Forming Knowledge – On Architectural Knowledge and the Practice of its Production

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Abstract

How do we actually produce knowledge in the field of architecture and what kind of knowledge is it? According to Michel Foucault – an idea elaborated by Gilles Deleuze – all knowledge is about form: anything we can have knowledge about has a form – or is given form in the production of knowledge. Architectural design gives form; it is about conceiving a unity from a set of contradictory requirements, factors or demands.
Architectural design, with its strong connection to social, economic and political factors, could produce new knowledge by giving spatial form to existing but elusive forces of different kinds – it can freeze, give form to diagrammatic conditions and makes use of forces in specific situations – and also explore and generate knowledge about potentials and possible paths of development remaining unnoticed so far.
The point of departure of this paper is to be found in the explorative architectural practices of FOA, MVRDV, Chora and François Roche. It deals with what architectural knowledge is and in what ways it would be possible to research and produce knowledge focusing on the architectural project. It is argued that the knowledge produced in architecture could be of a traditional, Royal, Mode 1 kind as well as of a nomadic, Mode 2 kind. Practices following processes in a context of application, as well as conscious reflections on the form and the formations of matter and texts that every architectural project produces are means to generate new knowledge.

Résumé

Quel est le caractère de la production de savoir au sein de l'architecture et quelles sont les caractéristiques spécifiques de ce genre de savoir? Selon Michel Foucault – et développé encore par Gilles Deleuze – toute connaissance, tout savoir, est produit autour ou à partir de la forme; toute notre connaissance est constituée par la forme – ou bien elle est formée au long de processus de la production du savoir. La conception architecturale produit la forme avec l'objectif ultime de concevoir et de constituer une totalité harmonieuse ou dynamique à partir d'une multitude d'exigences contradictoires, de facteurs et de désirs multiples et variés, dans chaque situation.
La conception architecturale, fortement liée aux facteurs sociaux, économiques et politiques, est capable de produire un savoir inventif par les processus de spatialisation et de mise en forme architecturale de forces éphémères de tout genre. Elle peut geler, cristalliser et donner une forme aux conditions diagrammatiques et peut exploiter des forces dans des situations particulières – mais aussi explorer et générer un savoir spécifique sur les potentialités et les voies d'approche et de développement possible jusqu'ici inaperçues.
Cette intervention aborde – donnant comme point de départ important de ce genre de réflexion surtout les pratiques architecturales exploratoires de FOA, MVRDV, Chora et François Roche – deux questions: qu'est-ce qu'un savoir architectural? De quelle manière est-ce possible de produire un véritable savoir architectural et de mener une recherche architecturale concentré autour du projet architectural? L'argument est avancé que l'on peut considérer deux aspects principaux du savoir architectural, l'un traditionnel et royale, Mode 1, et l'autre nomade, Mode 2. Les outils de base pour constituer un savoir inventif sont selon l'auteur les pratiques issues des contextes d'application professionnelle, des réflexions conscientes sur la forme et les processus de sa transformation initiés autour des ces processus ainsi que des textes établis postérieurement comme résultats de chaque projet architectural.

For a long time there has been a discussion about the nature of architectural knowledge and in what ways the architectural project and design work generates knowledge. Over the last years, more notions of architecture have shifted from static to dynamic – from object to field, to processes, from solid to fluid. These changes in notions also appear in a context where the societal role of architecture is discussed, a society that often is described by changes, elusiveness and flows. A political awareness viewing architecture less as an object and stylistic form, and more as the changing situations, conditions and forces that architecture originates from is growing. Concepts as 'inclusive fields of organized materialization' (Zellner 1999) and 'field conditions' are more frequently used and summarize an interest that concerning both broader socio political contexts and the local conditions that govern the materialization of architecture (Allen 1997). Sanford Kwinter argues that architecture no longer is the usual devotion to objects, but is becoming an organon, that is a means to gain knowledge, a system of inquiry, innovation and technique (Kwinter 1998).

