

The concept of the morphological region: developments and prospects

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***Abstract.** Over recent decades, the historico-geographical approach has been established as one of the main morphological frameworks to describe, explain, and prescribe the physical form of cities and to understand how this form is continuously shaped by different agents and processes over time. Within this approach the concept of morphological region – and the method of morphological regionalization – stands as one of the most important in recognizing the historico-geographical structure of the urban landscape. While the relevance of the concept has been demonstrated in a number of applications in different geographical and cultural settings, this paper identifies and addresses some major challenges that the concept has been facing. In particular, it argues for a stronger linkage between each regionalization and the historico-geographical body of knowledge, for clearer usage of language and terminology in each application to facilitate the shared construction of a more robust method, and for a more explicit and systematic definition of procedural options and steps.*

Keywords: morphological regions, morphological regionalization, historico-geographical approach, urban form, urban morphology

The relevance of urban morphology as a field of knowledge can be demonstrated from many perspectives. Barke (2018) argues for a threefold point of view – philosophical, cultural and practical. First, urban morphology can offer an accurate and precise description of the urban landscape, making sense of the world. Secondly, it can reinforce the meaning and significance of that landscape, promoting identity and a sense of belonging. Thirdly, urban morphology teaches both what not to do and how to do things better.

Based on the seminal work of M. R. G. Conzen from the late 1950s onwards, and promoted mainly by Whitehand from the 1970s, the historico-geographical approach has become one of the most important within

the field of urban morphology (Oliveira, 2019). Within this approach, the concept of the morphological region, and the method of morphological regionalization, stands out as one of the most important in recognizing the historico-geographical structure of the urban landscape.

While the relevance of the concept has been demonstrated in a number of applications, its use, not only by urban morphologists but also by academics outside the field and by practitioners, could be facilitated by a number of aspects. Three interrelated aspects deserve special attention. The first aspect is comparison. Does the common ground between different ‘regionalizations’ enable effective comparison or, on the contrary, are these studies

focused on the ‘particular’ and ignoring the ‘general’? A robust concept of the morphological region and a robust method for its identification in the urban landscape do exist. It is fundamental that each researcher, before deciding to apply the concept and the method, should be familiar with its origins, main developments and the most recent advances (a framework or body of knowledge), not only for their study to be as accurate as possible in the exploration of the specificities of the case study, but also to be able to, ultimately, contribute to development of the concept and/or method.

The second aspect is terminology. This paper compares a number of applications of the concept of ‘morphological region’, or of variations of the concept, sometimes under a different term. Perhaps the most significant difference in these is the use of ‘plan unit’ instead of ‘morphological region’. In this case, not only the term is different but so too are the form complexes addressed in the analysis: the town plan in the former (see Conzen, 2018, for a review of town-plan analysis); the town plan, the building fabric and the building and land utilization in the latter. The use of a term that would be more understandable by a wider audience is considered by some authors who, for example, adopt the term ‘townscape’ or ‘urban landscape’ (region or unit) instead of ‘morphological region’. While the rationale of these is evident, the advantages or the differentiation offered by other terms are not so clear – that is the case of ‘morphogenetic region’.

The third aspect is rigour of the methodological procedures. According to Kropf (2019), the significant contribution that urban morphology has made to the understanding of cities has been possible because it provides a rigorous approach to the study of urban form. Many papers on morphological regionalizations do not offer a rigorous explanation of how the method is used. A number of questions therefore arise. What is the purpose of the regionalization? What are the main criteria? In complex urban landscapes, how relevant must a physical difference be to support the relevance of a new division? While there

is not a straightforward line of application, can the sequence of steps be made explicit? How is each form complex being identified? Does it have a hierarchy? How is it mapped? How does each form complex contribute to the hierarchy of regions? How is the composite map of regions produced?

The main applications of the concept over six decades are now reviewed, leading to the definition of a number of general principles for more effective regionalizations. Table 1 gathers the main applications of the concept and synthesizes how each of these studies addresses the main challenges identified in the previous paragraphs: acknowledgment of and contribution to a relevant body of knowledge, clear terminology and explicit methodological procedures.

Applications of the concept

Defining the concept and method (1960–1989)

The concept of morphological region, or of plan unit to be more correct, was proposed by M. R. G. Conzen (1960) in his seminal study of the town-plan analysis of the Northumbrian market town of Alnwick (Table 1). Proposing a priority for the town plan (although this was intended to be the first of the three form complexes in Alnwick to be addressed in a series of publications) as a framework for the other human-made features, linked to the site and to the past existence of the town, Conzen defines the plan unit as an individualized combination of streets, plots and block-plans of buildings in a particular area of the town, having a morphological homogeneity that is distinct from its neighbours. He maps a four-tier hierarchy of units based just on the town plan (and not on the building fabric or on the land and building utilization). This reading of the urban landscape draws on the primary distinction between ‘Old Town and Inner Fringe Belt’ and ‘Outer Accretions’ (the two divisions of first order). It then proposes a set of plan divisions of: second order, distinguishing the fringe belts from the core and the residential accretions (the Roman numerals in the key of Figure 1); third order, corresponding to the

