Challenges of the modernist urban landscape

On urban design and (sub)urban space

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This article will discuss modernist urban design seen as a physical and functional condition for everyday urban life.[1] In focus are the large housing estate suburbs that were built in Sweden in the 1960s and 70s, the so called 'concrete suburbs' or Million Programme suburbs (named after the political project to build one million apartments in ten years). The physical environment of these areas has been debated since they were first constructed and great resources have been allocated to change them – with various results. Today, it is hardly controversial to claim that for instance the post-modern attempts to urbanise the suburbs with a battery of symbolic references to popular traditional urban places (such as Italian piazzas) were shallow, but I think that still today we have problems to address the underlying, structural conditions of urbanity. One of the reasons may be that these modernist environments are more difficult to analyse than the traditional urban ones. Architectural terminology largely lacks adequate concepts for the spatial particularities we find in these urban environments, and theories that are based on the traditional urban fabric are not always applicable in the suburbs.

The main point here is to draw attention away from mainstream criticism of open space and modernist building design in the suburbs, and instead use theories of urban morphology and space syntax to discuss how combinations of basic urban elements – streets, buildings and open space – and spatial configuration influence conditions of urban life. The focus is on features that architects and planners need to deal with, that is land use and design.

The neighbourhood unit period and its morphological developments

At a glance the concrete suburbs may seem like a unique urban type, but in reality they belong to the paradigm of neighbourhood unit planning, which stretched from the 1940s to the middle of the 1970s. This kinship is important because it means that many design features of the criticised 1960/70 suburbs are closely related to those of highly appreciated areas from earlier decades of the very same planning period. In fact, most of the fundamental characteristics of the neighbourhood units were the same through the whole planning era: urban enclaves with housing blocks in open-plan layouts, functional zoning, traffic separation,

1. Guldheden, 1940s. Although in a open and green layout, the interface between the private and public realms are close, clear-cut and fairly easy to identify.

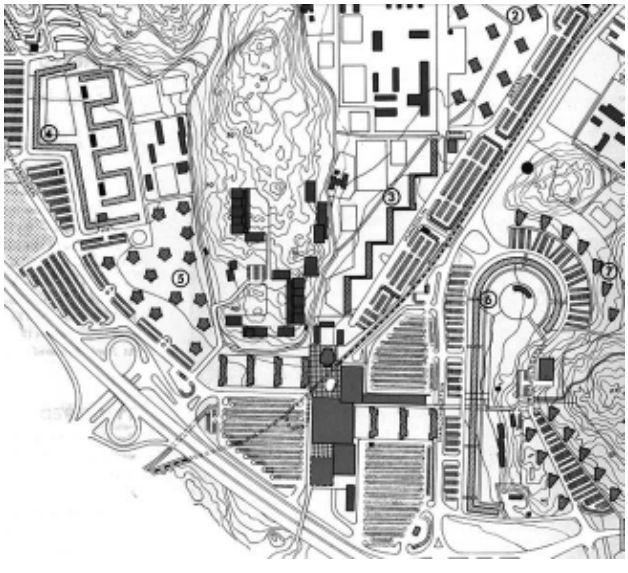
2. Biskopsgården, 1950s. The street has lost its direct relationship with the buildings, which now relate to the landscape.

and a local centre with a stop for public transport. However, one critical property that did change was the relationship between the primary urban elements streets, buildings and open space. In a few decades the suburban developments came to change their appearance radically – within the same planning paradigm. That makes the very basic urban morphology a meaningful point of departure for analysis.

The transformation of spatial relationships was brought about gradually (which may explain why the significance of the changes was not really discussed in contemporary architectural writing). A few typical examples can illustrate the development[2]:

In the areas built during the first decades of neighbourhood unit planning the relations between the private and the public realms are close, fairly clear-cut, and easy to identify. [ill. 1] The structural condition still resemble the traditional urban grid: The neighbourhood centres are integrated in the street network, and although set in spatially open and 'green' layouts, the residential building blocks still relate to the streets. Thus the buildings both define a streetscape and contribute to the social life of the street. The street networks of this time are foremost irregular grids.