The concept of design as a way of thinking and managing the elusive situations of today has been highlighted as an important concept to handle our contemporary postindustrial 'world of flows' as technology and science were in the industrial era. A world of flows favours those who are capable of seeing patterns among disparate things and underlying relationships between apparently unrelated functions – which is the trained capacity of the designer (Fisher 2000). Modern theory of science has started to redefine the view of science and knowledge, which are considered more local, situation dependent and preliminary. The question then arises if architectural practice and design, with their ways of thinking and working on directly situation based factors, could generate other kinds of knowledge about our societies and cities. It is not hard to see that architectural design practice in many ways make us understand our reality better and thereby gives us more possibilities to change it. One could even argue that architectural practice already produces knowledge about particular situations that is not fully exploited. But can this production of knowledge be seen as scientific of a traditional, 'Royal' or Mode 1 kind or is it of another kind – minor, nomadic or Mode 2? Or could we find ways to bring architectural explorations of reality into the scientific realm, to use its tools and potential to produce knowledge more consciously?

Form, diagrams and knowledge

Before trying to discuss those issues we must look at the relation between knowledge and form, between production of knowledge and processes of formation specific to design. Let us first consider one of the concepts frequently used in contemporary architectural practice and theory, especially in relation to new technology and media, namely the diagram. It originates from Michel Foucault's analysis of knowledge and power, but is highly influenced by the writings of Gilles Deleuze. According to Foucault – and elaborated by Deleuze – all knowledge is about form; what we can have knowledge about has a form – or is given form in the production of knowledge. Foucault has described knowledge as an open system of the dualities visible and utterable, decidable and deciding, or if you wish, material and discursive. Knowledge then

consequently comprises two elements: the visible and the utterable. These always have some kind of form. It can be environments in the form of buildings and things; texts in the form of laws, reports, programs, standards. Knowledge always relates to forms, to concrete assemblages or formations of matter, words and signs. According to Deleuze, knowledge consists of the interlacing of the visible and the utterable, every knowledge goes from something visible to something utterable, or vice versa, and this knowledge of visibilities and utterabilities is collected and stored in the 'archive' (Deleuze 1990). Every historical moment is a complex but concrete formation of things, environments, words and signs – a complex combining of discourses, architectures, programmes and mechanisms.

But is everything in a societal situation visible and utterable, can everything be formalized knowledge? In accordance with Foucault, Deleuze argues that power delineates a second dimension, which is irreducible to the dimension of knowledge – "knowledge relates to forms, the Visible, the Utterable, in short the archive, while power relates to forces, the play of forces, diagrams" (Deleuze 1995, 92). Power does not have a form; it is a strategy that *produces* formations, combinations of visibilities and utterabilities. Power is not concerned with the contents of knowledge, but rather its assemblage; it determines knowledge, but since it has no form – invisible and unutterable – it is not an object of knowledge in itself (van der Heeg and Wallenstein 1990).

A diagram – in the conception of Foucault and Deleuze – is not a collection of data as in an archive; it is something other than formations of visibilities and utterabilities. A diagram is a whole of the force relations of power that the formed material environments and functions in society produce at a specific time and place. It puts knowledge, interpretations, institutions, standards, rules and the concrete material into relations; it is the map of dynamic and changing societal conditions and forces. If traditional knowledge of the archive is concentrated on the past and the history of forms, the diagrams are aiming at the future, constantly generative and changing – the becoming of forces continuously producing new realities (and new diagrams).

How do we describe and get knowledge about these relations of governing forces that produce our formed matter and societal functions? Can diagrams be objects of knowledge? Since the power relations constitute a strategy escaping the visible and utterable stable forms, they cannot be objects of knowledge. At least, not until they have been realized in the formed and stratified relations made up of different kinds of knowledge (Deleuze 1990). The produced formations, the assemblages of matter, discourses and functions, could then be objects of knowledge. Architectural design as a practice of formation, of material organization, of giving form to elusive and contradictory forces of the project has a great capacity to produce knowledge. As Peter Downton writes: "Once in the world of things and ideas, a design can be seen as a repository of knowledge and interrogated to reveal the knowledge its designers have both intentionally and unintentionally embodied there" (Downton 2003, 107). The realized material form could inform us about the diagrammatic conditions and governing forces producing them. But making knowledge – and especially scientific knowledge – diagrammatic, taking into consideration the formless and informal diagrams active in forming assemblages, is difficult since knowledge is about forms.

