those studies that refer to larger settlements, however, where places have grown up in response to complex processes of growth and where classification into separate types is difficult to effect, usually adopt much more specific and limited indices of centrality (R. L. Davies, 1970). It would seem that a reversal of these methods of approach would be more appropriate for representing the realities of various situations: specific indices to index centrality in more specialized, smaller settlements; and general indices to index centrality in more diversified, larger settlements.

(3) *Hierarchical systems of shopping centres*

The notion of the hierarchy, nevertheless, has been used not only to describe the functional relationships between settlements, as epitomized in retail activity, but also as an organizing framework within which to differentiate levels of size and importance for the main shopping centres of settlements. Thus hierarchies of shopping centres have been described for Britain as a whole (W. I. Carruthers, 1967; D. Thorpe, 1968) which are seen to be different in form from corresponding hierarchies of settlements (A. E. Smailes, 1944; R. D. Smith, 1968). So, too, there have been numerous hierarchical descriptions of shopping centres for various regions (Thorpe and T. C. Rhodes, 1966; G. Lomas, 1964) which are conceived to be analogous with hierarchical descriptions of settlements but not directly compatible with them. This distinction between two kinds of hierarchical system, both of which refer

to retail activity, is not always entirely clear. Methodologically, studies about the hierarchy of settlements use retail statistics as a proxy variable for representing the full business complexity of places; studies about the hierarchy of shopping centres obviously use retail statistics to reflect directly on shopping importance alone. Unfortunately, both methodological approaches often use the same statistics for purportedly achieving different ends.

The obvious analogy between hierarchies of settlements and hierarchies of shopping centres has led to much replication in the literature about the problems which the concept poses. For example, the debate initiated in settlement studies (R. Vining, 1955; M. J. Beckman, 1958) as to whether clusters of places of similar size do occur in reality along the lines suggested by Christaller or if the hierarchy is simply a convenient taxonomic procedure for classifying places which show rather a continuous range of size has been extended into studies about shopping centres. Lomas (1964) indicates support for the latter view; Thorpe and Rhodes (1966) suggest there may be evidence to substantiate both. The problems encountered in properly indexing levels of centrality for settlements (whether these refer to retail activity or other criteria such as wholesaling and educational facilities) have been no more severe than the problems of measuring shopping importance. There are as many discrepancies in rank descriptions of shopping centres by researchers writing on the same area as are found in the case of settlement studies.

The hierarchy of shopping centres, like that for settlements, has also been interpreted as a universal framework within which every main shopping centre in an area of study may be treated in the same way. Little account has been taken of local factors affecting the level of centrality of individual shopping centres, though such effects have been noted to exist. In particular, the distortions imposed on retail performance by tourist trade have been highlighted (*Manchester University*, 1964; 1966). In addition, the hierarchy continues to be viewed as a single or unitary system rather than a composite one within which systematic variations may occur. The theoretical suggestions of Christaller and Lösch that there will be varying kinds of hierarchical system within areas of imperfect marketing competition are likewise ignored in most empirical settlement studies, though M. J. Woldenberg's (1967) work is an exception. Studies of consumer behaviour, however, such as those by R. A. Murdie (1965) and D. M. Ray (1967), suggest that different social and ethnic groups of people utilize a hierarchical structure of shopping centres in different ways.

(B) Retail structure at the urban scale

(1) Regularities in size distributions of shopping centres

It is a more difficult proposition to relate theoretical graphs and statistical curve approximations of the sort applicable to settlements and large-scale retail characteristics, to the size distributions of shopping centres found inside cities. Part of the reason for this is the lack of detailed, published statistics for the sizes of internal urban shopping centres. Numerous individual studies have tried to describe from surveys the overall hierarchical size-order relationships of centres, but these are usually incompatible or difficult to compare (Table I). Even where there have been researchers working on the same city, at about the same time and for much the same kind of purpose, there are discrepancies in the details of size standards rendered (Table II).

A major feature which emerges from broad comparisons of the American and British geographical literature, however, is the clear difference in the distributions of shopping centres by size in the larger cities of these countries. In the larger British cities, the central

TABLE I
Various hierarchical structures of shopping centres

(1) Frequency specifications in U.S. cities (S. B. Cohen, 1963)				
	<i>Greater Cleveland</i>	<i>Greater Minneapolis</i>	<i>Greater Boston</i>	
Regional centres	3	4	3	
Community centres	15	11	10	
Neighbourhood centres	17	23	17	

(2) Frequency specifications in British cities				
	<i>London (A. E. Smailes and G. Hartley, 1961)</i>	<i>Nottingham (I. G. Weekley, 1956)</i>	<i>Coventry Corporation (1964)</i>	
Centres grade	A	12	A	4
	A—	21	B	4
	B	17	C	2
	B—	28	D	6
	C+	27	E	18
	C	75	F	8
			District centres	8
			Neighbourhood centres	9
			Small centres	16

TABLE II
The hierarchy of shopping centres in Chicago, 1961

(1) B. J. L. Berry's description (1963)			
	<i>Frequency of centres</i>	<i>Ground floor establishments</i>	<i>Ground floor area (m²)</i>
Regional centres	4	200	55 800
Shopping goods centres	14		
High income		150	30 700
Low income		100	27 900
Community centres	25	77	15 800
Neighbourhood centres	21		
High income		55	11 600
Low income		40	7 000

(2) B. J. Garner's description (1966)			
Regional centres	11	147	37 200
Community centres	23	72	14 500
Neighbourhood centres	11	23	7 500
Add Workingmen's area:			
Major centres	8	99	25 000
Minor centres	9	47	10 600

(3) J. Simmons's description (1964)			
Regional centres	4	—	—
Shopping goods centres	14	—	—
Community centres	22	—	—
Neighbourhood centres	25	—	—

area continues to command a much more prominent position compared with a relatively little developed rank sequence of smaller shopping centres. To this extent, the urban retail system in British cities corresponds in character to the primate pattern of size relationships observed for certain settlements, whereas the American counterpart is likely to resemble more closely the log-normal form.