Table 1. Main morphological regionalizations

Identification		1. Framework		2. Terminology		3. Method		4. Contribution	
Year of publication	Researcher(s)	City/town	1.1. Main references (to other regionalizations)	2.1. Term	2.2. Reasons for the use of a different term	3.1. Criteria	3.2. Form complexes (identification, hierarchy, individual hierarchical maps)	3.3. Regions (hierarchy)	4.1. Main contribution(s)
1960	Conzen	Alnwick	Seminal work	Plan units	Focus on the town plan	Implicit	TP	4	Seminal work. Definition of the framework and of the concept of plan unit
1975	Conzen	Ludlow	Conzen 1960	Morphological regions	-	Implicit	TP (5), BF (5), LU (5)	5	First utilization of the three form complexes
1988	Conzen	Ludlow	Conzen 1960, 1975	Morphological regions (or townscape regions)	-	Explicit	TP (5), BF (5), LU (nh) Individual maps	5	First systematization of the method
1989	Whitehand	Amersham	Conzen 1975	Townscape units	Purpose of townscape management and conservation	Implicit	TP, BF, LU	nh	First study of a suburb
1991	Jones	Barnet Green, Edgbaston, Northwood	Conzen 1960, 1975, 1988; Whitehand 1989	Morphological regions	-	Implicit	TP, BF	3	Study of suburbs
1992	Baker and Slater	Worcester	Conzen 1960, 1988	Plan units (or morphological regions)	Focus on the town plan (particularly on plots)	Explicit	TP		Systematization of the method
1996	Barrett	Birmingham, Bristol	Conzen 1975, 1988	Townscape units (or townscape regions)	Purpose of townscape management and conservation	Explicit	TP (3), BF (3), LU (nh) Individual maps	4	Systematization of the method. First study of a major city

Continued/

Table 1. (Continued)

Identification		1. Framework	2. Terminology	3. Method	4. Contribution				
Year of publication	Researcher(s)	City/town	1.1. Main references (to other regionalizations)	2.2. Reasons for the use of a different term	3.1. Criteria	3.2. Form complexes (identification, hierarchy, individual hierarchical maps)	3.3. Regions (hierarchy)	4.1. Main contribution(s)	
			2.1. Term	2.1. Term	2.1. Term	2.1. Term	2.1. Term	2.1. Term	2.1. Term
1996	Kropf	Mennecey	Conzen 1960	Urban tissues	Synthesis of town plan and building fabric with <i>tessuto urbano</i>	Implicit	TP, BF	nh	First application into planning practice. First study outside Britain
2003	Barke	Antequera	Conzen 1975, 1988	Urban landscape regions (or morphological regions)	Purpose of townscape management and conservation	Implicit	TP, BF, LU	nh	First study on region delimitation by different agents (two types – one explicit, the other implicit)
2003	Zhang	Shanghai	Conzen 1988	Plan units	Focus on the town plan	Implicit	TP	5	First attempt to apply the concept in Asia. Study on region delimitation by different agents (three types)
2007	Bienstman	Alkmaar, Bromsgrove	Conzen 1975, 1988; Barrett 1996	Townscape regions	Purpose of townscape management and conservation	Explicit	TP (4), BF (4), LU (nh) Individual maps	4	Comprehensive discussion of the concept. First comparative study between areas in different countries.

Continued/

Table 1. (Continued)

Year of publication	Researcher(s)	City/town	1. Framework		2. Terminology		3. Method		4. Contribution
			1.1. Main references (to other regionalizations)	2.1. Term	2.2. Reasons for the use of a different term	3.1. Criteria	3.2. Form complexes (identification, hierarchy, individual hierarchical maps)	3.3. Regions (hierarchy)	
2007a	Whitehand and Gu	Pingyao	Conzen 1960	Plan units	Focus on the town plan	Implicit	TP	nh	First comprehensive application of the Conzenian approach in Asia
2007b	Whitehand and Gu	Beijing	Conzen 1988	Urban landscape units	Purpose of townscape management and conservation	Implicit	TP, BE, LU	2	Application in Asia. Study on region delimitation by different agents (two types)
2009	Whitehand	Sibiu		Plan units	Focus on the town plan	Implicit	TP	nh	Focus on boundaries
2009	Whitehand	Bart Green	Bienstman 2007; Conzen 1960, 1975, 1988	Character areas (instead of urban landscape units)	Applied into townscape management and conservation	Explicit (interactive map)	TP, BE, LU, V	4	Application into planning practice. Interactive map
2009	Whitehand	Upplands Väsby, Lantzville		Urban landscape units	Purpose of townscape management and conservation	Implicit	TP	3	First comparative study between areas in different continents. First study in North America.
2010	Gu	Auckland	Conzen 1960	Urban landscape units	Purpose of townscape management and conservation	Implicit	TP, BE, LU	3	First study in Oceania

Continued/

Table 1. (Continued)

Year of publication	Researcher(s)	City/town	1. Framework		2. Terminology		3. Method		4. Contribution
			1.1. Main references (to other regionalizations)	2.1. Term	2.2. Reasons for the use of a different term	3.1. Criteria	3.2. Form complexes (identification, hierarchy, individual hierarchical maps)	3.3. Regions (hierarchy)	
2011	Larkham and Morton	Docklands, Edgware (London)	Conzen 1975, Whitehand 2009	Morphological regions	-	Implicit	TP	nh	Focus on boundaries
2011	Whitehand <i>et al.</i>	Guangzhou	Whitehand 2009; Whitehand and Gu 2007b	Urban landscape units	Purpose of townscape management and conservation	Implicit	TP (2), BF (nh), LU (nh) Individual map of TP	3	Application in Asia. Study on region delimitation by different agents (two types)
2012	Birkhamshaw and Whitehand	Stratford	Conzen 1975, 1988; Whitehand 2009; Zhang 2003	Character areas (instead of urban landscape units)	Purpose of townscape management and conservation	Implicit	TP, BF, LU	2	Study on region delimitation by different agents (three types)
2015	Zhang	Guangzhou	Conzen 1960; Whitehand and Gu 2007a	Plan units	Focus on the town plan	Implicit	TP	nh	Application in Asia
2015	Oliveira <i>et al.</i>	Porto	Whitehand 2009	Morphological regions	-	Implicit	TP, BF, LU	4	First comparative study between different morphological approaches
2018	Chen	Zuoying	Conzen 1960, 1988	Morphological regions	-	Implicit	TP, BF, LU	nh	Study on a military townscape

TP – Town Plan, BF – Building Fabric, LU – Land Utilization, V – Vegetation
 nh – no hierarchy 1–5 – levels in hierarchy

