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DELIMITING THE CENTRAL AREAS OF WEST EUROPEAN CITIES: THE EXAMPLE OF COLMAR

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Starting from North-American and British theory and methods, the article aims to investigate whether a central area can be satisfactorily delineated in a medium sized West European city with an important historical legacy in the form of its morphology. Data was collected in Colmar, France, by a group of 30 students, through direct observation and through the interpretation of aerial photographs. Density of plot use is investigated in terms of height of building and percentage of built-up area. Attention is paid to the type of land use to recognize a concentration of central functions, during which the vertical component in the use of storeys is not neglected. An attempt is made to delineate the central commercial district. Finally attention is paid to the age of buildings, historical appearance and conservation legislation and its possible influence upon land use.

Introduction

The concept of central area has been a major obsession of urban geographers for many years. The remarkable concentration of many urban functions in a small part of the central city, its distinctive morphological character deriving both from the intensity of its use and the continuity of its functions over time, together with its emotional and symbolic importance, all justify such an obsession. Small wonder that the central area has been seen as, „the primary focus of urban service facilities, around which the subsequently developed intra-urban service systems are arranged“ (Herbert and Thomas, 1982), and as „the organizing centre about which the rest of the city is structured“ (Carter 1981). In the North American city in particular the functional and morphological distinction between the central area and the rest of the city has always been particularly sharp. It is not surprising therefore that attempts to analyse the structure and delimit the extent of central areas has come mainly from the United States.

When looked at more closely the concept has proved to be more amorphous both in terms of selecting the definitional criteria, and using them in an

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attempt to demarcate the area in practice. We are still in search of, „an efficient and general method whereby the C. B. D. may be delimited objectively“ (Carter and Rowley 1966). Three related conditions are generally involved in such attempts, with different studies selecting different aspects of the triad for attention. Bid-rent theory was developed by Alonso (1960) among others, on the assumption that land values were the principal determinant of land use in a free market, and that centrally located land was by definition in limited supply which together with high levels of demand, allowed the main definable characteristic of the central area to be land price. In practice it was usually easier to focus on land use, if only because of its visibility to the researcher compared with less easily obtained land values, and to use selected land use criteria to delimit the central area,

Whether in terms of the Central Business District {pioneered by Murphy and Vance 1954}, retailing core {see inter alia Pallier 1982} or other land use description. This functional approach suffered from the problem of logical circularity, in that the central area was delimited in terms of the presence of functions which themselves were identified as proper to the central area because of their presence in it. The third approach considered the link between land value and land use through accessibility, the assumption being that demand for central area sites is determined by the users' need for accessibility and their willingness to pay for it.

To enumerate the conceptual problems of central area delimitation, whether approached from the side of land values or accessibility does not deny the practical usefulness of this sort of urban spatial differentiation, which has been demonstrated in a copious literature in the last 20 years. Attempts, however, to use many of the techniques of delimitation in West European cities have met with many problems. Functional differentiation is frequently not so sharp as in the American archetypes leading to the rather curious situation that applications of the familiar Murphy/Vance CBD delimitation techniques in some medium sized West European cities have failed to discover a CBD at all (Barrett 1973). This lack of a pronounced functional segregation has generally been considered to result from either a higher degree of functional inertia, or a different social valuation of the urban environment, which in particular has encouraged a substantial inner urban residential function. One American definition of the CBD even used the absence of a permanent residential population as a criteria (Herbert and Thomas 1982). Thomas' study of central areas in British cities effectively abandoned the idea of a CBD with its reliance on the definition of central functions, in favour of including a much broader range of possible urban activities in defining a more amorphous central area, as being more appropriate to the West European city.

A second important distinction is formal, as well as functional. The patterning of streets, blocks and buildings, and the architecture of the structures themselves has been inherited from the past. The argument is not that the Western European city has more historical artefacts as such, but that the historical forms are valued and protected by legislation, which in turn effects land use. The central area is, „the link between the past and the present since it usually coincides with that part of the city which has been occupied, either continuously or in part, since the first settlers made the decision to use the site“ (Daniels 1982). It has been suggested by Lambooy (1982) that the Alonso

assumption that land value is a determinant of land use, a construct that underpins American thinking on central area delimitation, is not merely a simplification of the situation in the West European context, but may well be reversed. The possible use of a building, which may be constrained by the physical possibilities offered by the building and by the land use designation that the planners have allocated to it, will in practice determine the land value, rather than vice-versa. If use is a major determinant of value then central areas of West European cities are likely to be substantially different from their North American equivalent. Not only are large areas of central land in the non-market sector, but the functions of much of the rest will at least in part be determined by planning decisions and popular sentiment.

The simple purpose of this paper and of the exercises upon which it is based, is to see if a central area can be satisfactorily delineated in a medium sized West European city with an important historical legacy in the form of its morphology. Such a delineation will in turn demand the selection of criteria and of analytical techniques to investigate these criteria.

