



"The pig is coming closer", Manne Lodmark.

# Scale, the theoretical object of architecturology

– some comments on the early ideas of Philippe Boudon

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Since more than thirty years Philippe Boudon and his associates have been working on the development of a theoretical foundation for an autonomous science of architecture – “une architecturologie”. They accept that there are many ways of doing research on architecture – modes that are founded on theories, concepts and methods which have been borrowed as theoretical givens from other scientific disciplines like sociology, psychology, economy, etc. But Boudon keeps on persisting that there is a need for an autonomous science of architecture, a discipline based on the relationships between the two key concepts of architectural conception – scale and model.

The difference between the two concepts is that ‘scale’ has been constituted by Boudon as the key-concept (theoretical object) of a new, autonomous science of architecture – an architecturology, while ‘model’ remains the theoretical object of the much vaster and complicated discipline of design theory (e.g. design theory as defined by Herbert Simon in *The Science of the Artificial*). The specific relationship between the

concepts of scale and model defines architecture as a special case of design, a limited field within the much vaster area of design.

The aim of this article is to reconsider the point of departure for the research programme that Boudon et al have been following for more than thirty years. My own point of departure is a book by Boudon from 1971, *Sur l’espace architectural*, in which he first defined this research programme, which of course has been developed, reshaped and reclarified many times since then. But the key-concept of scale still remains at the center of his theoretical work, giving structure and content to his very impressive research effort.

In *Sur l’espace* Boudon gradually closes in on the theoretical object of the new science of architecturology by defining and describing the epistemological obstacles which have to be overcome before we can arrive at a definition of the theoretical object of an autonomous science of architecture.

This gives me two questions to answer: What is a theoretical object and which is its function for the constitution of a new, autonomous science? and What is an

epistemological obstacle and which is its function in the process of scientific thinking?

The anti-empiricist philosopher Gaston Bachelard uses the concept of epistemological obstacle to clarify the transformation of a pre-scientific set of problems into a scientific problematic (a set of well ordered questions) and also points out the obstacles that have to be overcome in the creation-production of a new science. The discovery and definition of the epistemological obstacles to be overcome also points out the strategies and tactics to be used in the work on the creation of the theoretical foundations of a new science.

Bachelard also uses the concept of theoretical object as the theoretical base that relates an autonomous science to a real object of knowledge of its own. Therefore an autonomous science has to be created through a critique of the concepts which have been developed during its pre-scientific phase.

A key-concept then has to be constituted as the theoretical object of the new discipline. The critique therefore takes its point of departure in the pre-scientific problematic of the discipline to be created, and then analyzes the epistemological obstacles which are made visible by the critique. By defining the problematic of the discipline its specific field of interest can be delimited – the field within which its real object appears.

The epistemological obstacles to the production of scientific knowledge are (i) the initial or immediate experience, (ii) generalisations from initial experience, writes Therborn in his summing up of Bachelard's *La formation de l'esprit scientifique* (Therborn 1977, p 58, Bachelard 1967, p 14 f), and then continues (Therborn 1977, p 59): The concept of problematic is used exclusively in the analysis of discourses. It denotes the specific unity of a theoretical complex, scientific or not, and serves to conceptualize and delimit 'all the possible thoughts' of such a complex. That is, the problematic of a given thought is a knowledge that must be produced by analysis and cannot simply be collected by inspection. The concept of 'problematic' is the centre-piece of an anti-empiricist study of discourses.

According to the epistemology of Bachelard we can stipulate the following criteria of an autonomous

scientific discipline (as summarized by Therborn 1977, p 60):

- There exists an external world independent of men's conceptions of it, of which science tries to gain knowledge, and which provides science with its real object.
- What science studies is not an external reality as it appears to everyday sense perceptions, but a theoretically defined object, by means of which it strives to grasp the real world.
- These conceptual objects are incessantly worked upon and transformed in the scientific production of knowledge.
- The rise of a new science, then, means above all the discovery-production of a new system of concepts defining an object of systematic investigation. This entails a break with previous conceptualizations. Without such a defined object there can be no scientific knowledge.
- A fundamental difference between science and ideology is that the former is an open system of questions asked of its object, the answers to which are not prejudged. Ideology, on the other hand, is characterized by posing problems whose solutions are pre-ordained, produced outside the cognitive process.
- No external proof of the truth of a science can be given. The verification of scientific propositions is in itself part of scientific practice.

An autonomous scientific discipline therefore can be recognized by the following characteristics (Therborn 1977, p 424):

- It possesses a specific object and has discovered-produced a pattern of social determinations
- Its patterns of determinations do not invoke any mysterious forces, and generate effects that are readily amenable to empirical investigation.
- The effects of these patterns of determination can be studied empirically and systematically.
- The real question, however, it appears, concerns rather its relative fertility as a producer of knowledge, and its interrelationships to other disciplines – whether, for example, the object of this discipline

is an unacknowledged special case or aspect of another.

