

MODELLING DIAGRAMS

THE MODEL IN THE DESIGN PROCESS IN CONTEMPORARY EUROPEAN PRACTICE

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EXECUTIVE SUMMARY

The physical model is one of the most approachable forms of architectural representation. It possesses a universal appeal which cuts through architectural jargon and goes directly to the essence of an idea. While the model is relevant to the architectural community, it also possesses a certain magic and mystery which plays on the imagination of children and adults alike, no matter what their interests or occupations. Despite this, it has been my experience as a practitioner that architectural modelmaking has sustained a lack of research and critical discussion in Australia.

An investigation of the long-established tradition of innovation and experimentation with models in Europe can act as a springboard to revitalise a more vigorous attitude to this topic. The 2007 Byera Hadley Travelling Scholarship for Architects allowed me to undertake such an investigation. In September and October of 2008 I travelled to Europe in order to interview leading architects, modelmakers, and educators about the integration of the model into their design process. Through these interviews I gained an insight into the behind-the-scenes workings of some of Europe's most successful offices.

This report summarises my research by exploring the changing role of the model. With increasing complexities constraining the profession, and increasing pressure for speed in all aspects of practice, what is the future of the physical model in a digital world?

The report is in three parts. The first part explains the methodology for the research undertaken. It outlines the focus areas for the conducted interviews. The second part summarises the interviews by grouping the interviewed offices by size into small, medium, large and extra-large (S, M, L, XL). This is a direct reflection of my observation that the types of models produced are often linked to the size and resources of any particular architectural office. Initially the offices were to be grouped by country or location, but it seems the globalised nature of practice and the proximity of countries within Europe have led to a blurring of cultural boundaries and the reduction of any sense of regionalism in the modelmaking process. The organisational pattern of S, M, L, XL was first made popular by Rem Koolhaas in his publication of the work of OMA, but it also recalls the importance of scale within the practice of modelmaking. The final part of the report looks at how the traditional notions of craft in architecture are shifting to incorporate or compete with new technologies. It suggests directions for the future and reflects on how we can progress the practice of architectural modelmaking.

The report is interlaced with photographs of models taken by the author during the interviews. Full transcripts of all the interviews have also been included in the appendix.

Additional to this report, the results of this Byera Hadley Travelling Scholarship will include a Tuesday Night Talk for the Australian Institute of Architects in May 2009, as well as an exhibition focused on making the modelmaking process more approachable to the general public. The exhibition is to be shown at Customs House to coincide with the Sydney Architecture Festival in October 2009.

INTRODUCTION

The making of models is what first attracted me to the architectural profession. The creativity involved in making something physical with one's own hands perfectly brings together the expression of a theoretical thought process and the 'real' materiality of creating architecture. Similarly to many architects, I started my explorations with LEGO and moved on to various other types of models at a young age. My interest continued to grow throughout my tertiary studies, architectural education, and into practice. I have always attempted to explore and develop new ways of constructing models and learning from the process.

The models I am most interested in are not the professionally created ultra-realistic presentation kind. Instead, what I find most relevant are the expressive and exploratory process models which blur the boundaries between diagram, sketch and artwork. When the model becomes a medium for pause and reflection, and a tool to progress an architectural idea, a design stands to benefit a great deal. The Swiss architect Peter Zumthor beautifully describes the potential of these kinds of models: "I don't make a big myth of drawings. A real representation of something would destroy it. The best images of something not yet built are the ones that give you a broad, open feeling, like a promise..."¹

I believe that even though architectural models are among the most commonly used tools of design, there seems to be a lack of research about the theory and practice of modelmaking. The author Bradley Starkey sums up this issue by observing that: "Architects theorise their work through the practices of writing and drawing, but they largely ignore theorisation of, or through, the architectural model. Whilst architectural drawings are often discussed in relation to ideas, architectural models are more likely to be discussed in relation to matter. Architectural models have tended to escape theoretical consideration because they have been associated with matter, manual labour and craft, and therefore dissociated from the intellectual"². I also believe there is a lack of open discussion about the more pragmatic realities of making models in today's office environment.

As a member of the architectural profession I am aware of the many pressures imposed upon practitioners. Fees, budgets and deadlines often dictate the way a project will be run. Unfortunately, this has a negative effect on the use of models throughout the design process. As we leave the University environment and enter the realities of practice, the presentation or 'after the fact' model begins to take precedence over the study model.

While remaining a bastion of creative freedom for the architect, the model also holds great potential as an exploratory tool for testing ideas about Environmentally Sustainable Design (ESD). At University we are encouraged to use a Heliodon, timber workshop or wind tunnel to study models from an environmental perspective. These explorations seem to fall by the wayside as we enter professional practice.

Recent exhibitions such as '*Supermodels*', organised by Sam Marshall with the support from the Byera Hadley Travelling Scholarship, as well as the Abundant exhibition at last year's Venice Architecture Biennale have been positive steps towards exposing the wider community to the variety of models created by local architects. In addition to this, recent publications such as Karen Moon's '*Modelling Messages – The Architect and the Model*' or Albert Smith's '*Architectural Model as Machine: a new view of models from antiquity to the present day*' have helped summarise the history of the model and renew interest in the topic. Perhaps the most significant recent piece of research focused on the model within Australian architectural practice has been the three-year *Homo Faber* project conducted by academics from RMIT and the University of Newcastle as part of an ARC Discovery Grant.

The unique nature of the Byera Hadley Travelling Scholarship allowed me to approach this topic from an overseas perspective, and prompted my proposal entitled "*Modelling Diagrams – the model in the design process in contemporary European practice*". I chose Europe to conduct my research for two main reasons. The first is the long tradition of modelmaking within European practice. The second is the fact that the geographical and cultural diversity of Europe has led to a great concentration of varied and innovative approaches to modelmaking.

Today the future of the hand-made model is at a somewhat uncertain threshold. Emerging rapid prototyping technologies such as CNC (Computer Numerical Control), SLA (Stereo lithography), SLS (Selective Laser Sintering), and 3D Printing are producing complex geometries and delicate features much faster than traditional modelmaking ever could, and forcing architects to re-evaluate the role of the model.³ The digital era has already changed the role of the model and many of the craft-based relationships between design and construction.

The London-based architect Patrick Lynch very clearly summarises the drastic change that has occurred in the role of the model throughout history. As his favourite model photo he puts forward a 1:20 facade model of the Church of San Lorenzo in Florence by Michelangelo (**fig. 1**).



Next to this he places a photograph inside San Lorenzo with interiors by Brunelleschi (**fig. 2**). According to Lynch, “in these photos you can see that there is a direct correlation between how the model was made and how the building was made. That is because in the 16th Century the only thing architects were paid for was their 1:20 model they made for a competition. That was called the *modello*. And then there was the *modano*, which was a 1:1 mock-up of certain parts of the building. So rather than drawing details, you would make a typical column capital and a typical column base at 1:1, and you would sell that to the contractor. Then he would basically reproduce that on demand.”⁴ This type of approach could not be further removed from the process of creating a digital model in the abstract space of the computer, and simply pressing ‘print’ to allow a 3D printer to produce the rather predictable result (**fig. 3**).

This report captures a snapshot of the role of the model within the context of the current architectural climate, and asks what lessons can be taken away for Australian architects. The geographical isolation of Australia means that it is more difficult to share and explore the ideas of one’s overseas peers in a direct and hands-on way. I trust the research contained in this report will shed more light on this at once universal and inaccessible topic.

RESEARCH METHODOLOGY

In September and October of 2008 I travelled to selected European architectural offices in order to conduct interviews and investigate the way the model is integrated into the design process.

The offices were chosen on the basis of providing a broad cross-section of architects from small up-and-coming studios to large, established and very well-known firms. The 'material' nature of models meant that they needed to be seen and handled in person, allowing a better interpretation than can be gained through images or text in printed media. The audio of the interviews was recorded and many photographs and videos made of the work discussed.

The topic turned out to be far broader than I originally expected, covering a whole gamut of architectural issues. Most interviewees were very candid about the behind-the-scenes processes of their offices, offering insights that cannot be gleaned from usual promotional material. The architects I spoke with were enthusiastic about this kind of research, and many have stayed in contact after the interviews.

The questions for the interviews were split into six areas of interest. These were kept generally consistent but tailored to suit my prior knowledge of the working methods of the architects involved. The main issues discussed were the following:

1. **WHAT, HOW AND WHY.** My first area of interest concerned pragmatic questions about what types of models are made, as well as where, how and who makes the models. I was especially interested in the range of scales and materials used, including some of the more unusual examples. What are the different ways models are used in the design process? Can the models be organized into types or categories? Do the architects seek a consistent language in the modelmaking or does this vary with each project?
2. **CONTEXT + LOCATION.** My next questions were to do with the relationship between the locations of the various offices and the way models are made. Are there any ways in which practicing in a particular city may affect the design process? Is there any regionalism in how models are made, or have globalized trends taken over? Are there common approaches to modelmaking in the work of the architect's peers? How does the site or context of each project change the approach to modelmaking? Where did the directors study architecture? What are the similarities or differences between their education and the way their practice makes models?
3. **DIGITAL / ANALOGUE.** The next series of questions explored the way digital technologies are affecting the analogue model. How are traditional methods competing with, or developing alongside, CAD-based modelling technologies? How has the use of models changed or evolved since the architects began practice? If the firms use both physical and digital models, what were the differences in their making and use? To what extent do the offices integrate developing techniques such as rapid prototyping and laser-cutting?
4. **ENVIRONMENT & STRUCTURE.** This part explored the use of large-scale models to test structural and environmental strategies. Are models used to test ideas of materiality or texture which cannot be done with digital models?
5. **CLIENTS, PUBLIC AND PLANNERS.** How do the architects involve clients in the concept modelmaking stage? How does their client's understanding of physical models compare to that of drawings or digital models? Are architectural models viewed with interest and actively used to promote ideas in the community? What is the relationship of local planning and building authorities to models?
6. **INTO THE FUTURE.** The final part asked how the making of models would be continued into the future. Do the offices have any systems in place to consciously explore new ways of using models? How do they see the role of the model changing?

The research conducted through the interviews comprises photographs of more than 500 models, over 15 hours of interview audio, as well as many videos. Also gathered was information regarding office structures, procurement methods, and the day-to-day management of projects.

For the purposes of this report the office sizes are based on approximate staff numbers at the time of the interviews: up to 10 staff = Small; 11-20 staff = Medium; 21-40 staff = Large; more than 40 staff = XL.

The following table provides a chronological summary of the architects interviewed.

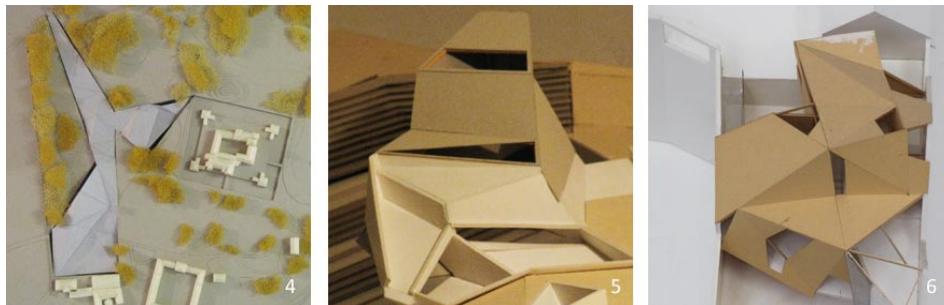
	Office	Location	Date	Interviewee	Position
1	XDGA	Brussels BE	3 Sep 08	Lieven de Boeck	Architect/artist
2	Bolles + Wilson	Munster DE	5 Sep 08	Jan Rinke, Fabian Holst	Press Contact Architect
3	The Next ENTERprise	Vienna AT	23 Sep 08	Claudia Cavallar	Architect
4	HOLODECK architects	Vienna AT	23 Sep 08	Marlies Breuss Michael Ogertschnig	Directors
5	Delugan Meissl Associated Architects	Vienna AT	23 Sep 08	Martin Josst	Partner
6	Lynch Architects	London GB	25 Sep 08	Patrick Lynch Naomi Shaw	Director Architect
7	Nigel Coates	London GB	26 Sep	Nigel Coates	Head of Architecture, Royal College of the Arts
8	Adjaye Associates	London GB	26 Sep 08	Anthony Davies	Artist/Head of modelmaking workshop
9	Atelier Jean Nouvel	Paris FR	1 Oct 08	Jean-Marc Kurczewski	Architect/Head of modelmaking workshop
10	Capella Garcia Architects	Barcelona ES	7 Oct 08	Miquel Garcia	Director
11	Barozzi Veiga Architects	Barcelona ES	7 Oct 08	Fabrizio Barozzi Alberto Veiga	Directors
12	EMBT Miralles Tagliabue	Barcelona ES	8 Oct 08	Sonia Blasco	Architect/Head of communications
13	Berrel Kraeutler Architects	Basel CH	13 Oct 08	Maurice Berrel + Raphael Kraeutler	Directors
14	HHF Architects	Basel CH	14 Oct 08	Tilo Herlach	Director
15	Burkhalter Sumi Architects	Zurich CH	15 Oct 08	Christian Sumi	Director
16	J. Meyer H.	Berlin DE	29 Oct 08	Jan-Christoph Stockebrand	Architect
17	Schultes Frank Architects	Berlin DE	29 Oct 08	Axel Schultes	Director
18	Flores Prats Architects	Barcelona ES	Via Email	Eva Prats Ricardo Flores	Directors
19	Coop Himmelb(l)au	Vienna AT	Ongoing	Isabelle Ost	Head of communications

INTERVIEW SUMMARIES (SMALL)

The Next ENTERprise (tNe), Vienna

The office of tNe is situated just outside the city centre in Vienna. It occupies the ground floor of a traditional garden courtyard apartment. An entry corridor separates the main office from a modelmaking space, where models adorn walls and lay stacked in every possible nook and cranny.

Models are an integral part of the design process for tNe. There is never a project without a model or series of models. Models of all types are made, but most commonly the starting points are models exploring the relationship between a site/landscape and a program. This approach leads to some degree of consistency in the language of the architecture expressed, namely that of complex geometries resolved from the very start to a great degree of accuracy (**fig. 4-6**). This shows the models always have a high degree of buildability in them, making them tools for testing *concise* ideas.



The scales of the models produced vary greatly. The main materials used are cardboard and foamcore. Colours are often used to distinguish programmatic changes. The largest and most time-consuming model in recent time has been a 1:50 model of the *Villach Swimming Centre*. Two student modelmakers had been working on this model since April, and were still nervously working away in clouds of cigarette smoke when I visited the office in September (**fig. 7-9**). The model incorporates LED lighting to highlight the path of water though the building.

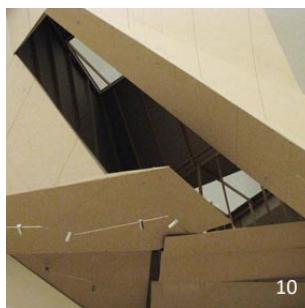


The directors and key staff of tNe studied in Vienna under architects such as Wolf D. Prix and Hans Hollein. The office also utilises digital models, which are constantly being reviewed and which help inform the modelmaking. Often parts of models need to be re-done on the fly to catch up with changes on the computer. The office does not believe in purely using the computer, or in utilising new technologies such as CNC manufacturing just for the sake of using them. They prefer a cultivated and thoughtful approach which they have had time to consider and reflect upon.

Because of the complexity of the form and structure of many of the firm's designs, the models are often used to help communicate ideas to engineers and other consultants. For the *Grafenegg Outdoor Auditorium* large 1:50 models were used to help in acoustic calculations and for working out cladding divisions (**fig. 10**).

Environmental issues did not figure heavily in the interview. Some comment was made about the slightly old-fashioned attitude of the general public in Austria to architecture, and the inevitable interest in the work of tNe due to the complex and expressive nature of their forms.

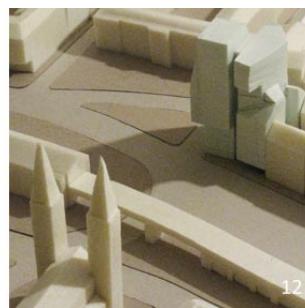
Further examples of the models produced are shown below (**fig. 11-15**).



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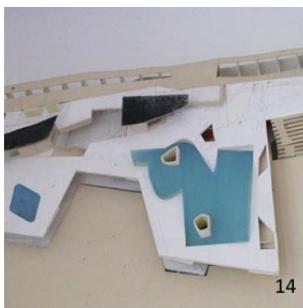
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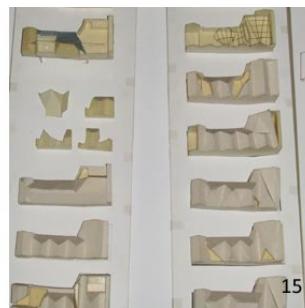
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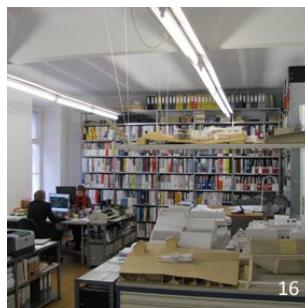
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HOLODECK Architects, Vienna

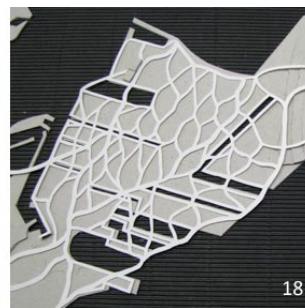
HOLODECK Architects are located in a grand courtyard building in the heart of the Vienna city centre. The architects refurbished the space to suit their needs. The office is bright and airy, with a small modelmaking room and many models on display throughout (fig. 16). The range of models made is varied, from 1:100 massing models (fig.17) through to large-scale urban competition models (fig. 18).



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The approach to modelmaking is certainly not consistent – often it is dictated by time constraints and the volume of work that needs to be produced. The office utilises the computer extensively in their process, sometimes choosing the digital model as the only kind used due to the speed it allows.

The two directors of HOLODECK come from different educational backgrounds, which perhaps contributes to their attitude of mixing the digital and the analogue. Both directors studied in Vienna, but Michael Ogertschnig also attended University in Barcelona where the focus was on the digital. Marlies Breuss, on the other hand, attended the Southern California Institute of Architecture, well known at the time for their physical modelmaking capabilities.

One project which demonstrates the range of modelmaking techniques utilised by HOLODECK when the opportunity presents itself is the *Urban Reflections Rooftop Apartment* project. The design was studied in a series of physical models which increased in scale as more detail was resolved (fig. 19-21).



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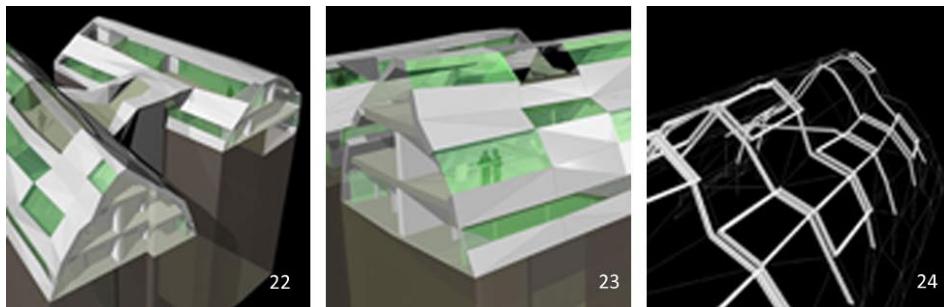


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At the same time, digital models were made to visualise the apartments in a different way (fig. 22-23), or to view selected aspects of the design such as the structural frame (fig. 24).



Another interesting technique often used by the practice is starting projects with a purely conceptual physical model which attempts to capture the client's dreams and aspirations, rather than being a direct architectural response to the brief. They believe they have not yet come across a client whose imagination was not captured by this kind of model. The practice is always very up-front about their architectural intentions with clients.

During the interview HOLODECK expressed their frustrations with the planning authorities in Vienna. They believe it is becoming more and more difficult to produce interesting work as building regulations are tightened and increasing responsibility placed on architect's shoulders.

The practice sees their current working methods continuing. Depending on the types of projects they work on, they would like to be able to spend more time on physical models in the future.

