Urban morphology is not a user-friendly term and a straw poll of 20 people who take decisions which shape our towns and cities reveals that few could give a working definition of the term. Yet the changes to the patterns of urban form which will take place over the next generation will be dramatic. They are the result of a myriad of design decisions taken by a wide spectrum of people including planners, engineers, architects, urban designers, politicians and others, seeking to address existing problems rather than take a hard, long term look at the future shape of our towns. As a result, the culmination of a series of highway ‘improvements’, local plan ‘designations’ and architectural responses to sites where the long term context is unknown, result in towns growing like a woman ever pregnant against her wishes. We are still too often building photogenic ‘pods’, driven by sites rather than movement structures.

‘Hold on’ you say, this is what the urban design community, government ministers, CABE, UDG and UDAL are addressing; development frameworks, cross-disciplinary design statements and codes will bring coherence. Well, in part; sub-regional strategies are broadly looking at capacities while urban design guidance has been primarily concerned with neighbourhood and street levels of design. The gap is in taking responsibility for the overall shape of a town, not just as an assembly of land uses hard-wired by road schemes, but as a coherent and legible spatial structure which originates from a pattern of movement lines which will be unique to a particular topography.

In this issue Jeremy Whitehand identifies the failure of urban design to draw on urban morphology, a view echoed by Peter Larkham who notes the inattention of many urban designers to the lessons of history. Andy Wharton underlines the connections between morphological analysis and the methodology of landscape characterisation. While Bill Hillier’s contribution describes developments in Space Syntax analysis, Brenda Scheer cites a situation where cities let developers plan residential areas and highway engineers join up the bits, and Nicola Marzot observes that the hierarchical structure of the city has been replaced by a network of centres – “net-city”. This is the first time this journal’s topic is dedicated to urban morphology and the papers sketch out a territory that is critical to urban design but which has largely been the preserve of academia There remains a gap in urban design practice which we must heed. Do we want to actively shape our towns as human habitats or are we going to wait and see what happens to us?

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The terms urban fabric, urban tissue and urban grain are very suggestive. They hint at both the tangible substance of a town and the intricacies of pattern. It is too easy, however, to leave them as just a metaphor, a fine cover to an empty book. Urban fabric is not similar to a piece of cloth, it is a kind of material with its own properties. The fertile direction for the analogy lies in the recognition that the internal structure of a material has a fundamental bearing on how it behaves under stress or when it is manipulated. Different materials have their own distinct ‘handling characteristics’.

Those with skill and experience understand that a material has a bias. It has strengths and weaknesses, limits and potentials depending on the way it is cut or joined and the forces or stresses applied to it, in relation to the bias of its internal structure.

The primary concern of urban morphology is the structure of urban form. So, if an understanding of internal structure is essential to successful ‘manipulation’ of a material, urban morphology is essential to urbanism and urban design.

The figurative and impressionistic use of terms such as urban fabric and grain only hint at the idea of structure. But the structure of urban form (or spatial configuration, take your pick) is pervasive and, perhaps more importantly, there are different kinds of structure with different characteristics at different scales. Individual buildings, at one level of scale, do not have the same handling characteristics as a street, at another, or a town as a whole at yet another.

The generic structure of urban form is a hierarchy of levels related part to whole. That is to say, one of the characteristics of urban form is that it divides into distinct levels. The patterns found at different levels such as street/block, plot series, plot, building, cell and structure are not interchangeable and the long term success of a design depends on understanding not only the differences but also the relationships between levels. The levels are interdependent.

Nor is attention to such questions of structure merely a formalistic diversion. The structure of urban form is the product of a social/cultural process and the structures at different levels correspond to distinct cultural habits, from the more generic such as paths to the progressively more particular: nucleated settlements, property ownership by land parcel, detached houses, conservatories or light steel frame construction.

And while the generic structure of levels remains relatively constant across cultures, there is immense variation of specific structures (both between and within cultures) corresponding to differences in social habits.

At this point it is common to infer that urban morphology is essentially equivalent to urban history. If that is the case, then structural engineering and materials science are nothing more than a branch of the history of technology.

The only way to begin to understand the handling characteristics of a material is to examine and experiment with it, test it to destruction. The results of experiments can only be gathered after the fact. Understanding (and the ability to predict) can only ever improve in hindsight. In this context, the built environment is a vast record of previous experiments. This line of thinking suggests that we need to experiment to improve our understanding but that we can only really improve if we pay attention to the results.

The identification of the generic structure of levels of scale and variation in specific structures as products of cultural habits becomes a powerful critical tool. A morphological critique is necessarily a cultural critique (although the links to human habits may be more or less explicit).

Why, for example, despite volumes of urban design guidance promoting permeability, is it so rare to find new development that fully integrates main routes between settlements or roads directly linking main routes (radials and counter-radials)?

In most cases the location of the site for development and restrictions imposed on access from routes with relatively high volumes of traffic means new development is effectively creating pods, loops and cul-de-sacs when seen at a higher level of scale. The connected routes that may be achieved within the site still only lead back to one, maybe two routes. Even the areas of connected streets remain visually as impenetrable and confusing as classic cul-de-sac tree layouts due to the over reliance on T-junctions and ninety degree speed reduction bends to achieve what is laughingly called ‘natural’ traffic calming.

What ideas and habits generate these forms? Not surprisingly, as human habits, they are sometimes irrational and contradictory. Word and deed do not correspond.
The generic structure of urban form is a hierarchy of levels related part to whole

Everyone demonises the car for global warming, profligate energy use, congestion, pollution, noise, cluttering the public realm, speeding and other safety hazards but it always everyone else’s car. People want the convenience of driving but don’t want to see any other car, certainly not down their street. It is a form of behaviour that has many attributes in common with addiction: increasing use with a refusal to acknowledge the level of use and its consequences.

There are other habits that perpetuate pod developments with illegible street networks: lack of investment in public transport, lack of imagination and will to solve the challenge of integrating different modes of movement in the same space, continued application of received ideas and assumptions in highway design (limited access motorways as the ideal), a planning process that is fundamentally reactive, allocating land for development by default, the abdication of public bodies in the design of the public realm.

But the root habit is the aggregate of public behaviour. By their purchasing preferences for large vehicles (to stay safe), suburban houses (to live on a quiet street) and out of town shopping (to avoid town centre congestion), people are expressing a dislike for the wider implications of the car. But those very choices increase the use of the car. The hangover cure is the hair of the dog that bit you: more of the same.

Two aspects of car use in particular show extremely clear signs of addictive behaviour: the level of use and speeding. The more you get the more you want. Give people the space and they will use it to drive ever more and bigger cars at ever higher speed (fuelled, as it were, by a no less pathological motor industry - a clear example of co-dependence).