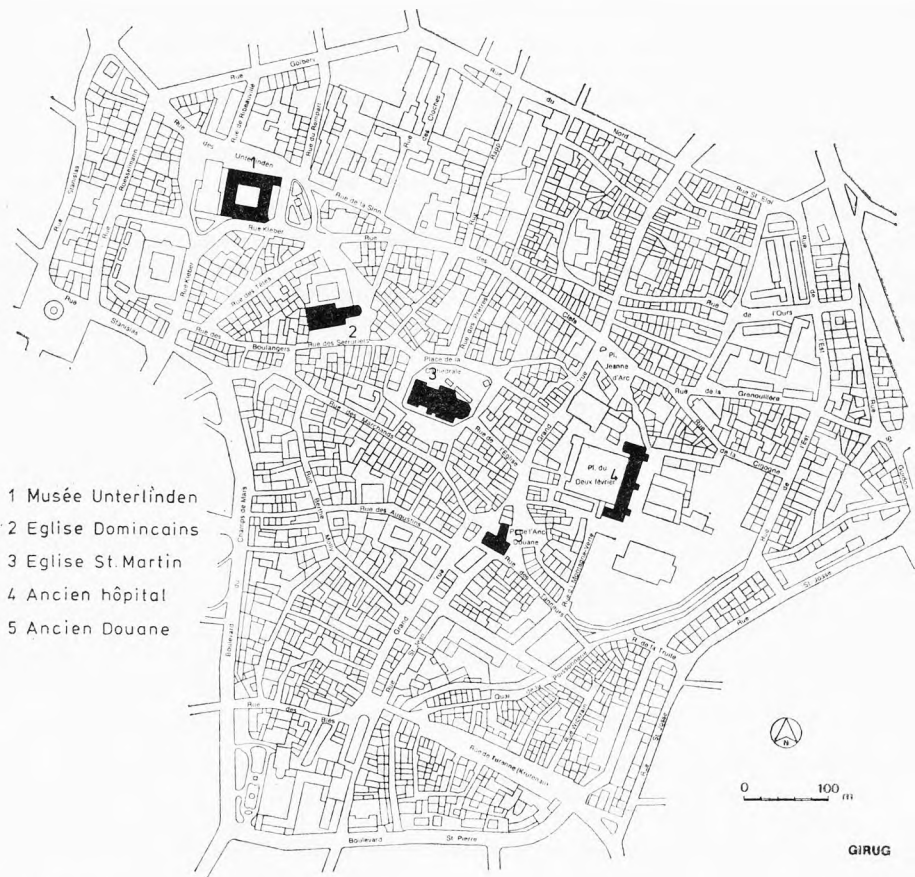
At a more fundamental level the purposes of the original exercises in Colmar were both academic and pedagogical in that the city was being used as a laboratory in order to teach students research methods and problems and to investigate the validity and reliability of student collected data. In academic terms the objectives are applied rather than theoretical, with the existing stock of theoretical ideas being sifted for applicable techniques. Theory and application can, of course, never be so conveniently separated, and it is to be hoped that our attempts to put into practice, in a particular city, some general concepts and techniques derived from elsewhere, may serve to modify such concepts or at least to bring into question their universal applicability.

Data Sources

The obvious and fundamental data need in any such work is information on the use, value and accessibility, to return to the basic triad, of building plots. The difficulty of obtaining such information is, no doubt, an explanation of the very limited empirical literature on such applications. The information is frequently just not available, either because it does not exist, such as land value data, exists but is inaccessible, such as many taxation surrogates for land value, or exists but in such profusion as to deter its collection, such as land use information. Three main methods of data collection were considered:

- the use of already collected and published information in the form of lists, or print-outs,
- the use of direct observation,
- the use of indirect observation.

The first relies on the chance occurrence of usable and accessible data and is not without its own problems of validation. In practice this possibility at the scale of analysis required did not exist here. Direct observation presents problems principally of organization and of definition, but is capable of generating large quantities of information if a skilled enough labour force is available to undertake it. Indirect observation, in this case though aerial photographs, is an alternative data gathering technique which provides large quantities of information with a relatively small expenditure of labour. The main



Map 1. Colmar: Inner city.

problems arise in the interpretation and analysis of the information, and in the innate restrictions on what can be registered through a camera lens.

The following analysis, therefore, uses data collected by the direct observation of 30 undergraduate students in 1980 (Ashworth and Schuurmans 1982) and obtained from 1:30 000 vertical aerial photographs taken in 1979. In so far as an overlap in information occurs then an element of verification is also present.

The Central Area of Colmar

1. Density of plot use

An obvious reaction of the occupiers of land would be to vary their intensity of use of a given plot directly with the value of that plot, in order to obtain a sufficiently high return to meet the bid-rent demanded. This may be reflected in the height of buildings. „In a physical sense the city centre embraces



Fig. 1. Height of building from observation (in storeys).

an intensity of land use and a vertical component in its development which is unrivalled elsewhere in the city" (Daniels 1982).

Fig. 1 shows an attempt using observational information to average the height of buildings in terms of the number of storeys above ground level. The crudity and practical difficulties of calculating such isolines is to some extent improved by the use of vertical aerial photographs (Fig. 2). The scale of these was inadequate to allow individual storeys to be counted, although using a different scale this is frequently possible, the height of buildings above ground level was measured with the help of paralax bars, for the middle point of each grid square and as a moving average.

The fact that the land value surface does not seem to be reflected as strongly as expected in the building height pattern may be accounted for in two ways. Their have been legal restrictions on the height of buildings, imposed for pur-

