A NEW MANIFOLD

STÄDELSCHULE ARCHITECTURE CLASS

- ADVANCED ARCHITECTURAL DESIGN
- CRITICAL PRACTICE
- PERFORMATIVE DESIGN
- THE AIV MASTER THESIS PRIZE

- BEN VAN BERKEL
- JOHAN BETTUM
- BEATRIZ COLOMINA
- MIRCO BECKER
- CHRISTIAN VEDDELER

SAC JOURNAL

A NEW MANIFOLD

SAC JOURNAL 1

BEN VAN BERKEL

Ben van Berkel is a professor of conceptual design and the dean of the Städelschule Architecture Class. Van Berkel studied architecture at the Rietveld Academy in Amsterdam and at the Architectural Association in London, receiving the AA Diploma with Honours in 1987. His first projects were built almost immediately after founding *van Berkel & Bos Architectuur Bureau*. Among the buildings of this first period are *Karbouw*, the *Remu Electricity Station* and *Villa Wilbrink*. Being elected to design the *Erasmus Bridge* in Rotterdam (1996) profoundly affected his understanding of the role of the architect today and constituted the foundation of his collaborative approach to practicing, leading to the foundation of UNStudio in 1999. Recent projects, which reflect his long-standing interest in the integration of construction and architecture, are the *Mercedes-Benz Museum* in Stuttgart (Germany, 2006), *Arnhem Central* (Netherlands, 2007), *GOW Nippon Moon* (Japan, 2012).

JOHAN BETTUM

Johan Bettum is a professor of architecture, the programme director of the Städelschule Architecture Class and vice-dean of Städelschule. Bettum studied at the Architectural Association (AA) after gaining a BA with a major in biology from Princeton University. He has taught and lectured, amongst other places, at AA, UCLA, the Berlage Institute, Innsbruck University, the EPFL, Lausanne. His main interests reside in the intersection between materials, geometry and architectural design. He was a research fellow at the Oslo School of Architecture from 1997-2001 and headed a nationally funded research project on polymer composite materials in architecture. Until 2000 he led the *OCEAN group* in Oslo whose work on polymer composites and advanced digital modelling greatly influenced the group's projects in this period. Bettum's PhD is entitled 'The Material Geometry of Fibre-Reinforced Polymer Matrix Composites and Architectural Tectonics'.

CHRISTIAN VEDDELER

Christian Veddeler is a guest professor at the Städelschule Architecture Class where he leads the second-year thesis specialisation, *Advanced Architectural Design* with a focus on system thinking in architecture. As an associate director at UNStudio in Amsterdam he is responsible for the design and execution of several international projects. Currently, he is lead architect on the project for the Singapore University of Technology and Design. In close collaboration with Ben van Berkel, he was in charge of a series of pavilion projects focusing on integral and emergent design processes, such as the *Holiday Home* at UPenn's ICA, the *Changing Room* for the Venice Biennale, the *Burnham Pavil-*

ion in Chicago, the *New Amsterdam Pavilion* in New York City, the *Motion Matters Series* at Harvard GSD, *Aedes* in Berlin and the *Maxxi* in Rome. His continuous involvement in academia includes numerous teaching assignments, amongst others at Harvard University, TU Delft, the Berlage Institute and the University of Illinois in Chicago. He is a registered architect and received a Master of Science degree in Architecture with honours from Delft University of Technology.

MIRCO BECKER

Mirco Becker, guest- and 'Stiftungs'-professor at the Städelschule Architecture Class brings his knowledge in computation and geometry in the design and execution of projects to the Master degree specialisation, *Architecture and Performative Design*. He has been responsible for building up advanced expertise in this emerging area of architectural design at offices, such as Foster and Partners and Zaha Hadid Architects in London. At Hadid's office, Becker worked as a lead designer with responsibility for BIM integration on various projects. Before this, Becker was senior associate principal, heading the Computational Geometry Group at Kohn Pedersen Fox in London for five years and responsible for the geometric design for the Abu Dhabi Airport. At Foster and Partners he was a member of the Specialist Modelling Group. He has taught in Diploma Unit 1 at the Architectural Association (AA) in London (2003-05), was a visiting professor for Digital Design Methods at Kassel University (2006-08) and tutored at the AA Design Research Lab. His work has been exhibited and published in Europe, the US and Asia, including at the Latent Utopias and Beijing Biennale. Becker founded *informance* 2012 in Berlin and holds an M. Arch. degree from the AA. His position at the Städelschule is generously supported by the *Heinz und Gisela Friedrichsstiftung*.