Such differences may be further considered in terms of Berry's developmental model (Fig. 3) concerning the growth trends of city population size distributions. This postulates an evolution from an initial primate pattern, through intermediate stages of s-shaped curves, to a final equilibrium log-normal form. Such a developmental model may well

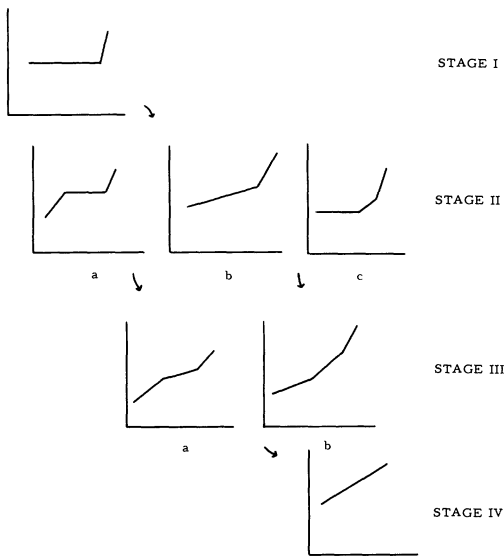


FIGURE 3. B. J. L. Berry's developmental model of city size distributions. The graph axes are scaled in the same terms as Figure 1. Reproduced from *Economic Development and Cultural Change*, 9 (1961), by permission of the University of Chicago Press

simulate the growth of internal urban retail systems, beginning with the primacy of central areas and ending with a much more fully dispersed character to shopping activities. Stage I of the model remains analogous to the urban retail system of most British cities since planning control continues to strengthen the pre-eminence of the central area, although in some cities, the rapid growth of population in the suburbs and some expansion of the lower levels of the hierarchy may have led to a situation nearer stage IIb. In cities of the United States, however, the relative decline in the central area and the rapid growth in middle levels of the hierarchy have led to a retail system more like stage IIIb, and perhaps in some cities to a close approximation of stage IV. It may be that, in certain continental European cities, situations resembling stages IIa or IIIa are found where conditions intermediate between planned concentration and free market decentralization of shopping facilities occur.

(2) *Typologies of shopping centres*

The threefold classification of settlements into central places, transport-based places and resource-endowed places which is mainly ignored in studies of national and regional levels of retail activity is given a distinct parallel in many classifications of shopping centres described inside cities. Berry (1963) has given most attention to this in descriptions for cities in the U.S.A. categorizing retail configurations as nucleated shopping centres, ribbon developments, and specialized areal clusterings. Like the elaborations which have been made about functional classifications of settlements, this scheme for shopping centres can also be expanded (Fig. 4) to include several variant forms. In the case of nucleations, a size differentiation of centres is structured in terms of a hierarchy in direct analogy with the hierarchy of central places. It is significant to note that the hierarchy in Berry's scheme is

applicable to this one class of shopping centres only, in contrast to those studies of settlements which treat the hierarchy as applicable to places other than central places.

Besides this similarity between nucleations and central places, however, further parallels between ribbon settlements and ribbon shopping centres on the one hand and special resource settlements and special retail clusterings on the other, have not been drawn in detail. It is interesting to speculate whether certain common kinds of locational constraint and functional character may be perceived. It is apparent in cursory ways that there may be some similarities: for example, in the traditional shopping street and the cross-roads settlement; the new suburban ribbon and the planned or unplanned linear town; the entertainment district of cities and the holiday resort; the medical centre and the health and convalescent place.

The main features of Berry's classification of shopping centres, nevertheless, have been little substantiated and explored by empirical study in British cities. This is because

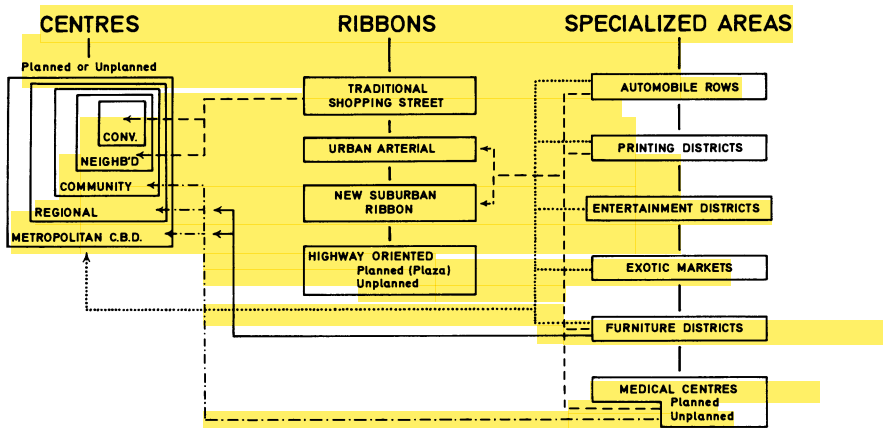


FIGURE 4. B. J. L. Berry's classification of urban business configurations

functional differences between centres are not so clearly marked and also because much attention has focused on the problems of properly demarcating the extent of individual centres. Several interpretations, however, suggest that differing kinds of retail configuration exist. Thus Smailes and G. Hartley (1961) and Carruthers (1962) have described what is mainly a system of nucleations in London; H. R. Parker (1962) has stressed the prominence of ribbon developments in Liverpool; and D. R. Diamond (1962) and H. Carter and G. Rowley (1966) have pointed to clusters of retail specializations in the central areas of Glasgow and Cardiff respectively. It is surprising that there has been little attempt to describe all three typologies or components within a common framework.

Few studies have been made of the spatial patterns promoted by retail configurations, either within cities or for that matter outside them, although studies of settlement patterns have been strongly linked to functional classifications. Differences between the greater complexity and haphazard arrangement of shopping facilities in older, inner terrace-housing areas of British cities, and the less dense, more strictly organized shopping centres in the suburbs have been noted (F. A. Leeming, 1959). B. J. Garner (1966) has attempted to relate spacing standards of nucleated centres in Chicago to theoretical patterns of central

place settlements postulated by Christaller, but suggested only a general resemblance to a $k = 4$ network pattern. Certain other broad analogies are drawn by Garner, especially for smaller centres which are seen to resemble rural settlement patterns described by Brush (1953), such that Garner concludes: 'the possibility (exists) that some underlying and fundamental spatial relationship exists in the spacing of different order centres in a hierarchy, regardless of the vast differences in population density and purchasing power between urban and rural areas.

(3) *The urban hierarchy of shopping centres*

The strongest analogy ever drawn between settlement characteristics and retail provisions concerns the concept of hierarchy advanced in Berry's theory of tertiary activity (Berry, Garrison *et al.*, 1959). The precise form of this analogy is that hamlets in the settlement hierarchy are matched by isolated clusters of stores in the city; villages are equated in functional role with neighbourhood shopping centres; towns have their equivalent in community shopping centres; cities are represented by regional shopping centres; and the metropolitan area is approximated in status by the central business district. This hierarchical structure of shopping centres has mainly been verified in the American context, but the hierarchy as a conceptual model has been repeatedly applied in British and European studies and has often, consciously or otherwise, been utilized as a framework to control the planning of urban shopping centres. Thus hierarchies have been described in London, Nottingham, Manchester and elsewhere, and usually deliberately invoked in development plans for most cities. In such cases, the hierarchy concept has once more been treated as a universal means for describing size relationships between all shopping centres, rather than a concept to be attributed to the one distinct class of nucleations recognized mainly in the American literature.

The reality of a hierarchy of urban shopping centres has been challenged, of course, just as it has in the case of settlement studies and retail activity at the national and regional scale (S. B. Cohen, 1963). In addition, comparisons of rank placements of shopping centres using different methods for indexing shopping importance give rise to the same kinds of discrepancy (D. McEvoy, 1968) as have been noted in similar comparisons of rank sequences of settlements and regional shopping activity. Differences in the hierarchical levels of urban shopping centres may also arise, not only because variable indices of centrality are employed, but also because of the varying degrees of detail involved in surveys of retail characteristics (R. L. Davies, 1968).