Lynch Architects, London

The London studio of Lynch Architects seems to be a direct reflection of their design philosophy and modelmaking process. The office occupies a rooftop addition to an existing shop, highlighting the practice's focus on issues of sustainability (fig. 25). The first and second floors of the building also contain an apartment for the family of practice director Patrick Lynch. Inside, the main meeting table is also the modelmaking space. The interior has a very detailed, highly crafted quality (fig. 26-27). Some of the details can be likened to a 1:1 test model of some of the practice's other designs. The space utilises plywood as the main cladding material for walls, floors and ceilings, as well as for an environmental control device in the form of sliding screens for the full-height glass walls.



The practice has a very involved and in-depth attitude to modelmaking. They believe in the model as a tool of design, which means it is often 'scruffy' and not perfect, much to the dismay of some of their peers. They are dubious about the digital and 3D printed models as expressions of an idea that do not carry the design forward. They believe the model is the most direct expression of architecture before it is built, and it allows the architect's naked eye to most honestly judge the success or failure of an idea.

Lynch Architects see the design process as an expression of the craft of architecture, and as such something that needs to be taught and passed on to new generations to continue architecture's role as a *profession*. It is interesting to note that out of all the offices interviewed Lynch Architect's website was one of the very few with a whole section dedicated to modelmaking.

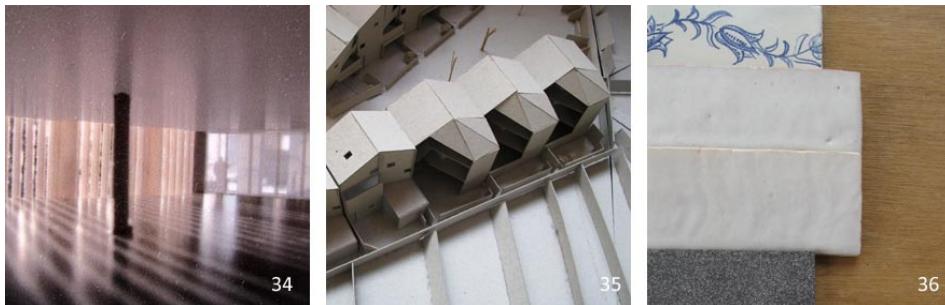
An exemplar of the practice's process is the *Greenwood Road House*. Models up to 1:20 in scale were made of the residence. This scale allowed the testing of details such as window frames and brickwork courses. The quality of natural light in the interiors was also explored, as were the proportions of the exposed green oak structural frame (fig. 28-31).



The finished result shows just how close the model is to reality (fig. 32-33).

The 2D documentation of projects goes hand in hand with the development of the models. Patrick Lynch is very critical of the planning system in Britain. He believes it strange that development applications still rely on a set of 1:100 drawings, which are not very well understood by many of the local Council's staff. This recalls many of the issues Architects in Australia also face. The architects often take their big scale models along to planning meetings. They actively use these models, and more often than not are able to push through designs that might otherwise have been stuck in the system for prolonged periods of time.

The practice believes issues of ESD are central to architecture. They place particular importance on the quality of spaces based upon natural light and ventilation. Many models are used directly to test window shading devices or show spaces at different times of day (fig. 34). The models range in scale from small massing studies (fig. 35) to 1:1 material sample boards (fig. 36).



Lynch Architect's frustration with the current 'star architect' system is apparent throughout the interview. They do not believe pure experimentation with digital techniques leads to real architectural outcomes. Instead, they choose to focus on issues of phenomenology, efficiency, and environment. Examples of recent design presentations in the office show sunlight studies, ventilation and shading strategies, as well as the testing of structure and materials efficiency to ensure money is saved in the construction phase.

Patrick Lynch does not believe architecture in Britain is very progressive, and does not agree with the approach of some of the local schools of architecture such as the Architecture Association. He believes they have a tendency of "forcing students to become geniuses based on their ability to create fantastic forms in the computer."⁵ The firm does not often use 3D printed models, although they are open to advances in technology.

Lynch Architects question the perception that something is necessarily new and progressive because it was made with new technologies. They will continue building their 'scruffy' cardboard study models and testing ideas at large scales to ensure a close connection to the craft of putting buildings together. They will embrace new technologies as long as they help with the design process, and keep learning and progressing. Further examples of the models produced by Lynch Architects are shown below (fig.37-39).



Estudio Barozzi Veiga (EBV), Barcelona

The young Italian/Spanish studio of Fabrizio Barozzi and Alberto Veiga occupies a small ground floor space in a typical courtyard building centrally located in Barcelona's famous street grid. Theirs is a very interesting example of a very rapidly up-and-coming office, just starting to make it onto the world scene. Their success is mainly due to some significant competition wins, among them the recent *Philharmonic Hall in Szczecin, Poland*, currently in documentation stage.

Due more to necessity than choice, the practice currently has a very pragmatic approach to making models. When they first started the studio, models figured much more heavily in their design process. Today the realities of needing to document large complex projects with relatively few staff mean that there is little time left to use this tool.

According to the directors their architecture attempts to solve as many problems as possible with the simplest gesture. Their favourite quote from the Spanish architect Alejandro de la Sota Martínez is, "One material for the models, two materials for the buildings..."⁶ This is quite apparent in the examples of their models, most of which are white and very pure in their expression of form (fig. 40-42).



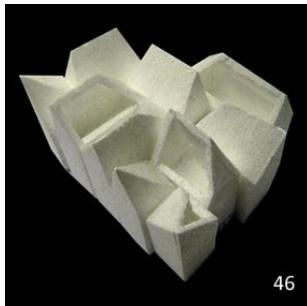
The family background of one of the directors is in woodwork. The family has a furniture business, which has allowed the making of beautifully crafted timber objects in the past (fig. 43). Due to recent time constraints, renderings are now more often used for competitions. These images are sometimes combined with models (fig. 44-45). EBV believe that often renderings help the viewer to place a building on a site easier than trying to understand the more abstract nature of the models.



The architects make a very interesting observation about what they refer to as the new 'Madrid Style' of architecture, which places great importance on drawing and the complexity of presenting a plan. They put forward as one of the proponents of this style the Madrid firm of Izaskun Chinchilla Architects. This new approach seems to be quite the opposite of what Estudio Barozzi Veiga is trying to achieve with their clean, crisp expressive forms.

The directors end the interview by stressing the point of the speed allowed by the computer and the reality of not having enough time to work with the physical. They hope to expand to larger premises as their success continues, and set up a dedicated modelmaking space to test all aspects of their designs in model form in the future.

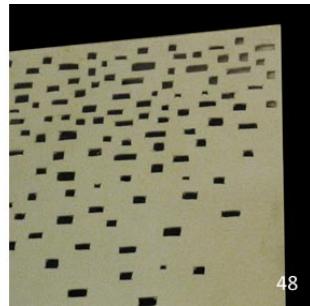
Further examples of the work of EBV are shown below (fig.46-48).



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Berrel Krautler Architects (BKA), Basel

The young directors of BKA started their practice after they won an international competition for a mountain lodge in Nevada. The model for this competition was very important. Since then they have always used models very heavily in the design process. The firm works from an ex car sticker factory, a simple, elegant, industrial-looking space near the centre of Basel.

The majority of their models are concerned with the materiality of architecture. They are mostly made in wood and are very sculptural in form. A small timber workshop is stacked high with timber off-cuts (fig. 49), while the models produced range from very rough form studies (fig. 50) to extremely detailed and accurate presentation models (fig. 51).



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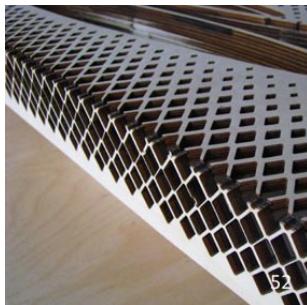


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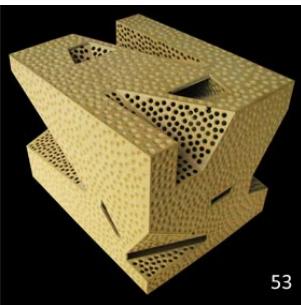


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BKA prefer the permanence of wooden models as opposed to materials like plasticine, where each option disappears as you develop the next one. The firm is very interested in combining new technologies such as laser cutting with more traditional modelling techniques to speed up some aspects of their studies (fig. 52-53). Whilst the architects have extensively photographed models for presentations in the past, they are increasingly using digital renderings in place of model photographs (fig. 54).



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For BKA models are used to test such a varied range of architectural ideas as the transparent skin of a temporary exhibition stand (**fig. 55**), the rough texture of a monolithic stone-like cladding for a mountain lodge (**fig. 56**), or the concept of a concrete facade where rough and smooth concrete textures interlace to reflect the surrounding landscape (**fig. 57**). The last idea was developed in partnership with a visual artist from Geneva.

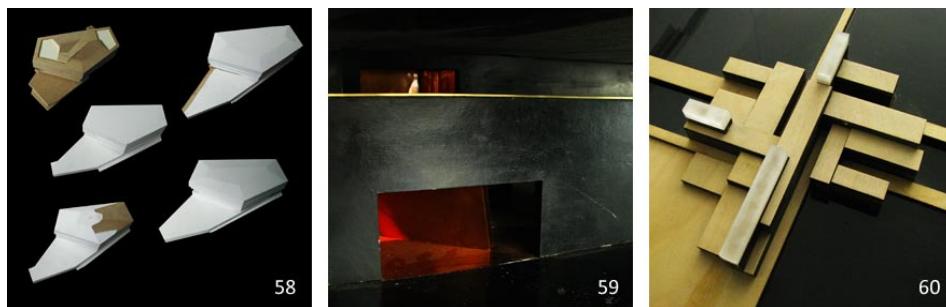


Like many of the successful architects in Switzerland, the directors of BKA studied at the ETH in Zurich. They comment on the large concentration of architects in Basel, as well as the positive influence the office of Herzog & de Meuron has had on the city.

One of the directors, Maurice Berrel, also studied architecture at the University of Newcastle in Australia. He makes an interesting point that in his experience in Australia the environment was a starting point for many of the designs, in contrast to Switzerland, where ESD issues come as a given and do not influence the architecture as directly. He describes the current Swiss architectural style as 'dense', meaning that it is intrinsically efficient in every way, including program, form and materials. ESD seems to be so ingrained in the culture of Switzerland that things like triple glazing are a standard dealt with on a day-to-day basis.

As the 3D rendering skills of BKA are getting better, they are relying more on digital modelling mainly due to the speed it allows. They like to use new technologies, and would happily add a laser cutter to their workshop if the technology became more affordable. They plan to keep developing both physical and digital techniques into the future.

Further examples of the models produced by BKA are shown below (**fig.58-60**).



INTERVIEW SUMMARIES (MEDIUM)

Capella Garcia Architects, Barcelona

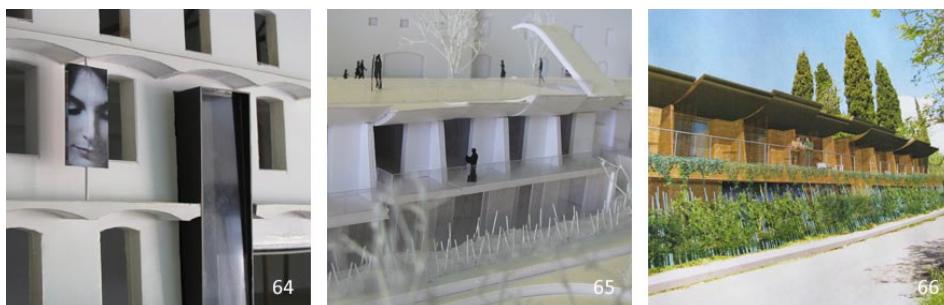
The office interior fitout of the office of Capella Garcia is very quirky, as is their website and many of their works. The architects have a playful approach to the concept stage of projects, allowing inspiration to come from many directions. For each project they choose a key concept, which can be as simple as a mushroom or as complex as a musical score.

The office sees both digital and physical models as useful in different ways. For the *Hotel Omm* the concept model was a torn piece of paper with sections gently folded out. This image has been al - directly translated to the building's facade (fig. 61). For another project - the *Hotel Diagonal* - the concept of a sheet of music called for design development on the computer to allow many options to be tested very quickly.

The office of Capella Garcia includes a small modelmaking space with full-time student modelmakers (fig. 62). Most often the models are made in white card/foamcore and pinned together instead of glued to allow change to happen easily (fig. 63).



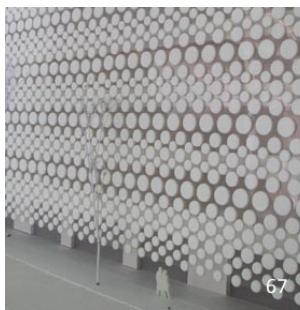
Because of the large number of historic buildings in Spain being re-used, many of the office's projects deal with interventions in existing sensitive sites (fig. 64). The use of ArchiCAD software for all documentation means that many of the physical models are often supplemented by rendered perspectives (fig. 65-66).



The architects choose to stay involved in all stages of projects from inception to completion. They do not believe in the outsourcing of documentation or site supervision to other firms. To Capella Garcia the design process keeps going until the building is occupied. Very often so does the modelmaking via 1:1 samples of materials on site. Often last-minute changes are made on site even as the building is nearing completion.

Each new version of 3D software brings improvements to the design and documentation process within the studio. The physical modelmaking process, on the other hand, seems to be quite constant and the architects do not see it changing drastically in the near future.

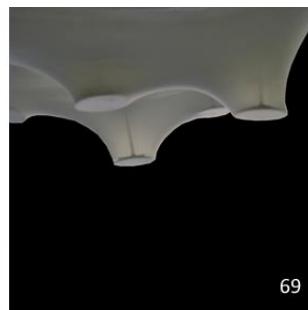
Further examples of Capella Garcia's quirky approach to architecture are models such as a building facade made up of disks which bear the logo of the client company (fig. 67-68) and a poetic study model for a ceiling system made using a very pragmatic female stocking material (fig. 69).



67



68



69

HHF Architects, Basel

HHF occupy a series of light-filled rooms wrapping around a courtyard in a building near the Rhine River's edge in Basel. They always work with models, but due to space constraints they do not have a dedicated modelmaking workshop. Most of the models produced are thus quite low-tech, executed in paper and cardboard. One of the three young directors, Tilo Herlach, explains that the negative aspect of this technique is that many of their models soon fade and fall apart.

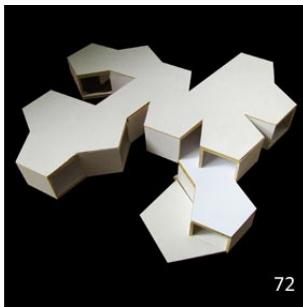
The models made by HHF are often used to test series of options within a certain set of geometrical 'rules' the designers assign (fig. 70-72).



70



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Despite their desire for better conditions for producing models, the range of examples around the office is very varied and interesting. For a cafe intervention within a historic concrete structure the practice produced a beautifully crafted timber and cardboard model, which pulled apart to show various components of the design (fig. 73). Other materials and techniques used include purple foam for a commercial facade model (fig. 74) and an ink transfer technique for a residential project study (fig. 75).



73



74



75

The practice set out to be involved in all stages of the design process, and have a commitment to site involvement and working out the detail of how their designs will come together. Their commitment to the craft of architecture is evident in many models around the office, including 1:1 tests of joinery details on a plywood table design (fig. 76), a light-box created to test the layered graphic of a shopfront facade (fig. 77), or a large-scale model of a cafe interior with final materials printed on the surfaces and scale furniture modelled for added reality (fig. 78).



76



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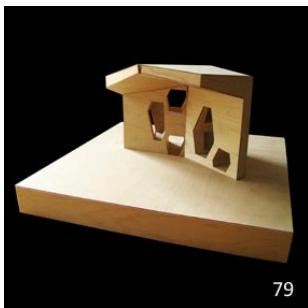


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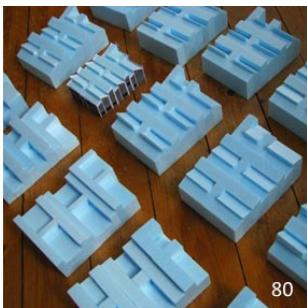
Some models in the office are made after a design is complete, as a way of retaining knowledge of projects. This seems to be quite a unique approach, with most other offices interviewed only making after-the-fact models for promotional and publication purposes.

The practice does a lot of work internationally, often collaborating with the Chinese artist Ai Weiwei. They make an interesting point about context not playing a role in places like China, where massive development constantly changes the existing landscape as projects progress. This is in stark contrast to Switzerland, where the natural and historical context has remained unchanged for centuries.

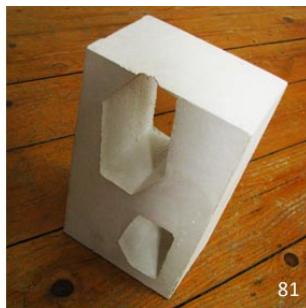
HHF will continue to use the computer to quickly test rules and configurations. They will not stop using physical models due to the psychological appeal of having 'something real and material in your hand'. Further examples of the models produced by HHF are shown below (fig.79-81).



79



80



81

Burkhalter Sumi Architects, Zurich

The studio of Burkhalter Sumi consists of a collection of varied spaces connected by courtyards within the city centre of Zurich. This practice has developed a very strong and unique way of working with models, which is firmly grounded in their philosophical and theoretical approach to architecture. Their models are some of the most colourful, precise, realistic and visually dynamic I had come across in my research (fig. 82-90).

The majority of models are made out of cardboard and coloured paper. The models are tools for testing the future building in as much realistic detail as possible, focusing on space and the phenomenological experience. Burkhalter Sumi does not focus on 'concept' models, as they are interested in the built reality and materiality. They are heavily influenced by the German philosopher Martin Heidegger's concepts of phenomenology and Gottfried Semper's theories of colour and use of pigment.

As a way of explaining their theoretical background Christian Sumi gives a quick history of Swiss architecture during the interview. He talks about Swiss architects moving away from experimenting with form, sign and symbols, and steering towards a more typological approach.

The computer for Burkhalter Sumi is just a "silly tool"⁷ which serves a purpose like any other design tool. They do not use the computer for exploration, but find it necessary to carry out documentation.

Christian Sumi's wife and partner in the firm, Marianne Burkhalter, comes from a more artistic educational background. She works extensively with painting and drawing (fig. 91), combining her approach with her husband's more technical one.

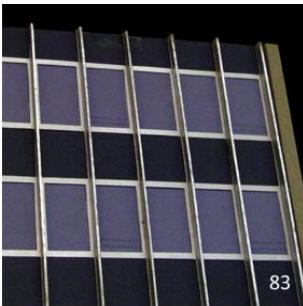
The architects are very interested in the psychology of architecture in relation to light and colour. They often test the same space with a series of models with changing colour schemes (fig. 92-93).

The modelmaking process used by Burkhalter Sumi is very time-consuming, with models of the same design often re-done over and over with changing materials and colours. Even though there is an incredible level of similarity to the built results in the models, the modelmaking process doesn't stop until the building is finished and assumptions tested, re-evaluated and often changed on site.

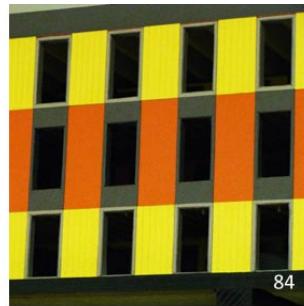
The architects are not precious about their models, often changing ideas very quickly. Christian Sumi makes the point that for him architecture is *not* art, and should not be treated as such.



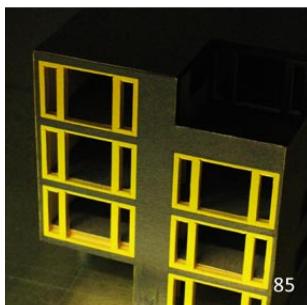
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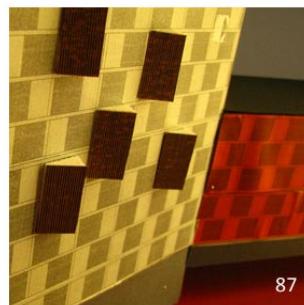
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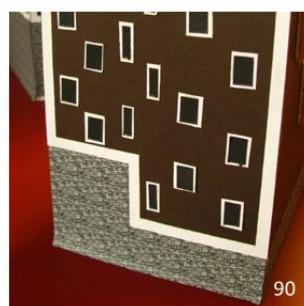
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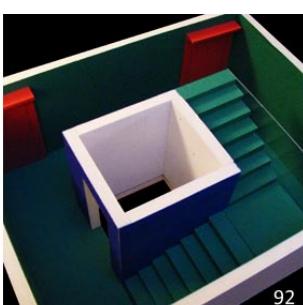
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One of the practice's recent projects, very relevant to the issue of modelmaking and scale, was their exhibition of the work of Gottfried Semper. For the exhibition, a 1:1 scale model of a wash boat designed by Semper was built within a gallery space. This housed the exhibition, where along with other material a smaller scale model of the same boat was placed (fig. 94). This was a very clever way of explaining Semper's work while allowing visitors to experience it first-hand. There are also examples of the office testing their theories at 1:1 within their own work space, where a skylight painted blue instantly recalls the colours on many of the models (fig. 95). Many of their massing models also rely heavily on colour (fig. 96).



