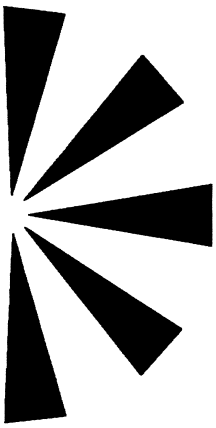

VIEWPOINTS

Discussion of topical issues
in urban morphology

The relation between urban form and density

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The introduction of the concept of urban density can be traced back to the Garden City movement in England and the early modernists in Germany. Reactions to the conditions of the late-nineteenth-century European city rested on the observation that too many people, dwellings, and workplaces combined with too little air, light and open space resulted in, among other things, social deprivation, ill health and crime. The concept of density proved to be useful to describe these conditions and prescribe alternatives, often in the form of low densities in decentralized environments. Examples of this are the garden cities in Great Britain and Sweden, the *Siedlungen* in Germany, and the move to the suburbs in North America (Rådberg, 1988).

The problem

At present, however, there seems to be an uncomfortable situation when it comes to the use of density. On the one hand, we keep using it and needing it in programming, in the communication of plan intentions and in the evaluation of existing urban environments. On the other hand, we are told to be aware of the fact that this has very little relevance to the resulting urban form (Alexander, 1993; Forsyth, 2003). This use of a concept with a large disclaimer warning is disturbing. But what if the traditional concepts that have been used to dismiss the relation between density and form are inappropriate? Perhaps another analytical instrument can be constructed that reveals important density aspects of urban form?

A number of methods to measure density have been used in the past, such as dwelling density, land-use intensity, building coverage, and spaciousness (Angenot, 1954; Heimans, 1965; Rådberg, 1988). The most widely used method of determining density until now – certainly in the Netherlands – is the number of dwellings per hectare. However, density not only concerns the number of dwellings in a particular area, but also their size and the number of amenities, companies and offices. Floor Space Index, or FSI, is more suitable in this regard. It expresses the amount of floor space in relation to the land area. But density is not only determined by the number of square metres of floor area: areas with an identical FSI can have a very different spatial character. In addition to aspects such as composition, materials, architectural details and the location of the area, factors such as compactness, building height and the amount of non-built space play an important role. These physical aspects are not taken into account in measures such as the number of dwellings per hectare and FSI.

This can be demonstrated by considering two urban fabrics in Amsterdam, the Grachtengordel and De Pijp (Figure 1). These have important formal similarities and are representatives of a typological family of perimeter building blocks composed of a great many individual lots. However, owing to differences in the size of dwellings and the number of amenities and workplaces, the density of dwellings in the Grachtengordel is only 45 per hectare in comparison to 185 per hectare in De Pijp. There is thus no relation between dwelling density and urban form. However, both fabrics have a FSI of

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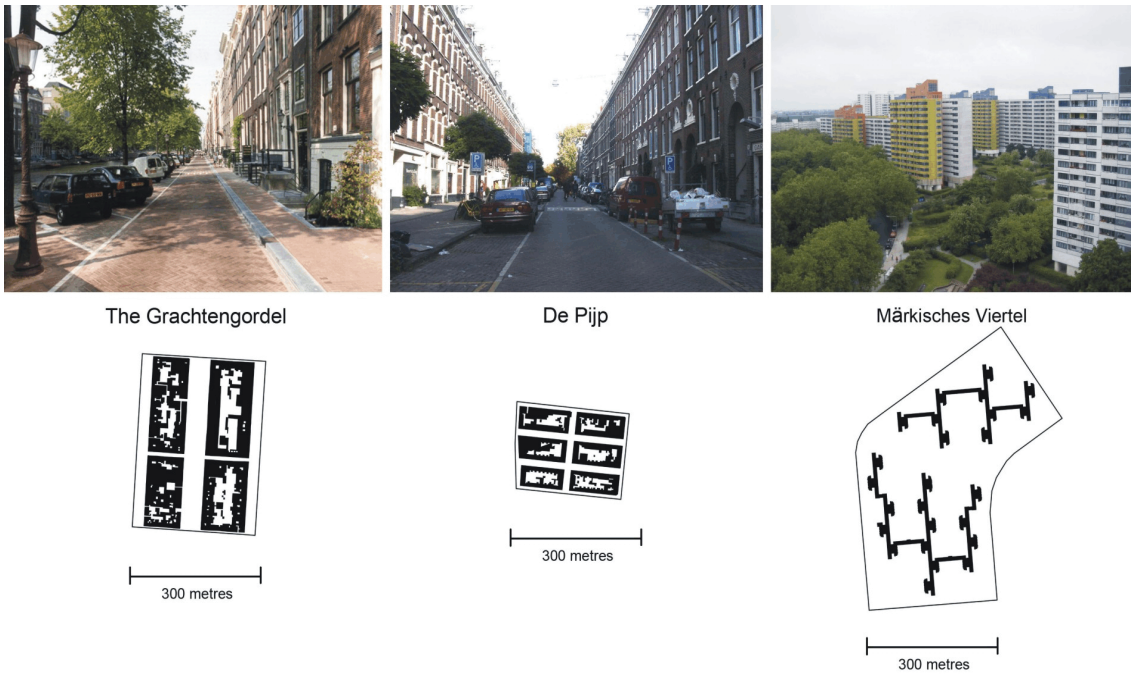

