The need for theoretical knowledge in architectural practice

Lars Marcus

Architecture is epistemologically a complex field and there is not a common understanding of its nature, not even among people working within it. On the contrary it is a field where various forms of knowledge meet, the relations of which are seldom investigated. This often leads to dichotomic statements from advocates of different standpoints, between representatives of an artistic or a scientific approach to the subject, for instance. One theme in the work of Bill Hillier is to deepen our understanding of architectural knowledge and its internal entities and relations, and to reconcile uch unproductive conflicts. This article draws extensively on the two first chapters of Hillier's Space is the machine (titled respectively 'What architecture adds to building' and 'The need for an analytical theory of architecture').[1] My aim is, first, to point out the urgent need for scientific research within architecture, and, second, to indicate exactly where such knowledge is useful in architectural practice.

A century of architectural building

Looking back at the twentieth century it is possible to say that it was the century when man finally conquered the world and changed the face of it. What in the beginning of that century was fundamentally a natural world, a world where most of its content was so to say given, became transformed so that the world we now live in and experience to a high degree is an artificial world, a world constructed by man. Thus, it is possible that if the twentieth century in many respects was the century of natural science, the present century will be that of what Herbert Simon has called the science of the artificial.[2] We have learned a great deal about the natural world, but as the artificial is increasingly part of it, we also need to learn more about the artificial.

One obvious, major area within which this man-made world has been shaped is construction and building; never before did we build as much as in the twentieth century. But let the sheer quantity not blind us to an equally important qualitative change. One of the most noticeable features of construction in the twentieth century is the degree of architectural building.

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By architectural building I simply mean building that is the result of the work and specific competence of architects. Previously such buildings have been marginal, even if often the architectural building alone has become permanent and noticed by posterity. Over previous centuries, most buildings have been "traditional" or "popular" or, to use a better expression, vernacular. This means a building that is not based on the type of specialist knowledge represented by architects, but knowledge that is part of a more general cultural tradition.[3] The purpose underlying such a distinction is not to make a value judgement of the type that architectural building is qualitatively better than vernacular, but rather to make the important observation following Hillier, that the different kinds of buildings derive from different types of knowledge.[4] It is when we become conscious of this fundamental difference that we can begin to understand what is specific to the field of building in our time and, furthermore, what this entails for architectural practice as well as architectural research.

Another noticeable feature of building during the twentieth century is its high degree of failure.[5] This is not intended as a dismissive remark. To begin with it is difficult to find examples of vernacular building in history that can be said to have been failures. In effect, this is an inevitable consequence of the very definition of vernacular building, as a direct spatial response to local needs and values in the cultural context from which it emerges. Technically, there have certainly been shortcomings, but it is difficult to talk about functional or aesthetic failures in a more fundamental sense. The architectural building of the twentieth century, by contrast, has been continuously criticised on both the functional and aesthetic planes, and has even been accused of actively contributing to many social problems. I am not saying here that vernacular building is "more natural" and therefore "better" than architectural building. What I want to draw attention to is how architectural building is in need of a particular form of knowledge and how this should be reflected in architectural practice and architectural research.

The characteristics of architectural building

The reason why architectural building sometimes can be said to fail while the vernacular by definition almost never does, arises from the fact that they emerge from different kinds of knowledge. If we begin by looking more closely at these types of knowledge, it also becomes possible to arrive at a better understanding of what I mean by failure in this context.

The vernacular building can be described as a type of knowledge that derives from craftsmanship that is slowly developed over generations through the use of a bank of practical knowledge that is transferred from individual to individual through practical expression. Proven solutions with a known outcome are transferred over time. Changes are introduced slowly, and their practical expression is tested before being adopted or rejected. Of course, conceptual leaps occur, but the vernacular mode depends to an overwhelming extent on the slow development of knowledge based on proven experience. The development of such knowledge, furthermore, occurs in a given social and cultural context, which directly reflects the needs and values established within it. The social order, in this way, is given physical expression in the spatial order and the opposite, the spatial order supports the social order. We can even say that the spatial order is one of the more important means by which the social order reproduces itself.[6] The close ties between both of these orders in vernacular building enable me to claim that in principle the vernacular building is never a failure, but in its given context is always satisfying. When it is not, it is usually exactly in relation to major social changes, which thus make the spatial solutions in question obsolete. We thus see major similarities between knowledge in vernacular building and what we call skills or, to use the Aristotelian term, techne, or knowledge of how one does something.[7]