In areas from the 1950s and early 1960s in Gothenburg, we can notice how these relationships gradually change [ill. 2, 3]. Since the street had come to be seen as a space for transportation only the architects were free to care more about landscape than streetscape in their urban design. Separate groups of buildings create their own spatial relations and in the



3. Fröunda, 1960s. Groups of buildings create their own spatial relations.

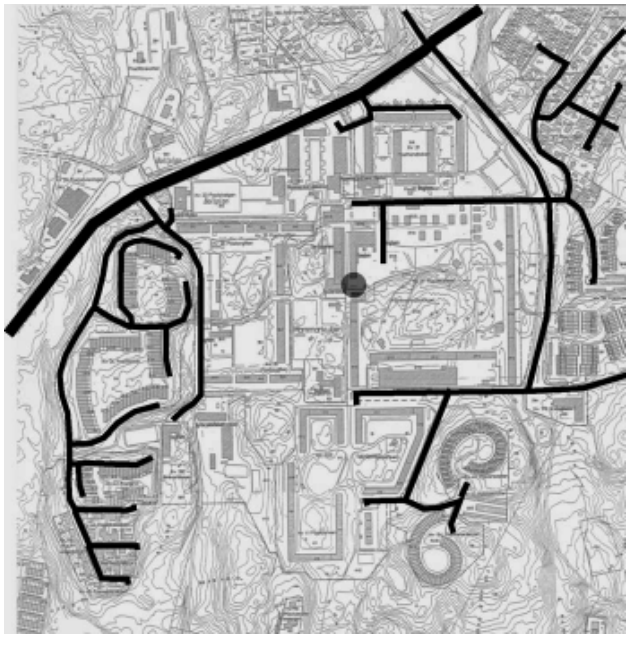
last stage of the planning period, around 1970, [ill. 4: Gårdsten] many housing blocks relate directly neither to landscape nor street but mostly to other private blocks. The relationships between the private and the public realms are in many cases diffuse. Another qualitative difference is that patterns of buildings and patterns of movement networks commonly are treated as independent objects of design: this lack of coherence makes the areas less legible, at least for visitors. Furthermore, the tree-like structure of the street network decreases the accessibility of the suburban centres for car traffic at the same time as the spatial segregation of these areas make them unlikely as destinations for random visitors. The problematic social segregation of many concrete suburbs is reinforced by design [ill. 5: Hammarkullen].

4. Gårdsten, 1970s. Residential buildings relate mainly to other private blocks. Public space is everwhere and nowhere.

Housing estates and primary urban elements

Urban design is based on the primary urban elements plot, street, open space and building. How these elements are designed and assembled decide the outcome of every urban environment. For example: In the old urban fabric the plot was a structuring element, with a direct relationship to the street and to the building. Open space related directly to, and was often defined by, the other elements. In the modernist urban fabric, the plot has lost significance as a structuring element as buildings and streets relate freely to both one another and to the plot.[3] Open space becomes the mediating element between buildings and streets, and different sorts of open space commonly relate to one another.

Although the primary urban elements are very useful as tools for thinking and as concepts for analysis, we must bear in mind the limitations of the simplified categories[4]. The least complicated one is 'building'. Firstly, there is a rather well developed terminology for different building types. Secondly, seen as urban elements the buildings we find in the concrete suburbs are not much different from buildings we find in other types of urban environments. The three-storey linear block is a common building type in picturesque neighbourhood areas from the 1940s as well as in criticised concrete suburbs. And the suburban high building block in straight lines has often been under attack, yet that is an element that is taken for granted in city centres.[5] The significant differences, then, come with how the buildings are combined with the other urban elements. Here we approach greater difficulties.



5. Hammarkullen, traffic separation. The neighbourhood centre (grey circle) is geographically central, but peripherally located for motorists. Movement network for vehicles in black.