94



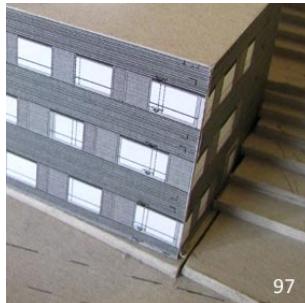
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96

Even when working at very small scale, the models of Burkhalter Sumi present a great level of detail and reality (**fig. 97-98**). The architects do not yet use laser cutters or other new modelmaking techniques. Their own brand of low-tech has been carefully developed into a unique style that will not change quickly. New technologies will only be integrated in the future if they suit their way of working.

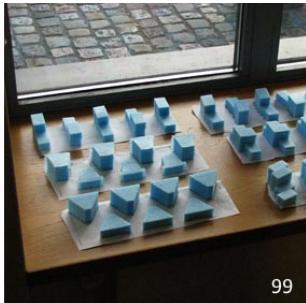
During the interview, two elderly ladies passing by a window display with massing study models (**fig. 99**) stopped to have a look and to chat and point at the different shapes. This was yet another reminder of the universal appeal of this medium of architectural representation.



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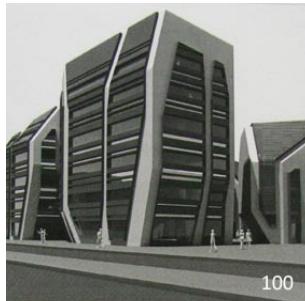


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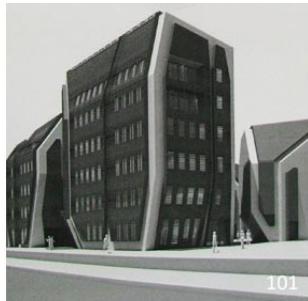
Jurgen Meyer H (JMH), Berlin

The director of this Berlin practice lives above the studio in an apartment block near the centre of Berlin.

The practice's design process is almost a complete opposite to the one of Burkhalter Sumi described above. Since one of their first projects, the *Stadthaus*, received wide attention, the firm has been developing processes of using digital technologies for designing their architecture. They have fully embraced the design freedom allowed by 3D software and parametric programming. Most often their design sessions are based on 2D printouts of views of buildings with options for surfaces, facades and (**fig. 100-105**).



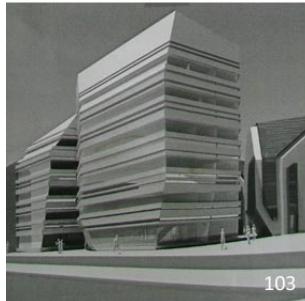
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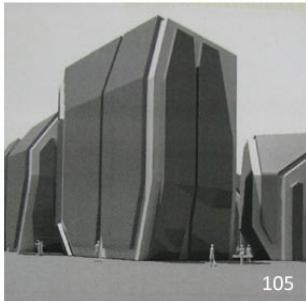
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JMH make some physical models to visualise parts of designs or complex shapes. These are not used extensively as a design development tool.

The potential for abstract, sculptural and artistic qualities of buildings is what JMH are most interested in. Great effort is taken in the final design documentation to keep this sense of the abstract in the built results. This leads in many cases to photographs of their finished work possessing a rendered or computer-generated quality (**fig. 106-108**). Seamless transitions and dynamic shapes are the norm in the architecture of JMH.



106



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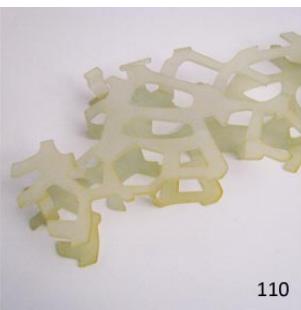


108

The few examples of physical models throughout the office display a great variety of technologies. They range from 3D printer-produced form studies (fig. 109-110) to more traditional handcrafted models done by students or assistants (fig. 111).



109



110

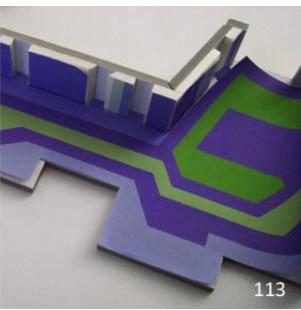


111

JMH have a strong sense of graphic design, and often their complex 3D forms are covered in 2D patterns. This shows an interesting dynamic between the flat images of the computer screen and the 3D forms of the resultant architecture. Many tests of these colourful graphic patterns range from massing studies (fig. 112), through interior finishes models (fig. 113), as well as 1:1 samples of colours and materials (fig. 114).



112



113



114

In many ways JMH represent a new attitude to the issue of craft in architecture. Gone is the typical modernist approach of making the built detail show the craft of how it was put together. This approach is still present in much of new German architecture. Instead, the office utilises existing and new technologies to *hide* the details to retain their building's abstract nature. They are inventing a new language of details and materials to necessitate the required complexity and fluidity of their designs. The interview also touches on issues of consultants not having caught up with the digital technology used by firms like JMH. The design and documentation process could be made much more efficient and accurate if all team members used the same digital model, but none of the local engineering firms has the capability to do so. Consultants still utilise traditional techniques for testing structural and environmental issues.

An excellent example of JMH's forward-looking approach to materials and form is the international competition-winning *Metropol Parasol* project currently under construction in Seville, Spain. For the project the most efficient structural approach was required, for which the firm worked with a timber truss manufacturing company. The company produced an elaborate model of the scheme using scaled-down versions of the trusses to be used on site. The model takes up a whole room in the office (fig. 115-116), and the progress photos of construction on site (fig. 117) show the direct correlation between the working model and the final built results. The interior views of the model also possess a quality of light and space impossible to reproduce in a rendering.



115



116



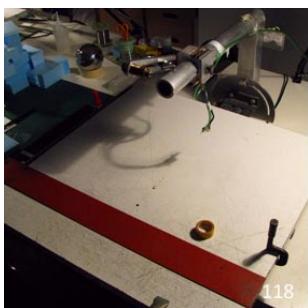
117

The reaction of the general public in Germany to the work of JMH is often one of questioning the complexity of the forms. It seems that architectural schools in Germany have only recently left behind the traditional approach of appointing architecture Professors based on their success in practice. This approach has led to many of the modernist principles being carried through to the work of many of the current offices. The attitude of architecture as research has not been as popular as in places like the United States, where architects such as Bernard Tschumi pioneered the idea of research in architecture at Columbia University in New York. The architectural scene in Germany is only now beginning to change and shift. JMH will try to keep pushing the boundaries of this shift with the freedom and creativity they believe the digital process allows.

Schultes Frank Architects, Berlin

Following on from the forward-looking and excited tone of the interview with Jurgen Meyer H., it was a sobering contrast to speak to Axel Schultes, the director of the Berlin practice of Schultes Frank Architects. The architect was very pessimistic about the current direction of architecture internationally, as well as the effects of financial pressures on the craft of designing space.

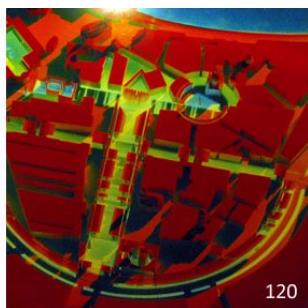
The practice started their very unique way of working when the architect and theorist Leon Krier came in to their office and brought with him a machine used for cutting blue foam. Since then the office has taken on board and fully indulged in the method of testing space, and more particularly the influx of light, using blue foam models cut with hot-wire cutting machines. This technique has been perfected over the years to a fine art, and has now become much more involved than its traditional use for simple massing studies. The office ended up inventing and building its own machines (fig. 118), using various styles of cameras and lenses to capture images of the models with special lens effects (fig. 120) and has amassed an impressive collection of models in their workshop (fig. 119).



118



119

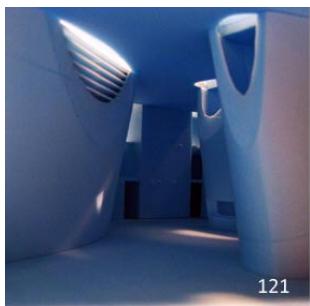


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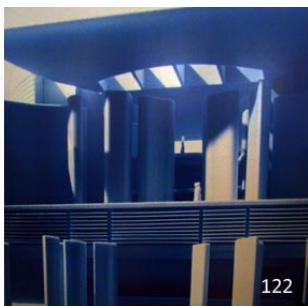
Axel Schultes believes no material other than the blue foam has come close to giving a true spectrum of light within a space. The practice has used this material to make many large-scale sectional models (fig. 121-122), big enough to fit your head in to look inside. Images of their built work, such as the *Treptow Crematorium* in Berlin (fig. 123), clearly show the similarity in the atmosphere of the models and the actual spaces.

The practice places great importance on the history of architecture, exploring the fact that Roman architecture was able to put together simple geometric shapes in a myriad of combinations and permutations. Axel Schultes talks about the depressing state of current architectural education. He believes the history of design is being lost, and the old ways of working are dying and becoming impossible to carry on.

Axel Schultes comments on his clients, both in Germany and abroad, who have to 'sell' a building much like they would a product. He believes people want a logo for a design, and the best tool to achieve this are renderings showing more landscape and happy smiling people walking around than actual architecture.



121



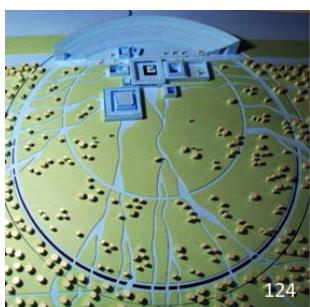
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123

The architect believes that there will be some practitioners bucking the current downward trends, but they will become more and more rare. He believes the digital era is destroying architecture. He talks of a loss of craft, and how a connection to the past, which was expressed in buildings by architects like Louis Kahn, is fast disappearing from architecture.

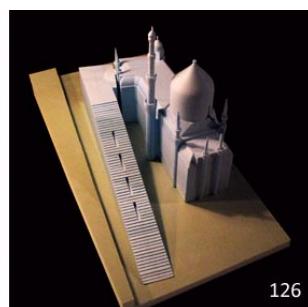
Further examples of the models produced by Schultes Frank are shown below (**fig.124-129**).



124



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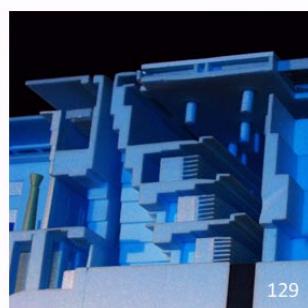
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129

INTERVIEW SUMMARIES (LARGE)

Xaveer de Geyter Architects (XDGA), Brussels

XDGA is one of the new generation of Belgian offices gaining recognition in the international scene, mainly through their many competition wins. The practice occupies two floors of an old-fashioned office block along a busy street in Brussels. The ground floor of the office has a large 'shopfront' window with some of the more elaborate models on display for the passing public.

XDGA make models in many scales from very large master-planning studies (**fig. 130**) through to detailed interior models (**fig. 131**) and full scale materials tests (**fig. 132**). Many of the models have a great level of reality, but some are purely formal and abstract. Often series of hundreds of rough models are made quickly to test various configurations.

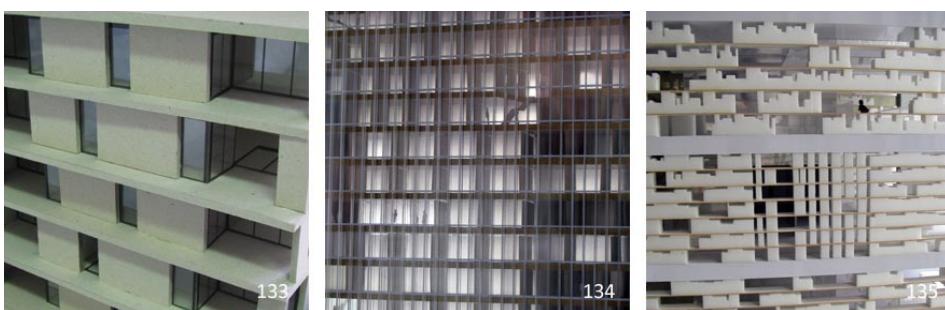


It seems that in Europe architectural competitions are a much more common project procurement method than in Australia. Most large offices interviewed usually work on open and invited competitions. This is certainly the case with XDGA.

The interviewee, Lieven de Boeck, has some interesting comments to make regarding the context of many of the practice's projects. He mentions context can get in the way sometimes and cloud the designer's mind. This is an unusual approach in many ways, a different way of looking at design from the traditional 'critical regionalism' approach. It is also interesting that, when asked about ESD in their design, the architect responds that the buildings are environmentally sustainable through good architecture. This again reflects how ingrained ESD issues are in the architecture process in Europe and how they are not considered a starting point for designs.

De Boeck makes a point about not being interested in 'blob' architecture, but is aware that a good physical model does not necessarily mean a good building.

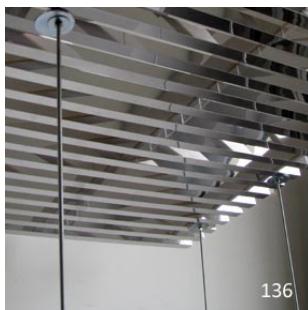
The architecture of XDGA always displays a strong sense of technology and structure integrated throughout all the stages of design. Many models are built to test the facade construction of their projects (**fig. 133-135**).



With projects involving a very large urban scale, XDGA often encounter difficulties in planning processes. Many of their winning competitions do not get built, or need to be modified as stakeholders change throughout the lengthy approval process.

De Boeck notes that even in the digital era you still have to imagine an idea first. He believes the digital does not change anything – one has to only look at the work of architects such as Eero Saarinen or Antonio Gaudi, who created complex structures without the aid of computers. To XDGA craftsmanship and materiality in architecture are of utmost importance.

Further examples of the models produced at XDGA are shown below (**fig.136-138**).



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138

Bolles Wilson (B+W), Munster

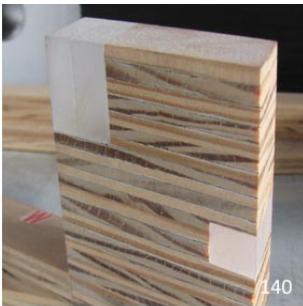
The office of Australian architect Peter Wilson and his German partner Julia Bolles-Wilson occupies one of two buildings they designed along a canal in a recently re-developed part of Munster.

B+W work with a long-established tradition of making models. The woodwork and modelmaking workshop is located in the heart of the office. Most models are made in wood. They are built to last and age gracefully much like an actual building would. The many models on display around the office showcase the amazing range of techniques and effects created with the traditional woodworking techniques employed (fig. 139-144). For B+W the context of a design is of great importance. The directors are very well travelled and acutely aware of different cultural circumstances. One of their early standout buildings was the *Munster Library*, which had to fit into a very complex existing city centre. The successful integration of the project showed the architect's skill at creating contemporary responses in historical contexts.

The office often draws on the modelmaking skills of local students in Munster. The architecture students there are often referred to as 'modelmaking students' due to the focus on models in the education system. The students work closely with the head modelmaker, who organises the workshop. Other architects in the office often assist with the models in between working on the computer documentation.



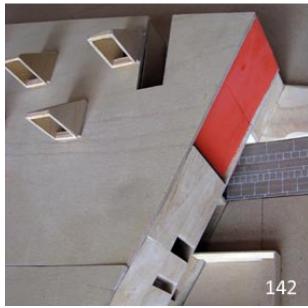
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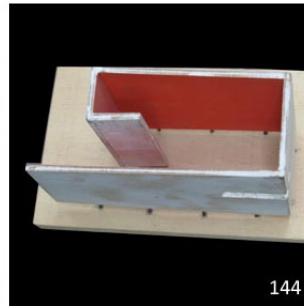
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B+W not only test some aspects of the design at 1:1, but also use their workshop to develop and build some of the timber furniture used throughout the office. As mentioned previously, context is very important in their work, and even with a chair design they ask 'who will sit on it?' Designs are tested at all scales in models including prototypes (fig. 145-146). Sometimes quirky and unusual materials like soap are used in place of the usual wood (fig. 147).



145



146

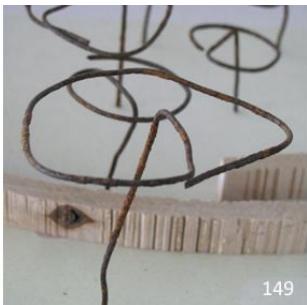


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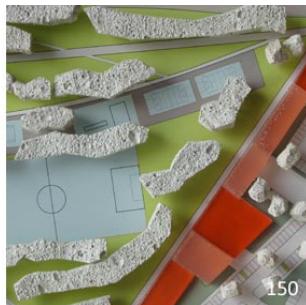
B+W always integrate the landscape into their models, as they believe it is an essential part of architecture. The practice has invented some of the most playful and innovative ways of modelling trees I have seen, including clear Perspex blocks labelled with the word 'Baum' (tree in German) (fig. 148-150).



148



149



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B+W are interested in matters of materiality. They have a library of materials that they are expert in, and the list of materials grows with each new project. Their boardroom is full of panels used for presenting the materials and fixtures proposed for each project (fig. 151). The expertise in construction details is passed on from project to project.

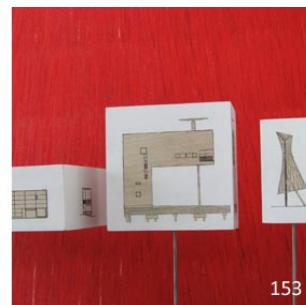
The office makes a point of using *traditional* techniques to create contemporary results. One example is the 'Photoshop' effect that Peter Wilson wanted to achieve on a facade. This was created using traditional bricks and mortar, but with the mortar colour perfectly matched to the brick to 'flatten' the resultant surface (fig. 152). Some models in the office display more of an artistic side, re-presenting designs as miniature artworks or sculptures (fig. 153).



151



152



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B+W believe designing on the computer is not an open process as it limits the interface between the designers and the subject. The architects will continue to focus on material and context while crafting contemporary architecture into the future.

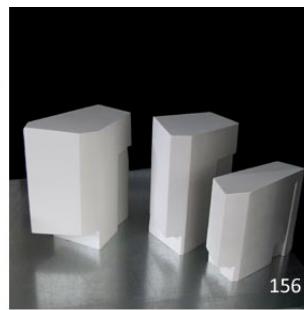
Further examples of Bolles Wilson models are shown below (fig.154-159).



154



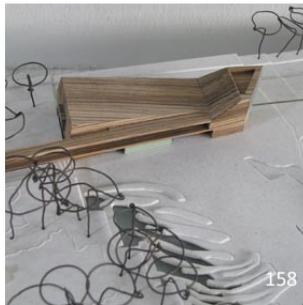
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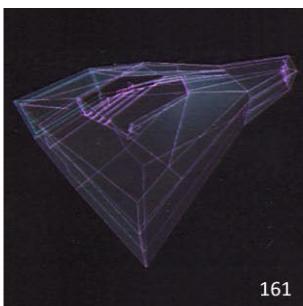
Delugan Meissl Associated Architects (D_M), Vienna

This young Viennese company first received international attention for their *Ray I Rooftop Apartment*. The project's fluid transitions of space and walls morphing into furniture were designed using early versions of what is now a very refined process.

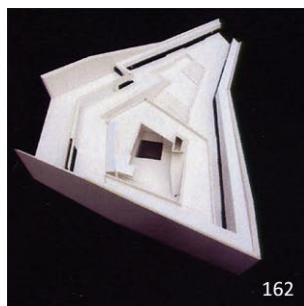
The design approach of D_M is very precise and pre-meditated. It can be described as a simple step-by-step technique which allows for great design freedom. First a sketch is drawn of the idea for a form (**fig. 160**). This is quickly modelled on the computer as a 3D wireframe model (**fig. 161**). The surfaces of the 3D form are then 'flattened' and printed out as 2D. A rough paper study model is put together out of the printout (**fig. 162**). This can then be studied, cut, and very easily modified as necessary. The whole cycle is then repeated and the form refined and developed.