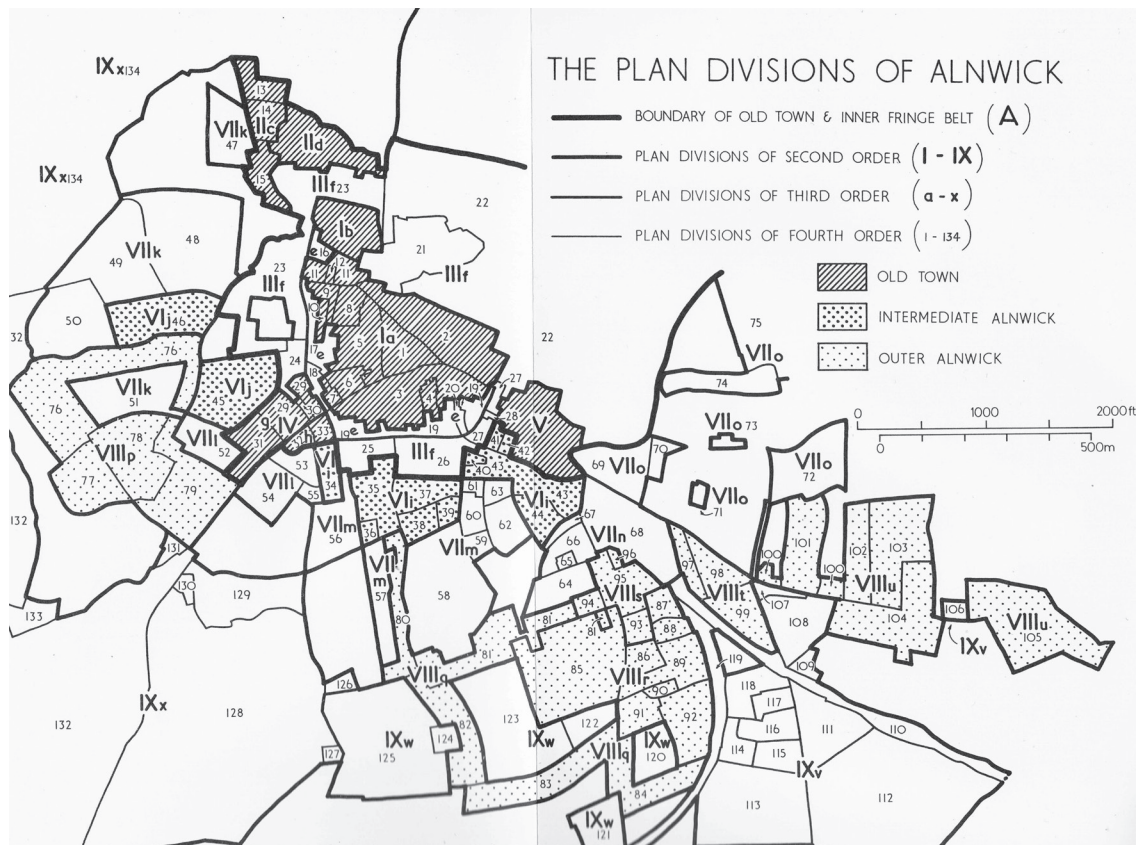


Figure 1. The plan divisions of Alnwick (Conzen, 1960).

groups of type units (the small letters); and fourth order, corresponding to the plan-type units (the Arabic numbers).

Fifteen years after publication of the Alnwick study, the first of his two texts on Ludlow was published (Conzen, 1975, 1988¹). In relation to the focus on the town plan in the Alnwick monograph, these two texts have introduced an innovative emphasis on the three form complexes, mapping morphological regions, based on the combination of town plan, building fabric and land and building utilization. Conzen (1975) maps each of the complexes individually. Each map contains a hierarchy of units ranging from major divisions of the town to very localized ones. The three maps together (the first three maps of Figure 2) form the basis for the preparation of a fourth composite map (the last map of Figure 2) of a five-tier hierarchy of morphological regions. The construction of this composite map was also an innovation (or a necessary

innovation, due to the more comprehensive focus) in relation to Alnwick. As in the case of Alnwick, the discussion of methodological procedures is only implicit in the first study on Ludlow.

In the second application to Ludlow, Conzen (1988) makes more explicit the rationale and criteria for morphological regionalization. He relates the three form complexes with the degree of form persistence and the morphological periods of the town, with the morphological constituents of historical stratification (range of morphological periods and period emphasis) and, finally, with their contribution to the hierarchy of morphological regions (morphogenetic priority) – Table 2. While maintaining the main pattern and hierarchy of regions of the 1970s study, the second application (reflecting Conzen's increasing knowledge of Ludlow and refinements in the method) differs in the hierarchical regionalization of land and building utilization.



Figure 2. The morphological regions of Ludlow (Conzen, 1975).

The three texts written by Conzen over three decades represent the progressive construction of a body of knowledge and theory that would be increasingly shared and developed over the next three decades. It starts with a focus on plan units, being then enlarged to the three form complexes, and it ends with an attempt at systematization of the method.

Sharing and discussing the method (1989–2007)

The east-central area of Amersham was the object of the first suburban regionalization, carried out by Whitehand (1989) in the context of a study of residential redevelopment. Whitehand introduced a terminology change, referring to the regions as ‘townscape units’ which may be related to its potential for townscape management (a major concern of many members of the University of Birmingham’s

Urban Morphology Research Group at this time). This new term is similar to the term ‘townscape regions’, and to their purpose, used in some parts of M. R. G. Conzen’s second study on Ludlow. In contrast to the complex interrelationship of town plan, building form and land utilization in traditional urban cores, in this small area the three form complexes had essentially the same distributions. Unlike the Alnwick and Ludlow studies, a hierarchy of regions was not identified.

