

Inaugural lecture  
Prof. Juliette Bekkering  
November 28, 2014

A close-up portrait of Prof. Juliette Bekkering, a woman with curly blonde hair, smiling slightly. She is wearing a dark jacket and a gold necklace. The background is a solid blue color.

/ Department of the Built Environment

**TU** e

Technische Universiteit  
**Eindhoven**  
University of Technology

# Architecture a user's manual

About sculpturality, scenography and materiality

Where innovation starts

Inaugural lecture prof. Juliette Bekkering

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# **Architecture a user's manual**

**About sculpturality, scenography and materiality**

Presented on November 28, 2014  
at Eindhoven University of Technology



# Introduction

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Rector magnificus, respected colleagues and friends, ladies and gentlemen,

In accepting the chair of Architectural Design and Engineering, I have set myself the task of furnishing my academic environment as a breeding ground for experimental architectural education and research: a breeding ground in which innovation and experiment take a central position to explore the boundaries of the discipline. In short: an inspiring environment to learn and research, where innovative architectural concepts can be explored within a broad cultural context.

I also see this as an important opportunity to build upon, explore and deepen the thematic thread that runs through my work as a designer and, in so doing, give shape to the notion of research by design within the chair. The narrative aspect of architecture has always been an important aspect of my work. Architecture is about the staging of life. Buildings should **speak**; the least we should expect of them is that they do so expressively and evocatively.

I did not of course invent all this myself. Le Corbusier was, during the last century, motivated by the same impulse:

*“La construction c’est pour faire tenir, l’architecture c’est pour émouvoir.” And: “Architecture c’est rapports, c’est pure création d’esprit.” (Le Corbusier, 1923)*

Architecture is an experience. This means that the design and the activity of design are required to meet considerable demands. To design entails a quest for the ‘Gesamtkunstwerk’: an architecture in which all facets of the design have been properly integrated. Not a miserable accumulation of shell, installations, interior and façade as autonomous parts that have nothing to do with each other but the creation of a whole. With these aims, the essence of the profession for me lies in the ‘making’ of things: the clever detail, the beautiful drawing, the excitement of the moment when the concrete is released from the formwork, the sensation of the first pile being driven into the ground, striding across the building site early in the morning dressed in your hard hat and your safety shoes, the smell of fresh plaster and concrete. Ultimately, that’s what you do it for.

# Tableaux

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The book 'Life a user's manual' (George Perec, 1978) is a story about an apartment block in Paris. The composition of the book follows the cross-section of the building and maps the stories of the building's residents or former residents through its spaces. The storylines all warp and woof and ultimately all crossing each other. The story reads like a compendium of spaces, mapping the building and the lives of its inhabitants as if it were an encyclopedia. Each of the 99 chapters carries a title as if it concerns the room specifications of the building: 'In the central heating cellar' or 'Stairwell 12'. Some chapters are simply given the name of the person living in the apartment: 'Altamont'. Every chapter starts with a meticulous and detailed description of a different interior: the space, the finishes, the furniture and finally small details like vases, paintings, corkscrews, musical boxes, cords, etc. After that we are given a description of the characters as if in a 'film still'.

I love this book because it says something essential about my discipline, architecture. Perec writes architecturally: he composes with numbers, axes, series and dimensions. He works with the material itself, in his case the words and letters. The novel is constructed with the precision of a specification drawing: one hundred rooms, ninety-nine chapters, series of lists, and jigsaw puzzles of exactly seven hundred and fifty pieces. The walls and the floors between the different worlds of the residents are shaped by chapters.

Analogous to the structure of Perec's book, every building can be described as a spatial composition that forms the decor of different storylines. The storylines are supported by architectural spaces: high spaces, low ones, stairwells and boudoirs, cellars and salons. The users all make use of these spaces in different ways. With his masterly use of words Perec paints the atmosphere and the materiality of these spaces, making them come alive one by one. As an architect this is exactly what you try to do, you design each route, each space, as a tableau: traversing the spaces in your mind, composing them, studying them.

HUTTING	<i>Honoré</i>		SMAUTF	SUTTON	ORLOW- SKA	ALBIN	Morellet	Simpson	Troyan	Troquet
	GRATIOLET				CRESPI	NIETO & ROGERS	Jérôme	Fresnel	PLASSAERT	
<i>Brodin-Gratiolet</i>	Docteur DINTEVILLE					ESCALIERS			<i>Jérôme</i>	
CINOC	Gratiolet								WINCKLER	
<i>Hourcade</i>									RORSCHACH	
RÉOL	Grifalconi									
<i>Speiss</i>									Danglars	
BERGER	BARTLEBOOTH									
Appenzell									FOUREAU	
					ALTAMONT					DE BEAUMONT
MOREAU										LOUVET
					ENTRÉE DE SERVICE				MARCIA	ANTIQUITÉS
CAVES	CAVES	CHAUFFERIE	CAVES	MACHINERIE DE L'ASCENSEUR			CAVES	CAVES	CAVES	

Plan de l'immeuble  
les noms en italique sont ceux des anciens occupants.

Figure 1

Plan de l'immeuble, George Perec

You design spaces to be used in all kinds of ways and which each person will experience and perceive in their own way. You try to imagine what is possible, and like a film director you write a scenario for the building. Let's say you are designing a university building; in so doing you imagine the student walking into the building in the morning, grabbing a cup of coffee and joining friends at a table. Someone from administration having a short chat with one of the lecturers that dropped in. Footsteps sound in the corridor. A party in the hall. The first lecture of the day in a darkened auditorium. You design buildings that generate something new: new uses, new encounters, a new public space in the public domain.

By picturing all this, virtually, in one's imagination, a jumble of storylines emerges with different layers of meaning: at the level of the city, of the building, of the individual spaces, and of the material. These tableaux come to life as soon as the building has been built. The tableaux of Perec become comprehensible the moment the design, in his case the novel, is finished. But how one designs is a question that has occupied architecture quite literally for millennia.

# The transformation of the Vitruvian trinity

When Vitruvius dedicated his 'Ten books on architecture' (Vitruvius, Morris Hicky Morgan, 1914) to Emperor Augustus some two thousand years ago, he could hardly have suspected that his pragmatic reflections on architecture were so universal that they would stand the test of time.

This says something essential about our profession: it is a comforting thought that the discipline of architecture, despite all technological, societal and social change, is subject to a slowness and a constancy that compels us to abide by the same basic rules. Vitruvius talked about 'venustas, utilitas and firmitas', we speak about beauty, functionality and stability.

This archetypal triad has been a constant presence in the theory of architecture and the architectural practice that derives from it. Over time the emphasis and interpretation has changed.

In 'De Re Aedificatoria', the treatises written by Leon Battista Alberti between 1443 and 1452, he leaned heavily on the principles formulated by Vitruvius, but widened their scope by developing the metaphorical and functional application of classical architectural theory (Alberti, 1988). The buildings were compared with the human body so that the individual parts of the building, analogous to the human body, had to be designed as a perfect, well composed and harmonious whole (Lefavre & Tzonis, 1984). The fact that all buildings are different can be explained by the fact that people are all different. The different needs they have determine the differences in the buildings. Use dictates form and form, reciprocally articulates use.