BEATRIZ COLOMINA

Beatriz Colomina is an architectural theorist, professor and founding director of the programme 'Media and Modernity' in the School of Architecture, Princeton University. She has written extensively on questions of architecture and the modern institutions of representation, particularly the printed media, photography, advertising, film and TV. Among her works are 'Privacy and Publicity: Modern Architecture as Mass Media' (1994, AIA 1995 International Book Award); 'Sexuality and Space' (1992, AIA 1993 International Book Award); 'Architecture Production' (1988), 'Double Exposure: Architecture through Art' (Madrid, 2006); 'Domesticity at War' (2007) and 'Clip/Stamp/Fold: The Radical Architecture of Little Magazines 196X-197X' (2013). She has been on the editorial boards of *Assemblage, Daidalos* and *Grey Room* and lectured at institutions and events throughout the world. She is the recipient of several prestigious grants, including from the Chicago Institute for Architecture, SOM Foundation, Graham Foundation, Fondation Le Corbusier, and the Center for Advanced Studies in the Visual Arts in Washington.

JOHAN BETTUM EDITORIAL

A NEW MANIFOLD FOR THE DISCIPLINE AND ITS DISCOURSE

With this inaugural issue of the SAC Journal, *A New Manifold*, the Städelschule Architecture Class (SAC) reflects on its postgraduate master programme. In its ambition to contribute to the development of architecture through research, experiments and the excellence of its graduates, SAC- like other educational programmes - faces an increasingly multitudinous and complex context in addressing the future of architecture. Yet, *A New Manifold* is also the beauty and multi-facetted opportunity that this future offers.

Contemporary architecture, whether pursued academically or professionally, must answer to growing societal pressures of all different kinds. This includes increased public concerns with what is built in cities where land is often scarce and expensive; scrutiny of the use of money for public projects; heightened awareness of environmental responsibilities; increased technical demands and regulations, and so much more. In addition to this comes architecture's expanded horizon of improved and new technologies, be it in the form of novel material systems, construction methods or infrastructural and service systems. In sum this offers a plenitude of possibilities, a rich fauna of architectural futures leveraged by the discipline itself, contemporary technology and the wild and beautiful power of architectural imagination.

Given the complexity of this future one may ask if it is at all possible to maintain architecture as a holistic discipline where the architect is typically thought to be a generalist, knowing a little about a lot and answering to everyone? The new manifold, which is the sum total of the contemporary condition for architectural explorations and production, proffers a nervous platform for future practitioners and theorists. In the process, will this not dismantle the architect as the master builder and once and for all bury the illusion that buildings are signed off by a single individual who draws inspired sketches of his or her complex designs? Or, will it once and for all deliver us to the free market vernacular, a built tomorrow without architects?

Meanwhile, architecture still demands an *idea* of the whole or, at least, a *will* to contribute to this whole. The new manifold needs to be collected and directed.

At SAC, these questions lead to research and experiments that unequivocally celebrate architecture as a discipline and architectural design as its greatest and most passionate expression. A modest reflection of the new manifold is to be found in SAC's small size and the way its programme is sub-divided and structured. SAC is the meeting ground of its origin, the classical master class, and the new manifold. It is the continuous negotiation of the many and the one. This negotiation does not conflate either of these; it is fully focused on architectural design as a discipline, understood in all its historical glory and served at best through a continued, experimental approach in the form of research. In the second of the programme's two-year course, leading up to the master thesis, SAC offers its students three alternative thematic specialisations, each led by a professor or guest professor.

SAC's specialisations are: *Advanced Architectural Design*, which invites its students to develop a design thesis around a building proposal driven by research on a select, annual topic while considering architecture a product of the traditional, modernist amalgam of form, programme and structure; *Architecture and Performative Design*, which approaches building design with a focus on how material,

constructional and technological systems influence design decisions and the final thesis outcome; and lastly, *Architecture and Aesthetic Practice* (until July 2013 called *Architecture and Critical Spatial Practice*), which attempts to benefit from SAC's unique relation to the arts within the Städelschule and use art theory and practice to invigorate architectural discourse and design.

Thus, comprising its own small manifold, SAC sees the three specialisations as complementary to each other and pursues the liveliest possible exchange between the faculty and students involved in the programme.

To portray SAC's approach to architectural design, the first issue of the SAC Journal presents the projects that were nominated for the first ever *Master Thesis Prize* at SAC in July 2013. The prize was generously supported by the Architekten- und Ingenieur Verein Frankfurt am Main (AIV), which also has supported this publication. The finalists represent all three second-year specialisations. *The Master Thesis Prize* was won by Kavin Horayangkura with Lerpong Rewtrakulpaiboon receiving an honourable mention.