To be dependant on traditional forms is nevertheless almost a negation of architecture, since architecture is largely valued on the basis of its capacity for innovation and the formulation of new solutions. Architectural knowledge is expressed almost in the opposite way to the vernacular, namely in its capacity to be creative rather than derivative. As Hillier points out, to copy is one of the greatest taboos in architecture— he is not speaking of conscious loans— while it in many

cases is exactly what is looked for in the vernacular.[8] At a deeper level this difference is concerned with the greater consciousness in architectural knowledge with the principal ideas from which one acts. We can very well imagine that even architects work by deriving ideas from older types of buildings, but the difference is that they are conscious of what they are doing. For them it is thus a question of a conscious choice among various approaches. It is these conscious choices between different theoretically possible options that, however, do not occur in vernacular building.[9]

This also tells us something about the way that architectural knowledge is transmitted. It differs from the vernacular in the way that it is not necessarily transmitted through practical experience from individual to individual, even if this also takes place, but largely with the assistance of theoretically formulated ideas. Underlying practically all greater architectural innovation during the twentieth century are more or less interlinked theories, which seek to inspire architectural work to take new directions (even if perhaps the actual constructions related to these theories play an even greater role). What is typical for such theories or constructions is a lack of connection to a clear social context. On the contrary, what is innovative often consists of transferring and applying ideas from one context to another, or setting parts of different contexts into new totalities. Architectural knowledge is thus based on ideas or theoretically based in a way that we cannot say applies to the vernacular. To put it in Hillier's uncompromising words: 'architecture is theory applied to building'.[10] This means that architects can be said to work at a theoretical level, that they make innovative choices that do not simply emerge from the cultural context in which they exist or from the practical tradition to which they belong, but that they also borrow from other contexts or develop solutions along new principles. We can thus, in contrast to the vernacular, see how architectural knowledge resembles what we usually call scientific knowledge or episteme, that it is not simply knowledge of how one does something, but also the principle behind it or why one does it.[11]

The problem with architectural building

But it is exactly here where the problems arise with building based on architectural knowledge. It is, as we saw, a form of knowledge that is proficient at generating new spatial orders or transposing existing ones into new contexts. Nevertheless, for obvious reasons, there is a lack of an experiential basis for such solutions of the kind that exist in vernacular knowledge. This makes it difficult to predict how the solutions that architects work with will be accepted and function in the social orders in which they are to be applied. The links between these two orders is thus, in contrast to the situation in the vernacular, very weak. This is the reason I think, that buildings of the twentieth century, largely of the architectural type, have encountered so many failures. In the social and cultural contexts in which such buildings have been erected, the aesthetic ideals that they represent have often been obscure and their functional solutions directly unsuitable. The strength of architectural knowledge thus lies in its generative capacity, while it demonstrates a noticeable weakness in predictive capacity.[12]

In vernacular building, the opposite condition tends to apply. As we saw, it avoids predictive problems largely through relying on known solutions with familiar outcomes. Internal development, is characterised by slow, small steps, so that what is new (and its outcome) can be tested by degrees and become known.[13] However, vernacular knowledge has difficulties in being generative, or in renewing and developing itself in a more radical sense and often has conservative features. As Alexander states, it relies on knowledge that in principle is unconscious of its theoretical base and thus has difficulties in discovering alternative possibilities and ways of relating.[14] Knowledge in the vernacular building thus, in direct contrast to architectural knowledge, has its strength in its predictive capacity and its weakness in the generative.

It is, however, important to recognise that these lines describe general conditions. There is a more tacit development of knowledge, like that encountered in the vernacular, even in architectural building, just as developmental leaps occur in the vernacular and not only in the architectural. My intention here is, of course, to point to general differences.