'Street', for instance, is a problematic concept in the housing estate suburbs. The mere use of the word tends to be normative, in favour of the traditional urban street. In the modernist urban settings, the street as an urban element has been split up in several sub-categories with different functions and different spatial properties. The question is what the element 'street' stands for in these environments. Does the pedestrian path represent the same element as the feeder roads and the arterials? In a way, yes: the basic function of the urban element 'street' is to be the carrier of movement, and with such a definition all movement networks qualify into the 'street' category – pedestrian paths as well as the roads for vehicular traffic.

But there is an enormous variation in both functional and spatial qualities of these sub-categories. Apart from the obvious difference concerning users (pedestrians and/or vehicles), further qualitative variations come with how the different 'streets' are combined with the other urban elements, that is the relationship to buildings and open space. This conditions not only the perception of the streetscape, but influence the potential activity along the street. The same goes for the configuration of street networks. More on that later, but first some reflections on another of the primary morphological elements. When the streets, of any kind, relate to open space instead of buildings, we come across the next problematic category: 'open space', which is even more difficult to handle than the 'street' element.

The open spaces of a square in a dense city, of a green field in a suburb, and around the suburban feeder roads are all extremely different, in both character and use. The wide range of open spaces between residential buildings in the housing estates represents an almost similar variety. The most interesting part for the housing estate suburbs may be the relationship of open space to open space, but on the whole there are many sub-categories of open space in these urban environments that need to be further analysed concerning their forms, their functions, and not the least the ways that they are used.

The lack of spatial differentiation and spatial hierarchy in housing estate areas has been shown to influence both perception of space and space use. In a study of a Polish modernist new town called Tychy, Magdalena Zmudzinska-Nowak found that inborn youngsters did not fully grasp the meaning of traditional urban spatial categories like courtyard, street, alley, quarter, avenue, and square. More interesting here, though, is that they also seemed to lack adequate expressions for their own spatial environment: 'the language and range of notions that they use […] is as poor as the described space that surrounds them'[6]. The Tychy study confirms the notion that the new (or at least relatively new) spatial categories of modernist urban space are difficult to label. The reason for this is of course that many of the open spaces are hard to identify, since they are both spatially and functionally vague.

Back to the Swedish housing estate areas we can notice that there is a significant difference in the treatment of open space between the early neighbourhood units and the concrete suburbs of the Million Programme. In the early neighbourhood areas the spatial interfaces – although in open plan layouts – define distinguishable elements such as street, courtyard, landscape. In the concrete suburbs on the other hand, there is an abundance of space that is neither street, courtyard nor landscape, nor any other known spatial or functional category, but merely distance.

This does not go to say that all urban space must be ordered, defined, and labelled. Cities need the odd spaces that are not programmed for certain ends, but there is a big difference between the sorts of urban space that invite creative use, such as the 'off-stage' places youngsters often seek for their gatherings[7], and poorly maintained and desolate voids between residential buildings. This phenomenon of *no man's land* between buildings in housing estates has been observed in different studies.[8] The research shows that in housing estates where the spatial design makes it possible to distinguish open space in terms of public, semi-public, and semi-private categories the semi-private spaces have been appropriated, used, and maintained to greater extent than in areas where the spatial design is less legible. That many spatially and functionally vaguely defined spaces seem resistant to people's appropriation can be confirmed in almost any housing estate suburb of the Million Programme.

To define and distinguish different kinds of open space, then, some physical borders are needed but these borders do not have spoil the very openness of open space. In a study where I asked teenagers to draw sketch maps over their areas, I found that small-scale spatial divisions, such as fences and hedges of private gardens or demarcations of specific functions (for example parking lots and play grounds) in open space are quite significant as spatial indicators. As

such, these sorts of micro-scale edges contribute to more legible environments.[9]

Open space was one of the hall-marks of modernist urban design. It has also been one of the more criticised features of the modernist environments. But to take on the problems of open space does not mean we need to model the suburbs on the traditional dense grid. The open space of the housing suburbs is indeed a morphological challenge: not a property to eliminate but quality to use and to develop.