Palladio, in his 'I quattro libri dell'architettura' takes the theme of the Vitruvian triad further. In the drawings of Palladio beauty, functionality and stability are linked to specific methods of notation: the facade stands for beauty, the plan organizes use and the cross-section represents stability, showing the construction, the columns and the vaulting. In his famous drawings all three are drawn closely juxtaposed as if to emphasize that the one is not complete without the other.

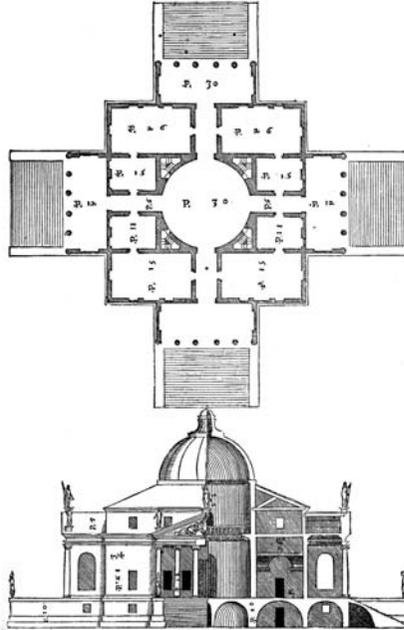


Figure 2

Villa Almerico Capra (“La Rotonda”), Andrea Palladio, 1566

Then we take another huge leap in time. In his book ‘Vers une Architecture’, which reads like a manifesto and is intended as such, Le Corbusier describes the three components that he believes determine the architecture:

*“Le volume et la surface sont les éléments par quoi se manifeste l’architecture. Le volume et la surface sont déterminés par le plan. C’est le plan qui est le générateur. Tant pis pour ceux qui manquent l’imagination!” (Le Corbusier, 1923, p.8)*

The plan, volume and surface together form, according to Le Corbusier, the three core concepts of architecture whereby volume and structure follow from the plan.

These three concepts are derived from the three notions given by Vitruvius, but their interdependence is raised a notch: no volume without a plan, no surface without volume. The plan directs use and the architectural experience, which he would later label the ‘route architecturale’.



Figure 3

Le Plan, La Surface, Le Volume

In the rhetoric of the modernists, of which Le Corbusier was the representative, the functionality of the building is constantly emphasized as the main driver. Form and structure are entirely dictated by the notion of functionality, which, however, did not mean the buildings it produced were necessarily very practical. It is not so much the theme of functionality that was developed in the architectural culture of the later twentieth century as the modernists' discovery that a building has to offer a dynamic experience. The Corbusian 'route architecturale' makes the building a series of scenes to be enjoyed while walking through it. This idea survived and itself became subject to many differing interpretations.

In the 1960s the architects of Superstudio took the principle of scenography in architecture even further, designing cities as stories, and in doing so took a socially critical stance. They made use of the notation techniques of the movie industry to illustrate their plans. Using words, collages and drawings, they sketched a complete future society (Superstudio, 2003). Later Rem Koolhaas in 'Delirious New York' described the city and its architecture as an accumulation of 'events' within a layered structure (Koolhaas, 1994). The metropolis is the product of congestion, to participate in it generates a wealth of experiences through the articulation of architecture. John Hejduk goes one step further: for John Hejduk the design has become a compilation of narratives that meticulously stage the lives of its residents. The designs are stripped of their programmatic requirements and quite literally become a form of speaking architecture that visualize experiences (Hejduk, 1989).



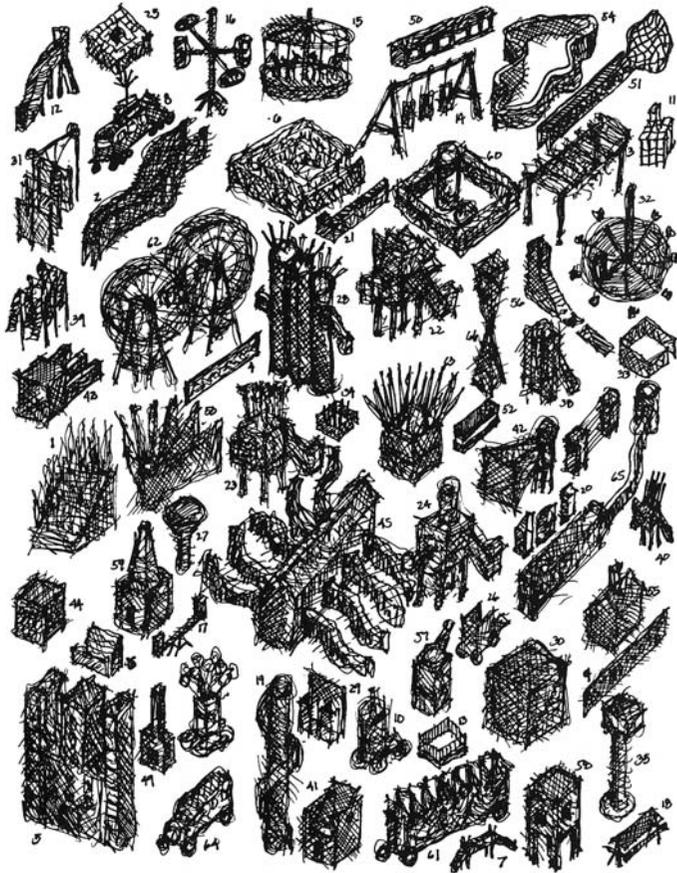


Figure 6

John Hejduk, *Victims*, 1983

The tendency to stage-manage a building into a series of experiences touches on all elements of the Vitruvian triad. It concerns the functioning of a building, the ideal of beauty and, of course, how a building is materialized: *Firmitas* in other words. But the craft of architecture has continued to develop, certainly since Vitruvius, but also since Le Corbusier. We have now reached the stage that we can build almost anything we want, in more or less any shape and material. That does not make the job of an architect any easier: it is no longer possible to apply materials with the innocent certainty that they can be processed only in this way and no other. Everything has become possible. More than ever before, you have to choose your materials with deliberation, as a part of the intended quality of the building.

# Sculpturality, scenography, structure

As far as I am concerned the three Vitruvian concepts remain as valid as ever. But in order to transform them into a contemporary design method, I have had to interpret them and give them new meaning. This is because I believe that a design should say something – quite a lot in fact – about the urban context, about the way that a volume presents itself in the environment and, especially about the spatial experience a building should offer.

Therefore, I prefer to talk about:  
sculpturality, scenography and materiality.

I combine these notions into a design method in order to develop an architecture with several layers of meaning: to place buildings in their context as objects (sculpturality), to create spaces and spatiality (scenography) and, finally, to give expression to the material and materiality of architecture (materiality).