Jones (1991) developed Whitehand’s focus and contribution on suburban areas. Addressing the English suburbs of Barnt Green, Edgbaston and Northwood, for the purpose of townscape management (as in Conzen, 1988 and Whitehand, 1989), Jones recognized a three-tier hierarchy of boundaries between regions based on the historical development of town plan and building fabric (land and building utilization was not considered). The

Table 2. The systematic form complexes as morphological regulators in the Old Town of Ludlow (Conzen, 1988)

1	2	3	4	
Systematic form complex	Degree of form persistence	Morphological periods	Morphological constituents of historical stratification	Contribution to the hierarchy of townscape regions
Town plan	Maximal	High medieval 1090–1270	General outlines of street system, plot pattern and building arrangement	High rank (major genetic plan units) intermediate rank (neighbourhoods: street and precinctual units, high medieval suburbs)
		Late medieval 1270–1500 and early post-medieval	Major island and lateral encroachments on street market, ubiquitous changes to street lines by minor lateral encroachments, ubiquitous minor alterations to plot pattern	Intermediate rank (eastern Dinham transformation, Bell Lane neighbourhood) lowest rank (morphotopes of market encroachments)
Building fabric	Considerable though varying with periods	High and late medieval 1090–1500	Few but prominent public buildings and defence structures. Very few houses by external indices, but structural remains inside and at rear of many post-medieval houses	Intermediate rank, but principally lowest rank (morphotopes) Lowest rank (morphotopes)
		Early modern 1500–1840	Majority of houses in localized period mixtures	
		Victorian and Edwardian 1840–1918	Houses in peripheral location or on minor streets. A few commercial buildings in business core	
		Inter- and post-war, Post-1918	Very few buildings within Old Town	
Urban land utilization	Minimal	Pre-1840	Major land use areas (business core, residential areas, institutional precincts)	Intermediate rank (traditional business core, traditional residential area, recreational area, castle ruins)
		Recent (twentieth century)		

main features supporting the morphological regionalization were plot boundary changes, antecedent form, dwelling type and building age. While the procedural aspects as a whole

were not explicitly discussed, attention was given to important methodological issues such as the production of the composite map and the detail of regionalization.

The study of Worcester by Baker and Slater (1992) offers detailed explanation of the application of the method. As in the case of Alnwick, and mainly because of the object under analysis – the medieval development of the core of a town – building fabric and land and building utilization are not considered. The plan units (with a focus on plots) have a two-tier hierarchy. While the main characteristics of streets and plots support the definition of the first-order regions, secondary characteristics of plots are used for the definition of second-order regions. Discussion of methodological aspects includes issues such as the scale of morphological unity and temporal change of regions.

The first application of the method to a large city, which increases complexity, was developed by Barrett (1993, 1996). Focusing on the city-centre conservation areas of Birmingham and Bristol, Barrett developed a number of methodological procedures – the main contribution of this work – very close to those used by Conzen (1988) in Ludlow, paying particular attention to how the different maps of units of each of the form complexes are elaborated and then combined into a composite map. A four-tier hierarchy of townscape units or townscape regions (the author uses both designations indistinctly) for each area was identified as follows (Figure 3). First-order boundaries correspond to the major plan units and reflect the main stages in the historical development of the street plan and plot pattern. Second- and third-order boundaries reflect plan changes within first-order plan units and in the boundaries of land-use units and major building form units. Finally, fourth-order boundaries take into account variations of building form and also minor differentiations of plan.

Kropf (1996) described the application of a type of urban morphological regionalization, developed in his PhD thesis, into planning practice – in the zoning plan of the *Plan d'Occupation des Sols* of Mennecy prepared with Ivor Samuels. Kropf proposed the urban tissue as a synthesis of Conzen's ideas on town plan and building fabric and Caniggia's ideas on *tessuto urbano*. This was not only

the first application of the urban tissue as a variation of the morphological region concept into planning practice, but also its first application outside Britain. It was based on two form complexes – the town plan and the building fabric – and uses a hierarchy of elements established at distinct levels of resolution. Within the set of studies gathered in the present paper, this is probably the one that shares the fewest similarities with the seminal concept of morphological region.

Barke (2003) introduced a new line of research on morphological regions. He compared the methodology adopted in the preparation of a Special Plan for Antequera, Spain, aiming at protecting and enhancing the built heritage of the town, with an approach based on urban landscape regions with a focus on the three form complexes. While a more rigorous comparison could be developed if the results of the latter approach had been presented in more detail, it is possible to understand that, despite the value of this plan in dealing with conservation (the use of areas of homogeneous character), it does lack the sophistication of Conzenian regionalization.

The topic of region delimitation by different agents introduced by Barke was further developed by Zhang (2003), which also offered the first attempt to apply the concept in Asia. Zhang sought to combine Conzen's morphogenetic approach and Lynch's cognitive framework of residents' perceptions (Lynch, 1960), comparing these with the actual policies for conservation in two areas in Shanghai, China. Two major aspects were considered in defining the plan units into a five-order hierarchy: the combination of different basic plot types with basic grids, and the grid patterns and their differences in terms of external shape and size. As in most studies included in this sub-section there is a lack of explicit discussion of methodological procedures.