Unlike the hierarchy of shopping centres at the national and regional scale, and also the hierarchy of settlements, however, the hierarchy of urban shopping centres has been viewed as a composite system within which varying kinds of sub-systems may be perceived. Such component sub-systems arise because of the effects of widely varying tastes and preferences on the part of urban consumers. Different socio-economic groups make different kinds of demand on the retail supply structure, which then become reflected in the kinds of stores made available in different parts of the city. Such effects may lead to variations in both the vertical structure of the hierarchy of shopping centres and to variations horizontally within any single order or level of centres. In the first case, Berry and Garner in their work on Chicago have provided evidence that the hierarchical structure which exists for white, higher income residents of the city is different from that which operates for negro, lower income residents. R. L. Davies (1969b) in studies on Leeds has

shown that variations in income considerably affect the functional use of small shopping centres. The general conclusions are that higher socio-economic classes tend to use a hierarchy more widely and variously, when lower socio-economic groups limit themselves to local facilities or the larger centres easily accessible along major bus routes. Vertical differences in hierarchical structure (Fig. 5) are then more obvious in the smaller orders of the general system, for larger centres become shared by different communities.

Horizontal differences within any common level of a composite hierarchy occur in terms of individual types of shop visited and actual items purchased. Shops stocking different types of goods and providing different images of quality may therefore be found in higher income areas compared with lower income areas (Fig. 5). Likewise, in the larger shopping centres, different store specializations and quality images may still be apparent which suggest that different groups of consumers patronize different stores and hence utilize such centres in different ways (I. M. Chatten *et al.*, 1968). These spatial differences in type and quality of stores and their relationship to threshold values are further explored in a later section. In Figure 6, a more detailed exposition is given on how a general hierarchical system may become modified by varying consumer market conditions to reveal component sub-systems.

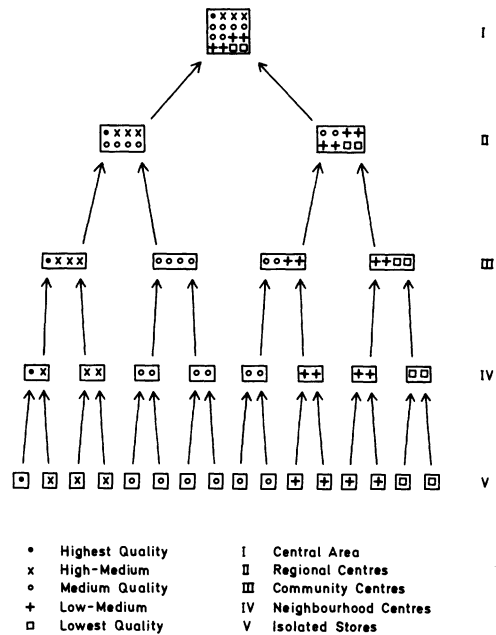


FIGURE 5. Hypothetical quality differences in shopping centres

ANALOGIES WITH URBAN LAND-USE MODELS

Since all general urban land-use models embrace retail activity as an integral part, there are clearly strong links to be found between the overall pattern of land uses in the city and the particular pattern of shopping centres. These links become more evident when it is realized that common but varying levels of accessibility are operating on the urban market as a whole and on the retail market as a part of this. In addition, the growth mechanism of cities is such that an equation of spatial supply and demand operates between the bulk land uses of the consumer population and the smaller land uses of the vendors. It ought, therefore, to be possible to draw a parallel between the popular theories of urban land-use structure, advanced by E. W. Burgess *et al.* (1925), H. Hoyt (1939) and Harris and Ullman (1945) and the most comprehensive classification of shopping centres, that which has been proposed by Berry.

The locational principles which explain the distribution of general land uses have also been seen to be applicable for understanding the internal spatial characteristics of shopping centres. In this respect, the largest of all shopping centres, the central area, will exhibit greatest evidence of structural orderliness amongst the various types of retail stores to be

found. The central area itself can be studied in terms of conceptual models and these may be considered in relation to both general models of urban land use and Berry's classificatory scheme for city-wide retail activities.

(A) Conformities in areal arrangements

The analogy between general models of urban land use and Berry's scheme for shopping centres is best realized when the concentric zone theory, sector theory and multiple-nuclei theory are not viewed as separate alternatives for describing any one pattern of land use but as contributing methodologies for understanding different aspects of the same situation. Thus an approximation to concentricity in land-use arrangements may be perceived as reflecting the general levels of accessibility operating within the city; sectorism may emerge in the direction of certain major roads because they represent greatly enhanced levels of

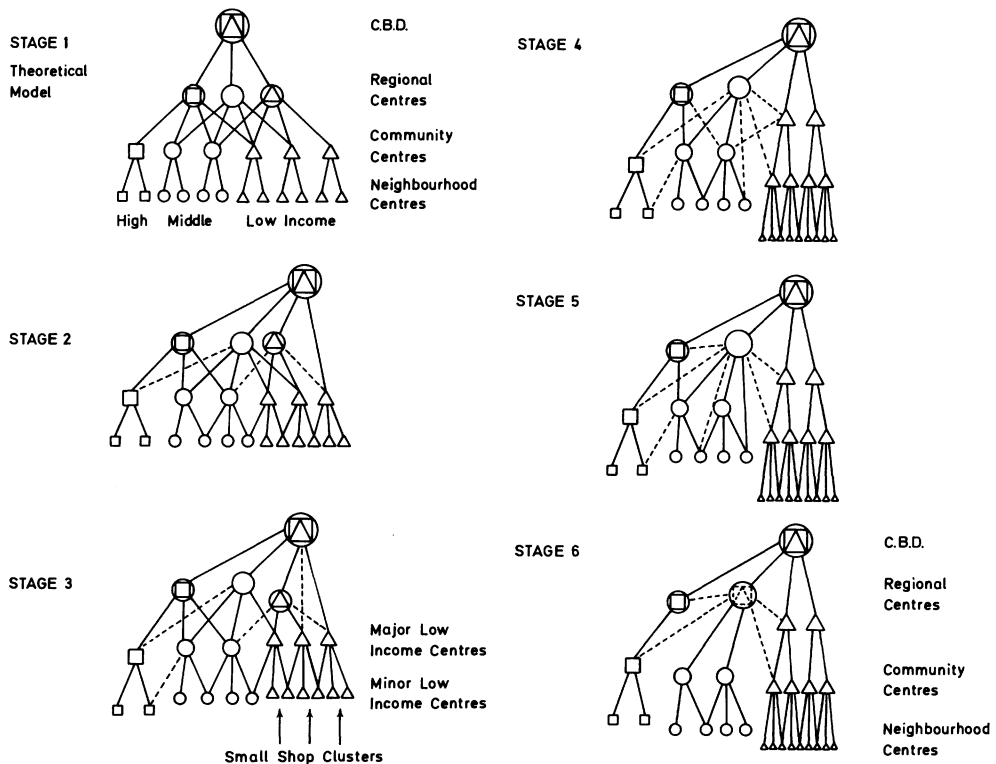


FIGURE 6. A developmental model of hierarchical sub-systems of shopping centres
(For explanation see p. 71)

accessibility; specialized concentrations of land uses may appear in varied locations because of unique kinds of enhanced accessibility being found. Such notions about the effects of varying accessibility are expressed in many economic rent models (R. M. Haig, 1926; R. Turvey, 1957). So, too, explanation for the different arrangements of shopping centres in the city has been given in these terms. Nucleated shopping centres are widely scattered throughout the urban area, though in belts of diminishing density towards the outskirts.

