

THE REASONING ART:*or, The Need for an Analytical Theory of Architecture*

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I A brief history of an idea

Space syntax originated in the early seventies in an effort to understand why, from a spatial point of view, buildings and built environments were as they were, and occupied only a small corner of the theoretically vast field of architectural and urban possibility. From the earliest days we focussed on the study of real cases, and our efforts could be contrasted with the parallel efforts of others such as March and Steadman at Cambridge (and then at the Open University) to identify the formal and geometric limits of architectural possibility. They studied possibility, we studied actuality, and we compared notes in the friendly rivalry of a mobile joint seminar, which soon expanded to include George Stiny, Bill Mitchell and others. The earliest space syntax work took real environments, such as organic settlements, and vernacular buildings, and tried to identify the formal, spatial and functional forces that generated their characteristic spatial forms. The earliest uses of the term space syntax in the mid seventies described this type of work.

From there, space syntax moved to an attempt to create consistent techniques for the representation and analysis of spatial patterns with a view to eventually being able to simulate spatial design proposals and arrive at a basis for predicting how they would work. This led to the first publication of space syntax analytic techniques in the early eighties, and they were then included in 'The Social Logic of Space', although this was a book whose primary intention was to try to redraw the theoretical map of socio-spatial studies. But it is true to say that an important aspect of the influence of that book has been methodological. Numerous scholars in many fields all over the world took up the analytic techniques for their own problems in ways which we did not foresee. It is the diffusion of methodology, above all, that has created the conditions under which this symposium could be held, and indeed has made it necessary. It is also the most gratifying aspect of the response to our work, and we at UCL feel very much in your debt for the efforts you and others have made.

Much of the focus of this conference will be on the methodology and its applications, and the final session will look at some new developments in methodology. However, my aim in this opening paper is not methodological but theoretical. Without theory, method is nothing. Space syntax has become influential not only in the various fields of scholarship and research represented here, but also in architectural and urban design. We have been privileged to use space syntax in working with some of the leading architects and urban designers of our time, and on some of the most challenging projects. My purpose in this paper is to explain why it is not simply the methodology that is applied but the theory, and why space syntax should not be seen as some interesting techniques on the periphery of architecture and urban design, but as central to the development of the practice and theory in those subjects.

Keywords:

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2 Architecture and philosophy

First, some reflections on architecture as a theoretical subject. Seen from an academic point of view, one of the most intriguing aspects of architecture is that it forces us to confront in a very immediate way some of the deepest problems of philosophy: the relations between the physical world and the 'minds' that experience it, the difference between the rational (of the mind) and the lawful (of the world); the nature of order and its relation to 'sweet disorder'. It is no wonder that we have no overarching theory of architecture. To have one would require us to solve all the problems of philosophy at once.

'Relations' are a case in point. Philosophers have always been puzzled by relations because they seem at once to exist in the real world, and to be abstractions. The relation that Edinburgh is to the north of London, for example, is not a material thing in the same sense that Edinburgh and London are material things, but seems more akin to an abstraction¹. We are tempted to see it as mental construct rather than as a property of the real world. Yet within the scheme of things defined by this universe Edinburgh really does seem to be to the north of London, and the relation to exist 'out there', written into things themselves. Our habit of assigning abstractions to the mental realm and physical things to the real world is undermined by such simple cases.

Typically, the philosophical problem of relations re-appears at the very heart of architecture. Architecture, we say, is the art of 'assemblage'. In creating works of architecture we create complexes of relations which we call by such names as compositions, plans, styles and types. Such terms indicate that both as spaces and as forms buildings are essentially relational schemes. It is through their relationality that we recognise the difference between one kind and another. Yet we have few terms or concepts for these differences. We talk easily of this formal element or that space, but we have little idea how to talk about the spatial and formal relational schemes which give each building its critical identity. Nor is it clear that relational schemes of space and form have any necessary connection to each other. Not only does a problem of philosophy appear in architecture, it seems, but it appears in a very complex way.