Bienstman (2007) offered what is perhaps the most comprehensive discussion of the concept and method. It was the first comparative regionalization study between cities in different countries: Alkmaar, Netherlands, and Bromsgrove, UK. Bienstman described,

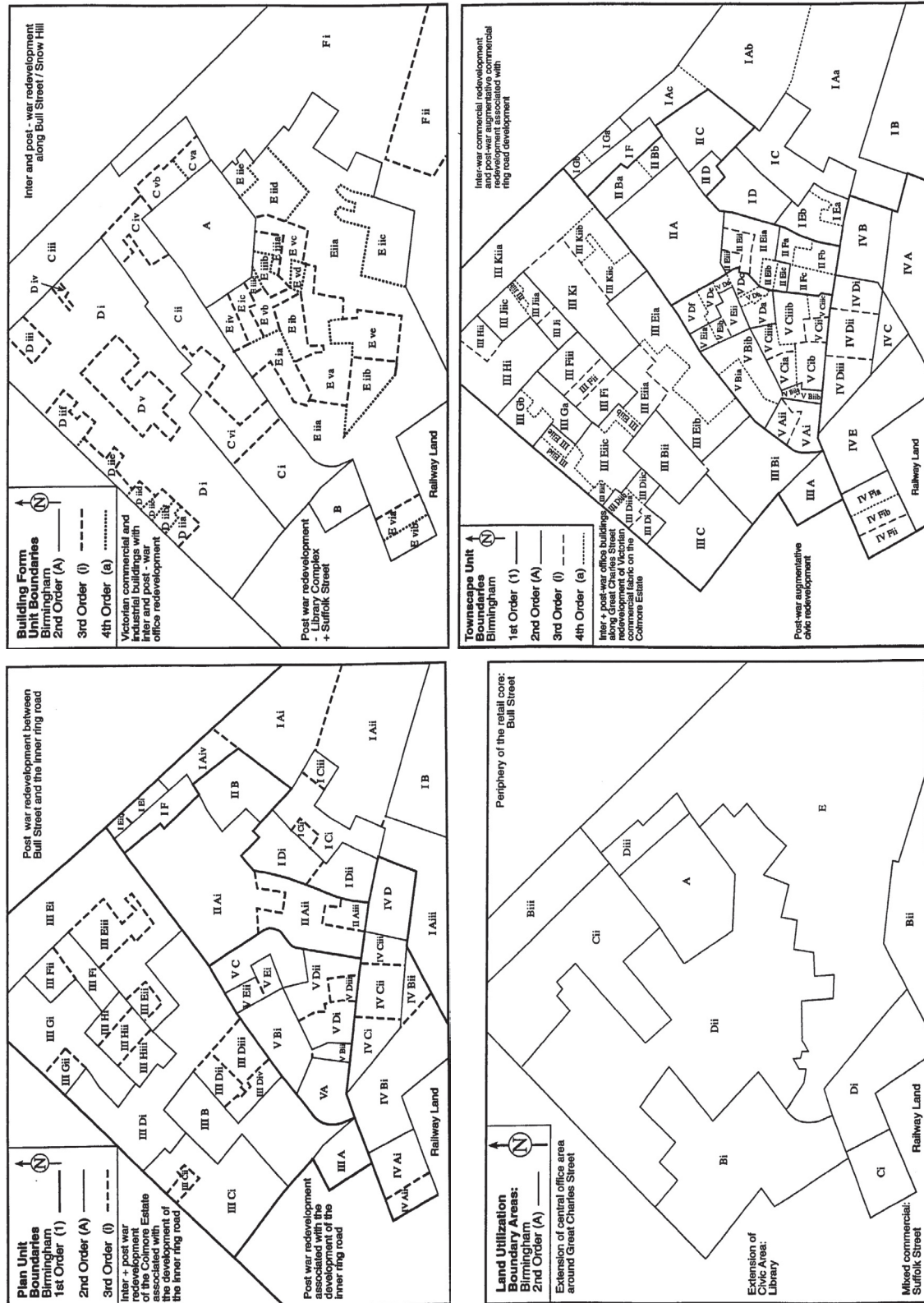


Figure 3. Plan units, building form units, land utilization areas and townscape units in Birmingham (Barrett, 1996).

in considerable detail, a method similar to that of Conzen and of Barrett, proposing a sequence of five main steps for the delimitation of a hierarchy of townscape regions. For Alkmaar and Bromsgrove, individual maps of town plan, building fabric and land utilization were prepared, informing the production of a composite map with a four-tier hierarchy of 'townscape regions', for the purpose of townscape management (Figure 4).

Over almost two decades, Conzenian morphological regionalizations became increasingly shared and discussed. The PhD theses of Jones, Barrett, Kropf and Bienstman, supervised by Whitehand, were fundamental

in this process. Indeed, Barrett and Bienstman offered the most systematic contributions to demonstrate the relevance of the concept and method and to identify those aspects to be strengthened in the following years.

Exploring different cultural and geographical contexts (2007–2018)

In recent years China has been the locus of a number of applications of the concept, notably by Whitehand and Gu. Whitehand and Gu (2007a) applied the Conzenian approach in Pingyao – the first such comprehensive