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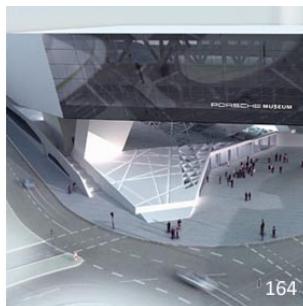
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Once the architects are happy with the design and want to take it further, they commission a local modelmaking firm to make a 3D printed model from the digital model they have developed. These 3D printed models are sanded and painted white to convey the crisp and slick nature of most of the schemes (**fig. 163**). The 3D modelling is combined with renderings to develop the designs (**fig. 164**). All of the above images describing the design process of D_M are of one of their largest recent projects, the *Porsche Museum* in Stuttgart, Germany (**fig. 165**). This project utilised their cyclical design process to its fullest.

One of the founders of D_M, Roman Delugan, is also a very skilled photographer. Many of the physical models are photographed in a way that blurs the distinction between the physical and digital.

D_M believe some aspects of design are not possible to convey using digital models. One example is the mirror-like cladding of the ceiling of the Porsche museum, which despite its incredibly high cost was accepted when the client saw the effect it created in a large-scale interior model.

The design process of D_M is in many ways scaleless, and works in the same way for a museum as for a door handle design. The Partner interviewed, Martin Joost, initially worked for the studio of Morphosis in Los Angeles, and brought his expertise in digital processes to Delugan Meissl.

Unfortunately, due to the fact that many of the final models are 3D printed and can be quickly reproduced at any time, very few of them are kept within the office. They are either given away to clients or thrown out once the design is finished. This disposable attitude to the models meant there were very few examples I could photograph during the interview.

Despite the very high cost of producing the 3D printed models, D_M will continue to use them into the future because of the positive psychological aspects of having something physical to handle and critique.

Adjaye Associates, London

The office of Adjaye Associates is very unique when it comes to their modelmaking. They employ Anthony Davies - a sculptor/industrial artist - as the head of their model workshop. This reflects the practice's approach to architecture, which allows great freedom and formal experimentation in the design process. Craftsmanship and materials are explored freely from the outset.

The projects often start with an idea or a sketch, which is then handed over to Anthony to develop further. Regular meetings are held to review the results. Environmental and structural issues do not come into the process straight away. The focus is more on technologies, materials and manufacturing methods to achieve the desired results.

One of the models discussed in the interview was a meticulously made balsa wood model of a pavilion which had just been completed along the River Thames in London's Southbank (**fig. 166-168**). The model shows great attention to detail and a materiality very close to the built result. The model was used not only to test the spatial quality of the space, but to ensure that the timber structure was self-supporting as intended.



This practice has quite quickly grown in size and recognition in recent years. Unfortunately, the office of Adjaye Associates was the most closely guarded about their projects out of all the firms interviewed. I am not sure if this is a reflection of the status of their clients, the fact that most of the models in the office were for projects still in progress, or that their PR department was instructed not to allow the release of any images of their process work. It meant that the majority of models discussed in the interview were not photographed and thus cannot be discussed in this report.

Enric Miralles - Benedetta Tagliabue (EMBT), Barcelona

The office of EMBT is located inside a beautifully restored courtyard building Benedetta Tagliabue owns in the centre of Barcelona. The practice has had the opportunity to fully integrate modelmaking and materials research into their work. The basement of their office contains hundreds of carefully crafted boxes with ventilation holes and labels in the unique EMBT font (**fig. 169**). The boxes house what is only a small part of the architect's modelmaking output, with many models travelling the world in exhibitions.



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The practice's material experimentation is present not only in their impressive modelmaking output, but also throughout the building they occupy. The courtyard contains tests of installations and precast seats used in a park project in Barcelona. As part of a renovation, the walls of the building have been stripped and re-painted exposing the original brickwork in random vertical stripes (**fig. 170**), while many of the pieces of furniture designed by the practice sit alongside collected antiques and artworks (**fig. 171**).

In the centre of the office is a modelmaking workshop with woodworking tools and a constant stream of students and modelmakers working away late into the night. Models are stacked and displayed everywhere, some on beautifully crafted custom-made display stands.

The office makes it a point not to fix any materials for their buildings at the outset of a design so as not to limit creativity. The projects usually begin with concept models made in a variety of materials and scales (**fig. 172-174**).

Once a design is progressed, it is usually tested in a variety of extremely detailed wooden models (**fig. 175-177**). Many designs are then remodelled many times over. The focus on resolving details and structural issues is clear. Many models are made either of exposed structure or with some of the cladding peeled back to reveal selected details (**fig. 178-180**)



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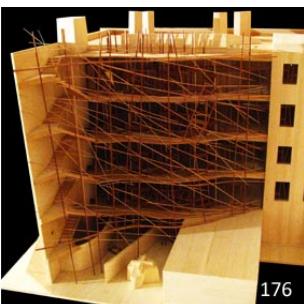
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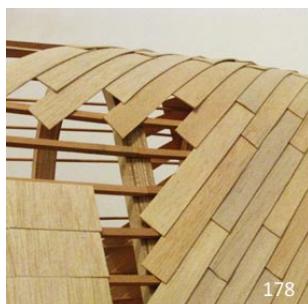
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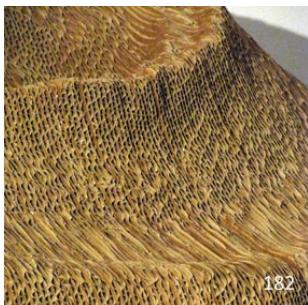


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Some designs are tested at full scale. Many material experiments are carried out. Examples include samples of paving tiles (fig. 181), seats for a Camper shoe store made out of laminated cardboard (fig. 182) or mock-ups of wicker cladding for a pavilion in China (fig. 183).



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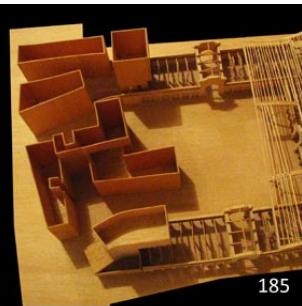
The office maintains a very busy research and publication department. One aspect of their practice which stood out was how open they are with their design process to clients and the general public. They participate in as many talks and publications as possible, aimed both at other architects and the public. It seems that this attitude is one of the reasons why the public in Barcelona is so well educated in terms of urban planning and architecture, and why so many of EMBT's extremely complex projects are received so well.

EMBT makes it a point that all of their staff must *like* to build models. There is specialisation within the office, and some architects mainly use 3D computer software. This is only used as a *tool*, mainly for documentation and to resolve complex junctions in their buildings. The office utilises the latest in cutting-edge 3D software but does not make a big deal of this and does not advertise based on their technological capabilities. They are comfortable with new technologies, but their process of modelmaking and material experimentation will continue into the future.

Further examples of EMBT's models are shown below (fig.184-189).



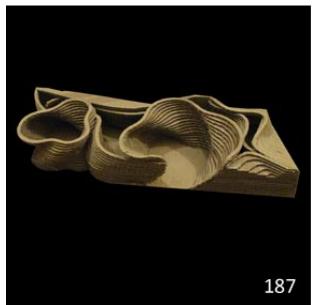
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INTERVIEW SUMMARIES (EXTRA LARGE)

Atelier Jean Nouvel (AJN), Paris

The studio of Jean Nouvel in Paris is the only example of a truly big organisation I visited. At the time of the interview, apart from the large building usually occupied by the office, a secondary space with about 50 staff was set up a few blocks down the street to work on a new casino project in Las Vegas.

The modelmaking space run by the architect Jean-Marc Kurczewski was also one of the largest and best-equipped visited (**fig. 190**). The typically French relaxed nature of the work environment was immediately made apparent by the presence of Jean-Marc's dog, which comes to work with him every day (**fig. 191**). The workshop contains one of Jean Nouvel's prized possessions: an architectural endoscope built by the French inventor Berty, one of very few in the world. The device is used to be able to see wide angle views of the compact interiors of architectural models which are usually inaccessible to the naked eye.



In some ways it is perhaps unusual that AJN maintains such an extensive modelmaking space. Throughout the interview it became apparent that Jean Nouvel prefers to dwell in the abstract and discuss moods and images rather than physical objects such as models. Discussion and capturing a unique 'spirit' for each project are his preferred methods of communicating. Considering he often prefers images of models to models themselves, it is clear Nouvel places great trust in his head modelmaker to explore architectural concepts in model form.

An example of the working method of AJN is a series of models and images of the vertical gardens planned for the new Frasers Broadway development on the former Carlton Brewery site in Sydney. The architects use a variety of techniques including traditional modelmaking (**fig. 193**), printed images manipulated in Photoshop (**fig. 194**), and laser-cut patterns (**fig. 195**) to find the right representation for the desired effect of layered greenery.



Computer technology is always present in the design process. For a new monumental casino planned for Las Vegas the inspiration came from images (both factual and manufactured) of desert landscapes (**fig. 196**). The concept for the casino is to create a sort of built landscape, with materials, textures, surfaces and facades reflecting the colours and moods of the desert which surrounds the Las Vegas Strip. The concept is first developed with sketches and in 3D on the computer (**fig. 197**). Then, in a technique similar to that of Delugan Meissl described earlier, cardboard study models are made from pieces printed directly from the computer models (**fig. 198**).



The use of technology is apparent in the precise models of the ‘landscaped’ ground plane planned for the casino project. Laser-cut contour pieces are glued together to give the impression of ridges, valleys and chasms in the surface (**fig. 199**).

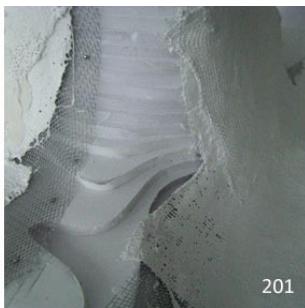
The office utilises many types of models, from full-sized pieces of industrial design like the lamp they designed for their modelmaking space (**fig. 200**) to much more traditional craft-based plaster studies (**fig. 201**).



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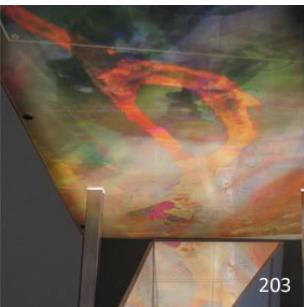
The interview ends with some of Jean-Marc’s observations about the craft of making models by hand and the beauty of their imperfections. The office did for a period of time have a CNC machine but they found the 3D printed results too ‘final’ and soul-less.

Atelier Jean Nouvel will continue to explore the relationship between the poetic and the physical though a variety of techniques into the future.

Further examples of models by AJN models are shown below (**fig.202-204**).



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INTERVIEW TRANSCRIPTS

Full transcripts of the interviews summarised above have been included in APPENDIX A of this report. The transcripts are in chronological order.

Two interviews additional to the ones summarised have also been included. The first is a brief conversation with Nigel Coats, who as the head of the Architecture Department at London’s Royal College for the Arts, gives an insight into his unique views on modelmaking in architectural education and practice. The second is an interview provided to me by the office of the Swiss architect Christian Kerez. In the interview titled ‘*Scales of Reality*’ Kerez discusses his extensive use of models with Martin Steinmann.

CONCLUSIONS + FUTURE DIRECTIONS

The results of the research undertaken for this scholarship have belied any doubts I might have had at the outset about the state of the physical model. I discovered that the model is alive and well, but it's making and use is undergoing some significant changes as architects are coming to terms with new technologies.

The fact that the study model is still one of the best *tools* for the design of space is apparent from the interviews. No matter how different each architect's design process is, in one way or another they all touch on the positive psychological aspects of having a real three-dimensional model to handle, modify and reflect upon. The advantage of the physical model over two-dimensional representations (either on the computer screen or as printed images) has been the subject of much discussion which is at the core of design discourse. According to Gernot Bohme, "If architecture really does consist essentially of the design of space, then it does not belong to the visual arts. You cannot see space. One is tempted to argue the viability of this statement on the basis of the inadequacy of perspectival representation, but that would involve jumping to the conclusion that what one actually sees (namely a picture) is flat – which in turn leads to the banal conclusion that no amount of illusion can adequately reduce three dimensions to two. The fallacy lies in the fact that we conventionally consider the camera a model of seeing with the eyes – with one eye! But vision obviously involves two eyes, and no amount of technology has ever succeeded in replicating what it shows us without recourse to the eyes".⁸ The physical model remains the truest pre-built representation of architectural space.

It seems that the 'digital era' has affected architect's attitudes to modelmaking. Some camps have begun to form, which can be grouped in the following way. The first group hold on to the ideals of craft and phenomenology. They use computers mainly as a documentation tool, and utilise hand-made models in many different forms to *test* design assumptions and ideas. The next group's position is the opposite. These are architects who have embraced digital technologies and aim to exploit these to their full potential. They often design buildings purely through the use of computers. If they use physical models, it is mainly to visualise or present designs, which have already reached a high level of resolution. Finally, the last group is caught somewhere in the middle of the analogue/digital divide. These architects are open to using all tools of design, and prefer a mixed-media approach to explore their ideas. All the above groups, as a result of their chosen design methods, produce very different types of buildings. These range from the expertly crafted and grounded in architectural tradition to the abstract, sculptural and 'futuristic'. Even on a purely visual basis, putting aside the experiential or tactile qualities of the models observed, it is clear from the many images included in this report how directly these different attitudes are reflected in the models produced.

The interviews for the Scholarship were focused on six areas of interest connected to modelmaking as outlined in the Methodology section of this report. The following observations reflect on these categories.

1 WHAT, HOW AND WHY. The types of architectural models made in the past have changed very little today. Most models are still made starting from smaller scales like 1:500 or 1:200 for massing studies and progress through to larger scales such as 1:50, 1:20 or even 1:1. An interesting discovery was the use of the scale of 1:33, which is the smallest scale at which artificial light can be realistically tested. This scale is mainly used for interior models and thus is often utilised in theatrical stage design. The traditional materials of wood and cardboard are also still there, with more unusual materials such as soap, rubber, resin, plaster and various plastics making some appearances.

As far as the model *makers* are concerned, some of the larger offices employ a head modelmaker (usually with some level of architectural training) to organise their workshop and help with specialised items. A definite standout was the office of Adjaye Associates in London, who employ an artist/industrial designer to run their workshop. This seems to be a conscious decision which allows their architects free range for exploring materials and manufacturing techniques for their study models. It was interesting to see how many offices in Europe use their success and popularity as leverage to employ students and assistants, who are willing to work long hours for minimal pay to make models.

New technologies are affecting physical models in many ways. Even traditional craft-based modelmaking is supplemented by laser cutters utilised to speed up the construction of parts, which would be too difficult or time-consuming to make by hand. Interestingly, this has contributed to a resurrection of ornament in architecture. This is due to the fact that fine lacework-like surfaces can be manufactured for models in almost the same way as in actual buildings. According to a recent Detail magazine article, "The architectural renaissance of ornament has been facilitated by the increasing use of digital technology in the design, planning and construction phases. Complex three-dimensional forms that could have once been executed only by means of craftwork can now be produced, re-produced and transformed in tailor-made serial forms to calculable costs. CNC technology (computerised numerical control of mechanical equipment) allows almost any texture to be transferred to a material by a process of vectorization (the generation of linear from gridded graphic forms). At the same time, for the surface treatment of modern materials like concrete or compound construction systems, craft techniques can still be used (such as cutting forms in timber shuttering) without simply imitation the traditional language of architecture".⁹

The most advanced and direct use of digital technologies in modelmaking is the ability to create 3D 'prints' directly from the CAD model. These are discussed further in the Digital/Analogue section below.

2 CONTEXT + LOCATION. The multicultural nature of practice in Europe means that there is a great cross-pollination of approaches to making models. AT EMBT in Barcelona, for example, the 40 or so staff members represent 20 countries from around the world.

It is clear that there is a great weight placed on the history of architecture and the local cultural context of many of the office locations. For example, BK Architects, who are based in Basel, mention that “the language of architecture here has a long history. It comes out of culture. The climate and the mountains in Switzerland are very important. These things have influenced buildings in the way of keeping things dense, of optimising the architecture”.¹⁰

Regionalism does not seem to influence the way models are made in different European locations. Most of the techniques and materials used are quite universal. There are, however, some differences in the way models are treated *after* a design is finished. Some offices hold on to most models for exhibition and educational purposes, as well as a way of retaining knowledge of projects. Others, who utilise more digital technologies, seem to view the models as more disposable. It is very simple to press ‘print’ and re-create 3D printed models or re-produce renderings.

3 DIGITAL/ANALOGUE. It seems that in the recent history of architectural modelmaking nothing has led to greater changes than the ‘digital era’. It is no surprise that the most passionate views expressed in the interviews concern this issue. These views reflect the divide present in the architectural scene between exponents of the traditional approach and fans of the computer-generated.

The majority of opinions are negative when it comes to using computers as the *primary* design tool. Fabian Holst from Bolles+Wilson says that “with the computer model there is the problem of the interface. With a physical model you can just take it and change something without having to think about how it can be done on the computer. Also, with the computer you can produce a movie or single images. With a physical model it gives billions of perspectives. As you move it the light changes, and it is just more complex”.¹¹ XDGA’s Lieven de Boeck believes that “the digital era does not change anything. I think the only way to create a good drawing is to think it through as if you were drawing it by hand. The rest I think is ugly and glossy and all looks the same. It is better to make a good model and photograph it than to make a bad digital image. It really is about craftsmanship.”¹² Architects also expressed the fact that digital models tend to hide design problems. “You can trick other people and you can trick yourself because you can always choose the best view (on the computer screen). When there is a problem you can always hide it. But this is not how architecture works, because in architecture you can go inside the building and see everything.”¹³

One of the recent buzz-words in architectural design is ‘parametrics’. This technology has been made available by software such as Bentley’s Generative Components, where digital models are built based on parameters which are coded or programmed by the operator/designer. Some of the offices interviewed utilise this capability to great advantage to speed up and optimise the documentation process. Delugan Meissl’s Martin Joost explains how for the *Porsche Museum* the parametric digital model allowed for something like a change in the thickness of an insulation material to automatically re-adjust all the drawings for a cladding panel. Without the parametric model this would have had to be done manually and would have been extremely labour-intensive and inefficient. Patrick Lynch of Lynch Architects in London has a very negative view of this technology, however, in respect to generating or ‘finding’ forms based on a set of parameters for a given site. “The idea of parameters in architecture is clearly the cause of all the architectural crimes in history. The premises are: is it on a hill, where is the prevailing wind coming from, where is the prevailing rain, all those things. I think, to be blunt, all those ‘parametricists’ as they’ve been calling themselves, are trying to find a way to salvage their guilty conscience from being into deconstruction before, which was very text-based and introverted. Another way to call it is an avoidance strategy – avoiding having to design anything”.¹⁴

The hesitant approach to taking on new computer based-techniques is echoed by Sonia Blasko of EMBT in Barcelona: “I hope that any new technology will come to help us and not to act as a prima donna around which we are meant to dance. This is our main worry as these technologies can easily take you over.”¹⁵

In Europe, architectural education also has a long history and a large bearing on the architecture produced. Traditionally, most European schools employed Professors in the ‘master architect’ role. They were usually very experienced practitioners, with a great deal of knowledge of craft, detail and construction. This has carried through to many of the interviewed office’s design processes, where models are used to test junctures of materials and ideas of buildability and structure. This is a different approach to many Universities in places like the United States. There, many of the Professors are pure researchers who have not actually ever built anything, which leads to a more experiment-based approach to design teaching. This in turn lends itself to utilising more digital technologies. I believe new digital technologies have not been taken on board and developed as rapidly in Europe as, for instance, in the United States.

4 ENVIRONMENT & STRUCTURE. The clearest message concerning ESD that came across from the interviews is that environmental awareness is so ingrained in European society that ‘green’ design comes as a given. Most questions related to using models to test ideas of ESD were met with slight surprise, as the firms not only utilise the latest technologies and materials in their buildings, but also have to comply with codes and guidelines much more stringent than those in Australia. Firms such as Lynch Architects make models to directly study environmental issues like the influx of natural light into a space and the shading utilised in fenestrations, but this technique is in general quite rare. The making of sustainable architecture equates to making *good* architecture to most offices interviewed. Their buildings are socially and culturally responsible and built to last for generations through good craft and detailing.