Current wisdom identifies the cause of the problem in the physical arrangement of the highway. Straight wide roads induce increased use and speed so the cure is to change the roads. Streets are deliberately pinched and contorted to physically restrict speed and convenience.

But physical restraint is notoriously ineffective in curbing compulsive or addictive behaviour. Car use and speeding are social and behavioural problems not environmental problems. Physical restraint may work as part of a package of measures but a more important step is for all individuals to acknowledge the extent to which their own behaviour is ruining their lives.

And aside from being ineffective as a cure, physical restraint is indiscriminate. Everyone must suffer the cure whether they need it or not.

Tellingly, neither is the cure applied everywhere. Underlining the social nature of the problem, those administering the medicine are complicit in the behaviour being treated. Essentially they tell us to behave ourselves in front of the neighbours but just around the corner they sell us the fix that keeps us addicted. If you’re a good junkie and go quietly down that residential street they’ll give you a great rush inducing hit out on the ring road.

More damaging still, the attempt to reduce car use and speed with the layout of roads ignores the consequences for other aspects of urban form, which is to say, the structure, character and usability of the places in which we live. It is a prime example of single issue urbanism. All resources of a particular group are directed at one problem. There is no appreciation of the handling characteristics of the material being distorted. No attention is paid to the knock on effects, either on the overall structure, legibility and visual hierarchy of the town as a whole, the streets or the possible arrangement of plot series, individual plots and buildings relative to the street.

The damage it does is enormous and, for all intents and purposes, irreversible.

More effective and, in the long run, more successful urbanism and urban design will only come from a better understanding of urban form as a material with a range of handling characteristics. Urban morphology is not a formalistic diversion. It is at the root of urbanism and urban design.

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A visitor from another planet, schooled in logic but ignorant of the behaviour of earthly folk, might have imagined that urban morphology would be one of the basic disciplines of which urban design was an applied discipline. Urban morphology is, after all, the study of urban form, and an important part of urban design is the creation of urban form. It is reasonable that the discipline that has as its central purpose the understanding of urban form should contribute to both the theory and practice of designing that form. Parallels with the relationships between biosciences and medicine, and indeed more widely between basic and applied sciences come to mind.

The reality is different. In the English-speaking world cases in which urban design draws upon urban morphology are rarities. One such in Great Britain is the prize-winning Stratford upon Avon District Design Guide about which the judges of the Countryside Agency Award for Planning Rural Areas and Communities commented that it uses ‘a morphological approach’. This particular design guide was largely produced by a PhD graduate whose thesis was on urban morphology (Kropf, 1993). Furthermore, the thesis bridged the divide between urban morphology and urban design. In doing so it made one of those all too rare crossings of the boundary between the disciplines of geography and architecture - a boundary, indeed a barrier, in both education and research, that has a strength practically worldwide that has no rational basis. That divide provides much of the explanation for the weakness of the relationship between the study of urban form on the one hand and the design of that form on the other.

**URBAN LANDSCAPE MANAGEMENT**

Although the need for a close relation between knowledge of urban form and its application in urban design may be self-evident, what matters for practical purposes is the nature and application of this relationship in actual towns and cities. Fortunately, in spite of interdisciplinary myopia, to use Ivor Samuels’ apposite term (Samuels, 2003), evidence of the potential value of urban morphology in the armoury of urban designers is to hand. Although not well known among urban designers, urban
morphologists have been addressing issues pertinent to urban design for over half a century. This has been evident not least within the small but lively field of what urban morphologists sometimes refer to as urban landscape (or townscape) management.

The origins of urban landscape management are intimately connected to the nature and development of an important part of urban morphology itself (Conzen, 1966). That part is concerned with tracing how the physical configurations of cities have developed over time. The ways of doing this became increasingly refined in the course of the 20th century. By the middle of that century the implications of the patterns recognised and explanations offered were being considered in relation to prescriptions of urban form, particularly townscape conservation (Conzen, 1958). An important basis for urban landscape management was the urban landscape units (or morphological regions) identified from systematic survey and analysis of the historical development of towns and cities. As a purely descriptive activity (urban morphography) this had been discredited in the German-speaking world in the inter-war years. But, linked to the social, economic and cultural forces driving the development of urban areas, systematic surveying and mapping of ground plans, building types, and land and building use became fundamental to the recognition of urban landscape units. Such recognition became, in the post-war period, a method of characterising the various parts of towns at different scales of analysis, from the individual building to entire settlements (Conzen, 1960). The delineation of unitary areas not only distinguished historical types of development but provided an important template with which to assess future development (Conzen, 1975). Presaging British conservation areas by nearly a decade and English Heritage Extensive Urban Surveys by nearly half a century, they offered an important method of assessing and delimiting ‘character areas’ in a way that connected them to the rest of the urban area. For design purposes they had particular value within existing urban areas but were lessons too for the design of entirely new areas.

A PLANNING PHILOSOPHY
An especially important aspect of this mid-20th-century work was the links it established between developing forms on the ground and long and medium-term historical changes, such as the adoption of innovations in transport and fluctuations in house building. In particular there was recognition that the physical character of urban areas was the embodiment of great variations over time in the form of urban extensions and the incidence and type of change within existing urban areas. With this recognition came a planning philosophy: a philosophy grounded in the belief that to experience urban landscapes as historico-geographical phenomena was an important means of benefiting from the successes and failures of past societies in their attempts to shape their built environments. The urban landscape as a vast reservoir of experiences passed down by previous societies became recognised as an educative source and therefore not lightly expendable but something to be assessed, learned from, sometimes conserved and, not least, used to inform the creation of new urban landscapes. Special attention was devoted to the ways in which particular parts of the urban landscape had taken on different degrees and types of historical expressiveness. These differences were embodied in the urban landscape units that urban morphologists were recognising.

Attention is devoted largely to individual buildings, sites and monuments, or small areas of special interest

EXEMPLIFYING URBAN LANDSCAPE UNITS
One type of urban landscape unit that has become widely recognised in many different culture areas is the ‘urban fringe belt’ (commonly shortened to ‘fringe belt’). While all urban landscape units are in detail unique, they have recurrent features. The fringe belt is no exception, and its wide significance for the understanding and management of urban landscapes makes it a good illustration of both urban morphological thinking and the potential of that thinking as a contribution to urban design.

A fringe belt is a product of the very large variations over time in the speed of extension of towns and cities. It comes into existence during a period of very slow urban extension, often owing to a house-building slump (and associated reductions in land values) or a topographical or other geographical obstacle to housing development. Such a long pause in the outward extension of an urban area tends to be associated with the formation of a distinctive zone encircling the built-up area. This is later embedded within the urban area and becomes a significant element in its historico-geographical structuring.