Movement, urbanity, and configuration

Our most common use of public space is for movement. Everyday life in cities is full of people who go to work, go home, pick up children on the way, go shopping and so forth, just as the transports of goods and waste go through the movement networks of public space. Quite naturally then, movement is one of the most powerful factors of urban development.

The essential quality of urban life has to do with mixing and encounters and with all the economic, cultural, and social exchange – or friction – they lead to. The easier it is to understand and to navigate in public space, the more accessible it will be – for locals and visitors alike. As such, the issue of urban legibility is connected to the use of public space and in a wide sense then also to the spatial qualities of *urbanity*.

The term urbanity is often used but seldom defined. In the architectural discourse the spatial aspects of urbanity are often connected to the physical characteristics of individual spaces. Urbanity is then a property ascribed to certain forms and dimensions of space; enclosed spaces are commonly considered as more urban than open ones[10].

The approach of space syntax theory draws attention to another spatial aspect of urbanity: that of spatial relations, and more importantly that spatial configuration influences both land-use and the potential for human encounters. This perspective is useful in the housing estate suburbs, because from an urban design point of view the lack of urban qualities derives rather from functional and spatial segregation, than from spatial openness or 'lost space'.

In space syntax theory, the sum of all movement is called the *movement economy* of a city. In a mixed-use urban layout, where points of origin and destination are spread out, movement is roughly going from everywhere to everywhere else, and each trip passes through a series of spaces along the way. The passage through these spaces is called the *by-product* of movement.[11] This by-product of movement tends to generate changes in land-use: we can notice it for instance when shops and cafés are established in places where many people pass on their way somewhere else.

Space syntax offers methods to investigate spatial configuration as relationships between the part and the whole.[12] The concept of *spatial integration* defines how far it is from each individual space to all other spaces in a spatial structure, not in distance but in topological steps. Numerous empirical space syntax analyses show an actual correspondence between the levels of spatial integration and movement, both in buildings and urban settings. The more integrated the space, the more movement will pass it.[13] Of course, this does not happen on a deterministic individual level, but with a critical mass of movement people tend to disperse according to integration values. In other words: spatial configuration is an underlying structure which we (more or less subconsciously) use for our urban navigation, and as such a fundamental condition for how movement is dispersed in public space.

However, Hillier states that the urban movement economy depends on 'a certain size, a certain density, a certain distribution of land uses, a specific type of grid that maintains the interface between local and global, and so on'.[14] What sorts of environments reach these 'certain' levels is not obvious, but it has been found that housing estates, seen as isolated spatial systems, commonly fail to show correlations between level of integration and movement.[15] This is vital, because, as we shall see, the reasons behind the lack of correlation clarify some important structural properties of the modernist urban landscape.

Suburban logic of space: a space syntax study

With space syntax theories applied to suburban centres, the well integrated ones would seem to have a better potential to become thriving public places than the less integrated ones. In a study of 14 neighbourhood unit centres in Göteborg, I set out to investigate if differences in visit frequency by the neighbourhood inhabitants could be explained by different spatial configurations of the areas. The hypothesis was that the most well-used local centres would also be ones that were well integrated in the neighbourhood movement networks (pedestrian as well as vehicular).[16]

There is no need to get into the details of the study here, suffice it to say that my hypothesis failed. No certain correlations between the layouts of movement networks and the use of the local centres could be detected. One could see that many of the well-integrated centres had a high average number of visits, but so did some of the more segregated centres.

I propose that this lack of correlation can be seen as an important indicator of the spatial and functional particularities of the housing estate typologies. With some of the central concepts of space syntax theory I will now discuss how properties such as the sparsely built open plan layouts and the traffic separation may influence the conditions for everyday life in the suburban environments.