As far as structural issues are concerned, many offices still utilise physical models to test structural elements. EMBT make many such models, which explore the relationship between structure and space. Digital models are also utilised in many cases to test complex junctions or maximise efficiency, but there is a gap in the use of 3D models by architects and by engineers. It seems that many consultants are slow to integrate new digital technologies.

5 CLIENTS, PUBLIC AND PLANNERS. The general level of the public's education in architectural matters is very high in Europe. Architectural models have played a significant part in this. Most major cities have architecture museums and galleries dedicated to showcasing architecture and making it more accessible to the general public. Because of the approachable nature of models, most of these exhibitions are strongly model-based. The need for a dedicated architectural museum in Australia is clear if the public here are to reach a similar level of understanding. The Australian architectural critic and historian Philip Drew has been campaigning for this for quite some time, most recently in the latest Architecture Bulletin March/April 2009 Issue.

The majority of offices in Europe are very open with their clients about the modelmaking process. The office of EMBT is a standout, getting heavily involved in public talks, lectures and exhibitions. They use models to explain the complexity of architecture, and to make clients aware of the vast amount of work and effort that goes into producing great work.

Models in Europe are also utilised in the public exhibition of prominent projects. Similarly to the city model at the City of Sydney Council foyer, most cities in Europe have large urban models in their town halls where designs are tested and discussed with planning authorities. Lynch Architect in London take the use of models even further, as a negotiating tool with local Councils. They believe that the use of very realistic models in scales such as 1:50 and 1:20 have allowed them to push designs though much more smoothly than with drawings alone. It is possible that the use of more models for Development Applications in Australia could help speed up the process and get over the problem of non-architects not being able to interpret plans.

6 INTO THE FUTURE. The working methods of architects do not change quickly. The majority of offices interviewed have developed their use of models to a point they are happy with and they will continue these methods into the foreseeable future. Some offices are hoping to actually utilise physical models *more* if time and budgets allow.

Some architects interviewed mention that a drastic shift in technology would be required to disrupt the constancy of the use of models. "We do not know what computer interfaces will be like in 20 years. But we will keep on living in a material world."¹⁶ Capella Garcia Architects believe that "perhaps in 5 years time we will have a 3D hat with electrodes directly into our brain, and only then perhaps we will make models in a new way".¹⁷

Another factor which differentiates the interviewed architects' working processes is the size of the practices they operate. In most cases, the size of the offices has a direct relationship with aspects such as the availability of staff, space and materials resources to produce physical models. Some interesting similarities begin to emerge as one looks at the work of these architects within the size categories of S, M, L + XL. These are described briefly below.

SMALL. This group has the most balanced approach to modelmaking. They utilise a wide range of tools and are open to new technologies. It seems that many of them struggle with deadlines and fee pressures and thus find it difficult to make time-consuming physical models as much as they would like. The model is thus forced more and more to be used as a presentation tool, with computer renderings increasingly taking precedence in the design process. They appreciate the speed with which designs can be progressed on the computer, but have a strong sense of the importance of models. Most of the architects in this group have relatively recently left the University environment, and thus have carried through their various experiences. This leads to their openness to a variety of techniques as they establish their architectural standpoints. The majority of small offices who are anticipating expansion believe they will increase the use of models into the future.

MEDIUM. The medium-sized offices interviewed display the most varied and unique approaches to modelmaking. These architects have had time to reflect on their techniques and take a decisive stance about their design process. The attitudes to modelmaking in this group are very contrasting. They range from the digital explorations of Jurgen Meyer H to the tactile and realistic 'low-tech' models of Burkhalter Sumi. The group also represents very diverse attitudes to the future of architectural design. Firms like Capella Garcia and HHF have a very positive outlook and are taking on new directions in their stride, while Axel Schultes believes the effects of the computer are "absolutely devastating and could mean the end of architecture as we know it".¹⁸

LARGE. This group represents the largest modelmaking output, showing that there is a definite correlation between means and results. It seems that given the time, fees and resources models are still being utilised in a very involved way. The sheer quantities of models produced by these firms are truly impressive. The large offices are headed by a relatively older generation of architects who have very strong ties to the historical traditions of architecture. They have developed their particular styles before the digital became so prevalent. These architects have been forced to become masters of computer-based technologies, but they only see these as a necessary step, not an overriding theory.

EXTRA LARGE. The Paris-based firm of Jean Nouvel represents the only example in this group. It is still a very interesting one due to the fact that Jean Nouvel is much more a man of the image than the model. Despite this, he maintains a large, very well-equipped modelmaking

workshop. He probably does not do this purely to produce presentation models for competitions, but because he still feels making models is an important part of the design process. The office has some of the most expert rendering technicians in the world, but they do not discount the study model as a great supplementary design tool. Jean-marc Kurczewski, the architect at the helm of Nouvel's workshop, says that their "relationship with the model is very sensual. You cannot have that relationship with a screen. With a model you can move around it, you can touch it, it is very physical. You do not have that with an image. You can get emotion from an image, but it is not the same".¹⁹

How do the lessons learned from the working methods of European architects relate to architecture in Australia? The traditions of practice here are still being forged, and the history of the profession is extremely short compared to that in Europe. This gives us a certain advantage in the freedom to form the future without any historical 'baggage'. The same freedom extends to our use of models.

The question is, then, '*What should we do with this freedom?*' The danger of foregoing the physical model for a purely digital design approach is clear. It often leads to a shift from the question of '*How will the built space be constructed, experienced and used?*' to the question of '*how was it generated and what does it look like?*' This is a problem which goes to the core of the survival of the architectural profession, in which, according to Herzog & De Meuron, the "on-site experience of the building, direct confrontation with it, is essential (...) In fact, that is architecture's only chance of survival. Architecture that looks good in reproduction is more marketable. But for the medium of architecture to survive, the only thing that counts is the one-to-one experience. That is the first priority, and the only way architecture can compete with other media. Why do people visit the cathedral in Cologne? It gives you an experience of space that you could never have in a movie by Steven Spielberg, no matter how spectacular his special effects. It is absolutely essential to aspire to these intrinsically architectural qualities. That is why the actual physical on-site experience is still the most vital factor..."²⁰ In order for architecture to retain the unique qualities of a profession concerned with the design of space, I believe we must carry on making physical models into the future, and with this our sense of craft and construction.

According to Patrick Lynch, "what we are really talking about, and what we are doing, is this relationship between craft and architecture. And the craft of making a model is a kind of crude and dumb analogy to actual construction".²¹ The recent changes in the use of models reflect the speed with which digital technologies are taking over many aspects of practice. This has a tendency to leave behind the skills of craftspeople, builders and materials artists, and diminish their roles in the production of architecture. I do not believe we should aim for a future in which machines manufacture buildings in the same way as they do models. We should rather aim for a gradual 'craftwork shift' rather than a sudden change. We need to delve deeper into how new technologies are affecting the design process. New skills need to be developed within the building industry to prompt new ways of looking at craft and materials. We need to ask how traditional techniques can be used to achieve contemporary results.

While there are definite advantages of using digital technologies as a *supplementary* design tool, I do not believe we should forget the techniques of the past. While knowledge management is pointing us towards ideas of 'collective intelligence', the computer operator works alone. The physical model can be seen by all at the same time, not restricted to selected views on the screen.

It is possible that in the age of the Internet, YouTube and Google we are becoming more and more impatient about achieving architectural results. It is all too easy to press a button and choose from a myriad of random forms, which at the end of the day could represent nothing but contrived formal ambitions. This seems much more exciting than the painstaking labour required for crafting a beautiful study model. And yet there is much truth in the Swiss architects Peter Zumthor's observation that "today people are interested in architects coming up with a sensational shape that attracts people at least for a year, or two, maybe even five or seven. This is the famous 'Bilbao effect', a worldwide phenomenon. But *good* work requires a lot of patience..."²² A danger also exists of not learning from the history of architecture and the arts, and focusing only what other offices are doing in other digital experiments.

I believe that with a well balanced approach to modelmaking Australian practices can help shape the future of architecture. If physical models were used more to share spatial explorations with clients, opportunities to achieve good architectural results could be increased. Too often we choose tricks of renderings and perspectives over the honesty of the model. Too often we take the quicker option of producing a digital model where decisions are precise and pre-determined, and we miss out on the advantage of discovery and accidental revelation available in the physical modelmaking process.

The vibrancy and uniqueness of Australian architecture can continue to flourish as we strive to be at the forefront of successfully negotiating the ingress of new technologies into traditional tools of design.

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APPENDIX A – FULL INTERVIEW TRANSCRIPTS

An Interview with Lieven De Boeck

XDGA –Xaveer de Geyter Architects, Brussels

LIEVEN DE BOECK May I ask you a question first of all? What do you understand as the model? Do you mean the model as a scaled interpretation of a design, or do you mean the model as a typology?

MARK SZCZERBICKI I am interested in the model as part of the process of design.

You mean as a part of the language of architecture or urbanism?

Yes, a part of the language of designing architecture. I am not interested in the kind of models made by professional modelmakers to represent the final product. I am more interested in the way you use models to explore ideas and to progress a design.

So your question is how this functions here in our office?

Yes. A starting point can be the types of models are made.

Well, the types of models which are made are very diverse. I think there is also an evolution happening with the introduction of computers. I think in the beginning, something like ten years ago, the design process was very much focused on the model. Then with the introduction of the computer, I think similarly to the drawing, the model became less important. You simply constructed images or viewpoints on 3D models. But I think here in the office there began a kind of countermovement against the computer model. The problem with the computer images is that they all end up flat and do not really show what you want them to. So some time in between 2000 and 2002 the model was re-introduced into the office, also for presentation purposes. So now very often we make a model to use in a collage. We build a model, it can even be a part of a building at a bigger scale, and then we take a photograph and put it into a picture of the context. We do this instead of building a 3D computer model.

And how do you find this better than using a digital model inserted into the context?

Because first of all the physical model also becomes a tool of design. By making it you test certain aspects of what it looks like, you approve it or you change it. On the other hand, if you draw it on the computer, it still stays as a flat image, so you don't see the mistakes as easily. Also, because you make the model as if you have to build the real building, you see all the structural difficulties and how all the elements come together. So you have to think about materials. In the computer you just give it a surface and a texture and you do not have to think about the bordering conditions.

Can you tell me more about the models you use as part of a presentation?

Yes, for example for the El Croquis publication about the office we re-made all the models. Most of them were used for the design process, but were then re-made for the publication. Because some of the models are part of the design process, perhaps only a part of a structure will be made. For the *Kitchen Tower* project, we made a lot of small-scale study models, to test different facades and different structural possibilities. Then there was a very big model made. After that the two main restaurant floors were made. This was again at a bigger scale, where you start putting in furniture.

Let me ask then about the architectural media and how modelmaking is portrayed. Do you think that this a problem that models need to be re-made nicely for a magazine like El Croquis? Does it hide some of the process?

No, definitely not. The thing about this office is that there are a lot of projects that are not constructed. There are some competitions which we might win and which will not be constructed. So it is important to show what the architecture will be like, to show just the final image. The reason that these models are re-made is to give a clear image for the publication of what the building was to look like.

So once you win a competition and a model of the building is re-made for publication purposes you do not use that model as part of the overall process. It is purely a post-design presentation.

Yes, and we also try to make the models all at the same scale and using the same materials. This is not the normal process when models are made during the design, when depending on the project different materials and scales are used.

And the reason to make the models in a particular style is to reflect the particular architectural style of this office?

No, it was really a practical decision so that we did not have to re-think the materials and style of model for each project. We also chose materials that could, despite the small scale, show some architectural detail. So for example if it was important for the model to have details of windows, it would not have been possible in cardboard.

And were all the models made in-house?

Yes.

Can you tell me about who makes the models in the office? Does everyone participate or is there a dedicated team for this?

No, everybody makes the models. The models for the El Croquis were made by members of the office, but in a language which we put forward. Also not all models are re-made; some models used for publication are competition models. Some of the competition models were not made in the office.

And for those you used a specialised local modelmaking firm?

Originally we used a Dutch modelmaking company in Rotterdam, which Xaveer de Geyter knew through OMA. This modelmaker also worked at OMA as their modelmaker, but has now started his own company. Nowadays we often also use 3D printing for models, which can be done here in Belgium, depending on how big the model is. We also use another Dutch company which is situated in Delft. They are now in the office for another competition.

What is the reason most of the companies you use are based in Holland?

I think this is maybe because of the high density of architects and architecture there. Maybe they are more into that language. In Belgium we also have modelmakers, but we don't like their style. They make some types of wooden models which we do not like as much. But I think that every country has a bit of a specialisation when it comes to modelmaking.

It seems most of your projects come about from competitions?

Yes, there are almost no direct commissions.

Does this mean usually there is no interaction with a client during the design stage?

This is not necessarily the condition. Let us make a division between urbanism and architecture. In urbanism projects there is often an interview with the people choosing the architects for the project. Then once you are chosen there are regular meetings with the specialists; so we meet the train specialist, the bus specialist, the monument specialist, the specialist who makes sure there are not too many windows ... (laughs)... and so on. In this situation the model is one of the most direct ways of communicating our ideas. It is something which people see and understand.

And you find in these situations the model works better than drawings?

Yes, definitely. For architectural competitions, on the other hand, the process is often different. It is not a process of communication. You are chosen, then you work, then you present, and that's it. So the model is the first tool to develop different options, then one or two or three options are chosen to develop further also in model form. Then the final form is chosen to develop further, and after that the final model for the competition is made. There is always a requirement for a model to be handed in.

So for a typical building how many models would be made?

It depends, but for some projects to come up with a form we could make maybe 500 models. For the *Urban Plan of Lille* every day we made a different model to check the composition. These models were just visual and aesthetic, not programmatic.

I noticed a space downstairs in the building with some models on display. Is that a part of your office?

Yes, this is the second part of the office. We use the window display as a kind of storage for models because our storage room is full.

Does that act as a kind of shopfront for the public?

Yes it is a little bit of a shopfront, we change it from time to time, and people really do look. It really is amazing. Especially dads with their sons...

Is there any involvement of the public in Brussels with models? Are there any special exhibitions of models held?

No, this happens mainly in Antwerp. There is an art institute there which often organises exhibitions. They do this regularly. They show drawings and models and images. In Brussels there is also an art institute but it is more historically orientated. I don't really follow architectural exhibitions I have to say...

We spoke earlier about making larger scale models of parts of buildings. In today's environmentally conscious climate does modelmaking in your office ever go into testing issues like the way the sun enters the building, how ventilation may work and so on?

No, not really. This is mainly something which is developed through the engineers. For every project you work together with a whole range of specialists. And the theme of sustainability is a really controversial one, because what does it really mean? There are so many definitions of what it really is, and I do not see how you can develop that through a model. Wind tunnel testing and so on is done by engineers.

So this is not at the core of what you are doing?

No, I mean that we make sustainable architecture by creating good designs, but issues of energy usage and so on are brought in through the engineers. It is not a starting point for us.

Coming back to the digital question, do you think that if someone uses purely digital models in the design process than the buildings end up being worse?

Yes, sure ... (laughs)...

I guess there are many buildings that looked good on the computer screen, but when they are built they still look like a digital printout...

Yes, but also the opposite is true. There may be some great physical models which, when finally constructed as real buildings, look really horrible, even if they were made physical first. When the scale of the model was translated into 1:1 things were no longer possible. But certainly the 'blobs' and 'fluid' buildings I don't believe in.

You spoke earlier about some particularities of working here in Brussels. Do you think that your location here in some way affects the way you work? If you do a building in Brussels do you feel a heavy contextual weight to respond to?

This is very dependent on the project. First of all, most of the competitions and projects we do are not in Belgium. A lot of them are in France, but also in Holland, Korea, Albania, Luxemburg and so on. Also I think that context can sometimes be an issue. It depends on the project.

Do you design projects in places which you may never visit?

Yes, I find this very interesting. Often I think it is an advantage not to go to the place where you start a design. This is because you are then influenced by the sensitivity of the environment on that particular day, at that particular moment when you were there. But the next day it could be completely different...

Do you think it can cloud your thinking?

Yes. There were a few times when I did not go to the site but someone else in the office went and got some information. So the issue is not that you cannot go to the site, but that in some cases it can be inspiring and in others quite limiting. So it is important to keep both positions in mind.

You studied architecture here in Brussels. What was the attitude towards modelmaking at your university?

Well, every week we made a new model...

So the importance of this was made quite clear from the start?

At that time, yes, but I don't know what it is like now. I personally find it very important. Also if I teach I only want to see models. The advantage of a model is that you do not have a single viewpoint. With drawings you always have a viewpoint so you can choose to hide or show particular things. The advantage of models is that they don't lie. I am not sure how it works in other offices, but here modelmaking is very important. I mean, if a visitor came to our office we would never show these rough study models which we now pile in a box, but at one point they were all essential.

What types of modelmaking equipment do you use in your workshop? Do you experiment with real materials in your models?

We only use the foam cutters. We often test different materials. This for example is a sample which we had made of an idea for a material. It is stone set into concrete. This was used for a facade. So we also do this kind of thing. Another example is this clear resin model used for a base of a building. So the wall has some clear polyester cast into concrete. We actually made a test wall with concrete.

We end up keeping most of our models for publications and exhibitions.

You spoke about the shift in the office away from the digital model. How do you think modelmaking will continue to change into the future?

This is a very personal opinion, but I think the digital era does not change anything. I mean you still have printed drawings, and I think the only way to create a good drawing is to think it through as if you were drawing it by hand. The rest I think is ugly and glossy and all looks the same. It is better to make a good model and photograph it than to make a bad digital image. It really is about craftsmanship.

Are you saying that since real buildings are always put together using real physical parts, then the digital model is never going to replace the physical model?

No, I don't think it will_

Brussels, Belgium
September 3rd 2008

An Interview with Jan Rinke and Fabian Holst

Bolles + Wilson Architects, Munster

MARK SZCZERBICKI Perhaps we can start by having a look at your workshop. Who makes the models in the office?

JAN RINKE + FABIAN HOLST We have one person who is in charge of the workshop. Then, depending on what projects are going on, different people work with the modelmaker. For the last year we have had one official modelmaker who is not an architect. Before that we only had some architectural students from the Architecture Faculty here in Munster. They were trained over the years to use the Bolles+Wilson modelmaking style. Now we have one modelmaker, who is always part of a team. He is responsible for the materials, the machines, etc. So for us it is very important to have someone here 5 days a week who can look after the workshop. The other architects who work here are very important, as they bring their years of experience on how to build certain details and types of models in the Bolles+Wilson style. So it is a team effort with the modelmaker contributing his experience with materials and construction.

In the last few competitions the process has worked in such a way that team members might do sketches and drawings, but then they might help build 2000 trees for a model... So it is a good atmosphere. Previously, the workshop was more of a closed room. Now it is open to everyone. We like this atmosphere as everyone can talk to each other and work in harmony.

Sometimes you can also see Peter Wilson here painting some of the models, so perhaps this is his time to relax from all the hard work ... (laughs)... So he is also very involved in this process.

It is great to hear that the process you describe is so inclusive. Can you tell me more about what you mean by the Bolles+Wilson style of model? Does this style appear at all stages of the design or just for the final model for each project?

First of all it is important that we mainly use wood to make the models. The 'atmosphere' of wood is not as abstract as some other materials. So we use mainly wood and some acrylic as we think it gives a model a certain 'atmosphere'. We also use a lot of colour and specially designed trees.

The thing about these types of models is that they age gracefully. If you see some of the old models in the office they are still beautiful...

Yes, they seem to age like a real building would. Can you tell me more about the use of colour? Are there any models which you would paint all in one colour?

Well, that all depends on the special setting of each competition. Sometimes the competition asks for an all-white model. So for example for an urban competition in a harbour area in northern Germany, the requirement was for a white/grey model. But since we like to use little bit of colour we coloured the acrylic on the bottom. So it is not white, not grey, but lightly coloured. So sometimes it depends on the competition. But it depends if we are free to do whatever we like.

How many models would you make for a typical project? Do you use certain common scales or does it depend on each project?