THE CHARACTERISTICS OF FRINGE BELTS
The characteristics of fringe belts include (a) a sparse road network, with a low incidence of radial roads (ie running across the fringe belt), and hence constituting a barrier zone to vehicles, although, those radial roads that do exist (being historical arterial roads leading out of the city) tend to be heavily used; (b) large, often well-vegetated plots, frequently containing institutional, sometimes ‘landmark’, buildings of architectural note; and (c) the fact that they form a boundary between historically and morphologically distinct areas (Whitehand and Morton, 2004). They are heterogeneous in ground plans, building forms, and land and building use. Public utilities, parks, recreational areas and allotment gardens are characteristic of their medley of land uses (Whitehand and Morton, 2003).

Among the most striking fringe belts are those that formed around medieval towns, especially associated with town walls, and, in Great Britain in particular, those that came into existence at the end of the 19th century and the beginning of the 20th century, especially during the slump in the house building between roughly 1908 and 1925. The latter, often referred to as Edwardian fringe belts in England, today separate two physically contrasting housing zones: that of the late-Victorian
A fringe belt is a product of the very large variations over time in the speed of extension of towns and cities governmental publications on historical environments (see, for example, Department for Culture, Media and Sport, 2001). Paradoxically, fringe belts survive within urban areas as physical entities redolent of the history of cities, but local plans, and central government policy documents, including those on historical environments, scarcely mention them.

TIME OF HOPE

Although the lack of synergy between urban morphology and urban design extends much more widely than the British case focused on here, fortunately linkage between these two fields has been developing more fruitfully in several other countries, notably over recent decades in Italy and France. This has been helped by the stronger presence in these countries of urban morphology within architecture. In the English-speaking world the bridge between architecture and geography, and, related to it, that between urban morphology and urban design, has with only a few exceptions been too weak to withstand more than very minor traffic. Yet both the logical and empirical bases for the link are evident. Furthermore, within Great Britain there has, over the last decade or more, been increasing interest beyond academe, for example within English Heritage, in mapping the ‘character’ of areas. This interest must surely lead, sooner or later, to strengthening the bridge between urban morphology and urban design. Let it be sooner.

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REFERENCES

Conzen, MRG (1960), Alnwick, Northumberland: a study in town-plan analysis, George Philip, London
Conzen, MRG (1966), ‘Historical townscape in Britain: a problem in applied geography’, in House, JW (ed.) Northern geographical essays in honour of GHJ Daysh; University of Newcastle upon Tyne, Newcastle upon Tyne, 56-78
Department for Culture, Media and Sport (2001) The historic environment: a force for our future, Department for Culture, Media and Sport, London
Whitehand, JWR and Morton NJ, ‘Fringe belts and the recycling of urban land: an academic concept and planning practice’, Environment and Planning B: Planning and Design 30, 819-819

HISTORICO-GEOGRAPHICAL STRUCTURE AND DESIGN

Since fringe belts are both ecologically significant (Hopkins, 2004) and, most importantly, articulate the historico-geographical structure of towns and cities, they merit much more consideration than they have received in planning and urban design. Their significance for environmental awareness is inseparable from their historical development. They provide practical geographical orientation by providing a sense of position within or on the edge of the city, but at a deeper level of appreciation they provide a historico-geographical frame of reference within which the phases of development, and physical forms, of previous societies are related to the physical configurations of present cities. There is much more to an appreciation of this role than the recognition of individual sites of historical and architectural significance. To recognise the structuring of an urban area in terms of fringe belts and intervening residential zones is to take a more holistic cultural-environmental view of cities: the many individual features that make up the urban scene take on added cultural significance from the way in which they relate to one another and combine to form historically composite urban landscapes.

The fact that little attempt has been made to explore fringe belts in relation to plan making and development control exemplifies the neglect of urban landscape units in urban planning, as distinct from their place in the study of urban landscape development. In Great Britain this does not reflect a lack of interest among planners and others with responsibility for the built environment - the designation of conservation areas, listed buildings and parks and gardens of special historic interest, for example, belies such an explanation. More significant is the lack of awareness of the wider historico-geographical structure of cities. Among those with a custodial concern for the built environment, attention is devoted largely to individual buildings, sites and monuments, or small areas of special interest: the emphasis is on individual features or small areas, rather than the historico-geographical structuring of entire cities or sizeable parts of cities.

This deficiency is very evident in UK
TOPIC

UNDERSTANDING URBAN FORM?
Peter Larkham discusses practical applications of morphological analysis to planning and urban design

It has rightly been suggested that knowledge of urban form (urban morphology equals the study of urban form) is one of the essential things an urban designer should know about (Moudon, 1992). It is a part of the broader picture; an approach to conceptualising the complexity of physical form. Moudon states that ‘to build up actual knowledge in urban design, one should not look for the correct approach or theory, but should instead compile and assess all the research that adds to what the urban designer must be familiar with’.

This is more than merely abstract knowledge. Understanding the physical complexities of various scales, from individual buildings, plots, street-blocks, and the street patterns that make up the structure of towns helps us to understand the ways in which towns have grown and developed. The qualities of place are often ascribed, to a considerable extent, to such physical characteristics as size, scale, and relative proportions of various elements. This knowledge helps us to appraise what is successful and unsuccessful. It may also – but this is contentious for some designers at both architectural and urban scales – provide design cues for future forms.

Yet, over the past two decades, the study of urban form has become much more than the study of form itself. Recent research has examined the processes that have shaped form: the agents and agencies of change. More elusive, but also important in many contexts, are the factors leading to non-change, especially in conserved urban landscapes.

A significant design-related question is the extent to which features persist in the urban landscape. Obviously, a certain amount of change can be ‘catastrophic’ in its cause or in its rapidity and extent. Change after natural or man-made disaster is one element; although some might argue that the extent of redevelopment in the post-war period, especially in those towns not suffering bomb damage, was also a disaster. It was an awareness of hostile reactions to this type of change that caused Francis Tibbalds (1988) to suggest that we should not build too much in one place at one time (one of his ‘ten commandments’ of urban design).

On the other hand, morphological studies in a wide range of locations and contexts have shown that there is an inevitability about urban change; it occurs everywhere at some scale and time. This is, to borrow a geological metaphor, ‘gradualistic’ change. It may respond to changing fashion, for example the fad for conservatories; to changing needs, for example the fitting of central heating or structures and spaces to cope with motor vehicles. At an urban scale, think of the 19th-century trend for urban parks, or the 20th-century requirement for ‘civic centres’.