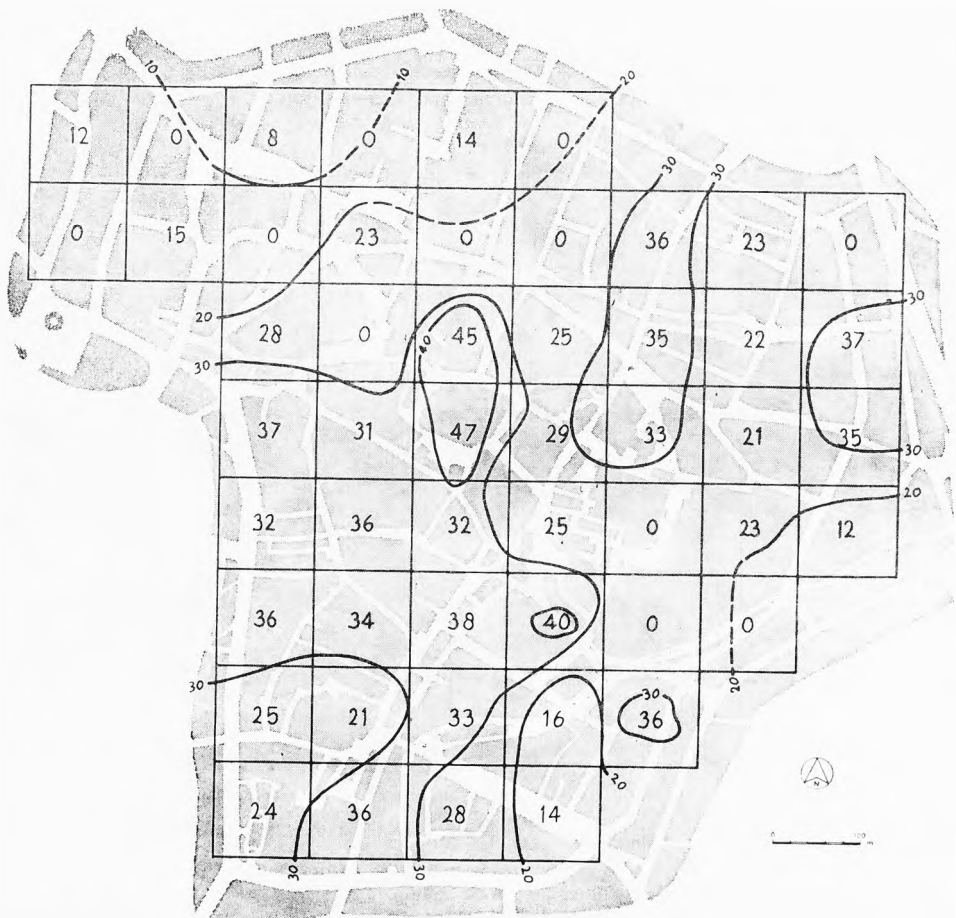


Fig. 2a) Height of building from aerial photographs. Height of middle point (in metres).

pose of urban conservation even before the designation of the secteur sauvegarde in 1966, with the result that the new buildings just beyond the secteur boundary, e. g. the Cours Ste Anne development tend to be higher than those within it. Alternatively it may be that the expected highly peaked land value surface itself does not exist, or that a high intensity of plot use has been obtained in ways other than building height as such. Measures of plot occupancy in terms of the proportion of plot area in use for buildings does in fact show a stronger tendency towards central peaking. Fig. 3 shows a measure of the intensity of land occupation obtained by calculating the area of usable buildings floors as a proportion of the total land area, from information obtained by observation. Fig. 4 shows the proportion of each cell that is built-up, regardless of the number of storeys that comprise that building (or, to put it



Fig. 2b) Height of building from aerial photographs. 3X3 moving average (in metres).

another way, if subtracted from 100 it shows the amount of open space remaining in the cell). This information was calculated from aerial photographs in terms of a moving average. A regular grid of points was used to establish built-up, as opposed to non-built-up, areas. Although both figures show a stronger tendency towards central peaking than building height alone, the difference between the results of the two techniques reveals a distinction between the densely built-up older core (in one central cell only 8 % of the land area is without buildings), and the parts of the northern and western periphery where space has been exploited in a different way. The Cours Ste Anne development to the north of the central area for example which figured prominently in the height patterns does not appear as having a markedly higher density of plot occupancy than the older buildings around the cathedral. Modern planning practice requires large areas of open space which to an extent compensates

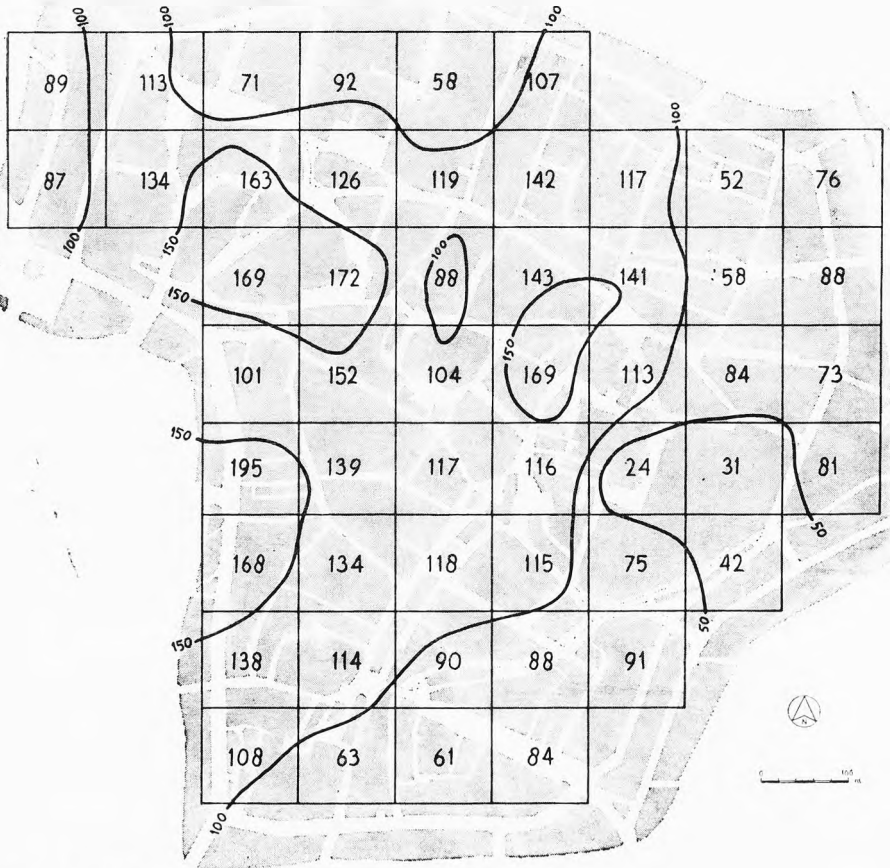


Fig. 3. Land use intensity from observation.

for the height of the buildings, to produce an intensity of land use lower than that found in areas in the historic core with more modest but older buildings. Similarly the higher building along the Rue Stanislas produces extensive usable floor areas, without an unduly dense occupation of the site.

2. Type of land use

The type as well as the intensity of land use has been fundamental to the idea of the central area as containing a Central Business District and fulfilling a function as a location of specialized services within a city, or city-region, wide hinterland. Information on land use was obtained by observation of each storey in each building. Two main problems arose in the collection of the data. The physical difficulty of observing the use of cellars and attics and buildings inaccessible from the public street, and the methodological difficulty of devising a functional classification.