We usually make one model for each project. But let's take as an example a competition in Perugia, Italy. The site had an interesting topography. So we started with this as a working model. After a number of weeks it was made clear that it was not possible to use the same model as the working model for the final presentation as the topography was so complicated. So the problem became how to change the working model to use as the final model. This happens many times. For another project we had a working model made of foam. After a few weeks the design became clearer and details were discussed in sketches and drawings. Then one week before the submission the modelmaker started to produce the final model. So the process is usually the development of one model.

How do computer models come into the design process?

Well, for many years we had all these programs to build 3D computer models. But it takes a lot of time to produce a good wireframe model and Peter Wilson, who is the head of the design department, works faster with sketches and watercolours.

With the computer model there is also the problem of the interface. With a physical model you can just take it and change something without having to think how it can be done on the computer. Especially with the urban planning competitions you can quickly change the whole situation, try it out and see it immediately. So I don't think that this will change as it is much faster and you get a good understanding of the volumes. But maybe we are a bit old-fashioned about it... Maybe in the future we will just have gloves and virtual reality - but not yet.

Also, with a computer model you can produce a movie or single images. With a physical model it gives you billions of perspectives. As you move it around the light changes, and it is just more complex.

Do you make larger scale models as well?

Well, 1:1 scale is very rare. Sometimes we make models of parts of the facade to test details. Currently we have one model at 1:1 scale to help communicate the design to the engineers.

Would a model like that also be used to test the environmental performance of a building?

No, not that. It is meant to help develop the details. It is not a model that will be taken to the site.

Do you end up keeping all the models that are made here in the office?

Yes, some of them even go into museums.

Is the exhibiting of architectural models common in Germany?

The models all become part of architectural collections. The museums here keep a lot of the models.

Is there a rich history of making models here in Munster which you think the office is responding to?

I am not sure about a history of making models in architectural offices, but certainly in the Architecture Faculty here in Munster there is a long history of making models. So when students from the school start work here they bring this history with them. There is a very good workshop in the faculty.

Sometimes people make fun of architecture students here and say that they are modelmaking students ... (laughs)...

Do you find the context of the places where your designs are based an important starting point? Do you ever design competition schemes without visiting the site?

No, the context is very important. It is maybe one of the most important parts of the process here. It really is about context in all its different scales and dimensions. From the sociological to the material to whatever the surroundings are. You cannot develop a project without knowing your context. It may be different with say designing a chair, but you still have to think about who will be sitting on it.

One of our projects was a series of exhibition pavilions for Mercedes-Benz. They wanted something to show their new developments, have events in and so on. So that is an unusual example where they wanted the building in different locations, a road version of our architecture. This was a very unique task, but usually we always talk about the context.

The partners in our office have travelled extensively. They have a good knowledge of many cultural situations. If they have to go to new places they just try and get as much information as they can.

Are many of your projects competition-based?

Most of our projects are competitions. We use competitions in the office as a kind of research. Just because you do not win a competition does not mean you get nothing out of it. It is all part of a process which goes on in various other projects. And we can say that in the last few years we have done a lot of competitions for which we have been invited.

One interesting thing to mention is that most of the furniture in our office was designed by us and made especially for us. So now if we need any extra shelves of anything we just make it here in our modelmaking workshop. The furniture is often developed here as part of our design process.

It seems the modelmaking really affects everything that you do here. Do you know if this is the case with most offices here in Munster?

No, not really. There are a lot of offices here in Munster who outsource their competition models to specialised modelmakers. In those cases it seems that often the modelmakers know more about a competition than the jury! So if you want some extra information about a competition you just go to a specialist modelmaker ... (laughs) ...

Since materiality is so important in your work, what do you think of the sort of 'blob' architecture which is generated by the computer and which is more concerned with form than tactile qualities? Do you use physical models because of the importance of how parts of buildings come together and how materials relate?

Well let us take as an example the facade of the building we designed next to our office here in Munster. Peter Wilson talked about a 'Photoshop' quality, or a lack of depth, which he wanted to achieve with this building. So the question is not if you use a computer, but what effect you want to create in the end and how you can find solutions for it. So this building is an example of a facade which reflects our 'digital' times but is done with traditional bricks and mortar.

The computer can certainly generate certain interesting forms. One architect who spoke about a building which would not have been possible without the computer was Ben van Berkel with his *Mercedes Benz Museum* in Stuttgart. But if you think for example about Eero Saarinen's TWA Terminal, which was done in the fifties, the things going on in that space are just unbelievable. The same is true if you think about Baroque architecture. So you always need to have an idea of a building in your mind first. Another point of view to this question comes from the way we work. For many years now we always start with a design. Then we have the construction and we get a building. For the construction we use materials. So for us the question is not how to use a 3D computer program to help put materials together, but rather where are our skills in construction? Our profession is founded on the use of materials. We have gathered the experience to use materials for many years. So our skill is to put materials together in a certain combination. That is our day-to-day job, while using a 3D computer program is not.

In some projects we may start by trying to put some materials together on the computer, but this is because perhaps the client has asked for this. Also, with every new project we try to have a new material. It is not a rule, but it seems with each project there is one or two new materials, while the other materials come from previous projects. For example the facade here in our office was used for the first time, and then we used it in another building. So we collect experience in using materials, and this is our skill.

Of course this does not mean that we do not develop ideas using the latest technologies. For example for a recent project in Milan we worked with engineers who were very skilful in finding new structural solutions using computer software. The building authorities did not believe the calculations done on the specialized software were possible, so in the end we were forced us to use a simpler calculation which used much more material.

So the craftsmanship of the building, how its details come together, this is the important thing. It is not just about the big concept.

Yes. We have samples of many materials. We often talk to the companies that produce these materials; we talk to the worker who is using these materials. This is very important as it can bring about a solution for a particular junction or corner of the building. So while it may be helpful to model something in the computer, drawing sketches to communicate ideas is much faster. Sometimes we build large-scale models to test materials. The most important thing is the dialogue and communication between the company which makes the material and the members of our design team.

There are many decisions to be made in the design process. These need to be also led by a very strong awareness of cultural context. This can affect the material choices. You are never free of a background, so you have to decide to either take a new position or bring forward what is already there. This is the same with the use of the computer. We must make sure we have the cultural knowledge to use these new tools. It will probably take a lot more time to find a real cultivated way to work with computers. It is a process which is still developing...

I think there is something interesting that has been apparent since the start of our conversation. It seems there are a lot of traditional techniques in the way you use models and the way you work. However, the results are far from traditional, they are very contemporary. It shows that your design methods have been carefully developed with a lot of thought over time.

You are absolutely right.

An example of what we are talking about is this bluestone which was used for the facade of a bank building in Magdeburg. One reason to use it was to start a conversation with the Cathedral of Magdeburg which is next to the site. The Cathedral has a stone facade from the middle ages. To use the stone we wanted we had to use very new technologies for cutting the material. This stone is one of the most expensive building materials you can get and it comes from Brazil. This sounds very exotic but is a product of globalisation. In Germany we produce many products for export, the ships go to faraway places and take on water with exotic fish, and all of a sudden we have species from the Amazon in our harbour which brings ecological problems. So that's how funny things are – we need to bring a stone from Brazil to respond to a Cathedral in Magdeburg.

That's how complex it is. It is about fish in the Hamburg harbour, it is about cathedrals from the Middle Ages, and it is about new building technologies. Those are the aspects that sometimes can come together...

I see what you mean by the cultural context bringing complexity into projects...

That's right, and it does not mean a conservative attitude.

I noticed you make a lot of trees and greenery in your models. Is this because of the importance of landscape in your projects?

It is part of the environment in which we work. It is important to get an idea of how the building will look together with the greenery. To give a historical architectural example of this approach one can look at Mies van der Rohe's work. Very few people talk about his landscape architecture, which at all times was as important as his buildings. We treat it in the same way.

And what do you think about the future of physical models? Will they ever be replaced by the computer?

Well we just don't know. We don't know what computer interfaces will be like in 20 years. But we will keep on living in a material world_

Munster, Germany
September 5th 2008

MARK SZCZERBICKI Can you tell me about the importance of models in the design process in the office?

CLAUDIA CAVALLAR There is never a project without a model. It is part of the process to work with models – physical and digital models. We do sequences of models, and you can see from one to the other how we change the formal and conceptual aspects as the series progresses. So you cannot see the models as single pieces – they may be the third or fourth version of a series.

So a model in a certain scale may be re-done over and over to try and find the right form?

The model is not just for testing assumptions – it is for developing ideas.

Do the architects who work here build the models or is there some sort of dialogue between them and a modelmaker?

We hardly ever commission professional modelmakers for our models. It is too close to the process. So usually one of the architects along with some office juniors makes the models. An important aspect of our models is that they are working models. They are something by which you test structural design, program right from the beginning, even if the model is very small.

So the models are not abstract artefacts floating in space – is there is always a strong connection to site?

Yes, the connection to the site is important. We usually start by building a site model, and it is from that model, that we start looking at the axes, the views and the topography of the land.

One good example is the competition model for the Grafenegg outdoor concert venue. Studying the terrain with its subtle topography helped define the excavations and hillocks, the artificial topography that echoes what was the original landscape. This venue is home to a music festival every summer for the rest of the time it acts as a folly in the park. This building is in a part of Austria where an architectural discourse is not really that advanced. It is set in a 250-year old garden with a castle that was re-built in the 19th century. The building works very well and what is interesting is how close the photographs of the building are to the models.

There is also a degree of abstraction present in the models. For example we may choose to use a certain colour for the ground plane to explain things to the client.

I noticed not many of your models are all white. It seems you are trying to distinguish texture and materials at an early stage?

Yes even in a very small scale certain ideas are already present.

The *Fidesser Haus* project in Retz is an interesting case. The project is for the conversion of an old winery and it is to become the client's secondary dwelling. The interesting thing about this project is that Retz has a building code which is quite precise. The site is on a small square just off the main square where other buildings from different periods and styles have already interrupted this homogenous storybook image. So the point was to take the scale, take the complex building code with all its coded rules, and start to twist it. So you start with a certain inclination that the roof must have, and then the neighbour's light access comes into play, and out of a written code you produce spatial geometry. There is a whole sequence of models built to study different situations arising from the building codes and other parameters and it is really fascinating to see what changes the building goes through. It ended up as a series of inter-connected yards with a bridge section spanning over the top and a small front elevation.

So the exploration is sometimes based on topography in a landscape setting or on a massing study in a built-up urban environment.

Can you tell me more about how the computer models work hand in hand with the physical models? Is the computer model also created at the start of the process?

Yes the digital model is also made from day one. There have been some projects where the computer has had a bigger role as a controlling entity. For some projects CNC (Computer Numerical Control) manufacturing is involved.

I can see some larger scale models here – also for the *Grafenegg* project?

Yes, there are some 1:100 and a 1:25 model. The 1:25 was used for acoustic testing. The acoustic engineers were able to look at the model and adjust the position of the acoustic panels. The 1:20 model was made specifically for that kind of problem-solving. The building was complex because the stage is open, and the building does not have an electro-acoustic system. So all the performers can rely on is natural acoustics. This is really unusual in an open-air stage.

There is another model also of the same building, but from what is written on the surfaces it was used to talk to the structural engineers. It was used to communicate the setout of the different wall panels. What you see is not how it was first built – it was changed and changed over and over.

Here you can see another sequence for a residential development (Auer-Welsbach-Strasse). You can see how the same scale of model is made over and over again – in this case to analyse massing in dependence of the building code. Other models may be made to just show the structure. Here is an example of a model for the *Seebad Kaltern* project in Italy. In this model it was important to focus on the the structure and the volumes of water. Sometimes these ideas are also explored with drawings and sketches. But what is nice about these series of models is their precision. It is not simply a little model, it is really precise. They are there to help develop ideas.

If the models were less accurate you would not get the right answers for the ideas you are testing?

That's right, exactly. Here is another series of models for *Kaltern*. It shows a transition from being a normal closed building to being a platform with water-filled depressions on top. You can see that at the beginning there is a lot of roof, and then slowly the roof starts to disappear and becomes two light-weight pavilions. So in the original idea the roof was inhabited and then this idea reversed itself.

Sometimes the models are really quick. They may be used to really focus on an idea. But it is always a case of using them in a process.

Can you tell me about what the approach to modelmaking was during your studies and how it compared to the process here at the office?

Well, Marie-Therese Harnoncourt (director) and Ernst studied at Wolf D. Prix's in Vienna. There was always a very strong emphasis on models. People understand the spatial aspects of architecture better through a model. There is still a lot to get your head around even with a model...

So you don't find that showing people a section or plan works as well.

Of course that works – each medium, drawing, model, visualization emphasises different aspects of architecture and we use them all – also as communication media.

What is the attitude to your architecture here in Vienna? Are people quite open-minded to your ideas?

Some like it and some don't but a lot of people value the intensity and diversity of our work.

You mentioned you always build site models. The context of each building must be very important in your work. Do you ever simply work off a Google map?

We do – in addition to models or site visits. We collate these different types of information.

But the approach to the topography is also theoretical, it is not just a question of '*have I or have I not seen the site?*' What I think is interesting in this office is that the buildings tend *not* to have a facade. *Grafenegg* has a figure, it is iconic, and you can take a photograph and use it as a logo. But it is not iconic in the traditional sense i.e. through a facade. It has an extraordinary geometry. You see on the models how it grows out of the topography, how it surges. The building is almost like a landscape feature. You have to move though it to understand it. *Kaltern* too can only be fully grasped by moving through it. People look at the model, and they always have this bird's-eye-view, which in reality you never ever see. So during construction you have the cranes there, and you take pictures just like pictures of a view of the model. And then one day the cranes and scaffolding are gone and only then could you appreciate how the space worked when you walked through it. In a way landscape has this quality. Walking though it is a way of seeing and understanding.

So it is an advantage to have a large-scale model where you can put your head inside and look around?

Yes, but even then the model can be misleading. If you look at a model of *Grafenegg*, you think this building has an enormous impact on the landscape. By its position and detailing quite the opposite is true it sometimes seems to disappear like a fata morgana. In the summer when the sun goes down it takes on the colours of the sky.

Do you think the modelmaking process in your office will continue to be used into the future? What effects will computer technologies have on the physical model?

In general if you are controlled by the process you are using and not the other way around, then you have a problem. So to just go and say '*let's use some CNC routing here because it's cool*' just wouldn't work because you need to have a mastery of a process first. And this office has a mastery of this modelmaking. There have been forays into other manufacturing techniques, and they have worked very well because they were appropriate for a project. And what is funny about those processes is that you use them once and then you shelve them but you always come back to them. So we would never exclude them.

It seems like the process you use here is something that has been really thought through and developed over a number of years.

Yes and there is certainly no end in sight. So you see for *Grafenegg* how the folding of the roof becomes the folding of the landscape. The transition between landscape and building is done by a kind of folding mechanism. So you work with the logic of a sheet of paper...

That is interesting because when you are working with a sheet of paper, you can physically fold it and cut it with your hands.

Yes and this comes from an approach that there is no foregone conclusion to a problem. In this office the idea is to say 'wait' and then turn and twist the idea. One aspect of the work is to start with a clean slate from a conceptual point of view, to question everything. Then this is combined with an almost engrained process of building the physical model. I don't think the next ENTERprise will do architecture without the physical model. But you never know – one of our main intentions is to be open to the unknown.

Vienna, Austria
September 23rd 2008

MARK SZCZERBICKI Perhaps you can start by telling me how models are used in your office in the design process?

MARLIES BREUSS + MICHAEL OGERTSCHNIG We always start the design with a model of the surroundings of our site. We try and emphasize what is important about the site, so we always visit the site and systematically try and understand it. Of course this is not always possible because of time constraints, but we always try and start with the site model. Then after we have understood the qualities of the site and the surrounding structures we make an 'abstract' or 'concept' model. This model is not really anything to do with the end product, but it is really importing the important things we have seen which we find interesting. From this concept model we then start working on the computer or work on the model again.

Is there a set scale or material that you use for that initial concept model?

I'd have to say it is always different depending on the project. It also depends on whether it is a structural model, a design model, or the final presentation model we're making. For the final models we usually use the same materials. Originally we made the models ourselves but now more often other employees make them for us. We check with them what they are doing, we discuss the models, and then they work on them some more. So we always try to be involved in the process and we talk about the progress every day.

And you have a dedicated modelmaking space for this?

Yes we have a modelmaking room where whoever is making the model can work.

You mentioned that a computer model is made after the initial concept model. How does the dialogue work between this digital model and the analogue one? Are they usually developed hand-in-hand or does it depend on the project?

I think this really depends on time. I can explain it from this position – right now we have 4 competitions in the office all at once. So the time to make the models is very compressed. So we had to decide to only make computer models for two of the competitions. On the other two we chose to build small study models and then immediately transfer them to the computer. It is really a matter of time – sometimes the computer makes more sense because ideas can be tested faster.

It is also a question of scale. Sometimes we use the physical model to test certain aspects of the spaces. Then we move to the digital model to analyse other aspects of the design better. And then sometimes we go back to the physical model again.

Is the same computer software used for the 3D model as for the 2D drawings?

No, we tried this process but it did not work. At the outset the designs were too fixed in their standard structure and spaces. For the kind of architecture we do we do not want the result to be so fixed at the beginning. We now use programs such as Rhino or SketchUp and then we find it easier to transfer those models into 2D. We also make a point of always making the computer models here in the office so we can maintain a certain style. We do not necessarily make completely realistic 3D models, but we try and have a conceptual style to them.

Do you ever outsource your physical models to other firms?

Yes, sometimes if we do not have the time to make it by ourselves, or if we want to use a material that we cannot work with in the office. Like with plexiglass for example, which is very difficult to cut. If we use materials like paper and cardboard we make it in-house.

Are the professional modelmakers local to Vienna?

Yes, there are about 10-15 modelmakers here. Most of them are not necessarily specialised in architectural models. They usually make models for things like diagnostics.

You mentioned before that you start the design process with a site model. Is the context and location an important factor in your designs?

Yes, on the one hand there is the context and the program. On the other had is our personal interpretation of the topic. All these things are then put together.

Where did you study architecture and what were the approaches to modelmaking during your studies?

We studied here in Vienna. Michael also went to Barcelona and I (Marlies) went to Los Angeles at the southern California Institute of Architecture. I chose SCIArc because it was very well known for model-making. They had a very big modelmaking workshop. At the time Columbia was more interesting in computers, but I was more interested in the conceptual approach. At Columbia there was much more of a

reliance on computer intelligence where you put all the parameters in and the computer designs the building. We are much more interested in combining our own logic with our own emotions and aspirations and the things we find on the site and interpreting these things.

In Barcelona on the other hand there was much more of a focus on digital models than the physical.

Over the years we have had many trainees in the office and it is amazing how different their attitudes to modelmaking have been. Depending on which University they come from there are big differences in how they approach modelmaking, how they interpret space and how they develop designs.

Do you need to explain to the trainees how to make the models in a particular style or do they each bring their own experiences to the project?

We originally discuss what kind of model is to be made, but then how they do it is up to their individual experience. It is a philosophy of our office that we keep the personality of each person working here. We think each person has an identity that is very interesting and that is why we choose them to work here. We want to keep this identity and involve it in our work.

Do you build large scale models to test environmental strategies and communicate ideas to consultants?

Yes, this is always the case. One example is where first we built a conceptual model of a roof. Then we choose a section of the roof to model again in a different scale and style. The models are also sometimes used on the construction site. At first the builder is always happy, but then after a few weeks of construction they realise the complexity of the buildings and they say '*Please, can you bring the model to the site?*'... (laughs)... And then when they see it on the model, they understand how it works.

How does the modelmaking process work with clients? Do you involve them in the development of the designs?

We always start with the model with clients. It is not possible for a client to understand plans. We also do not want to start with a rendering, because a rendering is something best suited for the final end-product. So what we do is that when we create the contract we always include a model. We never start without a model and it is always included in the first conceptual presentation. The model is always a conceptual model, not a typical presentation model.

Do you have clients who ask you not to build models, or try and convince you that perspectives will be sufficient?

We have had this happen a few times where the client says they do not want models, and they just want a sketch instead, but then we say just say no. The building is going to be something you are going to live in, something which will be around for fifty or even a hundred years. So it always better to see the model and understand what is happening and pay a little more money. And if they don't want this we don't work on the project.

What is the attitude of the planning authorities here in Austria to architecture?