We should also consider the natural and finite life-cycle of structures and building materials. Where we designate an area or building as worthy of retention and conservation, there is (in the developed West at least) an implication that such places and structures will become insulated from this life cycle. And yet, even in such places, there is still pressure for change (Larkham, 1996). Over the span of decades (three and a half decades since...
the earliest conservation areas in the UK), the amount of individually small-scale and incremental change in some areas has caused a few conservation officers to question whether areas should be designated, such has been the change to their character.

Carried further, morphological studies have also tended to show that there is a hierarchy of change within urban features. Buildings can change fastest, from alterations to complete demolition and replacement, in reaction to changing use requirements including an owner’s desire to personalise a house. So we have very few surviving medieval buildings, more Georgian, many more Victorian, and so on. Plot patterns can change, by wholesale redevelopment but more commonly through subdivision and amalgamation, often associated with changing ownership. Yet, in many UK towns, there are perceptible traces of medieval plot patterns still persisting, and still influencing new development especially through traditional frontage widths (typically 33 feet). Most resistant to change is the street network, and so again we have towns whose basic structure remains recognisably Roman or medieval; even though in most cases, individual streets have been straightened or widened. Nowadays, the investment in underground infrastructure beneath our streets helps to fossilise this pattern still further.

Change to these apparently innately conservative street patterns does occur, but even catastrophes such as the Great Fire of London and the wartime blitzes resulted — directly — in surprisingly little change. Developing technology has done far more, particularly with strategies to cope with the rising volume of motor vehicles, including the fashion for ring roads. Yet, in a number of recent cases, urban designers have suggested the reinstatement of long-vanished (often medieval) road alignments. Whilst this does have some grounding in urban history, does it really address contemporary needs?

COMPARISONS: BREATH OF KNOWLEDGE

One of the weaknesses of urban morphology has been that there are few genuine comparative studies, particularly across national boundaries. Few of us have the linguistic ability to follow the professional literature in more than two languages. Yet there is much in urban form and process that transcends current national boundaries, and a wider understanding would be potentially useful. Where is the traditional boundary between the narrow, deep burgage plot and house typical of north-western Europe, versus the courtyard plan common in Mediterranean and eastern countries? And what are the implications of migrant communities wishing to import urban and architectural forms familiar to them, representing their traditional culture? Too often these are felt to be ‘alien’ in the urban landscape (as, it could be said, were the structures and urban forms imposed by colonial conquerors).

One of the very few comparative studies of contemporary cities has been carried out for Seoul, Tokyo, Paris, London, New York and Los Angeles, by members of the International Seminar on Urban Form. Funded by the Seoul Development Institute, it sought to show how Seoul, as an extremely fast-growing capital city, compared in form and process with other ‘world cities’. A series of residential and commercial areas, each 500m square, was examined for each city. The residential areas were selected to represent similar social characteristics, and to be representative of significant formative phases in the city’s development.

This study clearly showed very substantial differences in the scale and physical form of development in these cities. Yet there are also many features in common. The substantial proportion of the built area given over to roads and pavements; the issues of car parking in most residential areas; the uniformity of large expanses of urban fabric developed at one period; yet the lack of conscious ‘design’ at many levels, can be appreciated. We can see the physical results of various controlling mechanisms (planning systems, legal constraints, etc). The next stage is to distil the practical applications: not ‘do’ and ‘don’t’, but ‘this is what can happen if...’.

**It is virtually certain that not all designated conservation areas have fully-developed character appraisals**

**FORM AND CHARACTER**

On another level entirely, urban form is obviously a major constituent of ‘character’, that rather elusive concept so important in much conservation planning and design, but also with much wider relevance in non-protected areas. Although there is guidance in the UK on character appraisal, it is virtually certain that not all designated conservation areas have fully-developed character appraisals, and non-designated areas have far patchier coverage despite the brave suggestion by Tony Hall (1996) that this should be widespread and should underpin development control decision-making and urban landscape management.

Stratford upon Avon District Council produced an innovative district design guide based on a detailed morphologically-informed approach (2001). Building on analysis of precedents within each area of the district, detailed advice is offered at scales from settlement, street, open space, plot, building and material. This is independent of land use: the advice could be used for a broad range of development types. Nor is it prescriptive in terms of architectural style. Although complex, it was possible to convey this message convincingly to both local politicians and public.

In reality, however, even detailed character appraisals based on morphological analysis at the level of individual plots and buildings can founder at the stage of an individual planning appeal. Will the Stratford guidance survive this test? Developers are increasingly proposing high-density development, to the densities proposed in PPG3 (30-50/ha), within residential areas which, although of distinct character, are not protected by conservation area designation. The result is very often that the development goes ahead. In my own, albeit limited, experience, a developer can disregard a detailed morphological character appraisal, relying instead on general statements about the
‘residential character’ of this entire suburban district; and base statements of the ‘high quality’ of the proposed development upon its conformity with PPG3’s density standards.

In one recent Birmingham example, the inspector found that “there would be a marked change in character and appearance” if 14 houses and a block of apartments were built on suburban back gardens, but that this would be acceptable: views into the site would not be “readily appreciated by passers-by”, the demolition of a house would not form a “significant variation” in character or appearance. Yet “the character and appearance of the area would be materially harmed” by more such proposals (where is the threshold?), and the inspector made no comment on the quality of the proposed new development itself, save that it would be “very different in character and appearance from that of the existing housing”, and such “backland development will often be at variance with the precise established nature of existing areas” (Appeal APP/P4605/A/03/1120919).

WHY BOTHER ABOUT MORPHOLOGY?
Some of our most significant urban problems of the last century have arisen in cases where new urban and architectural forms have been developed at speed and to a large scale, but with little or no reference to existing urban form and context. This includes the great swaths of modernist post-war urban redevelopment, criticised by so many commentators, and the tower block, many of which are now being demolished in the name of urban regeneration.

Conversely, there are places now recognised as being of high quality that also paid little heed to their predecessors: Georgian Bath and Edinburgh, for example. Yet many of these were urban extensions, rather than remodelling of existing built-up areas.

A broad knowledge of local and regional urban forms – a larger scale than the vernacular architectural detail so often recommended – and their analysis in terms of identifying those features that produce high-quality urban environments seems useful in the light of much of the 20-century experience. A wider sensitivity to national and international comparisons can assist in this respect, although one could query why Siena and other Italian hill towns reappear uncritically in so many urban design texts.

In post-Enlightenment Western thought, concepts of originality and authenticity have become significant, and this can be seen most particularly for urban designers in terms of conservation – its spread, and the growth of design guidance paying lip service to respect for original character and appearance. Again, can we learn from practice elsewhere? The approach in Japan and other Eastern countries to respecting character and design does not extend to veneration of the original fabric, while the urban tradition in the Near and Middle East has a very different approach to valuing and using tradition and authenticity.