Stage 1: the general theoretical model

This represents the aggregate system of shopping epitomized in central place theory. Four levels of shopping centres are described: the C.B.D., regional centres, community centres and neighbourhood centres; and three groups of consumers are identified as high income, middle income and low income. No importance is attached to the frequencies of centres at each hierarchical level or the proportionate share of consumer-group use, for these vary according to cities and do not follow the theoretical regularity postulated for rural systems. The different consumer groups share the facilities of highest order centres as indicated by the superimposed symbols.

Stage 2: effects of varying locational relationships

Allowance is made for the fact that low-income consumers live at great density near to the central area, whereas high-income consumers live more sparsely on the peripheries of cities. Shopping centres are therefore more densely concentrated in the inner parts of the city compared to the outskirts. In addition, the regional centres catering mainly to low-income consumers are overshadowed by the central area, such that they are often by-passed on shopping excursions. Regional centres serving mainly the middle-income consumers, however, are more central to the total urban market and likely to attract extra trade.

Stage 3: emergence of variant hierarchies

As the viability of low-income regional centres diminishes, the smaller centres in low-income areas are able to increase their standing in the hierarchical sub-system by taking on more specialized roles. This development is epitomized in Garner's (1966) reference to Major and Minor centres for working-class areas in Chicago, which are seen to combine the functions of regional, community and neighbourhood centres. The enhanced importance of the lower levels of this sub-system then allows for numerous isolated store clusters, which are very dense in the inner, older parts of the city, to be supported.

Stage 4: distinction of the low-income hierarchy

An almost separate hierarchy of centres emerges for the low-income areas since consumers here are less mobile than those in other parts of the city and visit either locally-based centres or the C.B.D. Considerable cross movements for shopping take place between the middle- and high-income hierarchical sub-systems of centres, however. In particular, consumer travel becomes heavily focused on the middle-income regional centres which therefore continue to grow in overall importance.

Stage 5: competition with the central area

In the absence of planning intervention, it is possible for a middle-income regional centre, in drawing trade from the bulk of the urban market, to create severe competition with the central area and undermine its functional role. This trend has been conspicuous in the U.S.A. though less so in Britain. As growth accumulates in such a centre and more movements are concentrated to it, the earlier variability in consumer behaviour in the outer parts of the city becomes reduced. Some consumers in middle-income areas may by-pass their smaller shopping centres and begin to erode the lower levels of their own hierarchical sub-system.

Stage 6: the empirical model

The emergence of three distinct, but efficient and related sub-systems of shopping centres is complete. The high-income areas have shown the greatest stability in overall hierarchical form although, because shopping centres here are usually few, the full structural levels of the hierarchy are not always to be found. The middle-income areas exhibit the largest types of regional centres to be found in the city; and the low income areas exhibit the greatest strength in smaller orders of centres. Integration of the three sub-systems remains crystallized at the regional centre and C.B.D. structural levels.

Ribbon developments are considered by Berry to be the response to 'arterial' conditions of accessibility along major roads. Specialized clusters of retail activity often occupy seemingly haphazard locations but survive because of prestige factors built up around their sites. The sector and multiple-nuclei theories specify that some of the controlling activities affecting their overall land-use arrangements will be elements of the retail system.

Further evidence for this analogy is provided by the relationships between land values and land uses as a whole, and between land values and shopping centres in particular. W. Alonso (1964) has explored the general form of the relationship, and Garner (1966) has discussed the particular form. In both cases, the surface of land values in the city shows noticeable peaks especially at the most central locations, along primary transport routes,

and at positions of special accessibility. Such peaks then reflect a more intense occupance of the land, often visually conspicuous in terms of greater densities, height and functional variety of buildings. In the general land-use case, these characteristics relate to a variety of office, shopping, wholesaling and industrial activities; in the specific retailing case, such characteristics are manifest in the assortment of shop types. In addition, Garner has suggested that the nucleated shopping centre in particular exhibits, in its surface of internal land values, a microcosm of the total urban market (Fig. 7). The whole surface of urban land values, interpreted in relation to general levels of accessibility, is theoretically

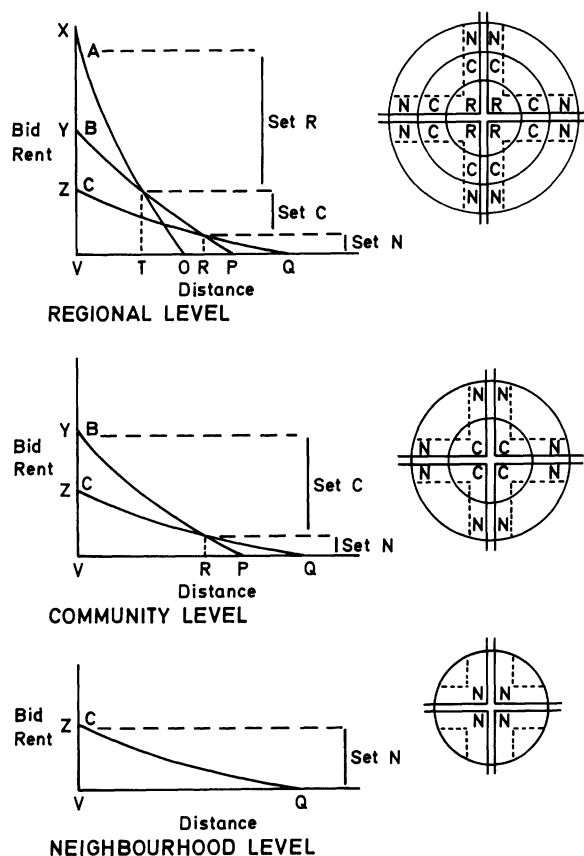


FIGURE 7. B. J. Garner's model of shopping centre characteristics

summarized as a distance-decay curve from the centre of the city outwards. Zonal belts of land use in relation to this become structured according to rent-paying abilities. The same regularity in distance-decay is assumed by Garner for the surface of land values inside shopping centres, and bid-rent curves are used to explain a differentiation of retail activities in terms of threshold values.