3 Ideas we think with and ideas we think of

Architects should perhaps not be too distressed that they have no adequate concepts to describe the relational properties of the things they create. No one else has them either. It is a general problem of culture. Looking back, we can see that the twentieth century cast a new light on this. All human activities through which culture is created have come to be seen as grounded in an interplay between concrete elements and abstract relations. The elements - words, columns, behaviours and so on - are present to conscious thought and are manipulated with deliberate forethought. The relational schemes through which we order and interpret elements - syntaxes, rule systems, semantic schemes - are handled unconsciously, and we deal with them without thinking of them. Concrete elements are the ideas with think of, relational schemes the ideas we think with.

It is because this is so that the languages which we use to describe our cultural world become biased to the concrete contents of assemblages, which are their raw material, rather than to their relational contents, which are their essential nature. Elements are

discursive: we can see them, name them and know how to talk about them. But relations are nondiscursive; we have no languages to describe them or conceptual schemes to analyse them. The interdependence of the discursive ideas we think of and the nondiscursive ideas we think with is the fundamental condition of our cultural existence. Architecture and urbanism are the most omnipresent case of this duality, because buildings and cities are where we apply nondiscursive relational schemes to the real world in which we live, and so convert our milieu from materiality to culture.

4 Architectural theory is the attempt to make the nondiscursive discursive

The role of architectural theory can now be simply expressed: it is to make the nondiscursive discursive, usually by seeking to express the relational nature of space or form in buildings in some consistent system of concepts and terms linked by some kind of logic. This is as true of deconstruction as of Alberti. Historically, however, for the most part architects have tried to develop theories by postulating a formal language of some kind - certain arithmetical proportions, certain geometric forms and so on - and then trying to fit them to architecture. Not surprisingly this usually has led to theories which create interesting architecture of a certain kind, but explain little about other kinds. We might say that theories have been strongly normative but weakly analytic. They have guided design but contributed relatively little to general understanding of architectural phenomena. This is not the only way for a theorist to proceed. Instead of postulating a mathematics and trying to fit it to buildings, we could follow the twentieth century practice of studying the phenomena *in extenso*, and trying to find some formalism to capture the more general properties of the relational schemes that underlie them. If successful, this would lead to a more analytic theory, one which aided architectural understanding, but remained relatively uncommitted to any normative theory of design.

5 Nondiscursive technique

The techniques we call 'space syntax' are exactly this, aimed at one of the two main dimensions of architectural nondiscursivity: space. Space syntax is a means to study architectural and urban phenomena directly and hope through this to identify the nondiscursive relational schemes that structure their characteristic forms. Two decades of the gradual development of these techniques has convinced us that there exists in architecture a very special relational property we call 'configurationality'. Configurationality means more than sets of relations. It means complexes of interdependent relations with two critical properties: that the configuration is different when seen from different points of view within it; and that when a part of the configuration changes, whether element or relation, the whole can change. Space syntax is about the configurational relation of part to whole, and aims to express these peculiar properties of configurations in a consistent, rigorous and quantitative way. But it is not simply about quantification. It also itself exploits nondiscursivity by using graphical representations of configurational properties, including quantitative properties, so that the intuitive eye and the analytic mind can work together in detecting the hidden patterns in architectural things.

By developing computer programmes which allow us to apply this kind of graphical and quantitative analysis to entities as complex as whole cities we are able to investigate human spatial nondiscursivity through its materialisations in the real world. There

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are three main stages of study. First, architectural and urban phenomena are studied in themselves to establish by analysis of cases the genotypical features (or deep structures) of the spatial patterns. Second, these formal studies are linked to the study of function and experience: how people move about and use space in buildings, where the building works, and where it goes wrong, and so on. Third, the gradual development of theoretical models aimed at more general understanding of architectural phenomena in both formal and form-function sense. For example, in my 1996 book 'Space is the Machine'² there are two chapters on what space syntax research suggests are the fundamental spatio-functional (Chapter 4: Cities as movement economies) and generative (Chapter 9: The fundamental city) forces at work in shaping the spatial form of cities.