THE NEED FOR A BROADER AND LONGER-TERM PERSPECTIVE
None of this detailed and broad knowledge will be of any use if it is disregarded at the highest level of policy-making, and at the most contested level of implementation, through appeals and legal challenges, which rest upon quasi-judicial processes and interpretations of the precise meaning of the words of statute and guidance. In creating high-quality places, is a broad and long-term perspective on successful urban forms less important than political ‘guidance’? Morphological detail can certainly fall at the hurdle of PPG3’s density guidance. This is a major challenge for urban design: not in designing entire new towns, but in producing what can be widely accepted as high-quality design at the local level, in the re-shaping of the existing urban fabric, in identifying, retaining and reinforcing the best qualities of past urban forms, and in persuading owners and occupiers of the rationale for, and quality of, new designs. Otherwise, the blunt tool of ‘guidance’ and the current official approach will fail to convince those who use and live in our new urban environments, and we may be designing and building the slums of the next generation.

And, moreover, we should be learning from past forms. Birmingham’s new Bull Ring may well be a vibrant and popular shopping destination but, as Joe Holyoak reminds us, it is “too inflexible, too monocultural, too narrowly defined, too contained within its own boundaries, to be an effective part of a city centre... In this, its makers are repeating the fundamental mistakes made by Laing in the 1960s, but this time on a bigger scale”.

Let us put the lessons of urban history and urban form back into urban design, to help create the high-quality, vibrant, places we all know are needed.

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WHO MADE THIS BIG MESS?
Brenda Scheer tries to pin the blame for the morphological disaster that is the American strip

I’m driving down a calm subdivision road in any American urbanised area (hard to call them cities, really). Sprawl has its loveliness: the precise patterns of houses of similar size, surrounded by a patch of lawn, facing a street that may soon be lined with trees. The space between houses is a regular rhythm, as is the curb cut and pavement of the driveway and even the doors of the garages. Although we can demonise it, it is not hard to see why Americans adore their own little piece of castle, tucked into a neat, orderly plot.

But, let’s keep driving, to the dirty little aesthetic underbelly of the cosy suburb – the strip. All we need do is leave the shady acres sign in the rear view mirror, drive to the main road, and we encounter a completely different world – chaotic, charmless and without the redemption of landscape or private domain. Here, no visible order prevails. Here is the hated symbol of sprawl, excess, corporate greed embodied in a world of shopping centres, fast food chains, downtrodden oriental buffets, gas stations, signs, parking lots, and roads without benefit of a curb, much less a tree.

A CANCER
Well, having studied it for years, I can describe it the way a doctor might be able to describe a cancer – it has a definitive form that is almost as predictable as the quiet subdivisions around it. Its form has subtly changed over the past 50 years since its earliest versions, but the elements are the same: single storey buildings in a wide variety of sizes and shapes placed on lots with widely varied lot widths and depths. All the buildings face one wide street, although they may address it at an angle. Many lots have front and back buildings, with the smaller ones in the front only slightly blocking the view to the rear shops. Parking lots are everywhere, paving fills in almost every available surface, except for pathetic landscape islands. Signs dominate the architecture and the streetscape. The condition of the street is typically deplorable: weeds, trash, gravel, streetlights, curb cuts all signalling neglect.

THE CULPRITS
Who made this big mess? Although we universally deplore it we can't seem to pin the blame on anyone at all. Sometimes it feels like we can't even explain it, like a mysterious cancer that just appears along a previously uninfected country road. Its not like we don't know any better, of course, we have new urbanist models of retail nodes, and even older existing neighbourhood business districts to help us visualise a different way that commercial and residential areas could work together.

Why don't we plan differently, even in circumstances where we have virgin farmland ready to be developed? Lets see if we can make the blame for this mess stick to various suspects by imagining a country road ripe for development, right before the onslaught of sprawl. First, the planners zoned all the land along the arterial for commercial use, with minimal setbacks and a height limit. The land NOT along the street was zoned exclusively for residential—mostly single family. Planners assumed that the arterial, the major access route, would have too much traffic on it to comfortably accommodate residential uses, so commercial or institutional was their only option. Politically, they had to zone the entire street that way, even though it would take a long time for it to develop continuous commercial activity.
There is no need to create orderly streets and subdivisions, since the single arterial serves everyone best.

At the same time, planners gave approval to subdivisions that were formally a series of dead end streets: 400 families all forced to come and go through one or two intersections on the single arterial. Internal streets are eerily quiet and calm without through traffic, just the way families want them. For the sake of protecting these family property values, no non-residential development is allowed, rarely even schools or churches, much less convenience stores.

The residential developers who planned the subdivision pulled housing lots hundreds of feet back from the main road because they thought the road would be a nuisance with so much traffic and commercial development on it. Their actions anticipate the high-traffic commercial cancer, but they also serve to create it by insisting that all subdivision traffic be funnelled to the arterial rather than connecting neighbourhoods with smaller streets. The arterial gets immediately clogged with traffic.

Commercial developers take one look at this traffic and see dollar signs. They begin to hunt down potential tenants, who will see the traffic as lifeblood for a business. The arterial hits a predetermined level of traffic and a McDonald’s springs up and then a supermarket, and three drugstores, each an island to itself, built on a single piece of land that happens (by historical accident or by subdividing) to be the right size. Soon, larger stores are built, or a shopping centre with multiple tenants. Signs spin out of control. Traffic zooms, forcing the good people of the nearby subdivisions to curse as they take their only route to home. The cancer has, inevitably, taken hold again.

RESISTANCE TO CHANGE

At every step along the way are legions of invisible forces and assumptions that move the process inexorably forward. There is a huge, national, built-in resistance that fights every change that needs to be made in these areas to replan or redesign them as humane places.

The land ownership pattern is one example. A simple look at the land subdivision along the strip shows a fragmented pattern of different sizes and shapes, the result of farms and houses along the country road. This fragmented pattern originally existed in the nearby residential subdivisions, too, but land there had to be aggregated and re-divided before roads and lots were planned, usually by a single actor. In the retail strip, there is no fundamental need for adjoining property owners to coordinate, much less to aggregate and subdivide. The variety of lots sizes suits a widely varying series of use types – if you have a small lot, you can build a gas station, with a larger lot, and you can have a grocery store. There is no need to create orderly streets and subdivisions, since the single arterial serves everyone best because it carries all the lifeblood traffic.