The similarity engendered in these economic models, however, is not easily commuted to the Burgess model. Burgess's model was originally formulated to describe social stratifications within the city, and hence strictly speaking refers to underlying social

processes. There is a likeness between Garner's model and Burgess's model only in broad abstract form, just as geographers have felt it acceptable to compare Burgess's social model with Hoyt's economic model as alternatives in the description of urban land use. The particular spatial structure for shopping centres that Garner envisages is (for the case of a large centre) as follows: convenience stores with the lowest threshold values are located at peripheral sites; more specialized stores with middle threshold values occupy an inner ring; and the most specialized stores with the highest threshold values are centred where land values are highest. This internal arrangement of retail activities is then equated with the vertical structure of the urban hierarchy of shopping centres, such that three belts of varying threshold values epitomize three levels of neighbourhood, community and regional centre functions.

The degree to which Garner's model of the internal characteristics of retail nucleations may be relevant to British conditions, however, has so far been little explored. Studies of the central area of Coventry (R. L. Davies, 1971) suggest it may be highly appropriate. In this case, measurements were made of the degree of clustering and dispersal of different threshold levels of shops using the techniques of spatial statistics. Clothes shops (as an example of regional centre functions) were found to exhibit the greatest degree of clustering immediately around the centre of gravity computed for all shops. Household goods shops (as an example of community centre functions) showed a lesser degree of clustering and more marked locational prominence in a middle belt of the central area. Food shops (typical of neighbourhood centre functions) showed the greatest amount of dispersal and more prominent locations on the periphery of the central area.

(B) Retail structure in the central area

In many ways, the central area is the key to all underlying relationships between settlement models, urban land-use models and the retail system. It forms the apex to both rural and urban hierarchies; it forms an area of mixed land uses in itself but provides the core component in general land-use patterns; it distinguishes itself mainly in terms of shopping provisions and exemplifies a whole set of retailing characteristics found elsewhere in both rural and urban environments. It is surprising, therefore, that few structural models of the central area, *per se*, have been provided, although much detailed and empirical study has been made by geographers and others. An exception is the simplistic model of E. Horwood and R. Boyce (1959) which differentiates two main parts of the central area as the core and frame along lines suggested by R. E. Murphy and J. E. Vance (1954). The core area is a zone of greatest intensity, represented primarily by concentrations of shops and offices, the frame area is a zone of lesser intensity, made up of a series of sub-areas of varying specialization in different activities, primarily wholesaling, warehousing, manufacturing, motor-car servicing, and some housing (Fig. 8).

There is no way by which the core-frame concept may be systematically related to the general models of urban land use, but it seems that the frame area represents a transition between the twilight areas of such models and the hub of the central area. In addition, the schematic diagram of the core-frame concept is made up of familiar abstracted forms: two concentric-shaped belts representing broad differences in intensity of land use; certain dominant directions along which there are 'principal goods flows'; and a series of nuclei or sub-focal points where particular concentrations of different activities are found.

These three recurring features of the taxonomic literature may also help to charac-

terize the detailed make-up of retailing alone within the central area. Figure 9 is a composite model built from three disaggregated components. Clearly, the reality of an empirical case is a much more complex mixture of activities (as indicated for Coventry in Figure 10), but the assembly of components postulated in the model may clarify the nature of some orderly underlying relationships. The three components are essentially analogous to Berry's classification of city-wide retail distributions. The first component of the model refers to broad zonal differences in types of shop, based on the structural variations in threshold values for nucleated facilities noted by Garner. This pattern arises in the case of

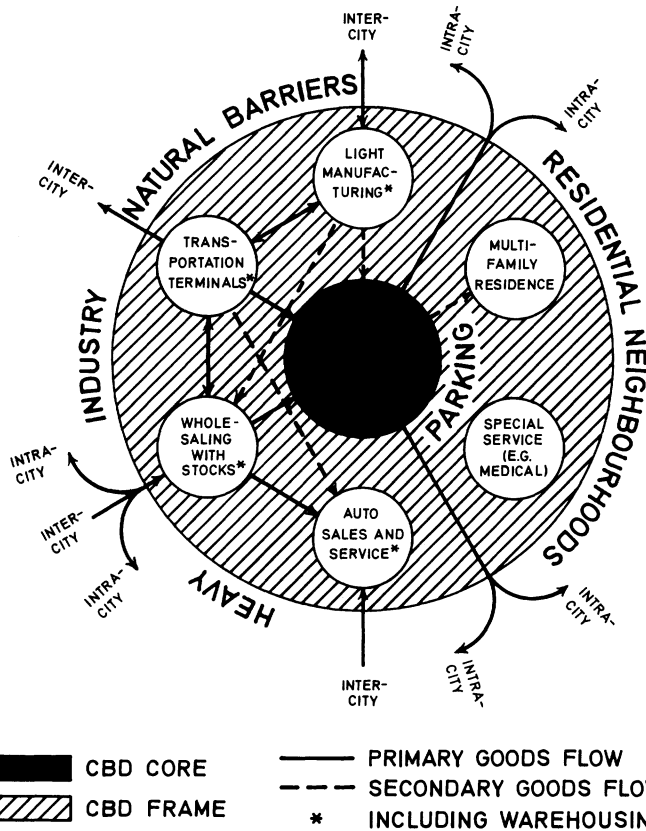


FIGURE 8. The central area core-frame model (after E. Horwood and R. Boyce, 1959; reproduced by permission of the University of Washington Press)

shops competing for the most central position of all and relates to a general surface of accessibility. Cutting across this pattern there will be embryonic ribbon characteristics along the major axial roads, exemplified by particular types of store, such as retail services and garages developed in response to these major traffic arteries. If the central area is considered as the apex to the hierarchy of city-wide nucleated shopping facilities, it is likely that it also engenders ribbon-like features, and indeed ribbon characteristics have long been recognized on the periphery of the central area as a major problem in the delimitation of boundaries. A third component superimposed on both nucleated and

ribbon patterns will comprise clusters or large areas of highly specialized retail functions which respond to particular advantages of site and unique conditions of accessibility as alluded to in many empirical case studies and referred to in Berry's scheme (Fig. 4).

There are two different kinds of specialized functional area that may be perceived, however. The first of these comprises clusters of shops which are distinct for their similarity in the lines of trade conducted, in which case such clusters may be related to either the structural forms of zonal nucleated facilities or sectoral ribbon facilities. For example,