Planned centres and patterns of movement

Most suburbs from the Million Programme period were built for one function, namely dwelling, with a local centre as the focal point for public life, and with the commercial and non-commercial service of the area concentrated there. With this combination of housing and a planned local centre, other patterns of movement appear in the housing estate areas than in the mixed use areas.

Movement economy in mixed use urban settings consists of people and goods, which altogether go more or less from everywhere to everywhere else. But this variety, which is natural in the multifunctional environments where origins and destinations are spread out, is reduced to a simplified 'origin-destination system'[17] in the housing estate suburbs. The origin is each individual dwelling, and the destination is more or less the same for everyone: the planned centre, where most service and also the public transport stop is located. The main patterns of pedestrian movement in the monofunctional suburbs could possibly be described as pendulums, swinging from each dwelling to the centre and back. Of course this is a simplification. Still we must acknowledge that there is a difference between the *complex patterns* of movements in the mixed use areas, and the *simple patterns* in the suburbs. (I do not speak of movement patterns on an *individual* level; it is only on an aggregated level that we can find complex and simple patterns of movement.)

It is tempting to call these simple movement patterns less urban, but it may be more appropriate to acknowledge – at least temporarily – that they just represent another type of urbanity. This goes for the traffic separation too, where there is a fundamental difference between how you move in the hierarchic tree structure of the Million Programme suburbs, and the net structure of the traditional grid. The tree structure allows only simple and fixed patterns of movement, while the freedom of choice in the net provides for more complex patterns.

The conditions for complex or simple movement patterns in the areas depend also on how well connected they are to their surroundings. During the neighbourhood unit planning era, the number of entry points to the enclaves was reduced. Geographically isolated areas with few entries, like many of the Million Programme housing estate areas of Göteborg, can not be expected to benefit from the movement economy of the city. But neighbourhood areas which are located next to other areas can do that – provided they are well connected to their surroundings.

Sparsely built open plan layouts and by-products of movement

Urban places change with time. Some places are more stable than others, but on the whole, and seen through millennia, centuries or decades, public places evolve, thrive, and lose their position in the urban life in cycles. With time this will apply to the public places in the housing estate suburbs too. But whereas we know at least something about how the use of the traditional urban fabric reacts on changes in economy, demography, configuration and so on, we still know very little about the urban mechanisms of the housing estate typologies. There are basically two reasons for this: the housing estates suburbs are young in terms of urban history, which means that we can not yet see any certain regularities in patterns of change, and they are so different from the older urban typologies we know about, that we can not uncritically infer knowledge from one typology to the other.

There are some important features in the design of the Million Programme housing estate suburbs that make the conditions for changes different than in the traditional urban fabric. The typical suburban properties of housing in sparsely built open plan layouts, combined with the separation and differentiation of traffic, condition not only people's movement, but consequently also where the thriving places can evolve.

We know that commercial activities normally benefit from good accessibility and exposure to potential customers. In the housing estate suburbs, where the interface between streets

and buildings largely was lost in the 1960s, the major paths for movements go either where there are no buildings near or, in cases where there are buildings near the paths, the buildings are seldom suitable for business. Where streets and buildings have little connection there is little opportunity to take advantage of what Hillier calls the by-products of movement. Let me give an example: in the 1990s the University of Göteborg located new faculty buildings and functions to Vasagatan, a fairly busy but at that time quite ordinary inner city street in Göteborg. In a few years the atmosphere of the street changed radically. The most certain sign was numerous new restaurants and cafés with outdoor seating. This transformation could happen – without further planning efforts or large investments – because the condition for it was already there when the new attractors were added: there were buildings along the street, with ground floors that were originally built for commercial use and thus already suitable for the establishments that students and other city dwellers apparently desired. It is difficult to imagine a similar scenario in a sparsely built suburb. Even if the same additions of attractors would have created a busy path, it would have been harder for potential economic actors to take advantage of the by-products of movement and benefit from the potential of the passers-by. A path over a grass field, a parking lot or through shrubs is unlikely to cause the kind of development we could witness along Vasagatan.