Then there is planning, that is, the profession of planning in the USA, which has a very limited set of standard tools. It is no longer customary or possible to ’lay out’ a broad area with streets and blocks that will be developed into new neighbourhoods and town centres, unless you happen to own the entire area in question. Cities don’t plan their own streets: residential developers plan the subdivision layout (residential only) and highway engineers plan the arterial and larger system, usually based on the simple expansion of earlier farm roads. Planning for areas of fragmented ownership really involves two major regulatory games: zoning and residential subdivision.
The demand for retail locations with high volumes of traffic has gone hand in hand with the development of the pattern of development in the suburbs that funnels all local traffic in a sector into one arterial, by means of the lack of connection between subdivisions. The resulting quiet streets of the housing are thus a contributor to the cancer itself.

It turns out to be much easier to make the fundamental changes in the residential fabric that new urbanism and smart growth advocates suggest (smaller lots, connected streets, alleyways, housing type mix) than to tackle the problem of commercial strips. One can even build small commercial villages within these idealised neighbourhoods, but these cannot displace the strip itself. Fundamental international distribution systems, an entire real estate finance industry, huge international corporations, an ingrained expectation about the role of planners, common real estate development typologies, and even the nice people on their cul-de-sacs will continue to overwhelm the ideal. The big mess will continue.

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There are obvious parallels between countryside character assessment and the understanding of urban morphology in towns and cities. What ties the two processes together is the broader concept of landscape. ‘Landscape’ really exists as a continuum across both rural and urban areas and can act as a focus and catalyst for managing change. This paper provides a brief background to the agency’s landscape character work and begins to explore how the two processes might work together, to help inform the visioning, planning and design of more multifunctional and sustainable environments, particularly at the rural-urban fringe.

**LANDSCAPE AS AN IDEA**

‘Landscape’ is a term that is powerful because it invokes, in a single word, a wide range of meanings. Whilst landscape is often associated in a countryside context, in a purest sense, landscape has no start or end points – for me it is a concept that drives through and continues across the ‘boundaries’ that may be perceived to define urban and rural environments. Landscape is a ‘thing’ that means different things to different people. And whether you are strolling in the rolling hills of the mid-Devon countryside or sat drinking coffee in Dam Square admiring the great sense of space, it is a concept that runs through all our lives and contributes enormously to our quality of life. It is not just the backdrop to our lives. Landscape can influence our behaviour, our values, our movement and over time fosters a sense of belonging to a particular place – rural, village, town or city. Landscape is a concept you can build ideas around, use as a common spatial reference point for discussion and a vehicle or springboard for debate about future change.

The Countryside Agency takes an extensive and comprehensive interpretation of landscape. This view encompasses both natural and cultural aspects of land, seeking to understand how they interrelate and interact. Whilst our work is predominantly concerned with the landscapes of the rural environment, the agency has a long history and a strong appreciation of landscape and the interconnections with larger towns and cities and how they function. For example, England’s Community Forests over the past decade have been pioneering and implementing the idea of multi-functional landscapes and bringing green infrastructure into the fringes and hearts of urban areas. Community led village and town design statements originated from a desire to extend and embed a landscape approach to the way development in smaller settlements is planned and designed. Both initiatives have widely encouraged rural communities to use their local knowledge to describe how their settlements and building materials have been shaped and influenced by the landscape. Our Doorstep Greens initiative has enabled many communities at the urban fringe to reinvigorate or create new spaces. We also have help to develop and promote concept statements – a planning tool for helping to achieve higher quality development. More recently, we have been engaging in and influencing the development of growth areas as part of the Government’s Sustainable Communities Plan. All these have an underlying theme of landscape and landscape character as the driving force behind them.

**UNDERSTANDING LANDSCAPE CHARACTER**

As individuals we often place higher value upon some landscapes than others, owing to personal preferences or deep connections to particular places. As a nation we express these values formally through our decisions to designate nationally significant landscapes. But all landscapes have particular characteristics that differentiate them, and which give them unique identity and value. It is from this philosophy that the countryside character approach and a national framework for finer-grain landscape characterisation in England evolved in the early 1990s. The former Countryside Commission joined with English Nature and English Heritage to develop joint character profiles, which shaped the ‘Character Map of England’, and eight...
All landscapes have particular characteristics that differentiate them, and which give them unique identity and value.

A LANDSCAPE CONTINUUM?
Urban morphological analysis and the methodology of landscape characterisation in many ways share much in common. Both are concerned with assessing and understanding form, function, cultural influences and ‘time-depth’ (an appreciation of the historical influences that have shaped the land or built environment). Whilst the language used to describe components and their spatial arrangement may slightly differ, both processes are essentially trying to understand and pinpoint how a rural or urban landscape, space, settlement or street has evolved and what defines its key characteristics and strengths. Both can provide a baseline of evidence or statement of current character and condition and both are usually undertaken as a precursor to developing policies, strategies, action plans or design principles for the future development, conservation or management of an area or neighbourhood.

Both processes are concerned with the idea of ‘landscape’ as a medium for guiding future action. The ‘holistic’ or broad landscape idea is one that recognises that different rural and urban landscapes and characteristics exist because of the inter-relationship and interconnection between social, economic and environmental factors. By looking at this from another perspective; landscape should be expressed as the common thread or ‘glue’ that helps to integrate social, economic and environment needs together, at the same time.

IMPROVING THE QUALITY OF THE RURAL-URBAN FRINGE
Earlier this year the Countryside Agency and Groundwork launched a consultation vision statement for the rural-urban fringes. The crux of the vision is based upon the principle of achieving landscape multi-functionality and using the existing statutory planning frameworks to help coordinate, implement and deliver the vision.

Across the country rural and urban local authorities and local strategic partnerships are busy preparing their local development frameworks and community strategies. Local development frameworks, replacing local development plans, are meant to set out the spatial planning dimension of community strategies. Community strategies provide the overarching ‘community’ vision for the area – the two need to be intrinsically linked, but how? Whilst most community strategies will include chapters on the ‘green’ environment, very few appear to delve further into visions and objectives for rural and urban landscapes. Perhaps a greater inclusion of the broad concept of landscape in rural and urban areas within community strategies could provide the necessary spatial ‘hook’ that local development frameworks can draw inspiration and direction from.

This approach could be particularly effective in the rural-urban fringe, where landscape character assessment and urban morphological analysis can be applied in tandem to help convert the rather nebulous broad landscape concept into a clearer, more objective language, understood by communities, and subsequently used to inform and shape area action plans for conservation or change. Whilst not groundbreaking in itself, the process of engaging people and raising awareness of their rural-urban fringe landscapes at the community strategy level could serve to bring about a wider appreciation of how the improvement and success of the landscape environment is a vital component to a better quality of life and to the achievement of sustainable development.