## Sculpturality

I understand sculpturality to refer to the balance between manifest form and the urban and cultural context. In each design you consider how buildings fit into their

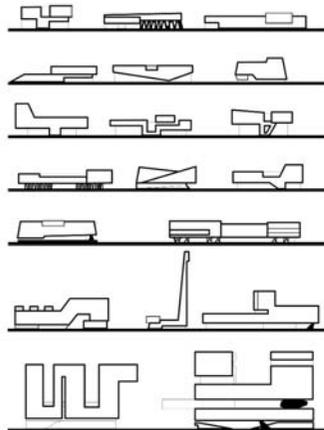


Figure 7

Sculpturality: projects, Bekkering Adams Architects

surroundings and how this is expressed. In this respect, my detour through the academy of art plays an important role: the two-year course in sculpture has influenced the way I think and act as an architect. To give expression to a building, architectural resources need to be selected in such a way that they acquire an evocative force, adding value to their urban surroundings. In the one situation a building might need to be modest and self-effacing, directing itself to its surroundings with regard to its volumetric composition, while in other cases it might need to be expressive and seek to contrast with its context. In both cases a proper relationship with public space and the surrounding landscape is vital. Facades, material and the volume of the building help shape the public domain. The sculpturality of a building should be evocative, shaping public space: buildings should be understood as the counter form of the public domain. The transitions between streets, squares, landscape, adjoining buildings and the building itself form the central and leading theme of design. They determine the form of the building.

### **Scenography**

I understand scenography to refer to the functional and spatial organization of buildings. How do you design not just a functional and practical plan but, through the structuring of space, a spatial experience? How do you determine the way a space should feel and sound? Architecture concerns itself after all with use in the most direct way: growing organizations and dirty fire-fighting suits, flexibility and fast routes, running children and dining halls. But architecture also concerns itself with the sequence of spaces; it is about how you walk through a building, about high spaces and low spaces, transparency and seclusion, routing and a sudden vista, public and private space. The atmosphere and the light.

If you want this spatial organization to tell a story, to present a scene, then the spatial experience has to be organized by what I term 'organizational space'. This organizational space gives structure to the use of the building and forms the backbone of its architecture.

Large central architectural elements, such as staircases or halls in the heart of the building, connect the various spaces and offer views. They must be very precisely composed and designed: the way the light enters, the proportions of the space, the positioning of voids and views, the materialization and the routes. The orchestration of use, the art of scenography, all make possible a varied use with a familiar signature: they form the places in a building where people meet.

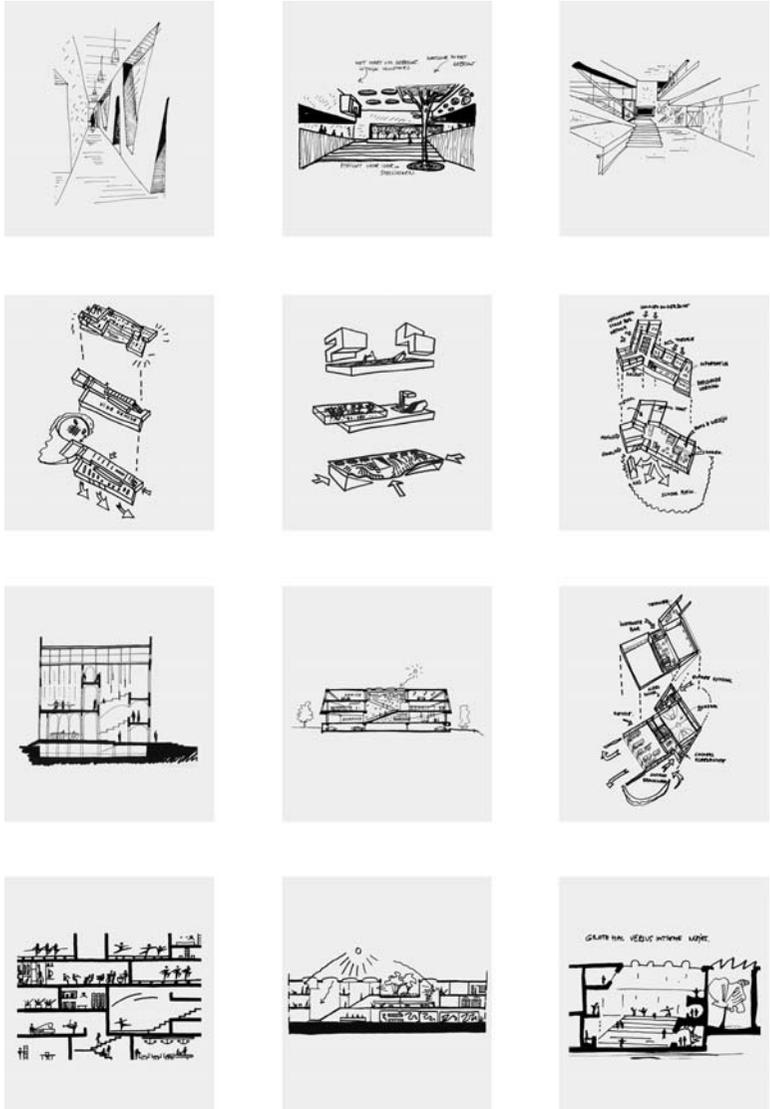


Figure 8

Scenography: projects, Bekkering Adams Architects

Changes in the occupation of our public buildings has meant that common and/or public spaces have increasingly been incorporated into the buildings themselves rather than remaining outside. The public program of the city has been swallowed by buildings and need to be redesigned.

It is important to design strong, good public spaces in the buildings themselves that can serve as the engine for urban life. Only in this way can we ensure a layered staging of spaces offering a variety of interlacing architectural routes. They help anchor our buildings, they are the points of reference in urban life. For us scenography is a leading and constantly recurring theme in our buildings. Large stairways, halls and rooms organize the building's mis-en-scène. History has plenty of examples of organizational spaces, such as Gian-Lorenzo Bernini's wonderful stairway, the Scala Reggia, which connects the Pope's apartments to the colonnades of St Peter's Square in a single gesture.