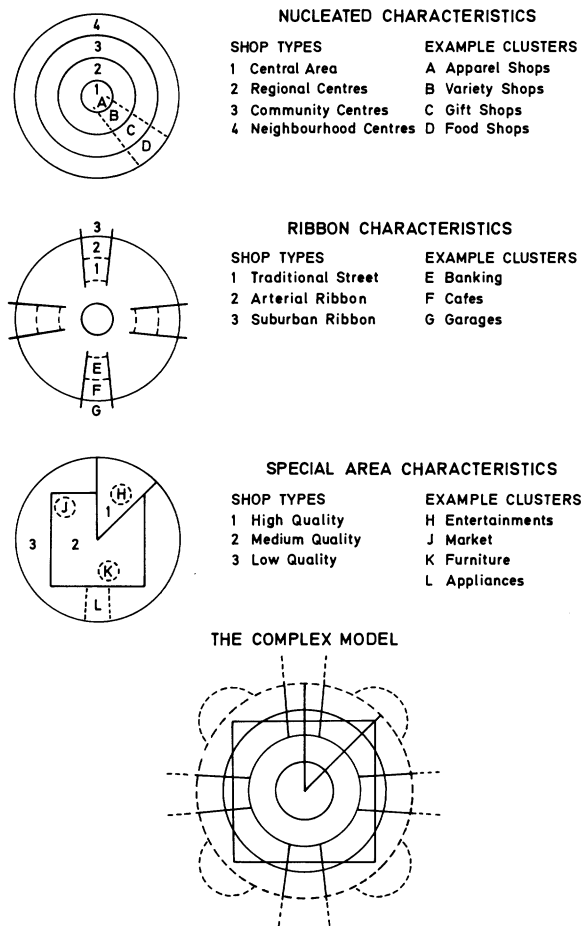


FIGURE 9. A structural model of central area core retailing facilities

concentrations of clothing shops usually reflect highly nucleated facilities, whereas concentrations of repair activities are more indicative of prevailing ribbon characteristics. The second type of shop cluster which may be identified is distinguished by a similarity in the levels of quality image, the mode of retail organization, or the specialized clientele which it serves. Thus broad areas of high, medium and low quality shops can be recognized throughout the central area, though they may exhibit an overall haphazard locational pattern. So too, there are seemingly haphazard concentrations of mixed functional activities, such as

entertainment districts and retail markets, which operate (in merchandizing terms) in a particular specialized way.

The distinctions in quality status of shops are especially important to make because of their relationship to threshold values. So far, we have equated the notion of threshold values with differences in functional types of shops only (since, for example, a clothing shop

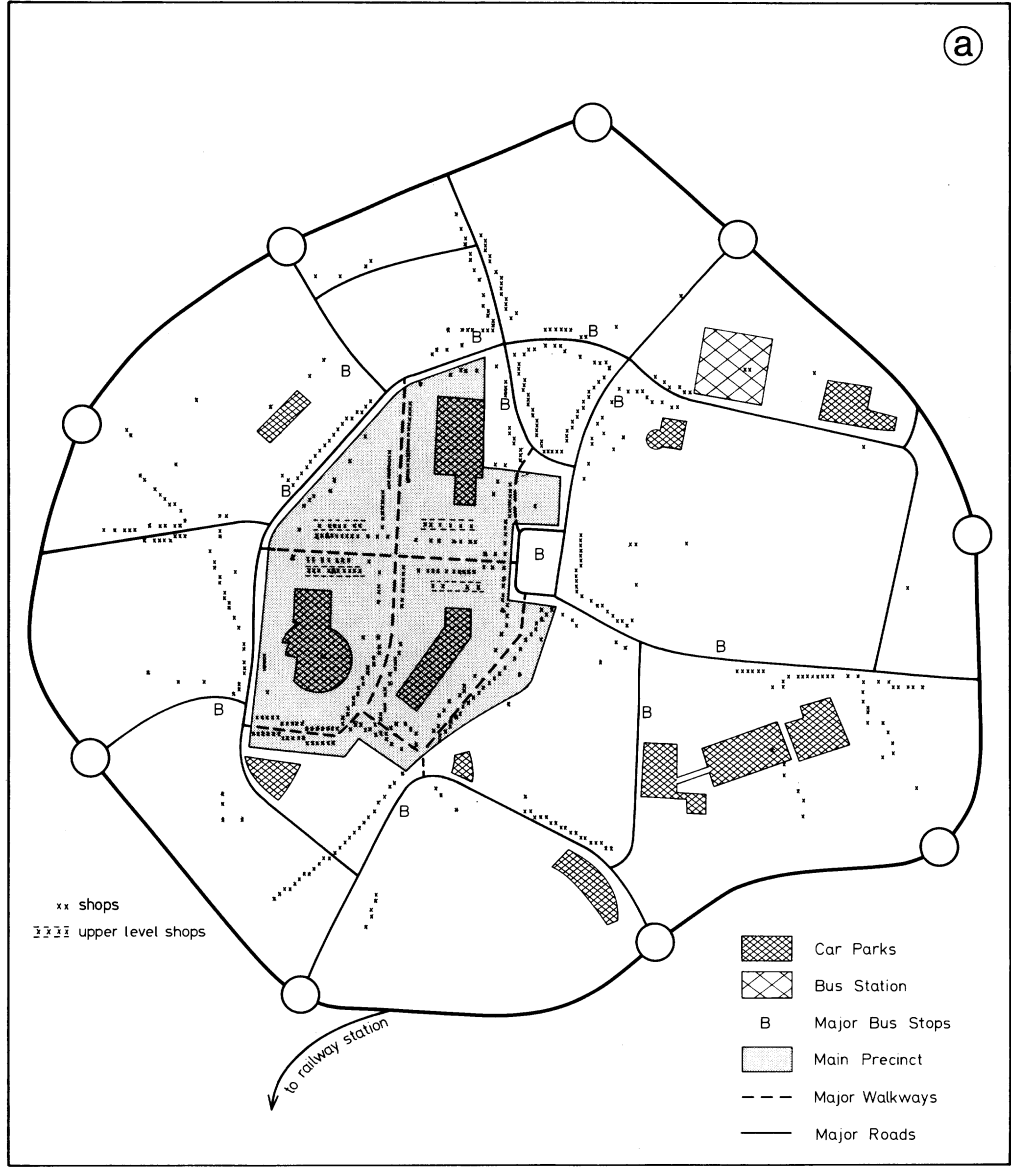
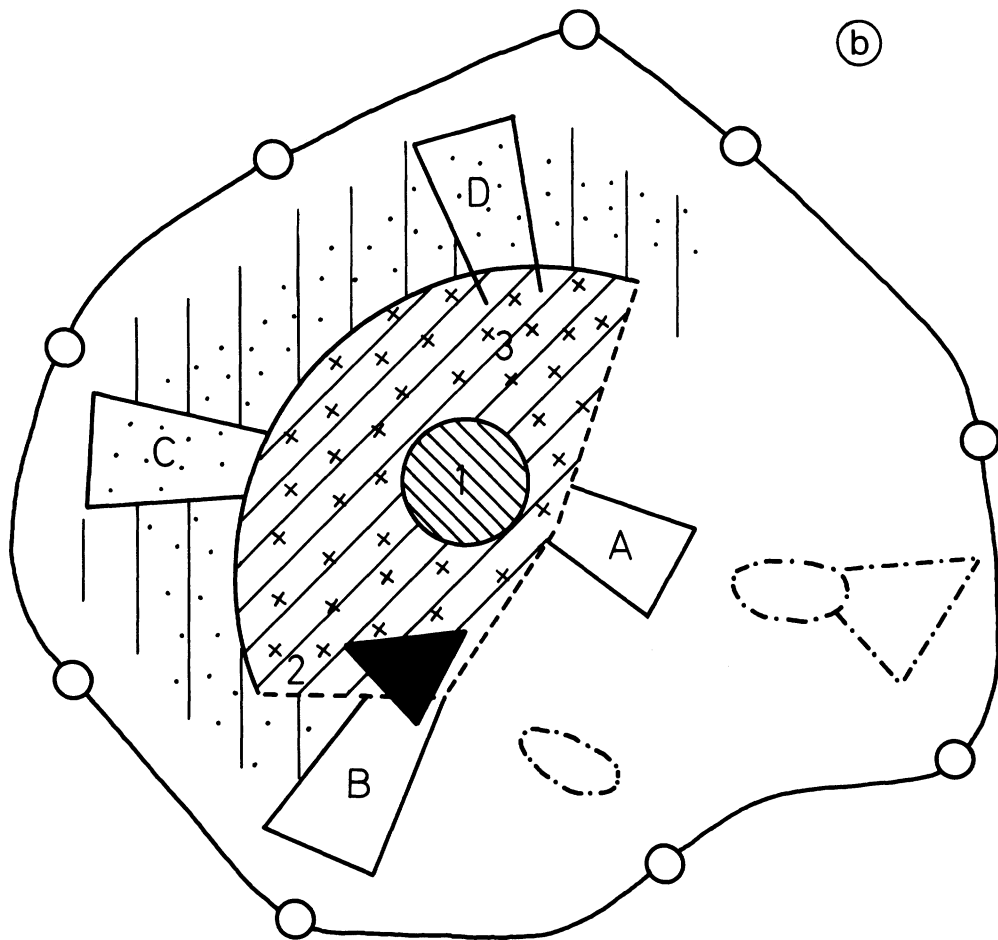