Guest professor Christian Veddeler introduces the work conducted in his group, *Advanced Architectural Design*. Guest- and 'Stiftungsprofessor' Mirco Becker introduces the projects completed under his tutelage in *Architecture and Performative Design*. Lastly, the project completed in the specialisation, *Architecture and Critical Spatial Practice*, led under this name by Markus Miessen from 2011 until 2013, is introduced by professor Johan Bettum. In addition to SAC's tutors and many guests providing invaluable support and guidance, guest professor Mark Fahlbusch, of the engineering firm Bollinger+ Grohmann Ingenieure, consulted the students in structural design and material choices for their project's.

The first part of *A New Manifold* presents three essay, each by a member of the SAC faculty. SAC's dean, professor Ben van Berkel, teams up with Karen Murphy to delve on architects' responsibilities and opportunities within the current professional climate. Their essay, *Architectural Practice within the Context of an Expanded Profession*, calls for intense research efforts and attention to the 'softer side of the profession'.

Johan Bettum, professor and SAC's programme director, unfolds his ideas about teaching architecture in the face of the many influences that will weigh on future architects. His essay, *How to Collect Fragments*, traces the contemporary fragmentation of the discipline and provides comfort by arguing that strategic design methodologies may also defend it by catering to the essence of the discipline through language and close collaborative ties.

Last but not least, SAC's guest professor in history and theory, Beatriz Colomina, turns her attention to SANAA's installation in Mies van der Rohe's *Barcelona Pavilion* (2008-9). Under the title, *Out-Miesing Mies: SANAA in the Barcelona Pavilion*, she expounds on a contemporary notion and role of transparency, demonstrating that disciplinary issues are not only alive but can be probed, devolved and, in astounding beauty yet shocking simplicity, contribute to the continued development of the discipline of architecture.

BEN VAN BERKEL WITH KAREN MURPHY

ARCHITECTURAL PRACTICE WITHIN THE CONTEXT OF AN EXPANDED PROFESSION

With the emergence of the digital age and the introduction of computational tools and design techniques, architects have not only experienced substantial changes to their methods of practice in recent times, they are also now faced with designing for a rapidly changing and increasingly connected world. A world of changing lifestyles and one in which innovation is no longer limited to isolated 'experts', but where instead social innovation quickens the pace of progress and challenges architects to reassess the core strengths and results of both their methods and their output.

In a recent article for the Financial Times, Charles Leadbeater stated: 'Digital technologies are innovation multipliers: each new wave of technology amplifies our ability to create, [...and...] this is changing what people can do and where they can do it, reducing their reliance on professionals and formal institutions.' Most interesting is his perception of how the current digital age differs from times of rapid progress in the past: 'Whereas all previous civilisations created technologies that were tools to amplify our capacities, in this mobile and networked age, technology will become more like a form of life, which we will inhabit, all of the time.'[1]

For the architect then, it is not digital design tools and methodologies alone that are bringing about change. It is precisely the shifts in how we live, work and play – this 'form of life' and the repercussions thereof – that have an essential role in determining what buildings are required to provide; how they need to operate, how they are organised and ultimately how they are experienced by the user. It could be said that it is in fact these concerns that have played an essential role in propelling the most significant changes that have occurred within the profession in recent years.

But what does this mean for the actual practice of architecture? In the past, architects learned to design through the triad of the eye-mind-hand relationship, at a time when learning was primarily concerned with the development of new and practical techniques for design. However, this applied approach is no longer tenable on its own in a profession which has recently undergone such considerable expansion in its scope, requirements and – therefore ultimately – in its possibilities. Similarly, we can no longer concern ourselves purely with aesthetics. It is for some time now that aesthetics no longer carries the all-encompassing meaning it once enjoyed, neither in architecture nor in a wider cultural context. Moreover, in architecture today aesthetics is linked to a healthy form of provocation, with the architect now in a position to reference other creative disciplines, such as art, fashion, literature etc.

By the same token, the scope of the profession has in recent years also expanded considerably in terms of its functional responsibilities and requirements. In contemporary practice we are concerned - now more than ever – with the utility of space, with efficiency models, with the importance of incorporating sustainable constructive elements and with global and economic constraints and considerations.
This augmentation of what is required from the contemporary practice of architecture means that architects today need not only to resolve complex structural relationships, but are also called upon to find a cohesive integration of variables. A building can no longer simply be approached as a purely autonomous entity or the sum of disparate elements merely in terms of a grid, a façade or as an iconic 'image'. Today's architect is in fact in a position to create an architecture

that is as integral and fully holistic as possible. In order to achieve this however, there is call for a multifaceted means of judgment, one that involves the synthesis of a broad spectrum of variables and one that is ultimately a dynamic method of evaluation that celebrates choice whilst being guided by experience.