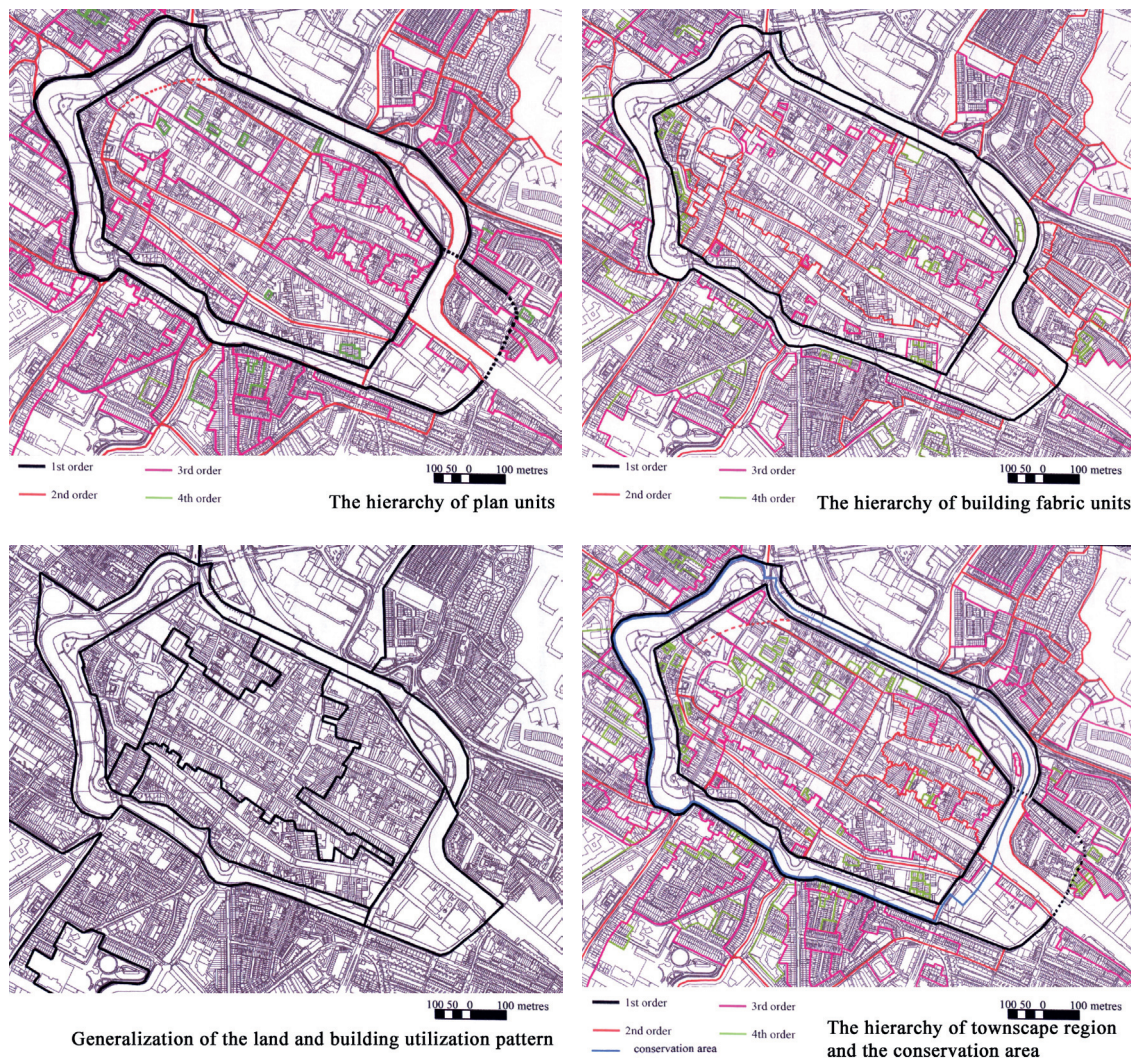


Figure 4. Plan units, building fabric units, land and building utilization patterns and townscape regions in Alkmaar (Bienstman, 2007).

application in Asia. They defined the components and stages of the plan layout using Conzen's method of plan analysis. Although the boundaries of plan units are not identified, a number of components are recognized for the delimitation of such units. Five street-plan types and three plot types are revealed. The block plans of buildings were not considered.

Still in China, and following an approach similar to that of Barke (2003) and Zhang (2003), Whitehand and Gu (2007b) compared Conzen's method of regionalization with an approach developed by the Beijing local authority. First, Whitehand and Gu produced a set of maps of plan units, building types, and land and building utilisation for the Zhishanmen conservation area. These maps acknowledge a two-tier hierarchy of urban landscape units. The main options of the delimitation are clearly related to the ground plan, and to the relationship between the three form complexes. Then a comparison with the local authority's maps was outlined. Very few of the boundaries of Conzen's method correspond to the boundaries delineated by the local authority.

In a fundamental review article, Whitehand (2009) gathered four unpublished regionalizations. The first is in Sibiu, Romania, where he identified a number of plan units, paying particular attention to streets and plots and to the topic of boundaries (distinguishing between street-block seams, plot-tail seams and plot-side seams). The methodological procedures are not explicit.

The second is in Barnt Green. This application has two main contributions: it makes the morphological criteria more explicit through an interactive map (accessible at http://www.urbanform.org/images/BarntGreen_large_map.html), and it is an effective incorporation of the concept into a parish plan. As Barnt Green is essentially a mature suburb, Whitehand added vegetation as a fourth element to the three form complexes proposed by Conzen. A hierarchy of character areas was recognized and mapped, with most of the main regions containing second- and third-order subdivisions and one of the regions containing fourth-order subdivisions (Figure 5). The identification of regions was supplemented by an illustrated description of each one. The