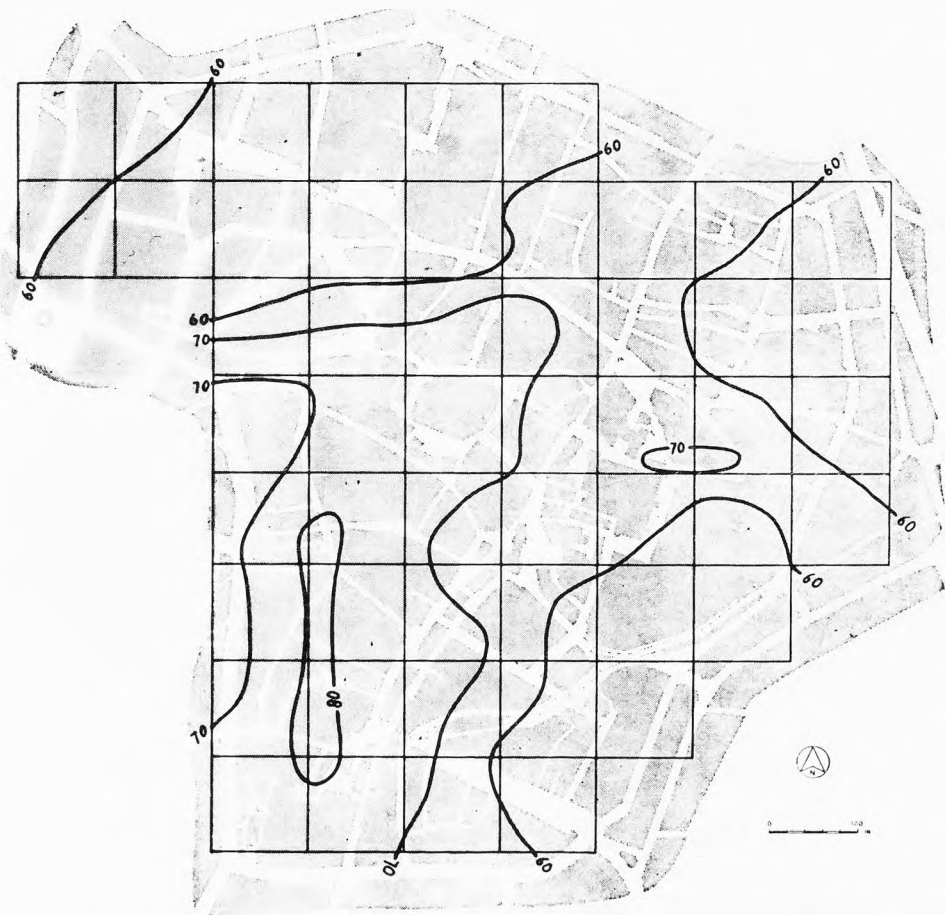


Fig. 4. Land use intensity from aerial photographs.

In practice given the purposes of the exercise neither problem was of critical significance. A sixfold classification of land uses (housing, commerce, financial services, industry and public buildings and empty) was sufficient for the attempt to identify concentrations of central as opposed to ubiquitous urban functions, and public accessibility is a pre-condition of the patterns we were attempting to identify.

The data were then arrayed in order to answer the question, „Is there a recognizable concentration of central functions?“. The attempt to generalize away from the building by building classification to reveal a broader pattern leads to the use of 100 m grid squares, but the problem arises of the identification of dominant land uses within a given square with the use of relatively arbitrary cut off points. A solution was found in a land use combination technique developed from agriculture where the same problem of identifying do-

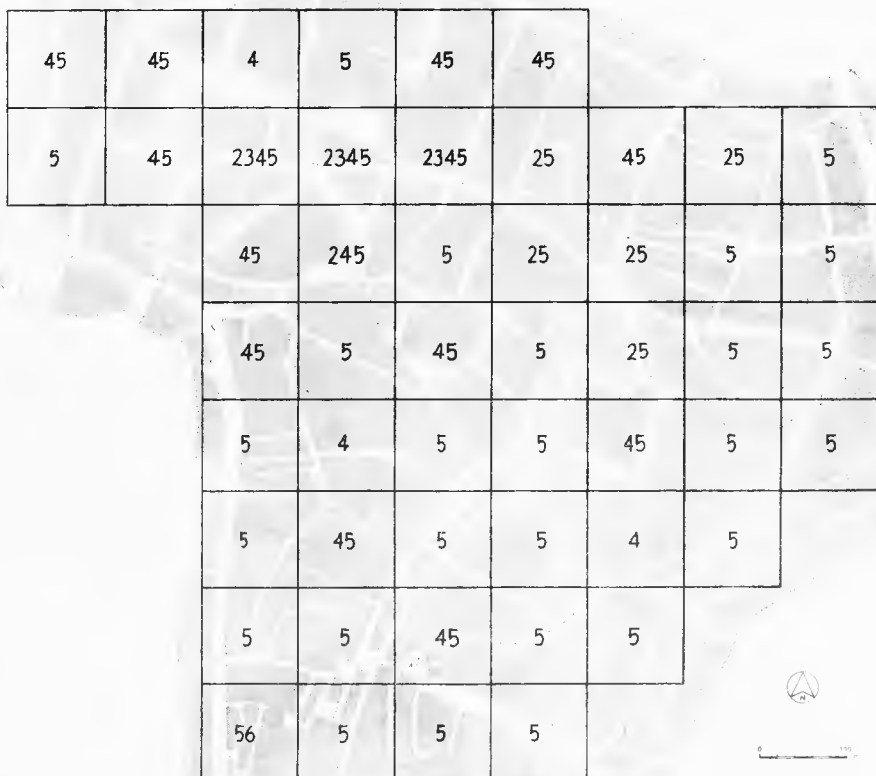


Fig. 5. Land use combinations (all storeys).

Key (for Figs. 5 to 8). 1 — industry and wholesaling, 2 — commerce, 3 — finance, 4 — public buildings, 5 — housing, 6 — empty.

minant crop combinations has arisen. The technique developed by Varley [1968] in Manchester effectively checks each possible combination of land uses in a grid square through a least squares calculation until a best fit is obtained.