DIGITAL DESIGN

We additionally live in a time where hard data is becoming increasingly ubiquitous and easily accessed. This not only affords the architect a vast source of readily available information, it has also enabled us to devise numerous computational tools with which to process data and apply explicit parameters in order to meet the requirements of precisely tailored designs.

Computational design has propelled the profession almost inestimably in recent years and has brought about vast changes to the practice of architecture. In particular there has been much excitement surrounding the adaptability of form enabled by the use of digital tools, and this continues to be the case today. However form-making is no longer tenable on its own in the context of an expanded architecture. It is essential that transformative computational processes enable a more intelligent architecture. Digital design as it is applied today is therefore – and is required to be – the result of adaptive processes.

Through engaging with all of the parameters contained in a project brief we are now in a position to give architecture a new expression. We can engage the computational to include and process data that is specifically related to parameters garnered from multiple sources and to tailor this information to the specificities of the project at hand. What is of most importance, however, is the way in which this knowledge and data are combined in the parametric and the influence that this adaptive information has on all architectural ingredients: technical and constructional systems, spatial constructs, integrated sustainable solutions, programme organisation, materials and, of course, form making.

Considerable developments in design and production techniques have also been brought about by the application of knowledge garnered in analytical phases and the linking of this to technical data applied in later design stages. In a future that seemingly promises increased levels of available data and knowledge along with inevitable new tools to process this information, if we ourselves adapt accordingly, we will be in a position to create a more intelligent, responsible and performative architecture.

DESIGN KNOWLEDGE AND RESEARCH

However, if computational tools are to hold the responsibility of calculating and correctly proportioning vast amounts of relational information, they of course rely on the input of relevant data. So how does the practice of architecture set about acquiring this specific knowledge, and how does it organise itself to not only have vast stores of potentially relevant knowledge at hand, but also to generate and share this information? If we understand that knowledge generates further knowledge and that knowledge-sharing is essential for co-creation and innovation, then it is essential that today's architect puts systems in place that enable these mechanisms to operate as fluidly as possible. This I believe also re-

quires a shift in focus from approaching projects as singular endeavours with their own specific problems, to placing research in a position of key importance within the practice. By so doing, we create a serial effect within our work and witness a more efficient application of knowledge and a continual refinement and evolution of our design thinking and practice.

It must be added, however, that we do not and certainly should not limit ourselves merely to the research or knowledge that we ourselves undertake or generate. It is equally essential that we look outside of the profession for all that will assist us in optimising our work. We need to spread a wide net that captures relevant knowledge from a broad range of sources, from the sciences to the arts. We need to have in-depth knowledge of the social sciences, scientific innovations, even of new theories of time and space – in short, everything that is scientifically understood to affect the way we live and perceive the world around us.

At the same time we need to garner knowledge about the 'softer', more subjective side of human experience: art, music, literature, film – the list goes on. It is a big task, but in today's society it is also an essential one. If designers or architects are to fulfil a relevant role and continue to make a substantial contribution to how the physical world is experienced, then we need to continue to build on existing knowledge from the past, whilst thoroughly researching and engaging our design thinking with all aspects of how we live our lives today.

APPLYING KNOWLEDGE IN PRACTICE

So what happens when we reach a point where we have data, we have knowledge and we have external references from multiple and varied sources? What happens when we are fortunate enough also to have the digital tools to process and adapt this information to an exacting level of precision throughout all design iterations and adaptations and which can communicate all changes at the blink of an eye to all actors involved?

I propose that what is then required of the architect is an extremely strict editing process – because lest we forget, we also have a design brief, financial constraints, environmental concerns, contextual and typological considerations; in short, the basic ingredients of any project. But it is to this mix that the designer is required to provide 'added value'. It is here that the architect can apply a trained form of judgement and choose to incorporate only the most cogent ideas and concepts in order to arrive at a design that fulfils all requirements on a pragmatic and functional level, whilst additionally incorporating spatial constructs and experiential effects that determine how the building is ultimately perceived and experienced by the user.

Here - in a seeming contradiction to what may appear to have been suggested above – I believe that it is in fact imperative to be reductive in our approach and limit ourselves to a small number of key details in our designs, to 'big details'.