In space syntax terminology a street space is *constituted* when building entrances face it.[18] For the use, as well as the experience, of a street or a pedestrian path there is a big difference if they are constituted or not. Typical for the urban typologies of the housing estates is that very little of the public space is constituted; the buildings are spread out and – more importantly – separated from the major paths of movement.

The sparsely built, open-plan layouts can be expected to contribute to another logic of space use in the housing estate suburbs than the urban grid. The conditions to respond to by-products of movement that we see in the dense grid are missing, and the new patterns of response have not yet become clear.

Movement predictability and land-use changes

We can extend this discussion to speculations about land-use, and land-use changes in the suburban housing estate areas. The traffic separation and the sparse layouts seem to make these environments more resistant to spontaneous change, as if their layouts generate some sort of *urban inertia*. But why is that? Neither the patterns of building nor the movement networks are really more fixed than in the inner cities. Whatever their layouts, both buildings and street infrastructure are long-term investments that do not change rapidly; it takes considerable resources and in many cases political initiatives to change them.

The difference between traditional grids and the housing estate suburbs is that both the housing blocks and the configuration of the suburban movement networks are less receptive to changing circumstances. Even if functional additions in new buildings bring about new patterns of movement, it is also plausible that it takes longer in the suburb than in the dense grid before the changes have effects on the surroundings.

The first generation of improvements that were carried out in the Swedish concrete suburbs were largely superficial, aiming at 'humanising' the environment with colours or added details in the architecture – to 'break down the scale', it was said[19]. Some local centres were beautified in the same manners, and some were citified with granite and bollards. These improvements have been met with various reactions, but regardless of what we think of them, we must recognise that they do not change anything at the structural level where the more powerful driving forces of urban development seem to work.

This means that within the range of physical planning we should pay more attention to the conditions for the movement economy, because that is a more forceful engine for change (if change is what we want) than for example the local centres or the separate suburbs seen as isolated entities. But with this attitude we face a problem: the higher up in scale the investments are made, the more costly they are and possibly also the more uncertain the outcome. We can argue that the suburbs need a more urban configuration, a layout which allows for instance flexibility in movement patterns, but the investments that are needed to bring it about are huge compared to the small-scale changes that make things look better – and they would still not guarantee to instantly achieve a more appreciated environment.

At the same time, we can try to argue the other way round concerning the simple and highly organised patterns of movement in the suburbs: since movement seems to be such a profound force for land-use, then the planning that leads

more or less everyone to the centre could be expected to make this place attractive for business establishment, as opposed to the spread out by-product spaces leading there. Why this is not the case (because it is not, at least not yet) can be explained by configuration at city level: other customers than the local ones do not simply drop by these spatially segregated areas. So even if a local centre is integrated in the neighbourhood area, its isolation from other areas makes it less attractive for economic actors, because it is not part of the larger movement economy of the city. Furthermore, we know that many local centres of the concrete suburbs are not even easily accessible within their own areas.

In this planned-centre perspective I think there are some interesting recent developments to follow henceforth, for instance in the socially and economically segregated Stockholm Million Programme suburbs of Rinkeby, Flemingsberg, and Kista. In Rinkeby a politically initiated youth centre for culture and sports has turned out a success (however not financially) and seems to have the potential to be a strong attractor. By similar political reasons, the Swedish government located the prestigious university campus, University of Södertörn, in Million Programme suburb Flemingsberg outside Stockholm. In Kista Scandinavia's largest indoor centre, situated in Kista Science Park, has become a place with integrating potential because of its location. Katarina Nylund points out that the indoor centre – situated in the 27.000 employee IT-cluster, and close to the residential area – has become a place where people of different social, ethnic and economical backgrounds if not mix, so at least become co-present.[20] These sorts of structural changes, with new conditions for movement through new attractors and new connections, are likely to need some time before the results start to show. The new big investments can be seen as full scale experiments to learn from.