The results (Fig. 5) demonstrate the multifunctional nature of the central area as a whole, and the tendency for the squares in the inner core to be even more multifunctional than those on the periphery. Indeed it is only on the periphery that unfunctional areas occur at all with some public building areas in the north and a ring of housing areas around the eastern and southern edge. The northern half of the inner core, the streets between the Cathedral and the Rue des Clefs, has commerce and housing as consistent members of 3—5 land use type combinations, joined intermittently by financial and public

1245	2345	4	2	24	45			
234	24	23	234	2346	24	24	12456	5
		24	124	2	2	25	156	45
		12456	2	24	2	24	145	145
		25	245	2	25	4	5	15
		156	2346	2	25	4	5	
		5	25	45	256	5		
		45	15	245	256			

Fig. 6. Land use combinations (ground floor).

services. The southern half of the inner core, however, tends to be less varied with housing forming the main component of 2-4 type combinations. Such land use combinations give an indication of the sort of functional mix found in a particular square, but are calculated on the basis of the use of all building storeys. The question now clearly arises of whether the multifunctional appearance of the grid squares is only a result of aggregating what are effectively unifunctional storeys in the calculation. Carter's (1981) suggestion that the land value surface will vary upwards as well as outwards from the peak value point, with resulting land use changes, should be relatively easy to test. Figs. 6-8 show the best fit land use combinations for ground, first, and subsequent floors respectively. Two main conclusions can be drawn. The hypothesis of changing land use with height above street level is substantiated with a clear substitution of commercial for residential uses with increasing height. The commercial area can be seen to contract in the face of housing, and to

45	45	4	25	245	45			
245	245	235	2345	23456	245	245	12456	5
		245	245	25	25	25	56	5
		123456	25	245	2456	25	5	15
		5	45	25	25	45	5	56
		56	3456	256	5	4	5	
		5	5	45	56	5		
		256	256	45	256			

Fig. 7. Land use combinations (first floor).

a lesser extent other land uses with successively higher storeys, maintaining a presence in the highest case only in the heart of the commercial core, along the Rue des Clefs. In addition the amount of multifunctionality present is much less in the aggregate block calculation of Fig. 5. One or two use combinations dominate with multifunctionality declining upwards from street level (Table 1). There is still too much detailed information to produce the clearly delineated central business district expected from the conventional model. Two further attempts to draw such a boundary can be considered. Traditional CBD analysis depends upon the distinction between central business functions and non-central business functions. There is no entirely satisfactory method of doing this, but observing a simple distinction between residential and non-residential functions may have much the same effect. Fig. 9 is surface based on the grid cell percentages of commercial as opposed to all land uses in terms

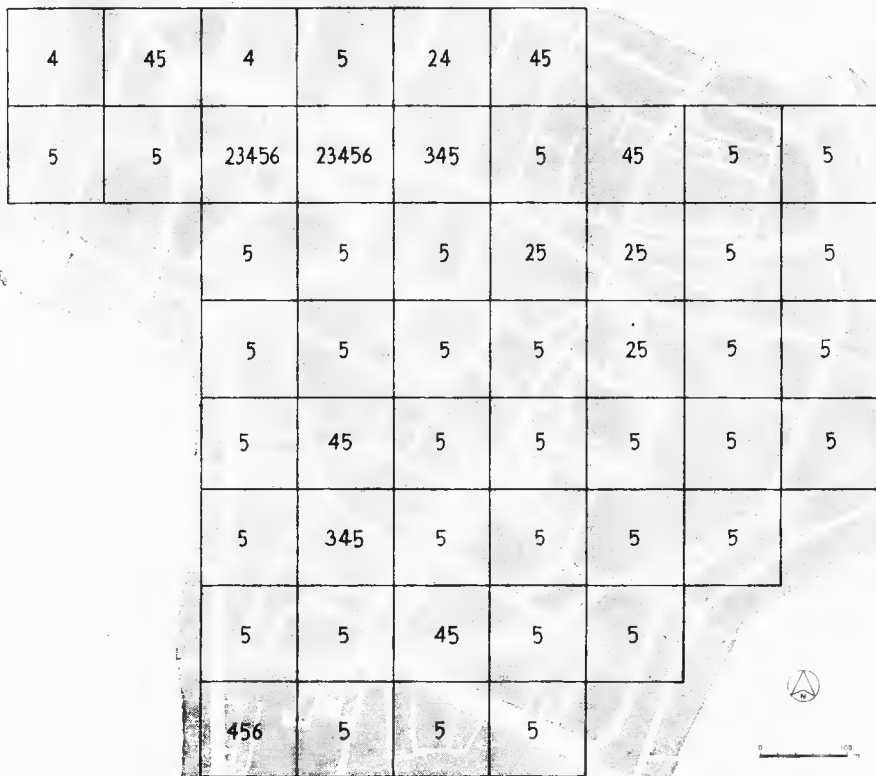
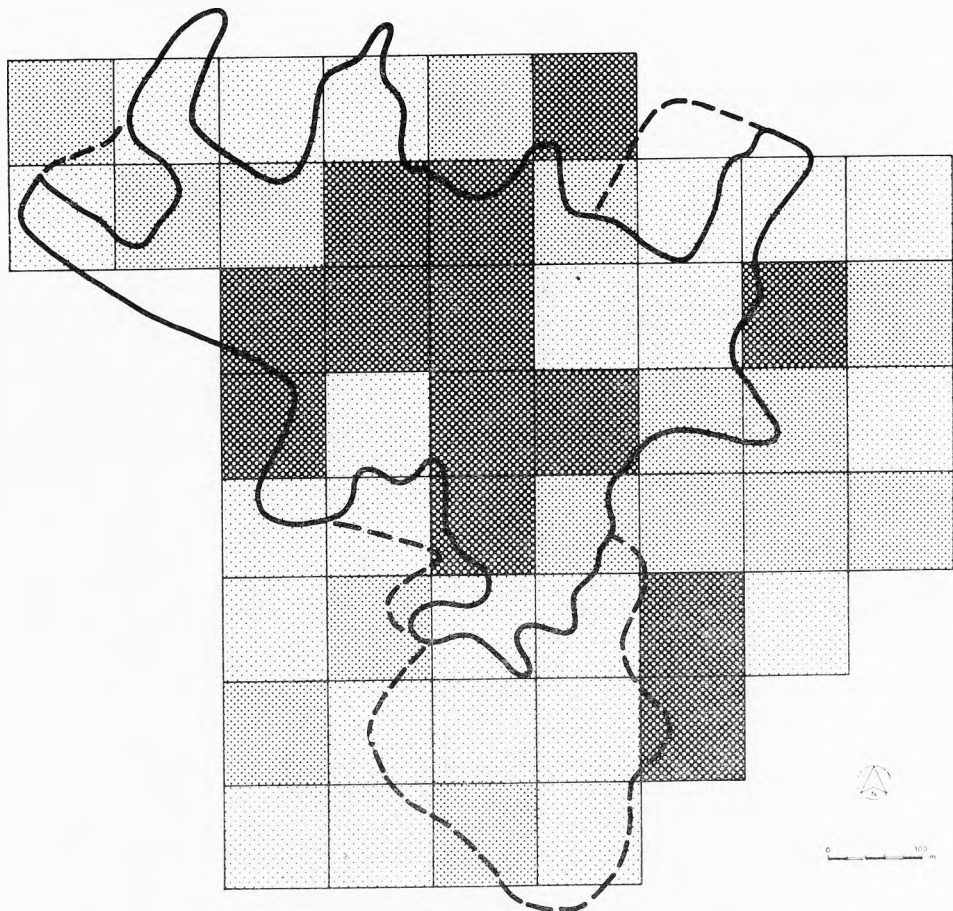