6 What we apply in design is theory

Space syntax techniques and its growing knowledge bases and theories are now being increasingly used in design, in particular on a large number of major projects. It is unusual for architectural research to be so directly applied in this way, and it is important to understand why. At one level of course there is a simple reason: space syntax techniques can simply be turned round and used in design as easily as they can in research. They are tools to think with and experiment with, as well as tools of analysis. There is no doubt this is hugely advantageous. However, experience over a long series of projects has persuaded me that it is not the techniques that are being applied. It is the theory. The reason is simple. Design is a matter of going from what we know to what we do not know. Techniques on their own cannot accomplish this. Only theory can. Indeed, the usefulness of theories is exactly that they allow us to proceed from the known to the possible. Architecture is about the exploration of possibility and so are space syntax techniques. Thus in urban projects, for example, we analyse the urban context syntactically and observe it directly, showing the local pattern of interdependence between the two. This gives a rigorous meaning to the idea of contextual analysis and the primacy of pattern. Given the working spatio-functional understanding provided by the analytic phase, we then turn the syntax model into design mode and simulate the configurational effects of different design ideas. As often as not, this leads to new design ideas, both from the researchers and from the designers with whom we are in constant interaction. Space syntax works with, not against, design intuition, and generates new generic possibilities for design intuition to explore rather than simply constraining design. It can do this precisely because it is a theory, and could not do this if it were not.

7 The reasoning art

Architecture endlessly debates the roles of intuition and reason in design. In most academics (not ours) reasoners and intuitionists are locked in opposition. Reasoners say that intuitionists are mystifying the art, intuitionists that reasoners seek to reduce architecture to a formula. It is time to put this false dichotomy behind us. Intuition in design is the creative deployment of the nondiscursive understanding of configuration. Design cannot be otherwise. Space syntax research is reason based, and more rigorous than most, but it has effectively led to the study of architectural intuition (of architectural 'ideas to think with') through its creations. In practice, as we all know, design proceeds by a mix of intuition and reason. It is

nondiscursive where necessary, discursive where possible. Space syntax makes the deployment of nondiscursive intuition more rational and therefore more discursive. It aids design as what it is: the reasoned deployment of intuition. Architecture remains, as ever, the reasoning art.

8 Beyond space

So far most applications of space syntax have been in the study of spatial patterns wherever this is found to be a problem, from archaeology to architectural practice. Recent developments however suggest that space syntax may only be an initial instance of more general techniques of configurational analysis, using configuration in the precise sense defined above as relational complexes in which the differences in one internal view point and another are significant, and in which a local change can create a global one. For example, in Chapter Three of 'Space is the Machine', the idea of syntactic integration is generalised to the notion of 'universal distance', meaning the distance from any point to all others as opposed to the distance from a specific point to one other. This idea is then applied to such matters as shape, area and density through the notion of layered analysis using universal distance measures as a base. These suggest a more important link to our geometric intuitions than previously seemed likely, and indeed in my paper at the end of the Symposium I will try to show how close this relation is by relating the syntactic construction of cities to how they are put together geometrically.

The ease with which these transitions are made suggest a greater generality for the concept of configuration as defined above than might have appeared likely. It is easy to conceive of complex relational systems - communities, organisations, even societies perhaps - where these notions might eventually find application, though without doubt in a rather different form. Most intriguing is the following question. If it has been shown that the world which human beings create has the fundamental property of configurationality, then what does this imply for the human brain and its functional form that we call the mind? If we think and act configurationally while keeping configurational aspects tacit, then surely this suggests that configuration is involved in the organisation of whatever it is we call the mind?

Notes

- 1 - See for example Russell B 1912: *The Problems of Philosophy*; Edition used OUP 1959 p 56
- 2 - Hillier B 1996: *Space is the Machine*; Cambridge University Press