Figure 1. Three urban fabrics with the same FSI, but with very different urban layouts.

approximately 2 (i.e. the floor area amounts to 200 per cent of the land area). Does this imply a relation between FSI and urban form? A comparison with Märkisches Viertel in Berlin suggests otherwise (Figure 1). This is an area of high rise slabs with a great deal of green area surrounding the buildings. The two Dutch examples and Märkisches Viertel all have a FSI of 2, but the spatial properties of the latter are very different from those of the closed building blocks of the former. Thus we have to conclude that neither dwelling density nor FSI are of much use in establishing a relation between density and urban form.

The solution

An alternative approach to density that has been developed in Delft (Berghauser Pont and Haupt, 2004, 2005) uses five variables to describe a developed area, namely FSI, Ground Space Index (GSI), Open Space Ratio (OSR), Layers (L) and Network density (N). These five variables express the intensity, the compactness, the pressure on non-built space, the building height and the amount of network in an area respectively. Here we shall consider FSI, GSI, OSR and L.

GSI is the percentage of the land area covered by buildings. OSR is the amount of non-built space at ground level per square metre of floor area. This provides an indication of the pressure on non-built space: if more floor area is developed in an area with the same footprint, the OSR decreases and the number of people who will use the non-built space increases. L is the average number of floors in an area.

If density is defined not just as intensity (FSI), but as a combination of intensity, compactness (GSI), pressure on non-built space (OSR) and height (L) it can be used to differentiate between urban form in a more efficient way. To assess all variables simultaneously, we have developed a diagram, the Spacemate (Figure 2). The FSI on the y axis gives an indication of the intensity in an area and the GSI on the x axis reflects its compactness. The OSR and L are gradients that fan out across the diagram. Combining these variables gives every project a 'spatial fingerprint'.

Looking again at the three urban fabrics, the Grachtengordel and De Pijp in Amsterdam, and Märkisches Viertel in Berlin, we see that the first two show great similarities in built density (FSI, GSI, OSR and L), while Märkisches Viertel – with approximately the same intensity (FSI) – has very different values for GSI, OSR and L. The typological similarities between the Grachtengordel and De Pijp is reflected in their proximity in the Spacemate diagram.

By placing more than 150 empirical samples of urban fabrics in the Spacemate diagram (Figure 3), it becomes evident that clusters are formed that

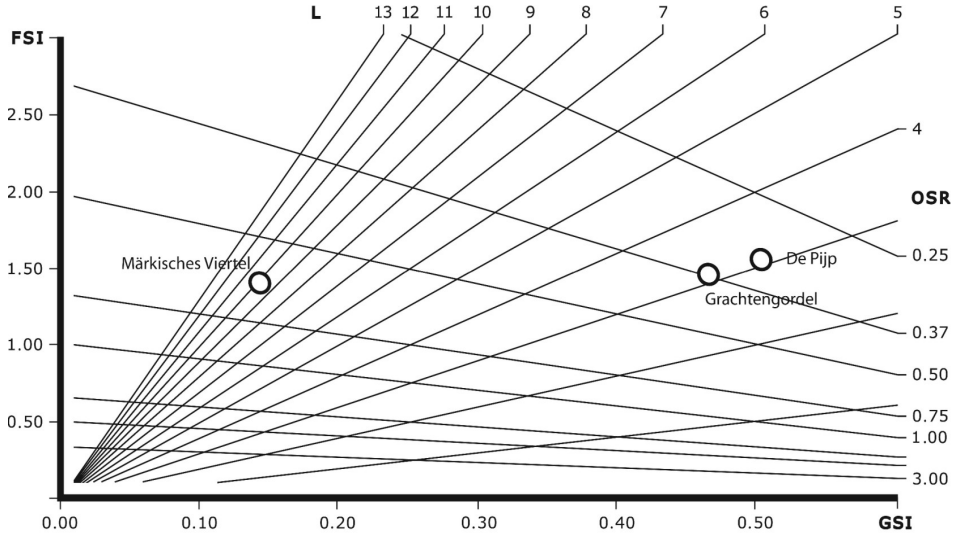

Figure 2. Three urban fabrics positioned in the Spacemate diagram.