Fig. 8. Land use combinations (second and subsequent floors).

Table 1. Land Use Combinations by Storey

Number of Land Use Combined	Number of Cells:			
	Ground Floor	1 st Floor	2 nd Floor	All Floors
1	15	29	37	12
2	19	18	9	20
3	11	1	3	13
4	4	3	0	3
5	2	0	2	2
6	0	0	0	1



- | | | | |
|----|--|----|--|
| 1. | | 4. | |
| 2. | | 5. | |
| 3. | | | |

Fig. 9. Percentage of non-residential land use.

1 — 0—40, 2 — 41—60, 3 — 61—100, 4 — commercial zone according to the 50 m criterion, 5 — commercial zone according to the 100 m criterion.

of the total area occupied. Three zones of high non-residential land use stand out, a south — eastern and south — western public service quarter, and a north — central zone that is dominated by retailing and non-governmental offices.

In an attempt to separate retailing from other non-residential functions and to concentrate on the boundaries of zones rather than on their variations in intensity, further and even more abrupt technique was considered. The com-



Fig. 10. Age of building combinations.

1 — before 1871, 2 — 1871—1919, 3 — 1920—1945, 4 — 1946—1970, 5 — since 1970.

mercial functions at ground floor level were assumed to form a continuous area and the boundary of the central commercial district was assumed to occur when that continuity was broken by a gap of 50 m. Sharply bounded regions (Fig. 9) are thus produced, again emphasising the shopping district bordered on the south by the Rue Berthe Molly, on the east by the Grand Rue and on the west by the Rue Stanislas/Boulevard de Champs de Mars axis, but with a ragged northern boundary caused by northwards extensions off the Rue des Clefs such as the Rue Vauban and Cours Ste Anne. A relaxation of the limit to 100 m adds what might be termed a supplementary shopping area to the south, as far as the Boulevard St. Pierre and to a lesser extent in the north.

3. Age of buildings

A distinguishing characteristic of the central area of the West European city

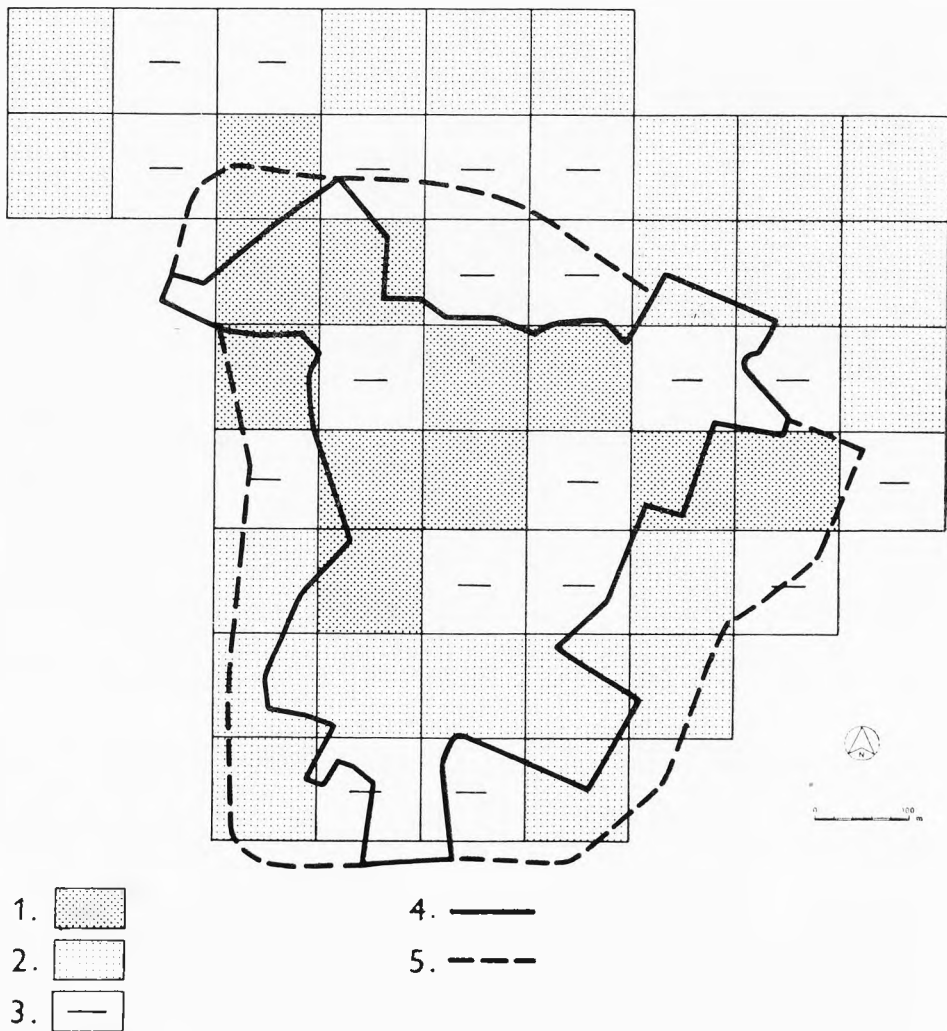


Fig. 11. Historical appearance.