It is very difficult. We feel like the government is always putting more and more responsibility on the architects and other people involved in the building's construction. So the regulations get more and more strict. It helps to protect the end user but makes experimental and vivid architecture very difficult to build. So even though everyone wants a lot more open space and more freedom, the regulations are becoming a lot stricter. So the architect is caught between this wish for a more open space and the government's regulations.

Do you find that the majority of your clients are excited to enter into a discourse about what you are trying to achieve?

The way it works is that most of our clients already know some of our projects through some publications or whatever. We then have a discussion process which uses the early concept models to add to the discussion points. So most of the clients are interested to get involved but then it depends on their personality. We don't hide anything in the process, and this is one reason we use models. We have to make them understand the concept, and once they understand the concept then everything is possible.

Using this process we have never had to do something twice. At the initial stages of a design we give our private clients the possibility to talk about an alternative solution, but they never select this option.

It is interesting that it sounds like you really delay the final decision about what the building will look like until the concept is made clear and the concept is understood by the client. You do not just work in seclusion and surprise the client in the end?

No, we have no genius sketch... (laughs).. That is not our way.

It sounds like a very open process in which the client is very involved...

Yes, but they are involved in the beginning and not in the final design process. In the beginning we ask the client to give us a list of what they know, what they have seen, and what are their wishes. What is their vision? What have they always dreamed about when they were a child? Or when a couple was dreaming together about their house what was their inner vision?

You do this instead of asking how many bedrooms, bathrooms and so on?

We are not interested in that. We are interested in their vision about how to live. We don't involve them in how high a room should be, in how big it should be. So they give us their vision, we design the concept and show it to the client, and this always works. They understand that we design for them something they have already been thinking about. We are the professionals and they let us do this.

Are any models made especially for publication purposes?

No, we only make presentation models for clients. If someone else wants a presentation model, they can make it themselves. We believe the models are here as part of the design process. They serve us to help understand the space, not to have special presentation qualities. And then once the building is finished they should photograph the real building, not a presentation model of it.

How do you see the process of using both the digital and analogue models developing into the future?

We are always working both with the digital and the physical, but it does depend on time. I think that if we had more time we would work more on the physical models to develop the projects. The computer is just faster at visualizing ideas. But we are currently teaching at the University here in Vienna, and there we say '*Forget the 3D computer model, because you can always fake it*'. You can trick other people and you can trick yourself because you can always choose the best view. When there is a problem you can always hide it. But this is not how architecture works, because in architecture you can go inside the building and see everything..._

Vienna, Austria
September 23rd 2008

An Interview with Martin Jost

Delugan Meissl Associated Architects, Vienna

MARK SZCZERBICKI Can you tell me how modelmaking is integrated into the design process in your practice, and how important the use of physical models is in the office?

MARTIN JOOST It is one of the most important parts of the process. This was especially the case with the *House Ray1* apartment project. I came into the office 7 years ago and the *Ray1* was in progress. There were many different ‘looks’ and scales tried out in the models for that project. At that time the computer 3D modelling process was not in the office. Everything was drawn in 2D and all the sculptural explorations and forming was made using the physical model. Also the idea of the *Ray1* was not only that of the exterior skin, but also that the interior and furniture were one continuous fluid piece. The bed was connected to the facade and so on. This could only be developed using the physical model.

The process has changed a little bit through the use of 3D software. But we still use the sketch or drawing to find the main idea. So the focus of the design idea is the sketch. Then this gets transformed in the 3D computer model. Then the computer model is always ‘unfolded’. The surfaces are printed in 2D and glued together to make the physical model. So you always have the sketch, then the 3D model in the computer, then it goes on to the unfolding, and then onto the physical model.

Can you further explain the process of unfolding?

It is very simple. From the 3D model we extract the 2D surfaces. We print them out on a piece of paper and we get them cut out and glued together ... (laughs)... Then we get a dialogue developing between the physical model and the computer model. This happens over and over. With the physical model you can touch it, look at it and feel it. In a way things that happen in the physical model cannot happen on the computer. We then re-make the computer model to be more precise. We find this process to be a very fast and an inexpensive way to come up with an interesting solution very quickly.

Does the scale of the models you make depend on each project or is there a set progression of scales you use?

This depends on the project. I recently gave a lecture about how we use the model. The example I used was the *Porsche Museum*. You can see how it starts with the sketch, then the 2D surfaces are taken from the 3D computer model and put together, and then this process repeats. The final solution was found by cutting away and pulling parts of the form using this process.

Is it not possible to cut parts of the model away in the computer instead of on the physical model?

Yes, but there is still a difference in doing it on the computer and doing it physically with your hands on the real model.

You asked previously about the stages of the model and the scales we use. For the *Porsche Museum* we started with something like 1:500 scale. We made around 20 – 30 prototypes. With each one the design gets more interesting and more detailed and the idea gets stronger and stronger. Once we need more detail or we need to produce something quickly for a client presentation, we use 3D printing. We do not do this in the office – we outsource it to a firm very close to our office. We send them the 3D computer file after checking it in the un-folded paper version, and they produce the 3D print. So here is an example of the first version, there are still some mistakes on this model so we did not use it further. Normally it would be sanded and sprayed and it would look very slick. The edges are very exact, not like on a cardboard model where you see all the joints at the edges. So if you then give a model like this to the client, it looks very professional because it is finished and polished. So it works in a similar way for competitions – we first have 20-30 of the rough paper models and then a final 3D print.

Another example of the process is a competition we are currently working on. We started with rough cardboard and foam core models, then we worked at a larger scale to work out the details, and finally we went back in scale again for the final 3D print which will be sent to the client.

Is the 3D printing process very expensive?

Yes, they have very good prices ... (laughs)... I mean one piece of foam core board costs 5 Euro, so a medium sized foam core model may cost 100 Euro including the labour time, but this tiny 1:200 3D print model was something like 200 Euro. But it does look more professional, and the process is quite quick – 3 days after sending the data we get the model back.

The 3D printing company works using .stl files. They first check that the geometry of our 3D model is OK, they simulate the 3D printing process to make sure it will turn out OK, and then they either get back to us if there is a problem or they just print it if everything looks ok.

At the beginning of this year we participated in a big competition for a concert hall in Jordan. This again followed a very typical process. We started at a very small scale to find the form. It is actually a pity we do not keep any of these early models. We throw them away because just

one competition produces enough models to fill a whole shelf. But the process was very interesting – starting from the small scale, working on the dialogue between the computer model and the unfolded paper models, and then moving up in scale. For the client we had a small scale model made which fit into their site model in Jordan. Apart from that we also had a larger Polystyrene model made where the edges were mitred and a kind of snake-skin pattern was laser-cut onto the surface. So you could touch and feel the pattern on the model. So even though Polystyrene is a very dead material, because of the very precise pattern on the facade it looked great. We could put lamps inside the model and because of the perforations we could see how different lighting conditions looked in the daytime and night-time.

Once we have settled on a form using the process described above, we then move on to other scales to further develop parts of the design. For the *Porsche Museum* we made a 1:200 sectional model. This was made out of foamcore here in our office. Depending on the skills of the interns you can achieve some great accuracy in these models ... (laughs)... The model was the size of a table. We brought this to the presentation, and Mr. Wiedeking (Porsche CEO) stood up and said '*wow, I want this!*' So for us it was very important to have this model because otherwise you only have plans, a PowerPoint presentation, and maybe you can rotate the 3D model on the computer. But it is never as good as having a real model – you can put your head inside it and look around, grab it, drive around it with the scale cars...

So that was how we developed it. The next step was the interior design of the exhibition space. We had a model made which showed only the space for the exhibition. Then the last scale was 1:20, for example for the coffee bar. 1:20 scale is really like playing with a doll house. Our idea was to have a pattern lit from behind so we just printed it onto a transparency to see how the light would work. We also made 1:1 samples which the client can put up against the light and see how it will look. So you can see how the process works with the model at all scales.

What I find interesting is that the Directors in your office talk about a kind of fluid transition between spaces in their architecture. It seems that the modelmaking style you choose represents this idea. If the models had rough edges and were less slick they would not represent the ideas as well.

Yes, they would not transport the idea as clearly. For a model of a concert hall we are working on, for example, we built a very precise, very sharp Polystyrene model. You could cut your finger on it ... (laughs)... Then we photographed it and inserted it into an image of the site. Roman Delugan (Director) is always very precise about his models and is also a very good photographer. When I first started in the office I thought they either must have very good visualisation people or they must be using some great rendering software. Then I realised it is just a photograph of the physical model!

How are the roles in the office divided when it comes to modelmaking?

The division is quite clear. The architects work mainly on the computer, and the interns or juniors build the 3D 'unfolded' models. Then the design team meets around the paper models and cuts and changes them in the meeting.

Is the context of where you design an important factor or does it always begin with the idea of a building itself?

Perhaps it is not true what I said before about not working with models at the start. At the outset of the project we usually have a very rough large context model built. We start designing using this model. We get the volume from the brief and we try it out on the site model. We study the kind of connection we want to the city, the kind of organisation we want and so on.

Do you think the architecture would suffer if you were working only on the computer?

Yes, it is difficult to describe this but there is a need to grab something physical. You somehow have to look at it in real physical surroundings. There is also the possibility that you turn the model upside down, or it falls and something breaks off, and then you discover something interesting. This is not possible with the computer model, because there you are working very strongly towards a particular direction.

So it seems you think there are more discoveries possible in the physical model as opposed to the computer? You spoke before about building large-scale mock-ups of certain parts of the *Porsche* project. Does this happen often?

Well, for the *Porsche* project we built models up to 1:20 or 1:50 scale. Even the 1:50 ones were absolutely huge. Normally all the models are white and abstract so you can see the form well with the light and shadow. But for the interior model of the *Porsche Museum* we were working with a particular material and we wanted to show how by the use of a reflective foil on the ceiling the space just expands. This was an effect which the client realised only through the model. Because of this we were also able to make a decision for the facade which cost a lot of money, but once the client saw it he wanted it. This would not have been possible with renderings.

What will be the finished facade made of?

Polished steel panels in a rhomboid shape.

So when you are designing and looking at these white abstract models is there an idea of materiality from the start of the project?

Yes, but this comes out at the larger scale. Also if it is going to make an idea stronger we will sometimes integrate materials into the models.

It is obvious that the structure of the buildings you design is quite complex. Are physical models used to communicate parts of the design to engineers or other consultants?

At the early team meetings we discuss models. But as the project progresses we use renderings and images only. I can explain how the process works using the *Porsche Museum* again as an example. Once we reached the documentation drawing stage, we received the 3D file of the initial structure from the engineers. Then we used this to build a sort of framework around it in 3D, similar to building a ship, with surfaces connecting points on the structure. Then we said to the consultants: '*This is the framework envelope where you can put your structure and services, and if it does not fit then we both have a problem...*' The computer gave us a big advantage in this process by using parametrics. Once the shape of the steel structure was fixed, we got an engineer to input the parameters into a program. Then if there were any changes in the insulation thickness, the type of cladding and so on, they did not have to go in and change the affected parts individually because the parametric program automatically adjusted everything. This makes a lot of sense, because at the outset of the documentation process we might not have every facade decided, and so usually with every change someone has to adjust all the structure. If you have it in parameters, you just change the parameters and the form changes along with them. So then we can cut the parametric model along the structural frames and we get a very simple line drawing showing the extent of all the spaces. We can then fill those with our construction details. This process of course does not have anything to do with the physical model, but it is very interesting also.

How do you think the attitude to modelmaking has changed since the time of your studies to now?

It has changed a lot. At first at University we were experimenting a lot with resin and with anything really just to see what happens... (laughs)... Now at this office this is obviously not the case. The time factor has changed as well – we do not have all the time now to experiment. But I do think that the process we use now still allows a lot of experimentation.

Do you think that without the computer this process would not be possible?

Well we are currently working only in 2D planes, not in rounded or warped surfaces. So yes it is possible to design this way only in 2D drawings and physical models; it would just take a lot longer. But if we did the rounded 3D surfaces I don't think it would have been possible without the computer model.

Even if we could reach the same result only with 2D drawings and with physical models I do not think it would be possible to build the projects. The engineers need the computer model to see the section through every member and to visualise the connections.

At the end what is important is that the model is just a tool. You must somehow transport your idea in a way that the client understands. I think it is just human nature to want to feel something, to look into it. A lot of clients cannot read plans and sections. Even with renderings and 3D fly-throughs it is still an abstract visualisation on a 2D plane. The advantage of the physical model is that you can just grab it...

Do you think the process of dialogue between the computer and the physical model will continue into the future in this office? Do you think one of the methods will eventually take over?

We will continue while thinking about how to optimise this process. For example, we wanted to buy the 3D printing machine, but it is still too expensive. The office of Delugan Meissl started with the current process when I arrived here. I previously worked for Morphosis in LA, and in 98' or 99' they were using this 3D printing process which allowed you to arrive at a very strong idea of a form very quickly. So when I started here we integrated this technology into the process.

We think that with this kind of dialogue the architecture can be more complex than just building boxes. You can push and pull the spaces on the computer, make the program more complex, and then very quickly see the 3D print of the form_

An Interview with Naomi Shaw and Patrick Lynch

Lynch Architects, London

MARK SZCZERBICKI I find it interesting that your website is one of the few that I have seen with a whole section dedicated to models and modelmaking...

NAOMI SHAW Certainly, modelmaking is an integral part of our process here. We always start with a model, and we very rarely make final presentation models. They are usually working models. Obviously, as we work with larger developers they sometimes commission presentation models.

A project which illustrates our design process very well is the *Greenwood Road Residence*. We began with 1:50 scale models in grey card. The site is an end-terrace in London; it actually used to be the rear garden of an old pub. It is a very small site. The clients were an ex-carpenter and a rock journalist, and were very keen to make a timber-framed house. We ended up using a green oak frame, and the client ended up doing a lot of the work himself. The precision that we ended up with on the building came from many things, one of which was the modelmaking process. We had the time and the resources in the office to build a model at 1:20. The detail at that scale allowed us to build the model as the building might be actually built.

Was the model used to explain parts of the building on site once construction began?

I'm sure it helped in communicating between us and the contractor, but it was especially useful for the client.

So we began with grey card models, as well as site models to show to Council. The local authority here in London was Hackney. They are always overloaded with work, so it is very difficult to get decisions from them, and the client was keen to progress the project. In the end the reason we got planning permission was that we took the model in to the planning department, and put it on the table, and you could see the massing, how it sat at the end of the terrace, and immediately they said they could see the scale was acceptable. So it was different enough, but still of a scale and character fitting for the area. It seems that some of the people in the Council don't fully understand plans, and that there is a level of detail which we have worked out when we take a design to the planners, which they just are not considering. They have not absorbed or read enough for them to accept the design. There is something more believable when you see it on a model than seeing it on a page. So you just cannot lie on a model, you can't 'fudge' any part of the design.

Making the models also allowed us to see where problems were going to occur, and to deal with any issues at a very early stage. We took a 1:50 model to the planners, but after that we very quickly moved on to the 1:20 because we knew we had to deal with the oak frame, which was a very fixed part of the design. So this forced us to deal with the dimensions of the frame.

All these models have been built here in the office?

Right here on our meeting table. The models are always the focus of our conversation.

We also took the 1:20 model to the planners and it was really amazing how little understanding they had of the building. With the large model they could point to a part of the building and ask '*What is that going to be made of?*', and we could tell them and make a note of the conversation.

How about the clients, were they very involved in the design process and the evolution of the models?

At every stage that we would resolve the design through the model they would come along and see that. So in a way we need to train our clients to read working models. Initially there can be a shock, or a lack of comprehension on a client's part, about what the white foam core means... So by the end of the design process they have learnt a new language as well...

That is an interesting point. I guess you don't want to hide the conceptual stages form the client, but at the same time you do not want to jump to a finished presentation model.

And similarly you do not want to mislead the client. You need to be careful about it; I think it is an editing process about what you show in terms of materials on a model.

For example, here you can see a large development we are doing in Victoria in London. It has just gone into planning. As you can see it is a working model, it has been cut up many times, but it is still legible in terms of its elements and some of the surface treatments.

It is important to mention that we use the working models to photograph in lots of different light conditions. We then take them into Photoshop and tidy them up. This is a technique we use quite a lot to communicate with the client about our design thinking. We personally do not produce purely computer-generated perspectives. We do use things such as SketchUp as a tool, but not for presentations. Our preferred method, which we feel is more accurate and more representative, is to take photos of the physical model.

You feel that the accuracy of the light is better on the physical model?

Absolutely, I mean you can't bend light around the corner.

You started out doing mostly residential projects. Now that the projects have increased in scale do you find the design process has had to be adjusted somehow, or are you still able to follow through the same steps?

I think we use the same steps, but perhaps because you are working at a bigger scale you cover less detail and less ground. It is also a matter of time and speed. This is a very, very time-consuming process.

An interesting example of how we use the knowledge gained from this modelmaking process is with the *Brent Cross* project. Initially a client came to us with a site. She wanted a terrace house built for her family. This was a design that we got planning permission for very fast, so it was fairly detailed. The client didn't have the funds to go ahead with it, so it was never built. We built a 1:20 model of it to get the planning permission. Then we were asked to do a housing scheme in *Brent Cross*, and we were given a certain density of housing that had to be provided. We realised we could achieve the correct density of housing by laying out these terrace houses we had designed previously for the other client. We were able to use our experience with the previous design and the model in particular, and the details we already worked out, to run out these houses on this lot and know that it would fulfil some of the economic constraints.

So obviously the design is not exactly the same, but having built the previous model at 1:20 there is a lot of information we already know about how that house would have to be constructed, even though we have not had to do construction drawings yet.

This is part of our frustration with the planning system, because when we build models at the scale of 1:20 there is a lot of information that is worked out, which is certainly not understood when they just receive a pack of drawings. So when we land the big models on their desk, after months and months of waiting, we suddenly get planning permission.

It seems that the majority of your large scale models are made with wood and not cardboard. What is the reason behind that?

The 1:20 model of *Greenwood Road* is foamcore with balsa cladding. There are a number of reasons for this – it is partly about the materiality, partly to express elements of scale, and also to start to understand how these things might actually fit together. So there are elements that could be built independently, but there are things that you would need to build in the order that they may stand up.

The grey card shows that you can deal very quickly with the form. But the balsa allows you to read the brick courses scored into the material, so then you begin to test things like how do you make an opening in this brick wall as opposed to a green oak frame when the cladding is timber. That is the sort of thinking that goes on in a model like this. These lines on the model are not random – they are the 76mm brick with the 10mm joint.

Are you anticipating using any 3D printing or laser-cutting technologies in your modelmaking in the near future?

Not yet! Because they are working models, the process of looking and cutting and sticking is part of the work, it is the work. So to press a button and have it done for you just doesn't have the value that we place on modelmaking.

Do you involve the consultants in the modelmaking process from an early stage?

Certainly with structural engineers we show them the models at a very early stage. Also with mechanical and electrical engineers it is very useful to show them what they are allowed in terms of add-ons. We show them how we see the environmental strategy being incorporated into the facade. We can adjust the model and see if what they suggested works with the design or not from an aesthetic point of view.

Is an environmental consciousness an important part of your work?

Yes. This is considered from the outset. Certainly what you can do very quickly with a physical model in terms of an environmental strategy is to test it in the sunshine. You can understand the relationship between openings and cross-ventilation very fast. For example on this model for a green office block at the Victoria project one of the first things we had to consider very carefully were the window openings. Each of the facades has a different window detail depending on solar orientation. We developed a brise-soleil using these models. By also using the 1:1 material models, we worked out how the bronze frames will work with the porcelain tiles. We realise the problem of maintenance and cleaning and streaking and staining and we modified the detail using the model.

That shows how an environmental strategy can be tested very quickly in the model...

Yes, in a model you are forced to deal with it. The minute you hold it up to the light you can see what is going on inside very quickly.

PATRICK LYNCH Since we have been working for larger client groups we have been forced to work in a more conventional manner. Here for example you can see a 1:500 CAD/CAM model produced by the master planning architect, and the reason we have it in the office now is that it took them all night to produce and it is wrong. And when you point out that it is wrong they get really pissed off and they don't want to change it. So my question is: why are we making the model? We're making it because we are going to a meeting with the planning authority. Well, then isn't it more important that the model is right?