Whilst it is essential to garner all the knowledge possible during the research of projects, it is equally essential to integrally incorporate multiple functions and effects as efficiently as possible into the final design. We must not make the mistake of interpreting expansion to mean that architecture becomes overly complicated, intricate or laden with excessive detailing. Instead we have to be ruthless but innovative in our editing and assimilating processes and incorporate multiple architectural ingredients into a small number of large, integral gestures. By so doing, we can create a form of multilayered efficiency that, although seemingly simple, in fact requires a highly complex degree of design thinking and decision making.

The void is perhaps a pertinent example of a big detail that holds significant potential to incorporate and influence multiple facets within architecture, but which to date has for the most part only been acknowledged for its capacity to affect an experiential response. The interior architectural void is of course, in its most literal sense, an empty space devoid of matter; a vacant, hollow vertical expanse, if you will. However, if we instead approach the void as a very present and essential 'negative' space, much like in a painting, then the void can in fact be appropriated and serve to define and compose all that surrounds it. With such an interpretation, architects can utilise the void to its full capacity and discover its potential as a device for the management of numerous essential concepts and fully integrated organisational solutions within buildings. In terms of organisation, the void can be designed not only to manage the infrastructure, routing, circulation, view corridors, interior climate and crowd control, but can also determine the massing, load-bearing and even exert its influence on the façade design. In addition of course, the void can influence perceptions of scale; it can create double readings and in so doing, it can encourage the desire for further discovery. In short, essential elements of buildings can be brought together and integrally managed by this one large yet seeming "empty" detail.

THE 'SOFTER' SIDE OF THE PROFESSION

As alluded to above, design thinking cannot be carried out purely by rationally biased or computational thought processes alone, as this would introduce a one-dimensional method of communication towards the user. If the goal of design, beyond the purely pragmatic, is to guide how the work will be perceived and experienced by the end-user, the architect has to assimilate and synthesise the abstract and the figurative within the design process in order to create buildings that are operative on multiple experiential levels.

Throughout history the subtle but conscious (or semi-conscious) exploitation of visual perception was for the most part the prerogative of the artist. If the objective of a work of art is primarily to communicate, then the artist must possess a cer-

tain understanding of how to manipulate the potential readings of his or her work; how to effect an immediate psychological, subjective receptivity whilst simultaneously trigger a more engaged cognitive response. In so doing, the artist either guides the viewer towards an understanding of the concepts and ideas behind the work, or conversely elicits individual experiences and interpretations. The artist could be said to typically first engage the viewer by means of visual intrigue, but once this has been achieved, an immediate merging of secondary cognitive reasoning and associative, metaphoric and subconscious thought processes occurs. And it is this assimilation of thought processes that results in the eventual individual interpretations of the work.

In architecture, however, we have to add functionality to this equation. Yet, by merging the abstract and the figurative, the hard and the soft sides of the profession, we can enrich architecture greatly and allow for unexpected moments of innovation and creativity within the design process. As a result, we can introduce elements of illusion and ideas of the oblique into the psychological effects of transformative spaces. Spatial experiences and multi-representational effects can emerge by understanding and employing merged thinking and design techniques. In this way architecture can effect paradoxical readings and provide complex spatial experiences.

The contemporary media façade can perhaps provide a fitting illustration of how scripting technology, material experimentation and abstraction can embed knowledge by means of an adaptive approach to design and produce an architecture that is informative, rather than merely form-driven.

A common misconception of the media façade is that it is simply a contemporary interpretation of the "Times Square Effect", whereby ubiquitous individual neon advertisements are replaced by large-scale LED media screens; screens which continue to display high definition advertising content whilst dematerialising the architecture that supports them and thus rendering architecture two-dimensional and somewhat irrelevant once daylight fades. In recent years, however, architects have conscientiously investigated the further potentials of the media façade and its capacity to form an integral part of an overall architectural strategy and language.

Yet, oftentimes the demand still remains for the facilitation of commerce through high density pixilation in order to communicate recognisable branding within the building's skin. However, the architect can approach this communication medium as an opportunity for the practice to further embrace art, creativity and abstraction and, in so doing, present an alternative, holistic approach to branding. The challenge is then to adapt and integrate an abstracted interpretation of the language of media-generated imagery into the inclusive concept of the building and thereby generate public constructs, cultural objects and urban effects. By working in collaboration with lighting experts and engineers, we can experiment with, innovate and invent integral and site specific solutions and, in so doing, paint and clothe buildings in ways that express their meaning and function through the abstraction of accepted advertising parlance. We can thereby create possibilities for art and commerce to be housed under one and the same roof.