1 — „historical“, 2 — „non historical“, 3 — „uncertain“, 4 — „secteur sauvegarde“ (1966), 5 — extension of „secteur sauvegarde“ (1972).

is its inherited patterns of old buildings, and the valuation placed upon them, reflected in planning policies, which in turn has consequences for the functioning of the central area and the management of its land uses. The distribution of three elements are considered here; the age of buildings, the historical appearance of buildings, and the spatial impacts of conservation legislation. The three, although obviously related do not necessarily coincide.

a) The map of the building age of individual structures is necessarily a so-

mewhat confused mosaic and for our purpose generalization was necessary. Again a least squares technique produces an idea of the dominant time period combinations within a grid, enabling the important age characteristics, at least in terms of percentage land area occupied, to be appreciated (Fig. 10).

- b) Historical appearance is to an extent a subjective concept and although of course deriving from the age of buildings is not the same, depending as it does on a popular reaction to what is thought of by citizens and visitors as historical. The justification for including this aspect is that it is this historical appearance that is a valued attraction of cities like Colmar. The result (Fig. 11) is easy to interpret, with a historically appearing core, being surrounded by a non-historical periphery. A comparison between age and historical appearance, effectively between image and reality, shows an expected agreement on the centre and the outer periphery, but leaves an indeterminate zone in which the image is uncertain.
- c) The third element is easy to map and is the legislative reaction to the first two. The boundaries of the secteur sauvegardé of 1966, and its 1977 extension, have been superimposed on Fig. 11. They accord, not unexpectedly with the age of buildings, but not so completely with historical appearance, especially in the southern part of the central area. A comparison between Figs. 10 and 9 allows the idea to be examined that in the medium sized West European city the conserved historical core is also the central commercial district. Although there is a good deal of overlap, there does appear to some differentiation between the southern half of the central area, from the Cathedral to Petite Vénise in which conservation is dominant, and the northern half which is, at least in part, outside the conservation area that forms the commercial core. There is also some indication of differentiation within retailing with the popular multiple stores concentrating in the northern sectors, leaving the shops in the central part of the conservation area, and especially its pedestrianized sector dominated by smaller piece goods and speciality shops including those serving a tourist clientele.

Conclusions

The central areas of medium sized West European cities are composed of formal and functional elements, both of which are important in the creation of the distinctiveness of such areas. That fairly obvious point needs stressing because many of the explanatory models are based only on function. The West European city is characterised not merely by the distribution of particular functions but also by the age of the building forms. Many of the best used models of urban land use fail to incorporate this simple but important characteristic of the West European city. The problem of defining and then explaining the segregation of land uses cannot concentrate exclusively only on the functional aspects and relegate the morphological features to mere resultants of economic and social processes.

The assumption that form results from land use which in turn is a response to land values is too simplistic in a historical city. In Colmar it is clear that the value placed on existing forms has influenced the sort of land uses evol-

ved as well as the way building plots are exploited. Secondly it is clear that the degree of multifunctionality present makes the delimitation of functional zones more a matter of subtleties in the land use mix, than unfunctional areas. Thirdly accessibility becomes more difficult to interpret at the micro scale, and its variable impact upon land uses more intricate. Accessibility to upper floors for example may be directly from the public road, or through the ground floor, while even at street level variations in accessibility resulting from the shapes of building blocks and the structure of streets, and from legal restrictions on vehicular access, will begin to be important.

It is clear that work on the patterning of land uses, while a necessary beginning to an understanding of the central area of cities, has distinct limitations. The explanations of the existing situation, and an understanding of the processes of change, will depend on a much fuller investigation of the behaviour of land users, of those influencing the land use decisions and the structures within which those decisions are made than was possible here. The series of seven articles, introduced by Beaujeu-Garnier in 1982 „*Annales de Geographie*“, outlined the course that such future studies of the processes behind the patterning of land uses might take in the French city.

In Colmar in particular the relationship between tourism and the conserved city is still very imperfectly understood, as is the relationship between retailing, conservation and tourism.

Similarly the importance of the residential function within the central area poses questions about the relationship between social change and urban renewal, and the operation of social segregation in spatial terms.

Finally the multifunctionality that we have stressed has resulted in an agreeable environment for living. An accessible and viable commercial centre is combined with a conserved, refurbished, and, where necessary replaced, urban form. The treats to this balance, are however equally obvious. Growing tourist demands, unpredictable changes in retailing, changes in both the supply of, and demand for housing in the central area, a continuing shift in transport demand in favour of the private motor car, make it important to determine which particular combination of land uses, and which relationship to the existing built environment, is necessary to maintain this harmony into the future.

Acknowledgements

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ДЕЛИМИТАЦИЯ ЦЕНТРАЛЬНЫХ ЗОН ЗАПАДНОЕВРОПЕЙСКИХ ГОРОДОВ НА ПРИМЕРЕ ГОРОДА КОЛЬМАР

Несмотря на то, что понятие центральной зоны города относится к основным понятиям географии городов, большинство попыток произвести анализ структуры и выделение центральных зон сделано североамериканскими географами. Это обстоятельство создает не малые проблемы, касающиеся дефиниций и делимитации центральных зон при аппликации этого понятия к западноевропейским городам, для которых функциональная дифференциация является не столь четкой и для которых присуждается важное значение историческим строительным формам.

Цель данной статьи — избрать и рассмотреть критерии и исследовательские техники делимитации центральных зон для средне крупных западноевропейских городов, отличающихся значительным историческим наследством. В качестве объекта изучения избран город Кольмар, расположенный в восточной Франции, на территории Эльзасского региона. Основные данные получены из существующих официальных материалов, а также в результате прямых (т. е. полевых) и косвенных (т. е. фотограмметрических) наблюдений. Использование всех этих техник рассмотрено в статье.

Для данного экспериментального изучения избраны и определены три характерные черты центральной зоны:

— интенсивность использования земли, определяемая разными способами с учетом существующей структуры застройки;

— типы использования земли, описываемые посредством классификационной системы комбинаций использования земли;

— возраст зданий, описываемый при помощи их исторического возраста, субъективного взора и статута по охране исторических памятников.

В заключении статьи подчеркивается важность применения морфологических и функциональных критериев, применяемых для делимитации центральных зон. Большое значение при этом придается многофункциональному использованию земли и методам его измерения. Наконец статья призывает к более лучшему пониманию композиционной структуры западноевропейских городов, если нужно удовлетворять современным требованиям без нарушений ее современного гармонического равновесия.