FIGURE 10. Retail configurations in the Coventry central area:
(a) Actual distributions



NUCLEATED FACILITIES

SPECIALIZATIONS:

- | | |
|--------------------|-----------------------------|
| 1 Clothing Shops | Most Centralized Goods |
| 2 Specialist Shops | Regional Centre Goods |
| 3 Household Goods | Community/Convenience Goods |

RIBBON DEVELOPMENTS

SPECIALISATIONS:

- | |
|-----------------------------|
| A Bank Services |
| B Business Services |
| C Leisure Services |
| D Leisure/Personal Services |

SPECIAL RESOURCE AREAS

- | | |
|--|---------------------|
| | Highest Quality |
| | Medium Quality |
| | Lowest Quality |
| | Frame Area |
| | Functional Clusters |

FIGURE 10. Retail configurations in the Coventry central area:

(b) Theoretical patterns

(For explanation see p. 78)

Nucleated characteristics

Shops which represent in embryonic form the functional provisions of central area, regional, community and neighbourhood centres are arranged in relative order of threshold values around the most nodal position of peak land values. Certain clusters of retailing specialization may emerge, examples of which are furnished. The order of arrangement of shop types is not continuous in the real world, for there are clearly overlaps and variations in road patterns which distort the nature of concentric belts.

Ribbon characteristics

Shops which represent in embryonic form the functional provisions of outlying ribbon developments are more conspicuous towards the periphery of the C.B.D. core and extend into and through the frame area. Certain clusters of retailing and allied service specializations may again emerge, and some of these create larger areas of functional specialization in conjunction with other activities within the frame. The directional bias of these facilities is along the major thoroughfares.

Special area characteristics

Shops which represent in embryonic form a response to special resource factors in terms of accessibility may be differentiated in further functional clusterings of similar activities or alternatively according to quality levels. Clusterings of retailing specializations are in this case more distinctive as agglomerations of several associated functions, such as retail markets or entertainment districts, or particularly large space users, such as furniture marts and groupings of domestic appliance outlets. In location, these clusterings may take on characteristics of either nucleated or ribbon facilities. High quality shops may be found in concentrated positions anywhere in the central area, though more usually near to the peak land-value node. Medium quality shops spread out over the greatest area of the C.B.D. Low quality shops seem to be most prevalent on the periphery and are usually equated with neighbourhood or arterial kinds of shopping provisions.

The complex model

This is by no means a stereotype of central area facilities, but indicates how component sub-systems of the outlying retail pattern become combined. The dashed boundary lines indicate that the C.B.D. core merges often imperceptibly with the frame, wherein certain other distinctive retailing characteristics may be found, especially in terms of large, conspicuous specialized functional areas. The most confused and complicated retailing parts are found toward the periphery of the core.

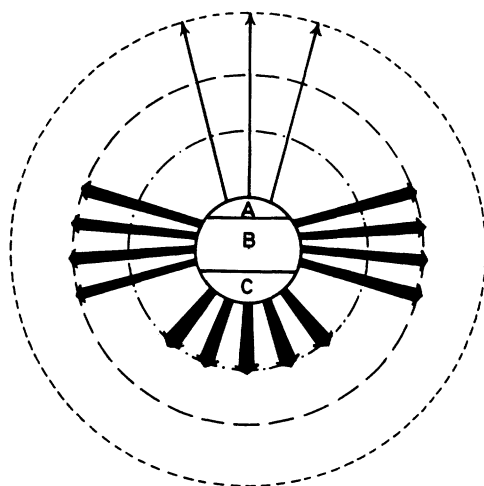


FIGURE 11. Hypothetical model of C.B.D. trade area characteristics: A. Location of high-quality retailing facilities; B. Location of medium-quality retailing facilities; C. Location of low-quality retailing facilities

will usually depend on greater amounts of purchasing power for support than a food shop). Quality differences among shops also affect threshold values, however, for though a high-class restaurant may be functionally classified with a transport cafe, the two clearly differ in the number and type of customers which they serve (Garner, 1967). The model postulated for the central area, however, suggests that the spatial structure of threshold values (in the usual context) does not correspond with spatial variations in levels of quality. Indeed, in real world situations, it is quite apparent that the shops of so-called highest threshold value are not always of the highest quality, and likewise those of lowest threshold value are not always of the lowest quality.

There are two ways in which the notion of threshold values may be interpreted. In the first case, differences in functional type of shop refer to a total amount of consumer

TABLE III

Analogies in taxonomic classification of retail complexes, settlements, and urban land-use forms

	<i>Locational influences</i>		
	<i>Arterial accessibility</i>	<i>General accessibility</i>	<i>Special accessibility</i>
<i>Settlement classification</i>	Transport-based	Central places	Special resource endowed
<i>Land-use models</i>	Sector theory	Concentric zone theory	Multiple nuclei theory
<i>Retail configurations</i>	Ribbon developments	Nucleated centres	Special functional areas

support, which may be drawn from a dense population living near by, or a scattered population over a broader catchment area. Essentially, however, there is no indication of where, in spatial terms, the volume of consumer support originates. In the second case, differences in quality levels of shops refer much more to the socio-economic character of consumer support, in which case such character may be related to residential patterns in the city. In other words, high quality shops can be generally equated with wealthier consumers who tend to live in widely dispersed locations; low quality shops tend to be patronized by poorer clients who are mainly concentrated in the inner parts of the city. It should be remembered that it is in the context of territorial 'drawing capacity', or spheres of influence, that threshold values are given a strict definition in classical location theories about settlement patterns. It is suggested, therefore, that threshold values are more satisfactorily and accurately defined in terms of the quality status of shops than in terms of functional distinctions in lines of trade. The seemingly haphazard areal arrangement of quality groupings in the central area model may then also be more clearly understood (Fig. 11).