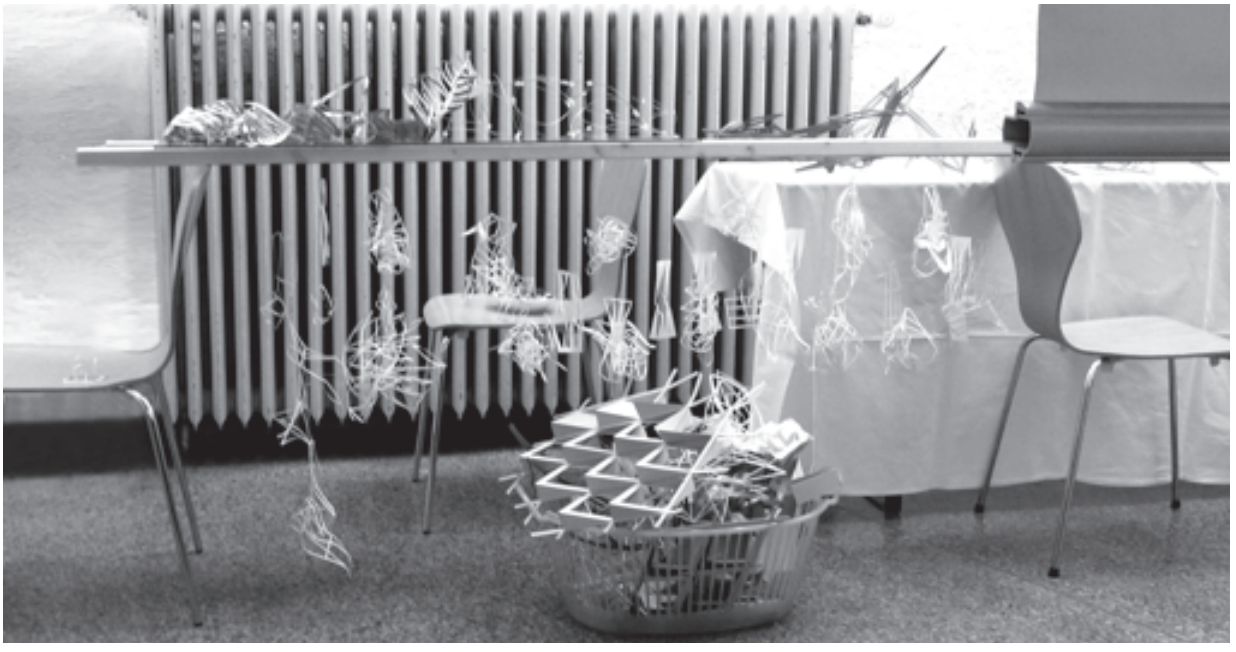
TO CONCLUDE

Although the expansion of the profession calls for a form of trained judgement and an understanding of the psychological effects and readings of space, it is important to note that this is not in any way formulaic, nor does it provide some kind of optimum or infallible blueprint for architecture. What it encompasses, however, is a flexible form of analysis, pattern recognition and choice-making related to how we guide and direct information in design. The broad spectrum of information and knowledge available to the architect today ultimately requires the facilitation of a critical approach and the editing of all parameters, irregularities and values in order to facilitate new relational choices which would inevitably - through acquired skills – seamlessly combine all elements needed to create a design that ultimately simply "works".

The question then arises: can such an approach be taught? Or does it remain the privilege of the seasoned practitioner with years of experience and numerous built projects under his or her belt? I would argue that it can and should be imparted to future architects. Whilst the unforgiving necessity of experience cannot be denied, on a basic level what is required is the ability to recognise the changes and the abundance of new possibilities within the profession and to act upon these. Furthermore, architectural theory has always been seen as the most important aspect when learning about the practice, however if you do not educate about the latest scientific developments in all their complexity and diversity, then you are not teaching how to design. Yet, in order to guide the student in the process of design, not only is it necessary to impart knowledge about and encourage research into the hard side of the profession, it is also essential to train students how to judge, select, edit and combine both hard and soft knowledge and to apply these creatively and intelligently in their designs.

NOTES

1.) Charles Leadbeater, 'Digital Innovation for Social Change', Financial Times, Nov 8th 2013. http://www.ft.com/intl/cms/s/2/64203e92-4747-11e3-b4d3-00144feabdco.html#axzz2l66ctySB.



JOHAN BETTUM

HOW TO COLLECT FRAGMENTS

In reviewing the exhibition of Daniel Libeskind's set of drawings, *Chamber Works*, at the Architectural Association in London (1983), the British architectural historian and theorist, Robin Evans (1944-1993), notes that ' [...] fragmentation has to be figurative because only things with a constitution can be broken'. [1] While Evans' subject matter was Libeskind's complex drawings and their lack of any clear or even tentative figuration within the space of the drawings, Evans' observation also has a general tenor. From it we may infer that only that which can be comprehended as complete and has a form, can be divided. Fragments presuppose a totality.