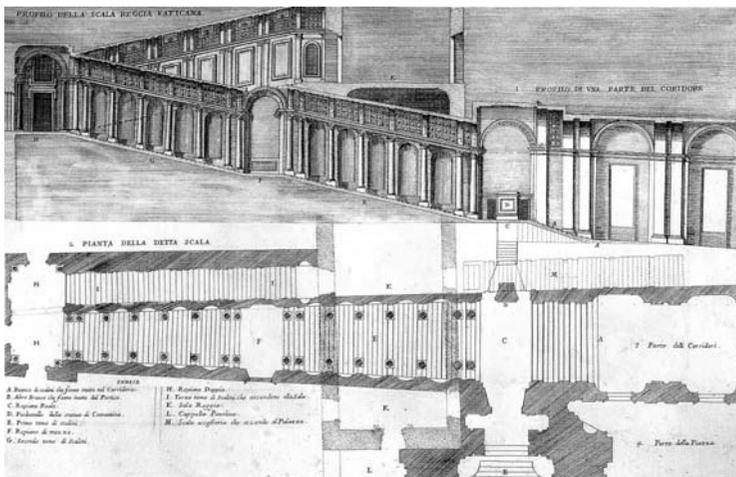


Figure 9

Scala Regia, Gian Lorenzo Bernini, 1663 – 1666

## Materiality

And finally there is Materiality, which concerns the ‘making’ of the building and how its structure, the engineering of the building, the process of making it, the detailing and materiality of the built form, can be used as an expressive design tool. Architecture is about beauty and volume, about light falling on a wall and the wandering through a space. Architecture is also about structure, material and the detail: an overhang that gives a volume its character, the reflection on a facade or the deliberate use of the specific properties of a material, such as an expansion joint, the relief or the grain of a material used for a particular ornamental effect. Or the use of the expressive qualities of the construction joints of concrete, the use of smoothed or bush-hammered stone, the razor-sharp detail of a window frame or the sheen of steel.

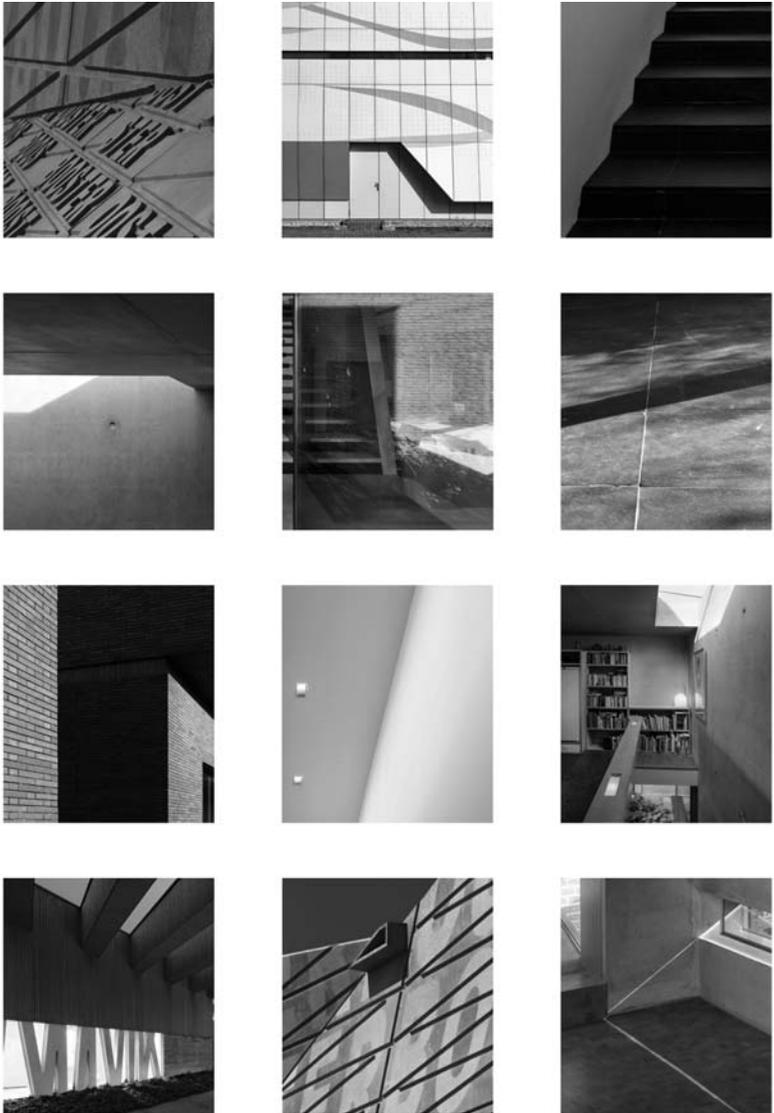


Figure 10

Materiality: projects, Bekkering Adams Architects

The materiality of the building determines the sound and feel of architecture. Because technology has advanced to the extent that almost anything has become possible, materiality has been allowed to transcend the purely functional and has become part of the architectural concept. The composition of material and

construction is an important part of the architectural design and determines to a large extent the expressive qualities of our buildings. There are many examples of buildings where the 'making' formed the basis for the design. In our own work we experiment with the possibilities of material and for the booster pumping-station in Amsterdam the expressive possibilities of precast concrete were fully exploited in terms of shape, color and technology.



Figure 11

Boostergemaal Oost, Amsterdam, Bekkering Adams Architects

In the so-called textile block houses built by Frank Lloyd in Los Angeles during the 1920s, he made experimentation and self-build housing go hand in hand. For these houses from his Maya period, Wright conceived a low-budget construction system comprising of simple concrete tiles with a pattern. His idea was that everyone could get out their molds during the weekend for example, and produce building blocks in their own backyard and so build their own home. The pattern was varied, it could be closed, or worked open to allow in the light. The pattern prompted the term textile block houses. In the end four houses were built using this 'Lego system', which possess an unimaginable poetic quality.

As often happens with the ideas of architects, this did not, unfortunately, lead to a low-budget system or self-build housing. In the end Wright directed the building down to the smallest detail. The intricate pattern in combination with the solid cubist block structure gives the houses an exotic aura, like a forgotten temple in the jungle.

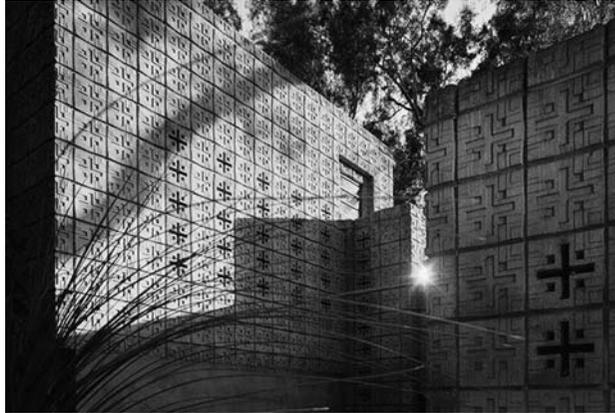


Figure 12

Millard House, Frank Lloyd Wright

Taken together, the three concepts of sculpturality, scenography and materiality lay the foundation for an enduring approach to building, one that is resilient to time, that cannot be thwarted by a simple change in use but is able to allow and accommodate transformations in program. A building of flesh and blood. Essentially, buildings are a kind of slow matter. But because the use of buildings constantly changes (as do their surroundings), we as architects have to take account of possibilities not initially considered. This is one of the interesting paradoxes of the profession. Time and again you begin a quest for the identity of the design and decide how to shape the rough stone, how to represent its public face. You do that with a specific and unique moment in mind. At the same time you take into account new uses and new encounters in a distant future. Each building is both generic and specific and as an architect you have to tack a strategic course between the two.