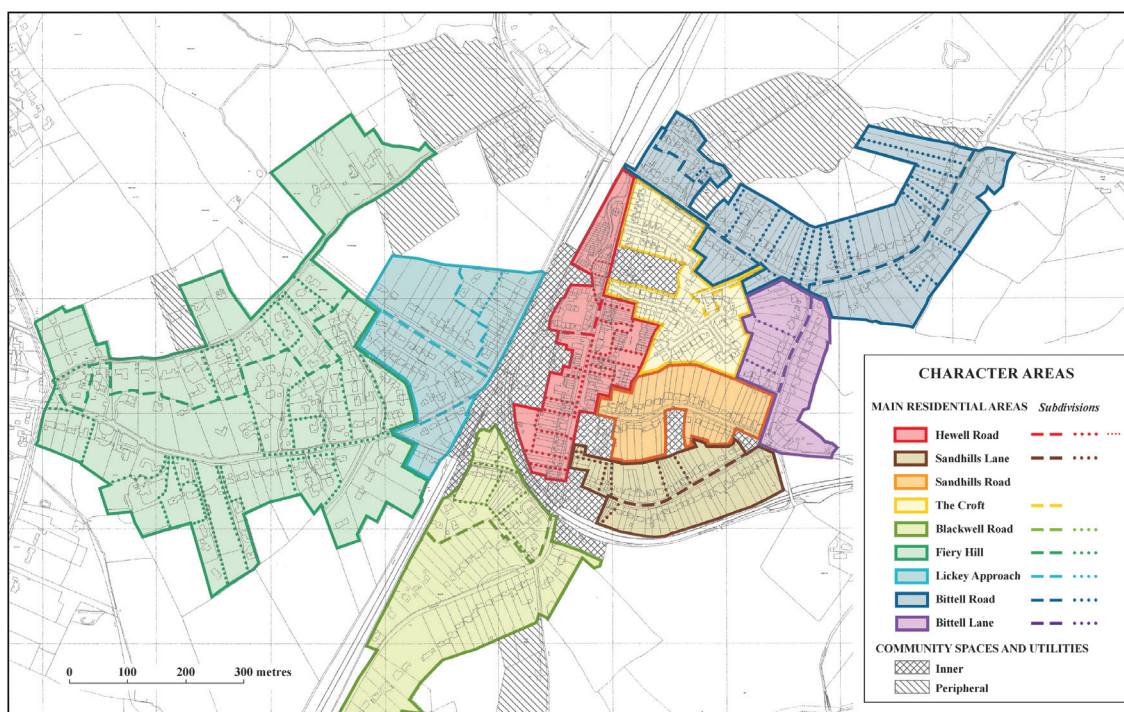


Figure 5. The character areas of Barnt Green (Whitehand, 2009).

descriptions were deliberately formulated in a way that enabled them to be understood by non-professionals and went further than a simple description to include observations on the history of the area and its salient features, including those that need to be respected in any future development (Samuels, 2019).

The third and fourth regionalizations presented by Whitehand (2009), are Lantzville, Canada, and Upplands Väsby, Sweden – the first comparative study between areas in different continents. Focusing on the town plan, Whitehand identified a three-tier hierarchy of urban landscape units. First, a distinct classification consisting of town centre, residential area and fringe belt was revealed. Secondly, each of these three areas was regionalized in a two-order hierarchy, reflecting variations of town plan. Thirdly, parts of these areas were regionalized at a higher level of resolution, taking into account variations within second-order regions in the external forms of individual dwellings. The comparative study raises the important issue of scale, or level of resolution, of the regionalization.

Gu (2010) offered the first morphological regionalization in Oceania. He aimed to provide a basis for townscape management in Auckland, New Zealand. A three-tier hierarchy of urban landscape units was illustrated on the basis of town plan, building form and land utilization. The first-order boundaries of these units were derived from the analytical map of plan type areas which represent street system, plot pattern and topographical features of the urban landscape. The second-order boundaries were largely derived from the map of building types and building heights. The third-order boundaries reflect the pattern of dominant land and building utilization.

The key issue of drawing a boundary between different regions, explicitly raised by Whitehand (2009) in the Sibiu regionalization, was explored by Larkham and Morton (2011). They address some key aspects, such as: (i) whether there is any difference between quantitative measuring and ‘by eye’ approaches to morphological regionalization, (ii) what is needed to constitute distinct morphological regions, and (iii) whether different

agents draw different boundaries. Larkham and Morton analyse two suburban areas of London, Edgware and the Docklands. The focus of the analysis is exclusively on the town plan and, in the end, no hierarchy of regions is identified.

Continuing the investigations in China (Whitehand and Gu, 2007a, 2007b), Whitehand *et al.* (2011) compared two conservation proposals for Guangzhou, China (Hualinsi and Tongfu Xilu): one by the Local Authority, the other based on urban landscape units. Three form complexes are employed to identify the urban landscape units and then to establish conservation priorities. A three-order hierarchy of morphological regions is identified. The first and second-order of boundaries of regions consist of the plan unit boundaries. The number of storeys is a major basis for distinguishing the third-order units.

In researching agency and decision-making, and taking Stratford-upon-Avon as the case study, Birkhamshaw and Whitehand (2012) compared the character areas delimited by different agents: researchers, local planners and residents. The researchers’ proposal of delimitation included the three form complexes (no hierarchy) and acknowledged a two-tier hierarchy of character areas. The comparison reveals major differences between the perceptions of the three agents – the coarse delimitation by planners and public has only a faint resemblance to the pattern of Conzenian regionalization (a similar result to that of Barke, 2003, and Whitehand and Gu, 2007b; see also Larkham, 1990).

Four years after the publication of Whitehand *et al.* (2011), Zhang (2015) returned to Guangzhou, exploring the process of morphological change of the city centre as a series of morphological periods. Based on the seminal study of Conzen and on the exploratory work of China by Whitehand and colleagues, Zhang offered a detailed reading of the urban structure of Guangzhou translated into non-hierarchical morphogenetic types of plan units (establishing some links to building fabric and land use).

Instead of comparing the application of the concept into different geographical settings,

Oliveira *et al.* (2015) compared the morphological region with other concepts. In the study of Porto, Portugal, they focus on the three form complexes, following the methodological guidelines of Whitehand (2007), and obtaining a four-tier hierarchy of regions. The first order reflects the form and age of streets, the type of plots, the block-plans of buildings, and the position of buildings within plots. The ground plan also contributes to the identification of regions of intermediate rank. The second and third orders are addressed together. They represent the ground plan, the building fabric, and to a lesser extent, the land utilization. The fourth order corresponds to small differences that can be detected when walking through each of those streets.

Chen (2018) addresses the walled city and naval base of Zuoying, Taiwan. Based on the analysis of ground plan, building types and land and building utilization (making evident the existence of four streets types, two plot types, eleven building and 42 different kinds of morphotopes), Chen identifies seven morphological regions. No hierarchy of form complexes or regions is established. The main contribution of the study to the body of knowledge on morphological regions is the

focus on a new ‘object’ – a military urban landscape.