Табл. 1. Комбинации типов использования земли по этажам.

Карта 1. Кольмар: центральная часть города.

- Рис. 1. Средняя высота зданий по результатам полевых обследований (число надземных этажей).
- Рис. 2а. Высота зданий по аэроснимкам. Высота (в метрах) в центре квадрата.
- Рис. 2б. Высота зданий по аэроснимкам. Скользящее среднее (в метрах) для 3 × 3 квадрата.
- Рис. 3. Интенсивность использования земли по результатам полевых обследований.
- Рис. 4. Интенсивность использования земли по аэроснимкам.
- Рис. 5. Комбинации типов использования земли (все этажи).
- Рис. 6. Комбинации типов использования земли (первый этаж).
- Рис. 7. Комбинации типов использования земли (второй этаж).
- Рис. 8. Комбинации типов использования земли (третий и последующие этажи).

Легенда (общая для рис. 5, 6, 7 и 8):

1 — промышленность и оптовая торговля, 2 — розничная торговля, 3 — финансовые учреждения, 4 — общественные здания, 5 — жилые здания, 6 — незастроенная территория.

- Рис. 9. Доля территории (в %), используемой для другой функции, чем для жилой.
1 — 0 — 40, 2 — 41 — 60, 3 — 61 — 100, 4 — торговая зона по критерию 50 м, 5 — торговая зона по критерию 100 м.
- Рис. 10. Комбинации возраста зданий.
1 — до 1871 г., 2 — с 1871 по 1919 г., 3 — с 1921 по 1945 г., 4 — с 1946 по 1970 г., 5 — после 1970 г.
- Рис. 11. Оценка зданий с исторического аспекта.

1 — „исторические“ здания, 2 — „не исторические“ здания, 3 — здания неопределенного возраста, 4 — сектор охраняемых исторических памятников в 1966 г., 5 — расширение сектора охраняемых исторических памятников в 1972 г.

Перевод: Л. Правдова

G. J. Ashworth, J. de Vries

DELIMITÁCIA CENTRÁLNYCH ZÓN ZÁPADOEURÓPSKÝCH MIEST NA PRÍKLADE MESTA COLMAR

Hoci pojem centrálnej zóny mesta patrí medzi základné koncepcie geografie miest, väčšina pokusov o analýzu štruktúry centrálnych zón a o vymedzenie ich rozsahu pochádza od severoamerických geografov. Táto skutočnosť vyvoláva nemalé problémy týkajúce sa definície i delimitácie centrálnych zón pri aplikácii tohto pojmu na západoeurópske mestá, v ktorých funkčná diferenciácia nie je taká výrazná, a kde sa pripisuje vysoká hodnota historickým stavebným formám.

Cielom tejto štúdie je vybrať a preskúmať kritériá a výskumné techniky delimitácie centrálnych zón v stredne veľkých západoeurópskych mestách s významným historickým dedičstvom. Ako objekt štúdia bolo zvolené mesto Colmar ležiace vo východnom Francúzsku na území Alsaského regiónu. Dáta sa získali z existujúcich úradných materiálov, a tiež z priameho {t. j. terénneho} a nepriameho {t. j. fotogrametrického} pozorovania. Využitie všetkých uvedených techník je prediskutované v štúdiu.

Pre toto experimentálne štúdium sa vybrali a definovali tri charakteristické črty centrálnej zóny:

- intenzita využitia zeme, definovaná rôznym spôsobom vzhľadom na existujúcu štruktúru zástavby,
- typy využitia zeme, opísané prostredníctvom klasifikačného systému kombinácií využitia zeme,
- vek budov, opísaný pomocou ich historického veku, subjektívneho vzhľadu a štatútu pamiatkovej ochrany.

Záverom štúdia zdôrazňuje dôležitosť používania morfológických i funkčných kritérií delimitácie centrálnych zón. Veľký význam sa pritom pripisuje mnohofunkčnému využitiu zeme a metódam jeho merania. Nakoniec štúdia vyzýva k väčšiemu porozumeniu kompozičnej štruktúry západoeurópskych miest, ak sa má vyhovieť moderným požiadavkám bez narušenia jej súčasnej harmonickej rovnováhy.

Tabuľka 1. Kombinácie typov využitia zeme podľa podlaží.

Mapa 1. Colmar: vnútorné mesto.

Obr. 1. Priemerná výška budov podľa terénneho výskumu (počet nadzemných podlaží).
Obr. 2a) Výška budov podľa leteckých snímok. Výška v strede štvorca (v metroch).
Obr. 2b) Výška budov podľa leteckých snímok. Kľavý priemer, 3×3 štvorce (v metroch).

Obr. 3. Intenzita využitia zeme podľa terénneho výskumu.

Obr. 4. Intenzita využitia zeme podľa leteckých snímok.

Obr. 5. Kombinácie typov využitia zeme (všetky podlažia).

Obr. 6. Kombinácie typov využitia zeme (prízemie).

Obr. 7. Kombinácie typov využitia zeme (prvé poschodie).

Obr. 8. Kombinácie typov využitia zeme (druhé a vyššie poschodia).

Legenda spoločne pre obr. 5, 6, 7 a 8:

1 — priemysel a veľkoobchod, 2 — maloobchod, 3 — peňažníctvo, 4 — verejné budovy, 5 — bývanie, 6 — nezastavané územie.

Obr. 9. Podiel územia využívaného na iné účely ako bývanie (v %).

1 — 0—40, 2 — 41—60, 3 — 61—100, 4 — obchodná zóna podľa 50 m kritéria, 5 — obchodná zóna podľa 100 m kritéria.

Obr. 10. Kombinácie veku budov.

Legenda:

1 — pred r. 1871, 2 — 1871—1919, 3 — 1920—1945, 4 — 1946—1970, 5 — po r. 1970.

Obr. 11. Hodnotenie budov z historického hľadiska.

Legenda:

1 — „historické“ budovy, 2 — „nehistorické“ budovy, 3 — neurčité zaradenie, 4 — pamiatkovo chránený sektor v r. 1966, 5 — rozšírenie pamiatkovo chráneného sektora v r. 1972.