# Beaux-Arts versus Polytechnique

The chair I hold is called Architectural Design and Engineering (ADE) and its background bears all the characteristics typical to Eindhoven. This doesn't alter the fact that the formula can be traced to two architectural traditions that can both be called European and that have left deep tracks in architectural education since the Enlightenment. The one tradition is that of the Beaux-Arts and embodies the set knowledge about architecture as approached from the domain of the arts. The other tradition is that of the Polytechnique, which stands for the technical and programmatic approach to the profession. Historically, the two traditions are distinct although it is impossible to conceive of good architecture that does not do justice to both: both the artistic ambitions that relate to the design of a building and to the objectives with regard to function and technology. In my chair both have equal status. The essence of my current position is to provide new content to the ADE formula, which is ambiguous by definition.

At the Beaux-Arts, the famous school of architecture in Paris, the study of the arts and architecture of Greek and Roman antiquity took center stage. The architecture of the present had to emerge directly from that of the past. At the Beaux-Arts design thinking centered around the cultural, the aesthetic, the artistic and the meaningful. Design was exercised by drawing and developing skills in composition and ornamentation and by studying and copying the classical masters. The treatises and manuals provided guidelines that had to be adhered to. Meticulously processing instructions led to beauty, utility and strength. The practice of architecture in this tradition was about learning to recognize and reinterpret existing patterns in order to align the present to the past. This happened mainly in the studios of famous masters like Joseph Guadet and Henri Labrouste, in which the design skills of the students were refined through endless design competitions, *charettes* and monthly thematic assignments (Broadhurst 2013).

In contrast, the Polytechnique originated in the military academy and represented the idea that architecture has its origins in engineering. Architecture is about invention, about adding something that was not there before. The architect was trained as an engineer, and the notion of 'invention' is contained within the word 'engineer'. Engineer comes from the Latin 'ingenium': inventive person, sharp,

quick-witted, intelligent. With the accent on invention and creation, the focus was not so much on the past but on the needs of the present.

Durand was, as the first professor of architecture at the Polytechnique, the exponent of functionalism. In his lectures he appealed for the rationalization of the design process and he subsequently had a major impact on the development of the industrial city. In his books *'Précis des leçons d'architecture données à l'école polytechnique'* (Durand, 1825) he describes a complete method of setting up a construction project and analyzing buildings. He was a major champion of pragmatic functionalism whereby functionality and 'economics' are key. That he prioritized the economy is illustrated by the following example. In part 1 he condemns the waste of money and material spent on St Peter's in Rome and in his book he suggests an improved version of St Peter's as an alternative to what he believed to be a wasteful design "embroidered with useless ornaments and embellishments" (Durand, 1815, part 1, p. 24).

This polarity between, on the one hand, the Beaux-Arts (looking back to the past) and on the other the Polytechnique (looking to the future) is a contrast that still influences architecture and pervades current educational and building practice.

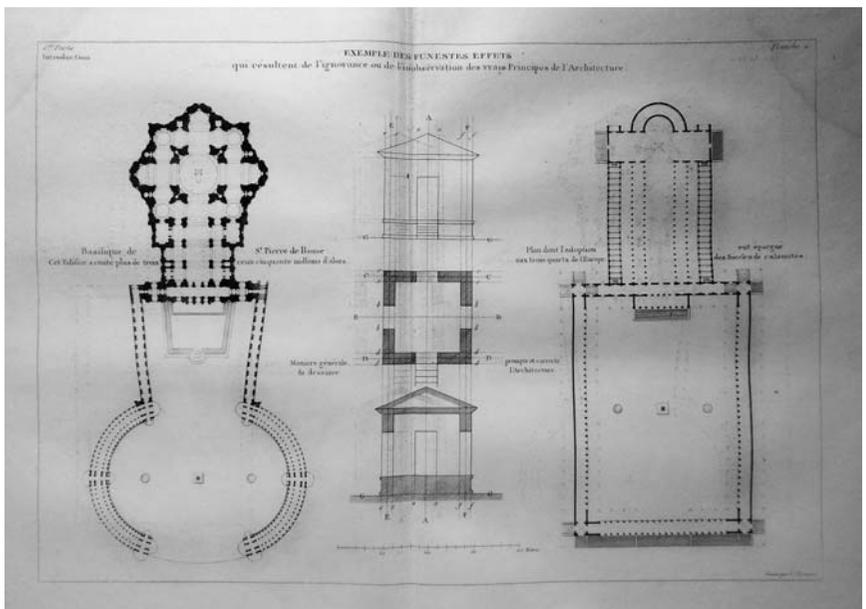


Figure 13

Saint Peter, Jean-Nicolas-Louis Durand

The question of whether a building is an engineering machine or a cultural artifact, which etches itself in the history of a place on Earth, is relevant to this day. Naturally, ladies and gentlemen, architecture should unite both: a hundred stories, meticulously ordered.

### The fridge and the shells

However, today buildings are regarded first and foremost as machines, which have to comply with all kinds of functionalities, rather than as cultural artifacts. Just like a fridge or the latest BMW, a building has an energy label; a safety certificate from the police, has been tested by the fire brigade, has to comply with the latest requirements regarding comfort and flexibility, and as the final seal of approval we have Breeam and GPR. All of them are quantified methods that seem to be stripping us of a real qualitative judgment. If we can give it a mark, then, apparently, everything is hunky dory.

The far-reaching specialization of the diverse parts of the building sector continues to defray the design process. This is reflected in buildings that, as a result of this approach, come apart; there is the shell, the package of fixtures and fittings, the installations, the construction, the trimmings and the interior furnishings, and more often than not, the architectural shell. They have all become separate components, frequently designed by different parties and often built by different parties.

Each part of the building has its own lifetime, logistics and functionality. The shell has to last 30 years, the installations 15, the trimmings 10 and the interior only has a lifespan of just 5 years, when fashions change and it has to give way to the latest trends.

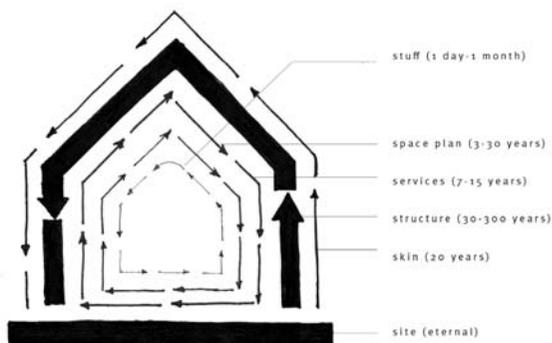


Figure 14

Steward Brand's six "shearing layers of change"

If the building no longer meets demands, it gets a facelift, a new interior or if it is written off after 25 years and comes 'off the books', it is demolished and replaced by a new building. Architecture is consumed: changeable, fleeting, it fits in a 'cash and carry' culture, often without lasting cultural value. This has led to buildings becoming a kit of parts that have to be constantly disassembled and rebuilt; at the same time the materials have to be able to cope with all this change. This trend is reinforced by the emergence of new commissioning structures and associated contracts whereby the individuality of the client with his specific agenda has been lost and replaced by an anonymous commissioning body. The related financing, which leaves the user out of the picture, leads to short-termism and makes it difficult to invest in the long-term.