Andy Wharton, Positive Planning team, Living Landscapes, The Countryside Agency

REFERENCES
5. Unlocking the potential of the rural urban fringe, Consultation document, The Countryside Agency & Groundwork, Cheltenham, 2004
THE ITALIAN APPROACH: PREMISES, DEVELOPMENTS AND PROSPECTS

Nicola Marzot discusses the importance of building type in urban design practice

VARIOUS APPROACHES

With this renewed interest in urban history, the concept of building type became deeply rooted in the past, even if its character and meaning seemed to change with the methodological interpretation of the different authors involved. For Gianfranco Caniggia, one of the most notable, along with the wider ‘Muratorian school’, the building type was to be considered a ‘collective project’, the result of widely shared cultural values deeply rooted in local traditions. In addition it was conceived as the temporary result of a never-ending process of transformation of existing buildings, progressively updated to new social and technical needs, leading to a dense and strongly layered architecture, a view abandoned by the abstract approach of the Modern Movement. To an extent, Giulio Carlo Argan and Pier Luigi Cervellati accepted Caniggia’s point of view, recognising the historical process implicit in the building type. But once it was applied, for example, in the plan for Bologna’s historic centre, they denied the possibility of using it as the starting point for more complex arrangements derived from a systematic transformation of previous types.

Aldo Rossi, on the contrary, aimed at joining traditional urban form with that theorised by international Rationalism. According to him the building type was conceived as a constant and archetypal configuration which persists through space and time as a design tool. Consequently architecture became the historical interpretation of its permanence and stability. While the hypotheses expressed by Caniggia and Argan were mainly applied to conservation programmes in historical centres, that proposed by Rossi and further developed by, among the others, Carlo Aymonino, Guido Canella and Gian Ugo Polesello, was taken as a reference point for new urban developments over the ‘70s and the ‘80s. This led progressively to the identification of the building type, in the Italian debate, as a matter that seemed unchangeable and independent of the different methods used.

The ideological framework inherited from the debate over historical centres was not, however, homogeneous. Caniggia, Argan and Cervellati believed in the city as a unique and organic totality, on which time acted according to recurrent laws. The development of urban form is characterised by the dialectic between residential areas and institutional building, expressions of the same typological substance. Rossi, on the contrary, assumed the city is a sort of patchwork made of different features, called the ‘città per parti’, obtained by progressively adding new parts to the already existing ones, which altered the meaning of the city by changing its previous configuration. In addition he distinguished the behaviour of institutional buildings, called ‘elementi primari’ from that of ordinary buildings, the ‘aree residenza’. While the former reveal formal stability, the latter undergo continuous transformation producing informal but not comparable arrangements. Both views do, however, admit that the city is, and had always been, the result of the dialectic between ‘centres’ and ‘peripheries’ and reveal a close relationship between urban morphology and building typology. This statement, in fact, could be simultaneously confirmed by the development of the traditional and the modern city.

But the transition from the industrial to the post-industrial economy has entirely modified this framework and urban design practice in the 1990s was quick to record new urban phenomena. In Italy, Bernardo Secchi was the first to theorise the concept of ‘città diffusa’ (urban sprawl). According to him we have to replace the idea of the modern metropolis with that of a totally discontinuous urbanised territory. Paradoxically, the Russian disurbanistic avant-garde proposals - to bring ‘urbanity’ into the countryside and blur the traditional distinction between the city and the open landscape - was not realised by the socialist economy, but by the emerging capitalist system. The massive improvement of territorial infrastructure, intended to enhance the efficiency of goods transport around an ever larger commercial market, has resulted in the almost uniform diffusion across the territory of the ordinary buildings necessary for production and trading, with an attendant change in their dimensions and mutual interrelations. This phenomenon has further led the spontaneous ‘backbone’ to settle into unexpected locations, both residential areas and centres of leisure activity, which continue to transform the same concept of urban living. The average scale of these new settlements is totally different in comparison to traditional and modern ones and proportional in size to the global economy.
In this new framework, the concept of building type is no longer capable of meeting new needs, mainly expressed by the ‘generic city’, theorised by Rem Koolhaas. The main cause seems to be the desire for flexibility and continuous transformation expressed by the new economy. The hierarchical structure of the city has been replaced by a network of centres located into the most profitable nodes within it, in order to intensify and multiply mutual connection. Because the configurations of the ‘net-city’ are always changing in close relation to the development of the market, the buildings are as anonymous as possible and tend to isolate each other in order to freely and rapidly meet new needs. Once again, as with functionalism, the architecture refuses to be ‘representative’ of shared values, making itself a matter of language, and aiming to offer itself simply as a working tool for programmatic purposes.

If and when architecture aspires to express contemporary values in urban design practice, we notice recurrent strategies: to blur into infrastructural iconicity, emphasising the role of mobility in current urban culture; to create of an artificial landscape merged into the natural one, expressing the endless widening of the traditional city boundaries; to compete with urban centres and become a self-sufficient small town, artificially replacing the scale of traditional patterns of public space, erased by urban sprawl. By admitting only a partial focus on reality, all of these, however, inevitably avoid the complexity of the current urban landscape where traditional urban nuclei, modern peripheries, fragments of productive farmland, territorial infrastructures, productive settlements and wastelands coexist close to each other to produce something which, in its entirety, reminds us of the idea of a ‘collage city’, as defined by Colin Rowe and Fred Koetter, even if shown at a wider scale than the original.

This ‘realistic’ framework opens up new perspectives to the possible application of the concept of building type in urban design strategies. The global economy has in fact accelerated the perception of differences as a matter of identity for the new city, bringing together into a new kind of unity territorial features which previously belonged to autonomous scales and purposes. It therefore no longer seems possible to define a unique solution and to pursue an ideological approach to the new urbanised territories. On the contrary it seems helpful for design practice to work on specific fragments. Every single urban feature should therefore be viewed according to its inner logic, implying a systematic deconstruction of its principles which are individual and cannot be generalised. This approach will inevitably lead us to recognise the internal differences which lie at the heart of every single feature and accept them as the conscious result of a choice, showing the historical heterogeneity of the city centres, the modern periphery, the rural landscape, the productive settlement and the ‘net-city’ itself and confirming the strong relationship between urban morphology and building typology in a ‘weak’ but important way.

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REFERENCE
3. Cervellati Pier Luigi (edited by), La nuova cultura della città, Milano, Mondadori, 1977
4. Rossi Aldo, L’architettura della città, Padova, Marsilio Editori, 1966
5. Secchi Bernardo, Un progetto per l’urbanistica, Torino, Einaudi, 1989
7. Rowe Colin, Koetter Fred, Collage City, Cambridge, Massachusetts Institute of Technology, 1978
8. This work of research is already started in Italy. The previous results can be found in Marzot Nicola, “The paradox of Castel Maggiore. A Planned city without any prescription about urban form”, in Petruccioli Attilio, Stella Michele, Strappa Giuseppe (edited by), The Planned city?, Bari, Unionografica Corticelle Editrice, 2003, Volume I, pp 159-165
Space syntax is a way of researching cities to understand how social and economic processes shape space over time. To use the current jargon, it is a way of looking at cities as self-organising systems.

