(Alexander, 1966; Nel and Landman, 2015; Salat and Bourdic, 2012). Secondly, resilient cities are well connected, with a diversity of routes and transport networks, thereby offering options in the case of system failure (Bourdic *et al*., 2012). Not least, resilient cities have diverse functions and uses that are distributed across the city at varying densities and distances from each other within modular networks.

In this way a complex order is created through the evolution of small-scale elements that in turn influence higher scales (Salat, 2011, pp. 57-8). These adaptations cannot be satisfactorily implemented at a single scale. Rather, they form part of a hierarchical continuum of interacting systems (for example, metropolis, neighbourhood and street) that adapt at different rates and require a variety of approaches to facilitate improved resilience. Only in cross-scale hierarchical structures of flow networks can local perturbations be limited and optimal efficiency and resilience achieved (Salat and Bourdic, 2012, p. 65).

A shift in paradigm is required to change current urban form in accord with a more inclusive perspective that recognizes that social values may give rise to cities that are not spatially resilient and that urban form can reduce social resilience. Is it possible then to transform social values by changing urban form? Could a more resilient urban form result in more resilient societies? These are the kinds of questions that TRUST is exploring in order to engage with the increasingly complex realm of urban development in an increasingly uncertain world.

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Urban morphology and daylight

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Adaptations of urban form to daylight rarely receive much more than passing mention in the academic literature of urban morphology. Yet their importance in the design of urban form has long been acknowledged. It has tended to be most evident, and received most attention among urban morphologists, where the concern has been with the agents and agencies responsible for urban form. Daylight was significant, implicitly and explicitly, in two prominent fashions underpinning twentieth-century urban form – the garden-suburb movement and the modern movement – though the ways in which this was manifested in the landscape were very different. However, there is perhaps space in this journal to underline a more technical aspect of daylight in the context of applied urban morphology within planning.

Today most architects have software programs that within seconds give the desired information on sunshine and shadows during the year. But that is, unfortunately, not a guarantee of better results. There tends to be a large amount of such information relating to major projects, but the requirement for higher buildings that are grouped in a denser way hampers the outcomes. In the UK, the report on *Site layout planning for daylight and sunlight* (Littlefair, 2011) is of major significance for planning. And a recently published report by Rode *et al*. (2014) shows how important the energy aspect is today. In the Nordic countries, daylight is

especially difficult to handle relating to its great variation diurnally and over the course of the year. A handbook on *Daylight in urban settlements* based on experiences from practical town planning has been written in Swedish (Sundborg, 2010). Unfortunately, it is easier for the planners and politicians to decide according to their own opinions without the interferences of factual investigations and other complications from the scientific world.

One interesting exception to the common situation among urban planners is the New Urbanism movement, which has developed special design codes for urban planning. The architect brothers Leo and Rob Krier have continuously used their own principles in practical projects. But it is also desirable to consider some old design principles from the days of Camillo Sitte and Raymond Unwin. To revise them, add contemporary principles and even develop some new ones adapted to our actual knowledge of such aspects of our environment as daylight, is a way of achieving better planning tools. With such tools, combined with local adaptations to the site, we can have more attractive and functional settlements.

The ways in which daylight can affect the design of such aspects of urban form as the street, the street grid, the urban block and residential courtyards are cases in point. In the case of the street grid, the amount of daylight depends very much on the type of grid. A typical rectangular grid allows low-angled light from four different directions. An irregular organic street grid creates difficulties for direct sunlight. The daylight distribution in streets and squares is dependent on the façades and especially the buildings at the corners of street blocks. The geometry of the corners can be rounded, chamfered or at an angle that is obtuse, right-angled or acute. Chamfered corners are among the best for daylight distribution.

Different openings between the street and the closed central courtyard in urban residential blocks are interesting to compare. It is both a matter of the shape of the opening itself and whether it is placed in the middle of a façade in the urban block or in one corner. If the openings are repeated in the same way from one block to another, low-angled light can be spread over long distances.

Perhaps for most readers of this journal it is unnecessary to add that such 'technical' design solutions from the standpoint of daylight need to be assessed in relation to other aspects of the character of the morphogenetic environments in which they are set.

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UrbanNous

UrbanNous provides access to digital multimedia focusing on urbanism (www.urbannous.com/urban-design-group.htm). Examples of lectures available online include:

Barry Sellers: Urbanism in China

Ed Parham: Urbanising rapid growth – space syntax in China

Eric Firley: The Urban Masterplanning Handbook

Matthew Carmona: Design coding – diffusion of practice in England

Sam Griffiths: The evolution of suburban town centres – questioning the narrative of historical decline

Isabella Yi Zhang: Learning from China

Paul Reynolds: Intelligent cities – urban design in the information age

Dominic Papa: Garden cities past and present

Fenella Griffin: Greening the city – towards a landscape integration

John Punter: Improving the quality of housing design

Stephen Marshall: Urban design – beyond pseudo-science?

James Cross: Models for growth – the new market town

Roger Evans: An urban design manifesto for the making of towns

Martin Kelly: The importance of trees in the urban landscape