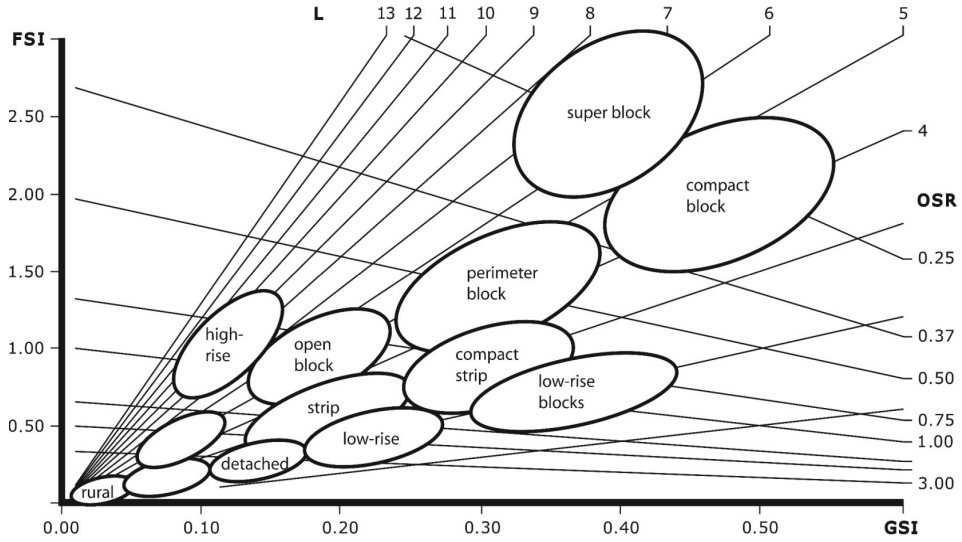

Figure 3. Typological clusters of urban fabrics in the Spacemate diagram.

display similarities in terms of spatial structure: for example, all high-rise areas are gathered together in one zone in the Spacemate and areas where perimeter building blocks predominate are grouped together in another zone. The interaction between the variables appears to be more significant than their absolute values.

In addition to portraying fundamental properties of built space, Spacemate can also be used to investigate variations in certain attributes – for example daylight access, privacy and parking – under different density conditions. Information is thereby provided about the problems and possibilities that can be expected for different densities or positions in the Spacemate.

Conclusion

Many of the established uses of density lack spatial precision and are unsatisfactory for describing and prescribing urban form. Only when density is seen as a composite of aspects, such as intensity, compactness, height, and spaciousness (Spacemate), can it be satisfactorily used to differentiate between urban fabrics, understand

their characteristics, and design guidelines for future developments.

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Stepping outside the comfortable confines of the West

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In Spiro Kostof's two classic metahistories on the urban artifact (Kostof, 1991, 1992), he emphatically argues that urban form is read correctly only to the extent of our critical familiarity with the precise conditions that served as its generators. On similar lines, Clifford Geertz – the so-called purveyor of small things – in his prolific writings deliberately chose not to formulate grand, overarching theories, instead seeking to find meaning in the *thick descriptions* prevalent across culture, time and space. If Geertz's definition of culture as 'the stories we tell about ourselves' (Geertz, 1973, p.14) in fact resonates true with academics and intellectuals that comprise urban morphologists around the world, to what extent have we actually written the stories that patiently await recording and writing? How often have we stepped outside the comfortable confines of our geographical settings to objectively view the urban settings of cultures that are far removed in intent and content? How critically have we viewed non-Western cities through pedagogy that negates clichéd bipolar opposites, and instead employs methodology emanating from thick descriptions?

Precisely why architectural and urban historians have feared to tread the arena of the non-Western world may be explained through a combination of complex factors. For one, the prevalent academic discourse to write and teach architectural and urban history in the Western world has never been concerned with more than a few select cultures, except at a superficial level. Bernard Rudofsky's (1964) claim about chroniclers presenting us with a full-dress pageant of formal architecture, conveniently skipping several centuries and cultures, in his brilliantly provocative *Architecture Without Architects*, still rings true today. Likewise, invigorating research on non-Western urbanism – cities, urban fabrics and legislative processes – has not fared any better. If public forums are at all indicative of critical discourse brewing or not brewing within the ivory tower, the recently concluded ISUF and EAUH conferences in Stockholm, Sweden (this issue, pp. 42 and 59-60) engaged only a precious handful of presenters impassioned by their preoccupations with the 'exotic' non-Western. More significantly, it is worth noting that in both these cases, 'half the world and more' in Geertz's vein escaped the very act of *story-writing*, so much so that there were not even enough papers in this category to form a panel differentiated by thematic content or geographical region. In contrast, papers and contributions from Eurocentric and Western categories abounded.

Obviously, the task of an urban historian, morphologist and researcher is by no means simple. Unravelling the complexity of cities calls for a unique, multidisciplinary approach and draws upon a range of social, economic, political, intellectual and architectural sources. In exploring these different materials, the researcher must carefully consider the motives of the various actors who manipulated urban form often to their own ends and faithfully record the palimpsest of urban change.