Although regionalizations were developed mainly by English-based researchers on European towns and cities during the 1990s and most of the 2000s, during the last decade there has been a higher diversity of researchers and contexts of application, notably in China. The work developed by Whitehand and Gu is of fundamental significance for the latter. Of major importance is also the paper by Whitehand (2009) – not only because it gathered the main advances on the concept, but also because it provided an example of application into townscape management.

Towards more effective regionalizations

The previous section gathered the main applications of the concept and method developed over the last six decades. While demonstrating that most researchers share much common ground, it also highlighted some main challenges that should be dealt with in the near future. This is addressed through four fundamental principles as follows (see also Table 3).

Table 3. Principles for more effective regionalizations

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- 1 Each regionalization should be linked to the historico-geographical **framework**.
Why? The acknowledgment of this framework will facilitate the successful use of the method.
How? The regionalization should be based on a literature review, with particular emphasis on the concept and method.
 - 2 The **terminology** should be clear and shared by different researchers.
Why? The use of different terms creates problems for the definition of a coherent body of knowledge.
How? Any departure from the original terminology should be clear, and grounded on solid reasons/arguments.
 - 3 The procedural aspects of the **method** should be explicit.
Why? To counteract a ‘black-box’ nature that disables a collective learning process.
How? Explaining the main procedural options, namely on criteria, form complexes (identification, hierarchy, individual maps) and hierarchy of regions.
 - 4 At the end of each regionalization, its **contribution** to the development of concept and/or method should be evident.
Why? As part of a collective learning process to make it more robust.
How? This should be the logical conclusion of a continuous line beginning with the literature review.
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First, each morphological regionalization should be clearly linked to the extant body of knowledge – on the historico-geographical approach, as a whole, and the specific literature on morphological regions. The method cannot be isolated from the historico-geographical framework, otherwise there is a risk that it becomes a mechanical set of rules for the production of a map. The acknowledgment of that framework will facilitate the successful use of the method and increase the relevance of its results. Table 1 (column 4) demonstrates the importance, as a referential frame, of the three texts by Conzen and of Whitehand's the state of the art review (Conzen 1960, 1975, 1988; Whitehand 2009). In addition, the table highlights the PhD theses by Barrett (1996) and Bienstman (2007) and their discussion and development of the methodological procedures proposed in the Ludlow study.

Table 1 (column 5) lists the use of eight different terms in the regionalizations analysed in this paper. In addition to 'morphological regions', the most frequently-used terms are 'plan units' and 'urban landscape units' (a term promoted by Whitehand and Gu, 2007b). While the use of the former is due to the exclusive focus on the town plan, the utilization of the latter is justified by the purpose of integrating the method into townscape management and conservation. The introduction of new terms, with no significant difference in terms of contents, should be avoided, as it prejudices the robust definition of a coherent body of knowledge. We argue that the terminology of regionalizations should be clear and shared by different researchers (second principle).

Thirdly, the procedural aspects of the method should be explicit. If that is not the case, a 'black-box' nature will prevail, making a collective learning process considerably more difficult. The explanation of the procedural aspects should include the criteria, the form complexes (comprising their identification, hierarchy, contribution and individual maps, if these are prepared), and the hierarchy of regions. As Table 1 (column 7) shows, there is only a relatively small set of studies that develop a systematic effort to explain the main

criteria supporting regionalization: the notable sequence of papers by Conzen (1988), Barrett (1996) and Bienstman (2007); the study on Worcester (Baker and Slater, 1992); and the plan for Barnt Green, with an emphasis on its interactive map (Whitehand, 2009). In relation to the form complexes (Table 1 column 8), more than half of the studies use the three complexes, but in the majority of cases a hierarchical approach to the complexes and the production of individual maps does not exist. This is a significant procedural divergence. Why do the majority of researchers avoid the preparation of these hierarchical intermediate maps? Is it because of the difficulty of producing a composite map, relying on a careful interpretation of intensity and priority of boundaries? And, if so, can this preparation be more explicit? Finally, most of the studies offer a hierarchy of regions (Table 1 column 9); yet seven studies do not. As Whitehand (2009) reminds us, although Conzen has provided a widely-applicable method, it would be unrealistic to expect this to be developed to the point of allowing patterns of morphological regions to be precisely replicated by different researchers or practitioners. Yet the construction of a more systematic concept and method should be on the morphological agenda.

Finally, the contribution of each regionalization study to the development of the concept and the method should be evident (indeed it should be essential, and the justification for its eventual publication). This contribution should be part of a collective construction to make morphological regionalizations more robust and more attractive to a wider readership of academics, practitioners and citizens. This construction has been possible due to the progressive addition of new dimensions to the seminal study on Alnwick: the consideration of the three form complexes (Conzen, 1975), the systematization of the method (Barrett, 1996; Bienstman, 2007; Conzen, 1988), the exploration of new objects of study, the development of comparative studies (Whitehand and Gu, 2007a), the application into planning practice (Kropf, 1996; Whitehand, 2009) and the region delimitation by different agents (Whitehand and Gu, 2007b).

Conclusions

The concept of the morphological region, and the method of morphological regionalization, has a central role in the historico-geographical theory of urban form. The case studies discussed in this paper clearly demonstrate its potential, not only in describing and explaining the physical form of cities, but also in prescribing the future transformation of that form. Yet, based on that same collection of applications, this paper identifies the need for a more systematic utilization of the concept and method, arguing that: (i) each regionalization should be linked to a conceptual and methodological body of knowledge; (ii) the terminology should be clear and be related to that body of knowledge; (iii) the procedural aspects of the method should be explicit, and finally (iv) in the end of each regionalization, its contribution to the development of concept and method should be made evident.

Note

1. Regarding M. R. G. Conzen's 1988 paper on Ludlow, 'editorial changes were made just prior to publication that adversely affected the quality of the argument and were not agreed to by the author. The edited version was printed without Conzen's consent' (M. P. Conzen, 2004, p. 9). The full and accurate version is published as M. R. G. Conzen (2004).

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