Parts and wholes are everywhere, and in architecture not only in the physical form of buildings. While architecture and its production are growing increasingly complex in organisation and detail, it relies more and more on enclaves of highly specialised knowledge and expertise to handle and execute the massive amount of information that relates to building and construction. While this represents a fragmentation of architecture as a discipline, Evans' observation ironically suggests that it also upholds it, simply through the relation of parts to a whole.

ARCHITECTURAL PARTS

That architecture over the last couple of decades has changed is beyond question – and for obvious and well known reasons. The massive influx of digital technology into every nook and corner of society constantly gives rise to new conditions for the production and processing of information in architectural design, material and building component manufacture as well as construction. Moreover, and partly linked to the ubiquity and powers of digital technology, improved and new materials and material systems have extended the range and intricacy of materiality and all forms of infrastructural and service systems (light, heating, water and sanitary sewer systems, etc.) available to architecture. In consequence, architecture is given over to an increased specialisation of expertise – be it theoretical or practical. While specialisation of knowledge and skills in building and construction is old, the increased complexity and sophistication of each part of architecture and architectural design present novel conditions simply due to the amount of information qualifying each input and stage of the design, manufacture and construction processes. Particularly when handling larger projects, architecture becomes the medium for vast flows of information

Graduation Ceremony 2013

that must be filtered, re-worked, coded and passed on to the next stage in the process.

In addition to transformations at the hands of technology, architecture has also become increasingly exposed to societal, political, environmental and economical pressures. Thus, the partitioning of the architectural discipline into specialist enclaves takes place in response to the heightened complexity of its production, social expectations and demands, environmental and financial considerations, industrial efficiency and many other factors. These weigh on the architectural design process in an unprecedented manner. The fluxes of these influences and their call on architecture cannot be underestimated; they have rendered the discipline a nervous organism with its protagonists often doubting or altogether ignoring the value of the discipline's history and epistemology, not to speak of its contemporary relevance and power. However, the same doubt also attests to the discipline's sensitivity and thus reflects architects' sense of responsibility and awareness of the exacting contexts in which they work.

Ironically, the basic problem is well illustrated by the condition of a fragmented digital hard disk. Frequent use of a disk naturally leads to fragmentation, by which the total information that comprises the file is located and stored in non-contiguous clusters within the space of the disk. This leads to inefficient use of the storage space, reducing its capacity and often performance – partly because the drive must search through different parts of the disk to put the single file back together. Thus, fragmentation slows down the speed at which the data is accessible to the user. However, in architecture fragmentation shall not only be understood in terms of potential reduced efficiency, it may also lead to reduced efficacy – which here means a reduction of architecture's capacity to produce desired effects on disciplinary terms, that is within its own framework of references. In other words, fragmentation of the discipline may have ramifications for the discipline itself; it may lessen its capacity to address, devolve and re-originate disciplinary problems.

Eventually, a bigger question becomes how to address architecture when the basis for doing so is already fragmented? In what language and on what terms does one address architecture after the digitalisation of its work processes and other factors have produced a "Tower of Babel Effect" on the discipline or whatever is left of it? How does one stage the possibility of innovation when there are only vague, perhaps loosely communicated and poorly understood premises for new ideas? Or: How does one avoid the trivial, standardised, cliché and merely economically efficient solutions dictated by a market place which in turn is fed by isolated packages of information that used to belong to a whole but now, so to speak, undergo forced integration by the powers of computation? The problem used to be extrinsic to the discipline, primarily affecting how architects would communicate and work with participants from other disciplines and interest groups. Today, however, it also runs as a viral effect through the discipline itself. Thus, we ask, how do architects speak to architects? When and how do the expertise and input from different participants and various disciplines in a project setting become integrated with one another to give the design process the needed momentum for architectural innovation?

Study Trip

Now, if 'only things with a constitution can be broken', there could be a way to trace our way back to the original outline of the problem. That is to say, despite the emergence of eddies that harbour specialists with esoteric yet crucial architectural expertise and knowledge, there would be an overall figure to it all, a figure in whose soothing but encompassing shadow all these specialists work. The figure, of course, is architecture, not in the form of buildings but as a discipline, a body of knowledge and expertise generated in an accumulative fashion over centuries, replete with histories, epistemologies, codes, formulas and rules. It may find itself in the throes of change, being challenged and torn by forces both from within and outside. This, however, will not be the first time. And the biggest question of them all is eventually what to do next? That is, how to educate tomorrow's architects in the face of the "Tower of Babel Effect" that shakes the discipline's foundations?