I believe that the only response to this trend is the design of high-quality neutral structures (powerful shells) enriched with a few gorgeous and specific main spaces.

Perhaps these main spaces could be compared with what the Beaux-Arts referred to as the 'Parti'. In the classical meaning of the word, the 'Parti' was the large central space that gave structure to the whole design. In my view the powerful shell, together with the organizational central space, is the contemporary answer to the lack of character in flexible, generic architecture. Architecture should speak and be specific.

# Integral design

Digitization enables our students to pluck standard details and materializations off the internet. This makes the issue of how you seal lead flashing to a wooden frame less relevant. At the same time, the issue of how the greater technical complexity of fire safety, building physics and installations can be integrated is something that, as an architect, you need to take account of as it will determine your design to a great extent. Technical complexity should be embraced rather than ignored; you have to learn to explore the boundaries of regulation and set the rules to your own hand while juggling with the logic of building products.

Knowledge of building practices is indispensable, because you ultimately have to be in full control of your technique in order to become a virtuoso performer. So it is necessary more than ever to emphasize what has surely become something of a commonplace, namely that the power of architecture lies in the confluence of all its functions – the technical, the programmatic and the aesthetic. The building should be a ‘Gesamtkunstwerk’. The Gesamtkunstwerk, as I see it, is not the outcome of the close cooperation between architects and artists in the classical sense of the word, but is supplemented by the concerted interaction between technique and materiality.



Figure 15

Tolhuis, Bekkering Adams Architects

Aspects like ventilation, sun-shading, heating, mass for accumulating capacity, overhangs for shelter and acoustic facilities should be incorporated into the architecture itself. Think of the *louvres*, the tropical roof, the shaded patios or the ornamentation of the hearths and chimneys that are designed to be the very heart of the building, the overhangs for shelter, the wooden details to prevent thermal bridges and in-built sofas with padding and soft carpets for the acoustic quality of the space. This is a form of architecture that produces very 'full' buildings. Nevertheless, there is scope for the maneuverability of the user, both now and in the future.

The requirements of technology and building physics should be incorporated into the building envelope making separate installations or supplementary technical provisions superfluous.

You have to learn to design with numbers and how to answer the problems posed by building-physics, climate, construction and function. What you get is a mix of architectural design and engineering. My chair focuses on both beauty and ingenuity. And for this you need buildings that show off exactly this aspect,

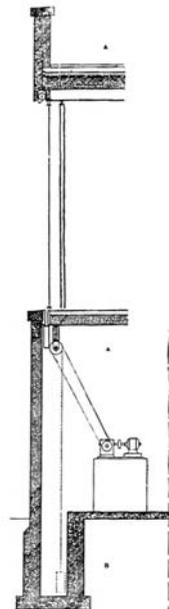


Figure 16

Details Villa Tugendhat, Mies van der Rohe

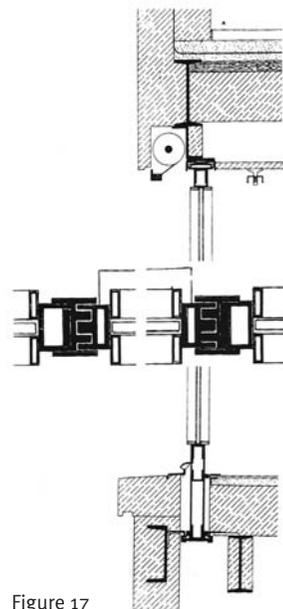


Figure 17

fantastic buildings that can serve as superb examples of such an approach. Let me give an example here that I believe is an exemplary illustration of the relationship between tradition and invention, or, if you will, between Academy and Polytechnique.

Villa Tugendhat, designed by Ludwig Mies van der Rohe in the Czech city of Brno, has been beautifully clad with large slabs of natural stone, rare timber and boasts a monumental glass wall. This house would not have been half as beautiful without the technical ingenuity that allows the meters-wide glass front to lower invisibly into the floor. As the glass is slowly lowered, the living room becomes a large veranda. The ventilation and heating systems have been incorporated invisibly into the ceilings, floors and walls. In the cellar, where the boiler has been placed, the air is purified and perfumed using a whole set of filters, filled with the briny pebbles of the sea, resinous pinewood chippings and the perfumed branches of exotic plants so that the house is always filled with a hint of expansive forest and the salty odor of the sea.



Figure 18

Rear facade Villa Tugendhat, Mies van der Rohe

# Making

In the chair and in my architectural practice ‘making’ architecture takes center stage. By ‘making’ architecture I mean learning to project an architectural idea into a materialized spatial composition. And in reverse order, materials and structures are explored as a possible source of inspiration for the architectural concept. To this end a set of instruments needs to be developed as practical design tools embedded in the body of knowledge acquired from theory and history. The chair is the place where ‘making’ and ‘designing’ become one.

We do that through research and more particularly through *research by design* to create an architecture in which culture and engineering are brought to a synthesis. Through experiment we explore assignments that are instructive with regard to craftsmanship and cultural engagement. It is particularly craftsmanship that is key to our definition of ‘making’: learning to anticipate the obduracy of the material, the idiosyncrasy of the location or knowing how to deal creatively with a complex program.

In his book ‘The Craftsman’ sociologist Richard Sennett regards design as a discipline related to craftsmanship and takes the work of Adolf Loos as an example:

“The good craftsman understands the importance of the sketch - that is, not knowing quite what you are about when you begin. (...) The good craftsman places positive value on contingency and constraint. Loos made use of both (...) Loos made metamorphosis occur in the objects by looking at problems on site as opportunities.” (Sennett 2008 p. 262)

Craftsmanship is learning to design by anticipating the tangible result as the culmination of all design decisions made. But, according to Sennett, craftsmanship emerges only in a comprehensive understanding of all the facets and aspects of the entire production process. His book should be read as a warning against the increasing fragmentation of the building process and the frittering away of architecture’s body of knowledge as the result of the increasing division of labor. Within our chair, we give prominence to the acquisition of a large

and specialized body of knowledge and to learning how to design, using this body knowledge. In order to educate our students we need an ongoing simulation of the practice of design to achieve what according to Sennett's observations, would constitute architectural craftsmanship.