Sanford Kwinter has argued for what he calls an extended 'true formalism' instead of the 'poor formalisms' that are limited by a conflation of the notion of 'form' with that of 'object'. According to Kwinter, the problems of form are rather about the mechanisms of *formation*, about processes in which discernible patterns are emerging out of a less finely ordered field. In this perspective, form is *ordering action*, a deployed logic while the object is merely a resulting image of that process. Kwinter writes that true formalism refers to any method that diagrams the proliferation of fundamental resonance between the form of the object (or the form of expression) and the form of the content that produces the object, and demonstrates how these accumulate into figures of order and shape. In a line of arguments that seems to owe a lot to Foucault (turn to Foucault 1972), Kwinter argues that true formalism offers the possibility for "a pragmatic description of historical emergence (why this object, institution or configuration here, in this place, at this time, and not that?)" (Kwinter 2003, 97).

Formalism in Kwinters' view demonstrates that form is the resonance and expression of embedded forces, and the best local formalisms show that these embedded forces are themselves organized and have a pre-concrete, logical form of their own. It is about peering into the object towards its rules of formation and the dynamic relation between these two levels of form. The manifest form that appears is the result of a computational interaction between internal rules and external pressures that, in turn, originate in other adjacent forms, according to Kwinter. But I would argue that many of the forces of the external (as well as internal) pressures are more of a diagrammatic, formless kind, that the forming action of the architectural project actually gives form to them as well, and thereby presents a possibility for knowledge about the specific forces, situations and societal conditions.

Architectural practice as knowledge production

During the last years there has been a renewed and intensified discussion about the specific traits of architectural research, and the international architectural theory debate has been focusing on architectural practice and the role of research (Daidalos 1999, Hunch 2003, Nieuwenhuis and Ouwerkerk 2000). Several contemporary architects use working methods that seem like systematic investigations of contemporary societies and cities (Bunschoten et al. 2001, Hensel and Verebes 1999, Kubo et al. 2003, Maas et al. 1998). With these discussions on research, the question of what kind of knowledge is developed and used within architectural practice is of importance, and Alejandro Zaera-Polo, principal of the Foreign Office Architects and dean at the Berlage Institute, emphasizes the importance of exploring the specific architectural knowledge. He believes that contemporary research is directed to fields of knowledge that are either supradisciplinary (economics, sociology, philosophy) or sub-disciplinary (engineering, construction management). The possibility of producing knowledge able to effectively analyse and articulate both levels is a niche to exploit, and architecture as a discipline involving many other disciplines has a potential to do so. Zaera-Polo stresses adaptable research engaged directly in processes of transformation of the built environment; speculative practices combining architectural knowledge with models from experimental disciplines where knowledge is produced simultaneously with real applications (Arets and Zaera-Polo 2003).

In their book *Phylogenesis,* Farshid Moussavi and Zaera-Polo try to classify their own ar-

chitectural projects developed during the last ten years, not according to established typologies, aesthetic, ideological or critical claims, but by constructing the consistency of their practice out of its own material – the architectural projects formed by internal and external forces. They chose to talk about architectural 'species' instead of 'types', where the focus is on the projects' architectural content grounded on the definition of consistent morphological diagrams and their evolution among the projects. "Types are fundamentally constant in time and space and therefore their operativity is always local. Species are sets of consistent morphological relations that vary across time and space, and therefore offer a much more effective tool to operate within a constantly shifting environment" (Zaera-Polo and Moussavi 2003, 10). They argue that the operativity of a practice depends on a balance between repetition and differentiation; operativity is not only determined by the capacity to adapt to changing conditions, but also by its transformative capacity to purposefully alter environments. A balance and congruence is needed between the internal consistency of the project and its consistency with external processes and the field of forces in which it is developed. "The need to construct an alternative approach to the classical opposition between the external and internal consistency of a production is probably grounded in the specificity of our nomadic practice: we had to learn to construct an argument that allows us to transfer knowledge across environments without losing our identity, while simultaneously being able to redefine our identity in response to the environment" (Zaera-Polo and Moussavi 2003). What they are trying to do is to understand the specificity and variability of their practice as it has evolved under certain conditions and pressures from external forces and actors and "by doing so, to initiate a new domain of knowledge within the discipline of architecture" (Zaera-Polo and Moussavi 2003, 16).