In *Sur l'espace* Boudon studies the two epistemological obstacles which makes us both understand and misunderstand (i) the questions of architectural space, and (ii) the questions of architectural design (the production-determination of architectural space). The two obstacles have on one hand twisted the theories of architectural space and architectural design, and on the other hand have given us the possibility to develop, re-define and constitute the key-concept of an autonomous science of architecture.

Those two obstacles are:

- the meaningless effort of trying to define the essence of architecture.
- the fundamental mistake of seeing architecture as nothing but a set of theoretically founded principles made tangible as built structures (the functionalist mistake)

The essentialist mistake is made when we try to find the "soul" or essence of the objects or processes under investigation. Boudon uses Zevi's *Architecture as Space* as an example of the essentialist mistake.

Zevi, following Giedion, tries to prove that modernist architecture is a result of the new conception of space that emerged during the last century – a conception which, for the first time in history, was made to include the fourth dimension of space – time.

Zevi defines space as experienced reality. His contribution to science is that he shows that a conceptualization of space should not be treated as a metaphysical category (as too many architectural theorists do), but should be based on the concepts and theories of the scientific discipline of perception psychology. His essentialist mistake that he does not make a distinction between architectural and natural space.

The functional mistake of seeing architecture as (nothing but) materialised ideas is shown by Boudon using Panofsky's *Gothic Architecture and Scholasticism*, where Panofsky proposes that the gothic cathedrals are (nothing but) a materialisation of the ideas and principles of scholastic philosophy.

Scholasticism meant that since it is impossible to

prove the Christian articles of belief they instead have to be justified by being represented as a rigorous system of concepts, the *Summa*. The gothic cathedrals therefore, says Panofsky, should be seen as the *Summa* made tangible. He supports his claim by pointing out the structural principles that were valid for both the *Summa* and the cathedrals – e.g. the principle of organic unity, the principle that the partition of the parts should be made according to systematically ordered rules, and the principle that each part of the whole should be given an identity of its own.

Boudon sums up: Zevi shows us that the concept of architectural space has to be based on the human experience of space (no metaphysics are needed), and Panofsky shows us that our perception of architectural space depends on our experience of it as a product of human thinking, e.g. human design. The human experience of architectural space by necessity encompasses tangible space as designed space. A building is both an object and a project.

When Boudon examines the relationships to be discovered-produced between the abstract spaces of design (architectural conception) and the tangible, built structures and the spaces they create he also takes his point of departure in the ideas of Viollet-le-Duc.

Maybe the most important source of inspiration for Boudon in this early phase of his career was the following paragraph in Viollet-le-Duc's *Dictionnaire raisonné* (my translation):

Scale. Within architecture we keep talking about "the scale of an edifice ... This building does not have the right scale". The scale of a shed for a dog is the dog itself, that is to say, the shed must have the proportions that fit the animal who lives in it. A shed for a dog which might be used to give shelter to a donkey does not have the appropriate scale.

Below are also included some principal texts from Viollet-le-Duc's *Entretiens*: Lecture X, pp 466 – 467

This principle of unity and harmony in the expression of the various requirements indicated in a programme" is therefore neither symmetry nor uniformity; still less is it an undigested medley of various styles and forms of which it is impossible to give a rational explanation,

even if such a medley were skillfully composed: it is in the first place a rigorous observation of the scale. But what is the scale? It is the relation of all the parts to unity. ... If, while adopting the principle of the human scale, we employ a system of geometrical proportions, as the architects of Antiquity and those of the Middle Ages evidently did, we unite two elements of design which compel us to remain true as regards the expression of dimension, and to establish harmonious relations between all the parts.

The concept of scale refers – according to the young Boudon – to the specific relationship between the abstract space of design and the tangible space of the built environment. The concept of scale emerges as a tool of architectural design thinking that makes it possible for architects to handle the fundamental question of how they should deal with the relationship between the model of the building and the tangible reality this model represents.

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### References:

- Bachelard, G, 1957, *La poétique de l'espace*, PUF, France  
Bachelard, G, 1967, *La formation de l'esprit scientifique*, Vrin, France  
Bunge, M, 1967, *Scientific Research*, vol I och II, Springer, Tyskland  
Boudon, Ph, 1971, *Sur l'espace architectural*, dunod, France  
Panofsky, E, 1957, *Gothic architecture and Scholasticism*, Meridian, USA  
Simon, H, *The Sciences of the Artificial*, MIT, USA 1971  
Therborn, G, 1977, *Science, Class, Society*, NLB, UK  
Viollet-le-Duc, EE, 1858, *Dictionnaire raisonné de l'architecture française du XIe siècle au XVIe siècle*, Morel, France  
Viollet-le-Duc, EE, 1959, *Discourses on Architecture*, Allen & Unwin, UK  
Zevi, B, 1957, *Architecture as Space*, Horizon, USA