PARTS LOOKING FOR A WHOLE

The Tower of Babel, whose story is told in the bible as the vain human endeavour to build a city with a tower that would reach into heaven, was so called because 'babel' is the prattle of many. As God gave the builders different and confused languages to punish the vanity of the project, they could not communicate, dispersed and stopped building. Today's fragmentation of architectural knowledge and expertise may not be quite as dramatic. Yet, the role of language is the same: it is the principle means for communicating and forming relations with others; it is the vehicle for the transmission of information and knowledge, coded packages of information that are meaningless if they remain isolated slivers of a whole. Language forms the crux of a discipline, furnishing it with the terminology, the expressions and parlance that define the body of knowledge that is to be transmitted and executed.

The moment when language cannot provide a modicum of certainty, when meaning is given to relative approximation rather than a more or less precise outline of possibilities, its productive role is reduced to serendipity. Notwithstanding the constant flood of information in printed and electronic media – rather reinforced by it – contemporary architecture's fragmented constitution is particularly vulnerable to disintegration when a transmissive and therefore potentially unifying language cannot supply the connective tissue and cohesion between architecture's numerous parts. Moreover, the role of language is particularly important for architectural design whose nature is characterised by conjectural thinking and practice. As an unproven proposition, a conjecture relies on its definitional terms in order to have relevance; it must be established on 'reasonable' grounds and beyond a given level of doubt for its content to be applicable within a critical context.[2] The conjectural comprises a specific logical procedure that underlies processes that are neither singularly deductive nor inductive. It calls for the development of intuitive ways of knowing about wholes as well as analytical ways of knowing about parts, which, if *not* a science of qualities, nevertheless takes into account the qualitative as much as the phenomena that constitute the world. Hans Blumenberg, the German historian, argues that the development of conjectural argumentation, 'which provides a collection of examples of both sufficient and insufficient proof – [is] an exemplary "rational doctrine of the probable".'[3]

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Hence, conjectural thinking and practice thrive on variation and change; they comprise a form of speculation that first and foremost is projective – that is, bent on the future. They present a form of constructive rationality that accomplishes the creation of unimagined relationships by gathering, rostering and exploiting parts, making leaps of rational faith to generate new wholes. Architecture, both characterised by and equipped with the capacity for conjectural modes of operation, is therefore well furnished to meet with the contemporary forces of change. As technology sweeps across the eddies that hold the ranks of specialists, while public and private interests weigh on the discipline in both superficial and profound ways, architecture has the capacity to project itself into the new productive realm as the ultimate machine for the "rational doctrine of the probable".

The challenge of understanding and gathering its parts presents architecture with a momentous task. If architecture could do this now, it would be a significant historical moment, no less, but one that has its historical precedents. For instance, when the Parisian École Polytechnique was founded in 1794-95, in the wake of the French Revolution (1789–99), the school was established in direct consequence of subtle yet profound changes that had taken place since the Enlightenment. 'Setting up science as a practical science,' Ulrich Pfammatter explains, 'occurred during the era of the Enlightenment by philosophers and scholars who not only wrote treatises and worked in scientific academies, but also took part in technical and proto-industrial projects that were part of and foreshadowed a practical re-shaping of the society and state.' A distinguished group of leading individuals (among them d'Alembert in France; Franklin and Jefferson in America; Humboldt in Germany) 'considered the development of the sciences and technical arts to be the motor for improving the general welfare and individual happiness of free and equal citizens within the framework of a democratically organised state, which was to be supported by public education.' Emergent military needs and technology were assimilated to provide an educational vision within a broad social and cultural context. Thus, '[the] modern architect', argues Pfammatter, was 'brought about [by] the invention of a systematic and universal teaching model that was to serve the general public, [manifest in] its first institutionalisation…'[4]

However, the École Polytechnique was founded more than two hundred years ago, and unless one pines for bygone days, universalising models and wholes belong to the past. Ideas of fixed and totalising regimes of knowledge and composition are contrary to the differentiation between parts and their relations that technology has allowed us to unearth by drilling into realities and modes of operating at ever smaller scales. We are no longer pursuing images of static and inviolate wholes; we are dazzled by the minute yet explosive flows and dynamics that all these parts stage and effectuate. We have learned how these parts constitute natural phenomena and organisms and how artificially processed material elements relate to one another through a minuscule, sub-molecular exchange of forces. Thus, we have come to assume that architecture can plan better buildings for the future by tapping into these micro-cosmoses that make up the wholes. Yet, while we to some degree master the technology, we have few ideas for how to accomplish this