Today, we can only say that it will be interesting to follow what the long term spin-off effects of these large-scale interventions will be. The question is if these new attractors will influence their surroundings, and in that case what sorts of effects it will be. Will there be significant changes in the social dynamics without any further changes in the physical environment? Will we see new buildings? Will the existing buildings around adapt to the new groups of passers-by? Or is there really something we could call urban inertia? Only time can tell.

Intelligibility as an aspect of urban navigation

Lastly, some thoughts on urban layouts and their inherent coherence. The concept of intelligibility in space syntax theories concerns how parts of the spatial structure relate to the whole[21]. The perspective of space syntax is necessary if we want to understand how different conditions for urban navigation influence how movement is dispersed in urban environments. With the particular conditions we find in the housing estate suburbs, with their functionalist traffic planning and highly ordered functional layouts, we need to use a few words on intelligibility of the spatial structure as a prerequisite for urban orientation.

The correspondence between space and movement that space syntax analyses have revealed in the traditional urban settings is claimed to arise because people navigate in the structure thanks to its inherent intelligibility. The underlying spatial patterns of configuration tend to make people move according to the spatial 'laws' of integration.

But in the light of the suburban peculiarities, we must elaborate the distinctions and recognise that it is not because people understand the configuration that they move in these predictable ways in the urban fabric. Most movement in urban settings is generated by people's day to day duties. Since these movements are carried out in well known environments, the choice of route is not primarily about intelligibility but about place knowledge and habit, though still according to the conditions afforded by configuration. The difference to suburban settings is not that the suburban configuration lacks intelligible order, but that it lacks optional patterns of movement. The configuration of the suburban housing estate areas is intelligible in an ordered sense, but it is not apt for the kind of explorative movements that lead to a 'natural' dispersion of moving agents, whether by car, bicycle or foot.

When movement is not habitual but explorative – as when we are tourists, leisure strollers, or have business to do in unfamiliar areas – we get an idea of how the environment is organised as we move around. We use a great variety of environmental signals to find out what direction to take, such as signposts, buildings, paths and streets, or the sight of people. The exploration continues with a sort of trial and error search I think most of us are familiar with: sometimes it is a pleasure, other times the search is only aggravating.

In the first case of movement, when we navigate in the landscape by habit, we use what I call 'place recognition'. In

this sense there is not much difference between the traditional grid and the suburban environments; by habit people can navigate without problems regardless of configuration. In the other case, when we explore unknown environments, we orient ourselves – if possible – with help of what I call 'type recognition'[22], and here appears a fundamental difference for intelligibility in the Million Programme suburbs. Even if we recognise the building patterns we may not understand how they are connected, and even if we recognise the typical tree type of movement network, it is difficult to navigate through the environment – most often it is not even possible in practice. Whereas a grid has a very shallow configuration, the typical tree of the functionalist traffic planning has a deep structure. There are most often many topological steps from one peripheral place to another, even if they are close to each other geographically. Furthermore, and with another term from space syntax theory, the level of connectivity is generally low – streets are only connected in highly hierarchical orders, because the whole point with the traffic planning of that time was to minimise connections to avoid potential points of conflicts. The consequence of networks that allow so little flexibility in the patterns of movement is a loss of potential integration, not seen as figures of integration values, but as potentials for the real social, cultural, and economic integration which comes with encounters.

Conclusions

All in all, the combination of new relationships between the primary urban elements street, open space and building, and independent layouts of buildings and movement networks in the concrete suburbs make them both less legible and less accessible – not for the everyday users, but for the potential visitors. It may seem as a minor problem if strangers who rarely have business to do in the area find their ways or not, but for the concrete suburbs this should be a matter of great interest. Since urbanity at its roots is about encounters (for economic, social and cultural reasons) and the task of urban planning and design is to provide spatial conditions for these encounters, we do have a sociospatial problem in many of the housing estate suburbs.