The architectural office MVRDV's work with 'Datascapes' is based on the idea that under the chaos of change resides a hidden logic of laws, restrictions, political conflicts, infrastructure etc manifested in the urban fabric. The hidden logic of forces make some formations appear and others not, and MVRDV visualizes these forces with architectural form (Maas 1998; Maas 1999). It can be seen as attempts to explore possibilities and potentials in a situation; extract and design concrete visibilities from diagrammatic relations of forces in a specific situation. It is the exploration of other – extreme and improbable, but potential – possibilities that are potentially there but not yet seen; an exploration that with the help of architectural imagination and visualization also uncovers conditions, alliances and governing forces in transient, elusive and ambiguous situations. New possibilities, which are used to guide the realization of the specific architectural project or to fuel and give new perspectives in public, political discussions, emerge through the exploration of a problem area in both systematic and designerly work with facts, restrictions etc. (i.e. turn to Maas and MVRDV 2003, MVRDV 2000).

Raoul Bunschoten and his office Chora develop methods, through concrete urban studies, to understand, model and direct dynamic urban processes by registrations of 'proto-urban conditions' and 'prototypes'. Proto-urban conditions are those forces and global trends that influence a specific site leading to a material reconfiguration of the local environment. Through field work and by the use of architectural means of notification, emerging phenomena and ongoing changes in the urban landscape are detected in an attempt to see the usually unseen and unknown. Prototypes

are organizations of programs in new, singular manners; they are specific architectural and programmatic configurations, organizational structures embedded in architecture and urban space – 'embedded diagrams' – combinations of form and operational mechanisms linking matter, space and urban dynamical forces (Bunschoten and CHORA 2002; Bunschoten et al. 2001).

Francois Roche tries to find new strategies to control architecture's processes of change and mutation. To be able to take control over and reveal the forces that direct architecture and our societies we need ways of working that are directly connected to concrete reality and Roche searches for ways to not view the world abstractly but to engage in existing systems and their immanent paths of development (Roche 2004). Through a passionate inclusion of perspectives, forces and images into a digital terrain model, Roche develops comprehensive and manifold geographic images or maps, that are argued to be more operative than the often abstractly reducing 'tracings' of reality that conventional ways of working give. New technology gives new ways of revealing immanent qualities in the existing, and following Deleuze and Guattari, Roche associates the map with experimentation in close contact with the real, in contrast to the reduced representation of tracings (turn to Deleuze and Guattari 1987, 12-13; Nilsson 2002, 41-42).

Roche underlines the difference between two opposite attitudes in the transformation of places that is similar to the two philosophies of design or creation of form elaborated by Manuel DeLanda. One of them considers form or design as primarily conceptual or intellectual, something generated as pure thinking isolated from a messy world of matter and energy and transcribed into physical form by being overlaid on obedient, homogeneous material. In the other philosophy of design there are no inactive recipients; the materials are active participants in the becoming of form, they are heterogeneous with varying properties and singularities, which the designer must consider and integrate in the designing process (DeLanda 2001). If the first model is the mere projection of already established concepts and technologies, the other model deals with developing new strategies out of continuous observations and close contact with the complexity of the specific material. Being occupied by many levels in the force field of formation in the designing process, this philosophy of design has greater possibilities to reveal and produce knowledge about diagrammatic relations governing the production of material space.