The need of theory for architectural building

Something which architectural knowledge appears to lack is thus a theory of the relations between spatial orders and social orders. This may appear to be surprising in regard to Hillier's statement that what distinguishes architectural knowledge is precisely its theoretical approach. Yet theory can imply many things; there is thus reason to look more closely at what is meant by theory in this context.

Hillier distinguishes between two types of theory within architecture, which are closely linked to two elements of what architects actually do and are expected to be good at.[15] We can in general terms say that architects in design processes primarily do two things; on the one hand they devise architectural solutions—the generative phase—and on the other they make predictions about the outcomes of these solutions—the predictive phase. In practical work a continuous interaction naturally takes place between these elements. What is important is to see that architects need theoretical support in both these elements, but above all that the theory in both cases must be of different types. In the first case, it is theory that helps architects to see how the architectural solutions they are working with can be developed, renewed, put together in another way or be replaced by new ones. Such theories can be characterised as speculative theories in a positive sense, that is theories that attempt to see assumptions in a new way — or theories of possibility as Hillier puts it.[16] Such theories we know amongst other things from art, where the various manifestos of modernism are good examples.

Yet architects also need theories to help them with the other element, namely the predictable outcome of the architectural forms and solutions that they propose. To make such predictions, there are only two ways to take, either to refer to previous examples, or to refer to some principle.[17] Here we can see the advantages of vernacular knowledge: it can always follow the first path and refer to earlier examples within the building tradition to which it belong. In principle, the outcomes of the solutions that are used are always known. Within architecture this is impossible as one generally wants to create what has not been seen before. An archi-

tectural building is, by definition, unique. This means that it is impossible to refer to earlier examples since they simply do not exist. What remains is to refer to a principle, that is to say, to some form of architectural theory.

Traditional architectural theory

Hillier further points to the fact that if we look more closely at what is generally called architectural theory, we shall see that it predominantly consists of theories which largely have been successful in the generative phase while having serious problems in the predictive.[18] This is because architectural theory such as we know it from Alberti to Koolhaas has generally been of a speculative type, which as we have seen can provide support particularly in the generative phase of the architects' work. Yet speculative theories cannot be a support in the predictive phase since we are no longer interested in how something might be, but want to know how something actually is or will become. This phase in the work of the architect quite simply needs the support of theory in a more rigorous sense, namely scientifically based or analytical theory.[19] Such analytical architectural theory is, however, unusual and has often come to be replaced by speculative theory extended beyond its limits. This makes it clear why I found it necessary to stress how architectural knowledge resembles scientific knowledge. Rather we can say that architectural knowledge often acquires a pseudo-epistemic character, which means that it tries to explain why something is done, but on the whole does this on rather insecure grounds.

To illustrate this, we can take Louis Sullivan's sentence form follows function as an example of a compressed type of theory that has had great significance for architectural building during the twentieth century. This sentence is of a clearly speculative type, as it helps us to look at architectural form in a special way. This makes it a theory that can provide very sound support to an architect who is concerned with generating ideas for suitable forms for an architectural problem; as such it has been particularly fruitful. However, it has very little to tell us when it comes to predicting the outcome of these forms even if this sentence can beguile us into

believing that a function almost automatically leads to a relevant form, and that this form in turn supports the desired function. This, however, would be to stretch the theory beyond its carrying capacity. Should this occur, its limits in these respects are revealed.

To take an example from the world of artefacts, we can see how the idea of differentiating between the functions of walls into two systems (on the one hand bearing and on the other spatially dividing — in the form of pillared decks and light walls) has been a particularly fruitful idea that has facilitated freer forms and new opportunities within building during the twentieth century. Yet to link this idea with predictability of the outcome, namely that such a separation in some way will lead to greater flexibility, which, it is often maintained, is something that experience has shown to be considerably more problematic. Such potential flexibility has seldom acquired the significance expected. We face once again a speculative idea, which in a generative respect has been very successful, but which in a predictive respect has created both misunderstandings and mistakes.