The best-known aspect of space syntax is probably its set of methods for analysing patterns of space – or spatial configuration – in the built environment. These methods both uncover spatial structures in cities and relate them to the way people move, stop, and interact. Space syntax methods also help project the mid- and long-term effects of design and planning decisions, and therefore allow designers and planners to work with social and economic processes rather than against them.

A number of these methods have been successfully used for some time, including axial analysis, (for analysing the network of streets and walkways cities) and ‘visibility graph analysis’ or VGA (for analysing patterns of visual fields in public spaces). However, new types of analysis are constantly emerging from the work of the Space Syntax Laboratory, University College London, and its commercial partner, Space Syntax Limited. This article briefly describes some of those developments.

**COMPLEMENTING CONFIGURATION: THE WALKABILITY INDEX**

To hold that spatial configuration strongly influences movement, as space syntax theory does, is not to say that configuration determines everything about movement or that its effects are equally powerful in all places. In some cases, the effect of configuration is weaker than in others, so that additional information is required before movement patterns can be understood or the outcomes of design decisions forecast. This additional information is related to such factors as transport nodes, land use, building frontage, infrastructural elements, major attractors or generators, and aesthetic features.

These other factors can now be linked to configurational models through a recently developed technique known as the Walkability Index. The Walkability Index is based on the statistical methodology of multiple regression analysis, or MRA. MRA methods empirically analyse data in order to determine the impact of each factor serving as an input variable to the movement model. MRA models can provide insight on questions relating to pedestrian movement patterns by highlighting the relative importance of, for example, local integration (the key configurational measure for influencing movement) compared to building height, transport nodes or active frontages.

Also, changing the value of different input variables – such as those relating to the width of a walkway, for example, or the amount of active frontage – can help in forecasting the movement patterns that would likely result. In fact, combinations of factors can be analysed and modified, allowing for a robust methodology.

The Walkability Index is particularly useful in areas where insensitive intervention has put spatial configuration, movement and land use out of sync, such as at the Elephant & Castle in London (the evolving masterplan for which is greatly informed by space syntax analysis). In fact, the need for a technique like this serves as a reminder that the agreement between grid configuration, movement, and land use is the product of the well-formed city, where all three have evolved together. It is probably the main reason why traditional cities are admired as much as they are. This does not mean that cities must be designed in the same way they were in the past, but it does mean they should be designed in the light of what is known about the ways in which collections of buildings and other urban elements can become living cities.

**CONFIGURATION AT A FINER SCALE: SEGMENT ANALYSIS**

One of the great advantages of space syntax is that it analyses space at the micro and macro scale of the city at once. For some time, the line has been the main unit of urban analysis (reflecting the simple fact that city space is essentially a network of linear spaces). However, it is not the finest scale that we need to
understand, as the different segments of lines between junctions often work rather differently. It is also important to take account of the fact that different cities have very different geometrical patterns, varying from the more grid-like to the more organic.

To deal with all of these issues, a new syntactic model has been developed. It is still based on the line network, but its basic unit is the line segment between junctions. This not only allows a much finer scale of configurational analysis, but also makes possible different types of analyses based on different ways of defining the distance between one segment and another: metric distance (how far is it from point A to point B?), fewest turns distance (how many turns does the route require, so how complex does it seem?) and least angle distance (how much turning does the route require in terms of total deflection from a straight line?). These different analyses capture different ways of representing urban complexity.

Research using this new model is ongoing, but it is already proving powerful in the analysis of changing land use patterns at the most micro-scale of the city. The model is being used to develop movement models that work at a finer scale than line-based analysis, and it is also helping to illuminate the role that metric, geometric and topological factors play in the way that the network of city space itself shapes movement. Important new results in this area will be announced in the near future – and they may come as a surprise to some.

INTERNALISING CONFIGURATION: SPATIAL AGENTS

The final development to be described here – EVAS spatial agents – evolved from the VGA methods used on many public space projects, including the recent redesign of Trafalgar Square.

EVAS creates virtual environments (based on maps or architectural drawings) and then populates them with virtual pedestrian ‘agents’ who have a limited form of forward-facing vision. As these agents move around, they use ‘perception-action’ rules to dictate their movement behaviour – for example, they can be attracted by specific objects that come into their field of view. If the environment changes (to simulate a new design, for example), EVAS demonstrates how the patterns of movement might change in response. The decision rules themselves can also be modified and tested.

Although other agent-based modelling techniques have been around for some time, none have attempted exactly what EVAS does. In truth, most have a similar general aim: to simulate complex social processes that are difficult, costly, or simply impossible to observe directly. In addition, there are several agent-based technologies presently in use that model human movement. However, these techniques tend to focus on either the macrodynamics of population movement, or, at the other extreme, the microdynamics of very specific scenarios, such as escaping a fire or behaviour within a crowd.

Virtually no models consider free-will behaviour in urban areas or large public buildings. Agent modelling in such scenarios has largely been avoided because, at these intermediate levels, what people can see on a journey plays an important role in what they do, and endowing agents with vision can be very computationally taxing.

EVAS overcomes this technical limitation by using the VGA technique of pre-computing what can be seen from any given location within an environment. When it comes to running agents through the model, they simply consult a database and retrieve the information about what they can see from the location they currently occupy. This allows rapid simulation of complex environments where computation times would otherwise be prohibitive.

As mentioned above, the Walkability Index seems to clearly indicate that the locations and densities of land uses have an effect on movement, but these in turn can be shown to be systematically related to configuration. Agent simulations allow more precise investigation of how all these factors interact. At the same time, it represents an attempt to get closer to the individual experience of using space, specifically targeting the old problem of whether human movement is more influenced by configuration or attraction.

Space syntax has never been merely a set of techniques for solving design problems

SUMMARY

This account of recent space syntax work should illustrate some of the interesting and powerful new capabilities that are being developed.

Space syntax has never been merely a set of techniques for solving design problems. Instead, it is a way of researching the relationship between the way cities are structured and the way they function. It has a long history of highlighting cultural differences between cities, but increasingly it is able to identify what cities have in common – and so it is helping to build a more general theory of the city, one that especially illuminates the relation between micro and macro scales.

Whether acknowledged or not, urban design is always influenced by how planners and designers understand cities on a theoretical level. The most important aspect of cities is that they are always to some degree self-organising. Space syntax contributes to an understanding of how cities evolve naturally, an understanding upon which future planning and urban design will depend.

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