All the practices referred to here are using architectural tools and imagination – now complemented by new technology – to analyse the complexity of contemporary society and to explore relations between disparate things in our cities. Form and images are not only the result of analyses; they are a way of approaching complex situations, making them manageable and meaningful. They are tools that give stability and meaning to the elusive. The rational, systematically analytical thinking has been expanded with an architecturally spatial and constructive way of thinking, which often seems irrational, subjective, vague and nomadic.

Architecture appears as a field where highly different kinds of knowledge amalgamate. This requires an ability to interpret through rational reasoning on the one hand, and to discover unexpected potentials through experimental shaping and designing on the other. But is knowledge actually produced in architectural projects, and if so, what kind of knowledge is it? Could it by any means be called scientific when it seams so local and irrational and when it has emerged from specific contexts of practical application?

Architectural knowledge, practice and design research

Architectural knowledge is not easy to define however. Nonetheless, it is clear that it deals with buildings and the material environment. It is not only about the existing material reality; it is also about the way buildings and urban structures are made and about the people who inhabit them. Francis Duffy delineates two special characteristics of architectural knowledge. Firstly, it is unusually combinatory and complex, linking many disparate elements since architecture is such a large and complex field pregnant with values. Secondly, architectural knowledge concerns the deontic rather than the descriptive – things as they ought to be, rather than things as they are (Duffy and Hutton 1998; Simon 1981 [1969]).

Architectural design gives form, often both to the problem and its solution; design is not primarily about solving well-defined problems, rather about "problematic situations characterized by uncertainty, disorder and indeterminacy" (Schön 1983, 15-16). Here the 'problem setting' is as important as the solution since the problems are not given. The problems must be constructed (a design problem in itself) from the material in the problematic situation. An essential characteristic of design is its ability to conceive unity from a set of mutually contradictory requirements, factors or elements. Design integrates contradictory demands and transforms them into a unified whole; it can freeze, give form to diagrammatic – and previously formless – conditions and makes use of forces in specific situations.

Finding new ways of thinking often implies a different notion of your own position in relation to reality. Henri Bergson argued that to one has to reinstall oneself within reality and follow it to understand the manifold and changing reality – to grasp change as well as the successive states in which it could be made immobile (Bergson 1998). To follow can be regarded as an uncritical attitude, but John Rajchman, with reference to Foucault, has emphasized the importance of redefining 'critical' to the question of how to see and grasp new forces that transgress our established notions (Rajchman 1998). Here is an insight that the traditional science and knowledge based on the 'archive' is not sufficient in handling relations of functions and space in contemporary society. What is needed is an understanding out of societal diagrams that link forces and produce discursive and material formations.

A main question is of course to what extent architectural and urban design can be regarded as a scientific and critical research activity. The spatial figures and formations crucial to design and architectural thinking can create wholes – formations of contradictory elements – to be tested and examined instead of reduced fragments. The spatial figures and images can be used as tools when trying to analyse and understand a complex situation. Experimental design can be a complementary way to widen the field of research and to formulate new possible problem areas. Probable perspectives can be predicted; improbable possibilities – potentials not yet thought of – have to be designed, be given an immaterial form. Architects can construct alternative realities, possible worlds that are improbable or not wanted because they are not yet conceived or visualized as possible so far.

The notion of the sciences of the artificial – formulated earlier by Herbert Simon – highlights the possibilities of design (Simon 1981 [1969]). Artificial science is by its dedication to how things might be – not primarily how they are – concerned with designing, and is interested in constructing rather than describing, understanding or explaining (Dahlbom 2002). It studies what might be possible instead of being restricted to what is realized – an exploration of a possibility space. Design can then be an important scientific method and give science a new orientation. Rather than studying the boundaries of the possible it can be an exploration of what is within the space of possibilities and potentials; a systematic knowledge of possible facts, including the ones not yet thought as possible – a true production of new, even surprising, knowledge.