"Technique develops, then, by a dialectic between the correct way to do something and the willingness to experiment through error." (Sennett 2008 p.160)

Using large-scale models, 1:1 mock-ups and sections of building components we teach and research the way space works in relation to materiality. This is one of the cornerstones of our design curriculum and forms the basis for our design research. It is in keeping with the rich tradition of our discipline. For example, Eero Saarinen's office investigated the sculptural, tactile and haptic qualities of the material and the space in man-size models, in which you could literally disappear (Saarinen, 2008)



Figure 19

Maquettes office Eero Saarinen

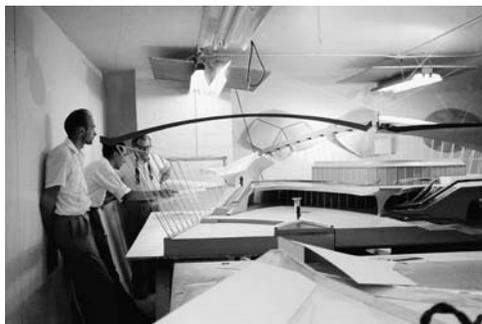


Figure 20

Maquettes office Eero Saarinen

# Generating architecture

In the introduction of the sixth edition of the IABR, curator Dirk Sijmons cites Nobel Prize winner Paul Crutzen, who, in an article, explains how, during a conference he caught himself speaking about the Holocene as “our” era when he suddenly realized that this was no longer correct, that too much had changed and that we have irrefutably arrived in the Anthropocene era: the era of man.

The influence of man on the Earth has become so great that we are even able to change the climate, and have done so. The fact that the Anthropocene era has arrived is inescapable. Urbanization and nature have become finely interwoven and impact upon each other. There are more trees in areas developed by man than in the rain forests (Sijmons e.a, 2014).

We are called upon to use this new insight, where city and nature overlap spatially and encroach upon each other, to design for it and to see it as a new challenge to explore the opportunities presented by these new hybrid forms.

However, this is often regarded as a task for the urban planners, designers and landscape architects; I believe, however, that it should be considered an architectural task. There is a growing societal drive towards the creation of self-



Figure 21

The Anthropocene

supporting systems. The built environment determines to a large degree how we live and accounts for around 40% of the energy consumed in Europe, while half of all material resources are used in the building industry. People want to take responsibility for themselves and there is growing demand for independence from the big networks. In this light, the task for the future is to design buildings that are part of the solution to the challenges given above: buildings that generate their own energy, that purify their own water, that can capture solar energy, can filter rainwater and are made of materials that retain their value. Buildings can become self-sufficient entities: buildings that can hold their own. In this way room is made to conceive of alternative scenarios: scenarios for autarky, smarter buildings in which architecture can generate rather than just waste and consume. Sustainability has to be a design attitude and not a measurable performance requirement.

I believe that generating architecture should be our foundational attitude within our discipline and one of the societal obligations to which our education and research should be directed.

I am still asked on almost a daily basis why I partly traded in my architectural practice for the university. I did so because I felt the urgency to focus on the issues and tasks described above. In the academic world we have the opportunity to make the difference.

# Innovation and experimentation

The tasks of the future demand innovation and experimentation. The challenge is to undertake design research for these future tasks, thereby linking design and research. The challenges that confront us change quickly and we must try to anticipate them now: the changing role of public buildings, climate change, rising sea levels, scarcity of energy and materials: these are all urgent problems that scream out for new ideas and concepts.

Given that buildings are always unique, the building and construction industry does little research into new concepts. The dynamics of building is slow – the objects are all unique so there is little repetition. Where other disciplines invest in research and development, because large investments in research pay off and the expertise is distributed over many different disciplines, architecture unfortunately is the exception rather than the rule.



Figure 22

Vacancy in Detroit, Michigan Theatre

Which is quite bizarre if you think about it. To give an example: every couple of years cars come out in a new version, with the latest model embodying the very latest state-of-the-art in aerodynamics, fuel consumption and comfort. But in architecture, which accounts for a 30 billion euro turn-over each year in the Netherlands alone, next to nothing is invested in innovation and the architecture departments receive little or no income from research. (Schoorl e.a., 2011) We are on the cusp of a major shift in architecture: the ageing of our population means that we will have a housing stock that will be practically unusable in just a few years' time and yet we continue to build along the same old lines. We have empty office space totaling almost 8 million square meters (source: newsletter on tackling empty office space, 2014), (almost twice Central Park, NY), which, with a little research, could be transformed into fantastic new buildings, and yet the market is dominated by new business parks filling up with the same low-quality office stock. We have the resources to undertake parts of the building work with robots or 3D printers and the aesthetics and qualitative possibilities of these are virtually endless, if we allow our universities to research them. But builders, just as they have done for decades, stand in the freezing cold on the scaffolding, holding a trowel.



Figure 23

Urban Forestry

# Organising inspiration

## From the Odyssey to Lethal Weapon

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By allowing design research to align with these urgent societal issues we can make the difference.

Ultimately design is about organizing inspiration: so that the tangle of images you have as a designer, the sources of inspiration from your own and other disciplines, can be transformed into a design.

The design phase is the pre-eminent moment to stock pile as wide a collection as possible of experimental sources of inspiration, varying from Homer's Odyssey to Lethal Weapon, from quantum mechanics to Star Wars.

In 2002 Herzog and De Meuron curated an exhibition that caused quite a stir. It was not so much the designs of the firm that were exhibited but the endless series of experiments, sketch models, mock-ups, reference materials and try-outs. This has now become a trend and regularly the contents of garbage bins and filing cabinets are tipped out over the exhibition rooms of our architecture centers.

The exhibition was accompanied by a book entitled 'Natural History', a book containing texts by people from related disciplines as well as all kinds of references and inspirational examples from other fields. (Herzog & De Meuron, 2002)

The only text in the book by Herzog and De Meuron themselves is called 'just waste' and concerns the exhibition as laying bare their archive: all the exhibition material, all their scale models and experiments with material were neatly numbered and displayed on tables, but, as they explicitly say: it is "just waste". The exhibition is, in fact, laying bare the archive to reveal like a 'Wunderkammer', the endless minutiae that led to the final realized project. These try-outs and experiments have therefore become meaningless. It is like exhibiting the archaeology of a desk, or like in a natural history museum where a distant past is reconstructed with the help of fossils and remains. The enormous importance of all these experiments, try-outs, scale models, chunks of polystyrene as well as sources of inspiration from the arts, science and simple implements like manhole

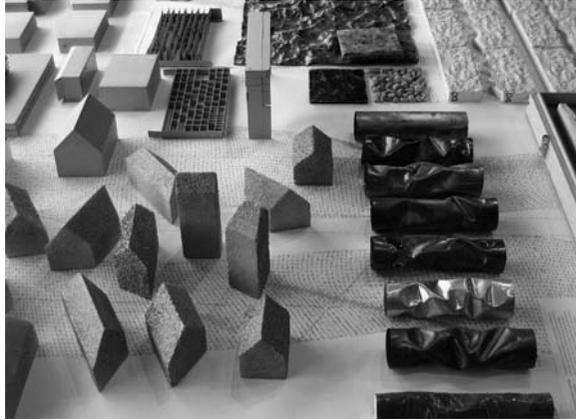


Figure 24

Exhibition *Archaeology of the Mind*, Herzog & De Meuron, 2002

covers and souvenirs, are not unique to the work of this firm. Without this apparent avalanche of ‘waste’ as they call it, an innovative architecture is not possible. The archive is the collective memory of the architecture.