Whereas the configuration of the traditional urban grid reveals a certain social logic of space, many modernist suburbs challenge us with urban spaces that are still to be identified, understood and appropriated by inhabitants and others. Public space is more diversified in the open-plan layouts than in the traditional grid, and it has got new sorts of spatial interfaces. In some ways it may be right to claim that these areas lack some fundamental prerequisites for 'urban' qualities. The configuration of many concrete suburbs exclude potential visitors, firstly by spatial isolation, secondly by movement networks that largely obstruct urban navigation, and thirdly by a lack of coherence in the relationships between streets, buildings and open space. With such spatial properties it can be expected to be more difficult to sustain varieties of urban activities and a vital urban life.

The morphology of the modernist urban typologies needs to be studied in detail to illuminate how these environments really perform and develop. To focus on critical structural properties of urban design gives the much needed opportunities to take the discussions beyond aesthetics and instead address underlying conditions for the use of public space. My thesis is thought to be one contribution in these discussions.

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Notes

1. The article is based on my dissertation *Suburban Navigation. Structural Coherence and Visual Appearance in Urban Design* (2003).
2. The development of the suburban morphology during the neighbourhood planning paradigm is described in Klasander (2003), pp. 57–88.
3. Cf. Levy (1999), "Urban morphology and the problem of the modern urban fabric: some questions for research", *Urban Morphology. Journal of the International Seminar on Urban Form*. Vol. 3, No. 2, 1999.
4. Henceforth, I leave out 'plot' of the discussion, because of its administrative character, and concentrate on the perceptible elements.
5. Cf. Klasander (1999), "Miljonprogram och förort – den stora skalans stadsmiljöer", in Wetterberg, ed. (1999), *Det nya stads-*

landskapet. Texter om kultur, arkitektur, planering. Göteborg, pp. 119–133.

6. Zmudzinska-Nowak (2003), "Searching for legible city form: Kevin Lynch's theory in contemporary perspective", *Journal of Urban Technology*, Vol. 10, No. 3, 2003.
7. Cf. Lieberg (1992), *Att ta staden i besittning. Om ungas rum och rörelser i offentlig miljö*. Lund.
8. Bauer (1997), *Living with Brasilia*. Göteborg; Lay (1997), "Relationships Between Site Layout and Spatial Behaviour in Low Income Housing Schemes", in Gray, ed. (1997), *Evolving Environmental Ideals. Changing Ways of Life, Values and Design Practices*. Proceedings, 14th Conference of the International Association for People-Environment Studies, Stockholm.
9. Klasander (2003), pp. 111–141.
10. Eg. Trancik (1986), *Finding Lost Space. Theories of Urban Design*. New York; Krier (1979) [1975], *Urban space*. London.
11. For an extensive discussion on movement economy and by-products of movement, see Hillier (1996), *Space is the machine*, Cambridge University Press, Chapter 4 'Cities as movement economies', pp. 149–182.
12. The concept of configuration is expounded in Hillier (1996), pp. 96–145.
13. For a selection of references, see Peponis & Wineman (2002), "Spatial structure of environment and behavior", in Bechtel & Churchman, eds. (2002), *Handbook of environmental psychology*. New York.
14. Hillier (1996), p. 175.
15. Cf. Hillier (1996), p. 214.
16. For details on the conduct and the precise figures, see Klasander (2001), "Suburban Squares. How come they are not all empty?", in Peponis, Wineman & Bafna, eds. (2001), *Proceedings.* Space Syntax 3rd International Symposium, Atlanta [pp. 61.1–61.9]; or Klasander (2003).
17. Hillier (1996), p. 178. Hillier connects the concept to dispersion, but I find it useful in relation to this type of monofunctional suburbs too.
18. Hillier & Hanson (1984), p. 105ff.
19. Cf. Klasander (1999).
20. Nylund, Katarina (forthcoming), "Swedish Outskirts – social polarisation and governance", in Bjur, Hans, ed. (forthcoming), *Time, place and meaning in the urban periphery*.
21. Hillier 1996, e.g. pp. 152, 215.
22. See Klasander (2003), pp. 20–21.

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