New modes and nomadic knowledge production

The now widely discussed new form of knowledge production – called Mode 2 – seems to have great potentials for architectural research. The main feature is that the new mode operates within a context of application where problems are not set within a disciplinary framework – it is transdisciplinary rather than mono- or multi-disciplinary (Gibbons et al. 1994). Transdisciplinarity is achieved by focusing on and following research problems as they emerge in contexts of application and where the heterogeneity of knowledge producers introduces additional criteria of assessment apart from scientific quality (Nowotny et al. 2001). Transdisciplinarity is dynamic, and consists in specific clustering and configurations of knowledge brought together on a temporary basis according to the specific problem at hand and the context of application, which is strongly oriented by problem solving. "It is problem solving capability on the move" (Gibbons et al. 1994, 5).

This second mode has a strong feature of experimental, innovative attitude. This is related to an interest in studying, manipulating and building specific, concrete and ordered structures and processes – rather than searching for general first principles – where innovative activities and search for knowledge through design are crucial. The experimental and practical design aspects of this inquiry are enforced by the means of new technology (Gibbons et al. 1994, 44). Mode 2 then implies a shift from a search for fundamental principles to research oriented toward contextual results reached through experimental practice. All these features have affinities with architectural design and the practices described above.

In *A Thousand Plateus* Deleuze and Guattari point out the existence of a 'minor' or 'nomadic' science opposed to the 'Royal' science. It is modelled on becoming and on heterogeneity rather than on being stable, eternal, identical and constant. It deals with deformations, transformations and operations, where every figure or form is an 'event' rather than an essence (Deleuze and Guattari 1987, 361-362). The nomad sciences have a stronger relation to the practical, experimental work than the Royal ones, and instead of being concerned with formalizations and finding constants it produces change and transformation. While the ideal of reproduction is a central part of royal science – and entails a permanent, fixed view outside to what is reproduced – the model of nomad science is rather to follow. You are forced to follow

when searching for 'singularities' in a material rather than a general form or a first principle, when studying continuous variation instead of finding constants (Deleuze and Guattari 1987, 369-372). The new mode of knowledge production can in this light be regarded as nomadic, but what has to be stressed is an important dependence and reciprocal play between the different kinds of science and modes of knowledge production[1].

Architecture – forming knowledge

So is architecture a science or a practice? Is it a minor science; a vague, nomadic science since it has a strong relation to practice and to the material it is working with at the moment and is forced to follow in complex and uncertain situations? Design as a way of working and thinking can have both royal and nomadic features. It can be reproducing and reductive or innovative and liberating – as science also has both sides. But primarily it has to be regarded as a nomad science – it is primarily producing, following and engaged in a specific situation and context of application. Design is aiming at determinations; but these are not valid in general, rather in a local, specific context that it changes during the design process. Design produces knowledge as formations of visibilities and utterabilities, but not with the primary aim of 'understanding', meaning or explaining. It is more related to the direct material, its way of working and function. Design can be seen as an interlacing of both royal and nomad science, carrying both their possibilities and problems.

To research by architectural practice and design offers great potentials, and first steps in attempts to develop this field can be seen (turn to van Schaik 2003). But whether it is to be considered as scientific depends foremost on the readiness of the scientific world to start viewing its 'minor' procedures, practices and activities in different ways. The architectural profession of designing and researching practitioners could in my view be developed in interesting ways by the notions of transdisciplinarity, Mode 2 knowledge production, artificial science, nomad science, which all have similarities and where architecture can contribute to the development of these notions as well.

Architectural thinking implies a special ability to handle uncertain, changing, complex situations strongly connected to the specific circumstances with all governing and contradictory forces. Architecture can give form to the elusive – realise formations, both immaterial and material – which can be objects of knowledge or discussed in political processes. The particular work of practices following processes in a context of application, as well as a conscious reflection on the form and the formations of matter and texts that every architectural project produces could generate new knowledge. Architectural research can formalize this knowledge, and also give important contributions to the contemporary discussions on the notions of science and knowledge production.

1 For a longer discussion on nomad science, Mode 2 knowledge production and architecture turn to Fredrik Nilsson, 'Transdisciplinarity and Architectural Design. On Knowledge Production through the Practice of Architecture,' in: *Discussing Transdisciplinarity: Making Professions and the New Mode of Knowledge Production*, ed. Halina Dunin-Woyseth and Liv Merete Nielsen, Oslo, AHO, 2004.

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