In a predictive respect, traditional architectural theory has thus generally been weak and has not managed to provide suitable support. With the lack both of

ced by any of the others, on the contrary, they are remarkably dependent on each other. Though each individual case is unique, this does not mean that in these cases knowledge of a more general kind cannot be applied. At the same time, general knowledge cannot show us how it should be applied in the individual case. In practice, architects always work at both these levels, as what they actually do is to apply generally applicable knowledge in a specific form in the individual case; the relevant question being how well founded the general or theoretical knowledge actually is. Scientific knowledge thus provides support in the form of knowledge principles when one's own experience of earlier examples is no longer sufficient to give the required answers. Responsibility for how such knowledge is

previous examples and a reliable theory, it is just in the predictive respect that architectural building can more specifically be said to have failed.

The relation of theoretical knowledge to the architect's experiential knowledge

Despite the obvious lack of knowledge in this regard, there is considerable scepticism, not least among architects, as to whether the development of such knowledge and theory is possible or even desirable. That such a development does not seem to be possible, may quite simply depend on our seeing so little successful theory; that it is not desired, may depend on it appearing as though the intention behind such theoretical development would be to replace the architect's creative work with researched norms and algorithms. This is, however, a naive perception and again involves the confusion of different kinds of knowledge. Scientific knowledge always speaks at the level of principles or how something relates in general, while the architect's knowledge is, to a great degree, experiential knowledge, which identifies what to do in a specific case. Here we encounter a third form of knowledge, namely discernment or fronesis, that entails knowledge which does not deal so much with how or why one does something, but rather when one should do it.[20]

Lars Marcus, PhD and Lecturer
School of Architecture
Royal Institute of Technology
larsmarc@arch.kth.se

This means that no kind of knowledge can be repla-

applied in the individual case rests with the architect though and, as always, it is exactly here where her/his qualities as an architect are revealed.

Thus there is no innate rivalry between theory and practice in architecture, between episteme and techne/fronesis. Rather it is obvious how the development of scientifically-based knowledge and theory concerning the predictive phase in architectural work is of great interest for architectural practice just as it is a vital task for architectural research. As a matter of fact, against the background of the failures of the twentieth century, it is nothing less than a necessity if one is to be able to promote the skill and expertise of the architect. Neither would such a development hamper the creative freedom of the architect. Rather it would define the field of the possible—i.e. give the architect's creativity precision and strength.

Notes

1. Bill Hillier: Space is the machine, Cambridge 1996.
2. Herbert Simon: The Science of the Artificial, Cambridge Mass. 1969.
3. A more familiar distinction with a similar purpose might be Christopher Alexander's between buildings as a result of "unselfconscious processes" and buildings as a result of "self-conscious processes", as put forward in Notes on the Synthesis of Form. The particular with construction and building in the twentieth century would then be the unprecedented quantity that is the result of self-conscious processes. Christopher Alexander: Notes on the Synthesis of Form, Cambridge Mass. 1964.
4. Hillier, 1996, 15–53.
5. Once again a theme of Alexander's.
6. Hillier, 1996, p. 43.
7. Here and in the following I use the Aristotelian concepts of knowledge as put forth in chapter 6 of the Nicomachean Ethics. Most revealing and helpful I have found José Luis Ramírez thorough discussion and interpretation of these concepts in: Skapande mening (Creative Meaning), (Nordplan Dissertation 13:2), Stockholm 1995. For a discussion on techne, see p. 49–110.
8. Hillier, 1996, p. 17.
9. Hillier, 1996, p. 46.
10. Hillier, 1996, p. 51.
11. Ramírez, 1995, p. 17–48.
12. Hillier, 1996, p. 65.
13. Alexander rather stresses the immediacy between the act of building and the act of use. Alexander, 1964, p. 48–52.
14. Alexander, 1964, p. 34.
15. Hillier, 1996, p. 59–65 and 441–445.
16. Hillier, 1996, p. 63.
17. Hillier, 1996, p. 62.
18. Hillier, 1996, p.65–68.
19. Hillier, 1996, p. 57.
20. Ramírez, 1995, p. 111–186.

References

Aristotle: Nicomachean Ethics

Christopher Alexander: Notes on the Synthesis of Form, Cambridge Mass. 1964.

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