CONCLUSION

This paper has explored the relationships between settlement and urban land-use models on the one hand, and retail models on the other. The main form of these relationships is summarized in Table III. In addition, some new models of retailing have been advanced on the basis of certain analogies and evidence in the literature. It should be emphasized, however, that many of the models reviewed are often gross generalizations about real world conditions, and their applicability in their own right to unique empirical case-studies (especially in Britain) may sometimes be seriously questioned. Against this must be set the requirement for a fuller and more consistent understanding of the urban milieu. 'Whereas progress has been made in understanding various facets of systems and sub-systems, for other facets we stand much as we did a decade ago . . . We have very little understanding of how to put these different patterns together in more general models that are broad in scope. Sound models of partial kinds are providing the building blocks, but maximum progress during the next decade awaits the architectural systematiser' (Berry, 1964, p. 161).

ACKNOWLEDGEMENTS

Professor J. W. House and Dr J. A. Hellen, of the Department of Geography at the University of Newcastle-upon-Tyne, kindly translated the abstract and figure captions into French and German. A grant towards the cost of illustrations from the University of Newcastle is gratefully acknowledged.

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RÉSUMÉ. *Modèles structurels en commerce du détail : analogies avec les théories de l'habitation et de l'utilisation du terrain urbain.* La plupart des descriptions de la structure du commerce en détail, au niveau régional comme urbain, font allusion à des conceptions formulées à l'origine en rapport avec des études de l'habitation et de l'utilisation générale du terrain. Cela se trouve illustré dans l'élaboration de la théorie des Lieux Centrales, et surtout dans la conception de l'hierarchie, afin de distinguer les catégories de grandeur structurelles dans l'importance relative des centres du commerce de détail. En plus, il y a une comparaison très nette parmi les classifications qui ont été formulées concernant les catégories d'habitation, les formes générales de l'utilisation du terrain et les configurations différentes en commerce du détail. Étant donné qu'il y a des similarités fortes claires entre les méthodes de ces études, il paraît peut-être remarquable que de certains points de vue des lignes de recherches en parallèle qu'on aurait dû attendre ne sont pas encore entretenues. Par exemple, peu d'efforts sont réalisés jusqu'ici pour faire relation entre les caractéristiques de localisation des centres du commerce de détail et les stipulations théoriques concernant les modèles de l'utilisation des terrains urbains. Cette étude fait l'analyse sur les degrés de formulation des analogies, et leurs possibilités de développement, entre des diverses modèles théoriques de l'habitat humain en général et des activités tertiaires.

- FIG. 1. Graphiques cumulatives des distributions par rang des villes (d'après B. J. L. Berry, 1961)
- FIG. 2. Distributions par rang de grandeur en population et commerce du détail: Angleterre et Pays de Galles
- FIG. 3. Modèle de développement concernant les rangs de grandeur des villes, d'après B. J. L. Berry
- FIG. 4. Classification des configurations en commerce urbain, d'après B. J. L. Berry
- FIG. 5. Différences théoriques en qualité des centres du commerce du détail
- FIG. 6. Modèle de l'évaluation des sous-systèmes hiérarchiques des centres du commerce de détail
- FIG. 7. Modèle des caractéristiques des centres du commerce de détail, d'après B. J. Garner
- FIG. 8. Modèle du cadre central des aires centrales (d'après E. Howard et R. Boyce, 1959)
- FIG. 9. Modèle structurel de la provision en commerce du détail dans le cœur de l'aire centrale
- FIG. 10. Configurations en commerce du détail dans l'aire centrale de Coventry:
- (a) Distributions en réalité
- (b) Dispositions théoriques
- FIG. 11. Modèle théorique des caractéristiques du commerce dans l'aire centrale. A. Localisation de magasins de haute qualité;
- B. Localisation de magasins de qualité moyenne;
- C. Localisation de magasins de qualité basse

ZUSAMMENFASSUNG. *Strukturmodelle des Einzelhandels: Analogien zu Theorien der Siedlungs- und städtischen Landnutzung.* Viele Beschreibungen der Struktur des Einzelhandels auf regionale und auf städtische Ebene beziehen sich auf Vorstellungen, die ursprünglich in Verbindung mit Siedlungs- und allgemeinen Landnutzungsstudien formuliert worden sind. Dies tritt in der Ausweitung der Zentral-Ort-Theorie hervor, und besonders des Begriffes der Hierarchie, um strukturelle Grössenordnungen in der verhältnismässigen Bedeutung von Einkaufszentren zu unterscheiden. Ausserdem besteht eine grosse Ähnlichkeit in der Natur der Klassifikationen, die für Siedlungstypen, allgemeine Formen der Landnutzung und verschiedene Einzelhandelstrukturen aufgestellt worden sind. Während bestimmte Ähnlichkeiten in den Methoden dieser Studien gefunden werden können, sind jedoch in gewissen wichtigen Hinsichten parallele Forschungswege wider Erwarten nicht beschrritten worden. Es ist z.B. kaum der Versuch unternommen worden, die Standortcharakteristiken von Einkaufszentren auf theoretische Grundvoraussetzungen von städtischen Landnutzungsmustern zu beziehen. Diese Abhandlung überprüft das Ausmass, in dem zwischen

verschiedenartigen begrifflichen Modellen allgemeiner menschlicher Besitznahme und tertiärem Bereich Analogien gezogen worden sind und später noch entwickelt werden können.

ABB. 1. Kumulative graphische Darstellung von Verbreitungen in Stadtgrösse (nach B. J. L. Berry, 1961)

ABB. 2. Verteilungen von Bevölkerung und Einzelhandel nach Stadtgrössen geordnet: England und Wales

ABB. 3. Entwicklungsmodell von Verbreitungen nach Stadtgrössen nach B. J. L. Berry

ABB. 4. Klassifikation städtischer Geschäftsstrukturen nach B. J. L. Berry

ABB. 5. Hypothetische Qualitätsunterschiede in Einkaufszentren

ABB. 6. Ein Entwicklungsmodell hierarchisch geordneter Untersysteme von Einkaufszentren

ABB. 7. Modell charakteristischer Eigenschaften in Einkaufszentren nach B. J. Garner

ABB. 8. Das Zentralgebietmodell: Kern-Rahmen (nach E. Horwood und R. Boyce, 1959)

ABB. 9. Ein Strukturmodell der Kernstücke von Einzelhandelsangeboten im Zentralgebiet

ABB. 10. Einzelhandelsstrukturen im Zentralgebiet Coventrys

(a) tatsächliche Verbreitung

(b) theoretische Muster

ABB. 11. Hypothetisches Modell charakteristischer Züge des Handels im Zentralgebiet. Platzierung von Spezialgeschäften: A. höchster Qualität; B. mittlerer Qualität; C. niedriger Qualität