In the studio projects we tutor in Eindhoven there is plenty of scope to experiment and produce endless quantities of apparent ‘waste’. The study is concerned with the acquisition of knowledge and skill: students learn by consuming lots of cultural and technical knowledge and by endlessly experimenting, producing and trying out. The chair as breeding ground and workplace of so-called architectural ‘waste’ accommodates this indispensable aspect of experimentation. Because architectural virtuosity can only come about by the grace of the perfect orchestration of technique.

# Order and evocation

The book by Georges Perec, with which I started, comprises an endless series of lists and descriptions of the spaces and their users. The structure of the story adheres to a strict order whereby the cross-section of the apartment building takes the lead.

The main protagonist Bartlebooth collects jigsaw puzzles. His life's work is to put together an increasingly complex series of jigsaw puzzles, 500 in all, each comprising 750 pieces. Through a complicated process he has them made by a jigsaw-puzzle maker who finds a sardonic pleasure in creating puzzles that are so complicated as to be almost impossible to solve. The discovery of this constitutes the apotheosis of the book and coincides with the description of the final room whereby the jumble of storylines are shown to fit together. The writer describes a different space in each chapter, using the chessboard move of the knight to jump from one space to the next. In the end, after 99 chapters we come full circle and the whole apartment building has been mapped. In this final chapter it becomes apparent that all narratives took place simultaneously. The clock ticks round to

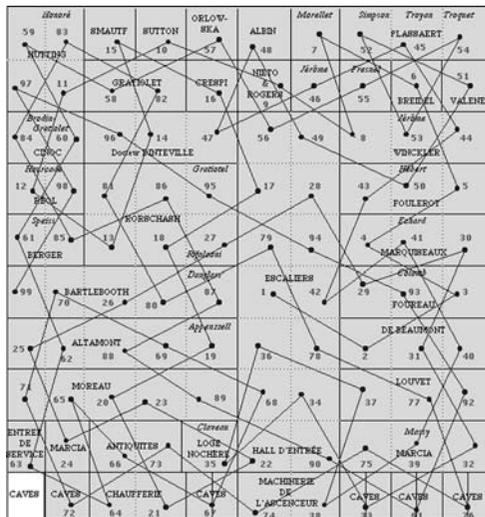


Figure 25

The chess move

exactly 8 o'clock. It is June the twenty-third, nineteen hundred and seventy-five as the clock sounds at eight in the evening. The main protagonist, the eccentric billionaire Bartlebooth, dies with the final jigsaw piece in his hand. It doesn't fit.

As the storylines converge, the whole becomes visible, just as it happens in architectural design: the disparate summaries, the separate narratives and minutely detailed descriptions converge into a majestic story. The 'white' of the drawing is defined and the story metamorphoses from summary to architecture.

In one of the most influential reflections on architecture of the last century entitled 'Complexity and Contradiction', Robert Venturi suggests that meaningful architecture is multi-layered and contains a multiplicity of meanings: 'the difficult whole' (Venturi, 1966). The synthesis between Beaux Arts and Polytechnique requires, in my view, this complexity that is praised by Venturi but also significantly by Sennett. Sculpturality, scenography and materiality are the means of choice for shaping this complexity.

### **Operating Instructions:**

***The beauty of 'Life a user's manual' lies in its radical mathematical structure; the body of the story, the intellectual arrangement that space offers to successive narratives. Analogous to this I propose a set of operating instructions for architecture: a virtuoso technical ordering complemented by a powerful spatial evocation. An expressive and full architecture, spread thickly with a hundred rich stories.***

# Words of gratitude

It is during the closing remarks that most people reveal their true colors. A conclusion suddenly becomes autobiographical and wrapped in gratitude as the speaker reveals the context from which she speaks. For myself, this is no different.



Figure 26

San Carlone, Arona

In the book ‘A scientific autobiography’, Aldo Rossi talks about the sources of inspiration from which his own work sprang. In a methodical and scholarly way he describes objects, buildings, panoramas and memories and links them to his projects. I grew up not far from where Aldo Rossi was born and lived. Those same panoramas over the lake, the same destination for that first school trip, the same churches and church lanes are part of my past and serve as sources of inspiration for my work.

Let me first and foremost thank my parents for the inspiring context they created for me. Not only did I grow up in the idyllic world of the North Italian Alps with a lake on our doorstep but I also became familiar at a very young age with the many architectural highlights we saw all around us. During the building of our own house, I learned to wield a concrete mixer and to prepare the shuttering and

formwork at a young age. This early expertise still serves me well and probably explains my predilection for cast concrete.

Although I cannot, unfortunately, name everyone to whom I am indebted – colleagues, clients, friends and family – I would like to mention a few special people who have helped me get to where I am, here and now.

Firstly, I am grateful to our dean, Elphi Nelissen, and my fellow professors at the Architecture and Urban Development Unit, Pieter van Wesemael and Christian Rapp, for the trust they have put in me and their help. In particular I want to thank Bernard Colenbrander, for all the good conversations, the comradeship and his advice and assistance. My special thanks also goes to everyone in the AUDE unit, the secretariat and especially everyone of the ADE chair for the confidence they have invested in me, but more especially for their positive energy that makes this chair second to none. A very special thank you to Jan Schevers and Sjef van Hoof who quickly made me feel very much at home in Vertigo.

A very special word of thanks to Monica Adams, my partner, friend and rock who, within our firm, Bekkering Adams Architects, made it possible for me to be where I am today.

Finally, my gratitude to the three big loves of my life: Michiel and my two sons, Stefaan and Laurens, who I want to thank for their patience, help and so much love.

I have spoken.

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# Curriculum Vitae

**Prof.ir. Juliette Bekkering was appointed full professor of Architectural Design and Engineering at the Department of the Built Environment of Eindhoven University of Technology (TU/e) on 1 January 2013.**

In 1989 Juliette Bekkering graduated as an architect from Delft University of Technology. In 1993 she completed a postgraduate course in urban design at the Polytechnic University in Barcelona. Having worked with a variety of architectural firms, including OMA (Office For Metropolitan Architecture) and Neutelings Riedijk, she founded her own firm in 1997, now called Bekkering Adams Architects, that she heads together with Monica Adams. Renowned designs of hers are the headquarters of Esprit in Amstelveen, the Boostergemaal Oost in Amsterdam, the headquarters of the Schuurman Group in Alkmaar and the fire stations and school in Doetinchem and Rheden. Different designs are at the cutting edge of architecture and engineering, applying the results of experimentation and research. The synthesis between architecture and research, as developed in her work, establishes a profound basis for education and research within her chair.

Her work is published worldwide and she has been represented at various national and international exhibitions. Her designs, have won a range of awards. In 2014 her work was exhibited at the Architecture Biennale of Venice. Juliette Bekkering was previously visiting professor of Architecture at the Czech Technical University in Prague.

## Colophon

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The Netherlands

**Postal address**

P.O.Box 513  
5600 MB Eindhoven  
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