But no, it's this confusion between presentation and work which always exists. There is a belief that people must make models only for presentation purposes. So the guys at the master planning architect's office were trained at the Bartlett and they keep saying '*Oh, that's really interesting, you're making models before you've designed the building. That's really strange...*' And we keep saying '*We design the building through the model*'. But for them design is this orthographically driven thing, where the drawing is God, to the extent of '*Stuff the design, let's just make a beautiful drawing*'. It seems like a world of 'paper architecture'. And it seems like a bizarre, old-fashioned, plan-driven way to practice. They do not see the plan as a way of orchestrating movement, but the plan as a thing in itself, like a tapestry where you draw dots on the plan to show movement, allowing you to infer that the space between columns is where you're going to walk. That is the CAD/CAM model that just doesn't work.

I've just come from a meeting where the firm that was making models for a presentation of one of our projects was making everything wrong. They were working off a design we did in March and now it's September. It's all got to do with this stupidity of having the modelmakers being stuck in the basement, accessing their server, and it turns out some student working on the project has not put the right files in the right folder. So they end up making a model which is 6 months out of date. And the model guys have never spoken to the project architect, who is there at the meeting, and who suddenly starts shouting and swearing as if the model guys are just slaves in Cleopatra's court.

MARK SZCZERBICKI And how does the client react to this?

I don't think the client gets it. We bring our big models along, because we think they are useful for everybody to talk about. Then we get told by the master-planning architect not to show them to the client because they're too 'scruffy' and they look un-professional.

Then the client looks at the models, and doesn't make the connection that through the model we are able to deal with crucial environmental questions. The site is south-facing, it's an office building, it's incredibly noisy, and if you want to put housing there which is not air-conditioned, and which you might have an iota of possibility of getting planning consent for, then you cannot duck the issues, you have to meet them head on. And if you produce a piece of architecture which is ugly as a consequence of trying to do something stupid (like putting housing next to a theatre on one of the busiest streets in London), the fact that the client can say '*That looks really ugly*', means that I can say '*Things in architecture are beautiful if they are a result of beautiful thinking*'. And we got to this point quite quickly in this particular project, because we made a big model of it and the client said it just looked awful. So then we're able to go back to what we had originally intended.

We also make these other models which are incredibly elaborate and very detailed, and we bring them along to bi-weekly meetings with the planners. And the planners say '*These models are really scruffy, I hope the building isn't going to be as scruffy as these models...*' So you get trapped in this cycle of representation being about *presentation*, rather than anybody catching up with the really obvious thing that is happening to architecture. It is not about CAD/CAM, it is about digital cameras. You have the camera connected to a laptop, you take a photo of the model and you email it to somebody, and you can change things instantly. And if you have the camera at the right height, looking at the model of the building, you're as close as you will ever be to kind of manipulating reality in the future, knowing that it will be perceived in this certain way.

But I think we're going against 50 years of modernist orthodoxy, so we make a planning application with a set of drawings at 1:100. You then make a set of tender drawings at 1:50. And then you try and build it and you realise no one has really thought about any junctions or what anything actually looks like. So you end up with this situation on the construction site where you have eight different materials trying to meet...

And no one has realised this was going to happen...

Yes, because no one has built a model of it. No one has thought from day one about what is the rhythm of brickwork, what bond of brickwork will we be using, how do you make a window, how do you deal with bringing a vapour barrier to bear with a thermal barrier, and how all this relates to the structural integrity you are trying to achieve?

The other crucial thing is how does all this relate to cost? I mean, the client looks at us and says: '*OK, so you can get planning permission next to a heritage listed building – that's rare. You can make it work without air conditioning – that's even rarer. Oh, and the QS can price it and it's a lot cheaper than what the other guys are doing with their CAD model experiments. Right, OK...*' And they sort of leave it, they don't think there must be something in this methodology of work which enables us to control cost since we are coherently thinking about construction at the same time we think of form and scale. I just don't think they get it...

You think they miss the point...

It's like the paradigm shifts. It's a specific boiling point where the water will sit there at 99.75 degrees Centigrade for about five minutes before it finally gets the energy to jump to steam. It's just bizarre. They just don't want to get it. There is this thinking that new technology equates to new architecture.

Here is a model we had made recently, where we had this vague idea about how to make a facade. We photographed the model and collaged it in. The model was really crude actually - we used acid on the surface to get the desired effect. But the thinking behind it was that you have this really simple form, so how do you variegate the amount of sunlight entering the building, so that you don't need AC? How does that create the opportunity to create richness, pattern, or ornament on the surface? And how do you make this happen without basically making stupid shapes where you end up with 10% of floor area which you cannot let. The big thing the commercial offices have stolen from Foreign Office Architects and Zaha Hadid is that if you put your walls on an angle, then it looks like it's in the future. This is purely because thanks to CAD/CAM technology you can build. But the planners say '*Well, this is just a bit of cheek, because you cannot overhang the street anyway, and half the space you cannot let, so why build it?*' So instead we are trying to work out how the simple environmental device of the projected fin enables us to have windows, which give a human scale to the building. It means you can open up a window for ventilation, but it also helps create a surface pattern which relates to a heritage listed building across the road with Victorian high-led content glass. But in the end they are still using another architect's scheme for this site, which is a kind of CAD/CAM generated thing.

So the thinking is sill that technology = technical progress = social progress = artistic progress. But take this as an example - this here is the best model I've ever seen. It's a 1:20 facade model of the Church of San Lorenzo in Florence by Michelangelo, which apparently they are just about to realise. For now it is still just a brick facade. And this is a photograph inside San Lorenzo with interiors by Brunelleschi. And you can see that there is a direct correlation between how the model was made and how the building was made. And that is because in the 16th Century the only thing architects were paid for was their 1:20 model they made for a competition. That was called the *modello*. And then there was the *modano*, which was a 1:1 mock-up of certain parts of the building. So rather than drawing details, you would make a typical column capital at 1:1 and a typical column base, and you would sell that to the contractor. Then he would basically reproduce that on demand. So if you go to the museum of the Duomo in Florence, they have about a dozen competition entry models for the facade of the Duomo. So typically that is how you would judge a competition – you would put the 1:20 models on the site in their context and look at which one looks the best. Which seems a lot more sophisticated than models which take 6 hours to print out on a machine and are wrong anyway, and you only ever look at them as if up from a helicopter looking down on the world.

So the problem with modelmaking in a traditional practice where the plan dominates is that the model is then simply an extrusion of the plan understood as an object. This is opposed to an understanding of a phenomenological experience of space aided by the *experience* of making a model.

Perhaps it is easy to miss the point that just because a building looks 'modern' and it has been produced using 3D computer technologies that it may not be at the cutting edge of technical and environmental achievement. Perhaps some more traditional methods can also be used to create sustainable buildings, and architecture doesn't have to be reduced to slick glass office buildings...

I think glass buildings are dead anyway. In the future a building that uses that much energy to heat and cool itself will not be approved and is completely irresponsible anyway. Along with that comes not only a whole series of beliefs, but also a whole series of compositional devices which are linked to those beliefs. It all basically comes from Le Corbusier's Raison d'Architecture. If you base your composition on a column grid, with a non-load-bearing facade, then you can have the glass at funny angles. So the whole of contemporary architecture is doing this funny-coloured glass and random windows and what-not. That is premised on the idea that there are limitless human resources to heat and cool a building, which you did not have in the Renaissance. So the paradigm has been post-enlightenment that anything pre-enlightenment was necessarily primitive or barbaric or crude.

Also I think there is a sort of connection made in architect's minds to the sort of weak Marxism that gets taught as history in schools of Architecture, which says that anything pre-enlightenment was corrupt and barbaric. It says that humanist architectural values must equal to monarchy or aristocratic rule. This is completely unfair to the understanding of humanism. It is also completely entrapping architects in an ideological strait-jacket.

It also means that the people we work with that come from the Bartlett send us images that were done in the Fascist era in Italy by people like Piasentini or Giuseppe Terragni as kind of joke, as if our work looks like that. What was interesting about those architects was that they were challenging the Bauhaus notion of mechanical progress equalling social progress, and the notion of having to start from a clean slate. Today it can be seen that all their buildings have weathered incredibly well. Whereas you kind of despair of all the teachings of Gropius at Harvard and the kind of Le Corbusier British School, because all their work is now being demolished. Because they are made from glass, the buildings are so inefficient, that you can't rent them out any more. You don't get the correct comfort levels.

So it's sort of politics mixed with ideology mixed with a bad theory from art historians. The problem is there are only art historians teaching theory at schools of architecture. You don't get anyone teaching a consistent argument about the relationship between culture, construction, economics, climate, and explaining that old buildings look like this because this is who commissioned them, this is how the architect was working, etc.

You know, you have to read non-architectural books, like tourist books about Florence and the Duomo to find out that Michelangelo was the guy who invented the packed lunch. It took an hour for the workers to climb up the scaffold to the top of the Duomo, so if they stopped for lunch like the Italians normally would, you would lose two hours of the day. They had to walk down, have their lunch, and then walk back up again. So Michelangelo invented the packed lunch – you would send it up there in a bucket and 15 minutes later they were back at work. So there is this whole social project of an architect which just gets ignored...

Why does it get ignored? Is it not considered worthy of architectural history?

I think it's because *art* historians teach the history of architecture. You get these figures who are completely peripheral to architecture, but because they get to write books, they don't have practices to run, they're kind of ambitious, and the only way they can make a living is to do teaching, they don't mind to sit on committees and become promoted and so on. Which I think is just bizarre because it brings us back to this problem of modernism.

Back when I was studying architecture in Liverpool we did not have to do a dissertation, there was no teaching of history, none at all, there were no lecturers, no one talked about anything. I had to go to Cambridge to do a Masters to find out about any buildings designed before the Victorians, apart from the Romans who were taught to us as a kind of engineering.

And so what we are really talking about, and what we are doing, is this relationship between craft and architecture. And the craft of making a model is a kind of crude and dumb analogy to actual construction. This is unlike a lot of contemporary architects who seem quite happy to do a sketch design, fax it to somebody in the middle of America to build it for them, the so-called 'executive architect'. That's how Zaha Hadid operates, it's how Libeskind operates, how Rem Koolhaas operates, because they are not actually architects – they're not qualified and they have no professional indemnity insurance. So actually they are quite happy for someone else to build it for them as a kind of approximation of their 1:100 squiggle. There is no art of building in that. There is no care for the appearance of things, oddly. That's why at Zaha Hadid's exhibition last year people thought it was really weird that there were no photos of the finished buildings. There were only these beautiful illustrations of the buildings. That's because the real buildings looks really bad if you get within 100m of them. But that's not what matters to her, clearly. There's something else at stake.

I don't know what is going to happen in the future. It's a big problem we have in this country, a kind of ideological problem. I mean architects can go to Tuscany and enjoy old architecture, but for them to learn anything from it seems impossible. This generation is stuck in thinking that it would be decadent, somehow embracing or endorsing some kind of repressive political regime, to be interested in the past. But in a way I think we are lucky – we've lived through modernism. I was trained as a modernist so I can make a plan work, but then I was also trained as a post-modernist.

And then you get students in tutorials who sit there playing with their laptops during a crit. So rather than printing a drawing out for a tutorial they have this SketchUp model on the computer and they keep turning it and saying '*No, no, if you look at it from this angle you will like it*'. And the act of putting a large piece of paper up on the wall, or the act of photographing a model and printing it out and standing around with your colleagues looking at it and saying '*That looks shit, doesn't it?*' and all knowing and all being witness to something which is better or worse, doesn't exist in the majority of schools of architecture today. The whole idea that architecture is a craft and thus might have the values of a discipline that may be shared and handed on and discussed logically I think has been replaced by the genius complex.

You get this sort of connection between genius and completer. It is to do with this collision in the modern mind between this mad scientist, like Frankenstein in his castle, and the mad artist starving in his garret. And both those models of creativity have really nothing to do with the traditional role of the architect as someone who is able to discourse about geometry, astrology and astronomy on the one hand, and who is at the same time down the hole in the ground talking about questions of reinforcement. But then we are all kind of put on this middle level of selling this stuff to people and not being influenced enough by clients to just endlessly repeat ourselves. That type of oxymoron of an architect where you are meant to be both an artist and a scientist but are actually neither, is not the popular paradigm. Today's students don't really aspire, I don't think, to being what we all become: Camper shoe-wearing, casual/smart, vaguely modest, slightly harassed, burdened with an ethical value system which is often at odds with our own ambition and our own client's demands, and desperately trying not to be a fuddy-duddy when you are trying to hold out for values which no one else in the construction industry even remembers.

So in your teaching how do you handle the question of craft, of getting down to the detail and of making models?

Well, the first thing is to take their mobile phone when they're texting during the crits and throw it out of the window, then threaten to throw their laptop out of the window, and when they start crying to tell them to piss off. And then to say '*Look, I'm sorry, I know this is not what you thought you were going to be doing, but this is a professional environment and you have to behave yourself*'. So it is really about trying to make them see that the way they produce work and talk about their work is a kind of dress rehearsal for being a professional.

One thing we do is to make them work together on very finely detailed models of the site. They often make oak models which require a certain amount of skill and take large amounts of time. So the first month or two of projects they are all working in concert and there is a

kind of commonality of skills that the third-years will teach the second-years, which means that next year they will continue with that role of having more knowledge about how to manage their time, how not to cut their fingers off, how to ensure people don't dawdle and make good use of their time.

Is this task also a way of making the students delay that jump into the so-called 'master sketch' of a design?

I think that typically one has to study an area quite closely. You absorb a lot more information that way than if you just walk around and go 'click, click'. It is not about an approach of '*I'm a genius*' – that instant gratification masturbatory fixation of '*I had an idea!*' It means that the students don't jump the gun.

It also has to do with the way the human mind works. I think that apparently we are only able to consciously deal with about 10% of the information we are taking in. And the positive side of that is why we can play cricket or football. Because if you thought '*Shit, the ball is coming towards me*', you would run out of the way. But that's how the mind works and that's why you can kick the ball on the volley or catch that catch in the slips. The conscious mind has very little access to those parts of the mind, and especially very intelligent people have a way of their mind inventing a rhetoric which gets in the way of that kind of intuitive behaviour. But I think that kind of information takes some time to settle. And the other reason the brain doesn't let you take it all in at once because you would just never get anything done, you would be in a kind of autistic state going '*Wow, look at the sky...*' But of course all these things are the basis of Vitruvius' books on architecture. Alberti, Palladio, they are all very straight forward about it: what's the orientation, where is the sun in the evening, where is the prevailing wind coming from, where is the rain coming from? It means: don't build the building on the bottom of a north-facing cliff because it will get flooded in by water and it will be freezing cold all year round, and there won't be any air to deal with the condensation.

So there is something about slowing people down and making them *look* at the model and saying: '*That's around the wrong way, isn't that the north facade?*' and they'll say '*No, that's the south facade.*' And they don't *know* that they know it, but they know it. It's like the times tables at school. You just instantly know that 7 times 8 is 56, you don't need to calculate it. So even though there is something old-fashioned about subjugating your will to a common good, it also enables your individual reflection to occur. Because when the 'star architects' do their off-the-wrist sketch, it's always exactly like their last off-the-wrist sketch.

The problem with genius in architecture is that it is a trap – you are condemned to endlessly do the same thing. So I had the best idea in first year, and I was the best first-year student ever. There are only two compositional techniques that first-years use. One is to draw a square and then try to fit the program into pods and put them into the square, the other is to draw a blob and try to fit rooms into. And that is basically what you do if you have never been taught architecture, i.e. if you went to the Architecture Association...

But I think that once a model has gone into your hands, into your body, you get a sense of scale. I mean I just came from a meeting where these guys made a model that looked completely out of scale with the site model. It was as if the site model was at 1:50 and their model was at 1:75 or 1:40 or something. And then they got bemused when the town planners said: '*There is a problem with scale here*'. And they just don't get it, they think it's subjective. So they have designed a building which is meant to be green with fins on the north and not on the south facade, and with whole walls of glass meaning that they need three storeys of plant. But then they just pick the model off the site model and look at it and say: '*But it's a beautiful object, isn't it? It's really beautiful...*' And that sort of insolence is what you find in most contemporary architecture.

And you know you can make a building too big. I mean the Duomo in Florence is too big. But it's beautiful because the proportions are beautiful. And you know that they built models to test these things. But with students I think it's all about teaching them good habits...

What was your experience of teaching at the AA?

They said:

'Why haven't your students made use of the CNC machine?'

Well, because A - it costs 600 quid to make a model and they haven't got 600 quid, and B - because we made lots and lots of models by hand.

And they say '*Yeah, but they're not real models*'.

How are they not real models?

'They're just sketch models. When are they going to reach the point of a decision?'

And I'm thinking that this is testing, we are in the process of testing. So I don't know. Is it a form of anal retentive narcissism that makes people want to have finished things? Is it linked to technology and the desire to be in control of the world? There is just something about scruffy models which seems to offend people. They just think they are not real. They don't really exist because they are not perfect.

But if you make a physical model and it is rough you can hold it up and look at it and you can manipulate it. It seems to be a kind of petrified visuality when you reduce something to an image, so you are looking at a cad model printed onto paper. And it is completely fixed, you can't move around it, you can't let the sun move around it. It's like a perspective drawing.

I didn't even make models when I was a student. You would make the plan work, and if that worked OK then you would make the section work, and then if you had some time left you would draw some elevations, and then if you had a bit more time left you would draw some perspectives. But you could still come first in the class with only a plan and sections. Now in some ways this is really useful because it is difficult to make a plan work. But I wouldn't be any good beyond being the guy at a large organisation who is good at making the plan work.

What do you think of a purely computer-driven type of architecture? Are you open-minded about the sort of 'blob' buildings generated by computers?

Well, I think that is just a different process. I mean CAD/CAM processes are used to manufacture timber trusses in engineered buildings, which reduces the amount of on-site work, reduces tolerances to a fantastic degree of accuracy. That's a manufacturing technique which you would be stupid as a craftsperson not to embrace. There is no ideology or theory in that, it's just an evolution of a process of pre-fabrication that has been going on since we worked out how to cast bells and deliver them to site. Bricks are a prefabricated material.

I think the idea of parameters in architecture is clearly the cause of all the architectural crimes in history. The premises are: is it on a hill, where is the prevailing wind coming from, where is the prevailing rain, all those things. I think, to be blunt, all those 'parametricists' as they've been calling themselves, are trying to find a way to salvage their guilty conscience from being into deconstruction before, which was very text-based and introverted. Another way to call it is an avoidance strategy – avoiding having to design anything. It is linked to a certain group of people whose parents can afford to pay for them to go to the AA or Harvard and think '*I won't pay for art school, and law is too cut-throat, let's do architecture*'. But what then happens, is that 90% of people studying architecture can't actually do it, but need to be trained in some way to be useful enough to make a living out of it. In most architectural schools it's not enough to train people to get paid not too much working in an architectural office and having a great deal of ethical pride in what they do. What they want to do is to find a fail-safe way to make you a genius. So that is what the computer is there to do, to find a method where if you chuck in a whole lot of information, and the decision is taken away from whether you have a good eye or a bad eye, or whether you are a lazy or committed thinker. What it also guarantees is that it's all going to look the same. So it really is a contradiction in terms, because a genius is supposed to produce things that are different, but what the computer is doing is making it all look the same. It eliminates doubt, change, and individuality. So the people who are bandying parametricism around, and have sort of hit 50 or so years of age, are kind of thinking the paradigm of individuality has not worked, the paradigm of critical theory – that didn't work, so maybe we should start actually looking at the world? But because phenomenology is a kind of weak science, and if you haven't got 30 years of looking at the world as an architect behind you, whatever you do is going to be either a blob with boxes in it or a box with blobs in it.

So it sort of is as if someone who has never learned to cook, instead of finding out first that this is bread and this is a knife, is first asked to invent a bread-cutting machine.

One of the first practices that inspired us was Herzog & de Meuron, who were strangely operating as artists. They have always been seen as anti-theoretical, but Jacques Herzog was a performance artist. He was teaching with Aldo Rossi at the ETH in Zurich. One of the first things they did was to make models out of plywood, because that was the material which was going to be used for the buildings, and film them in such a way that they had a sense of menace. And when they began to get successful, they kind of hung on to this art world background when they were making models. So they would make a 1:50 plywood model of a house, and the mind could somehow transport that to the 1:1 scale building. It had the right light and texture of materials. And the eye seems to make sense of this.

Ultimately what the architect is doing when they are making a drawing or a model is that they are simultaneously thinking about the 1:1 scale. How is someone going to get their hand in there to build that? What is it going to feel like to touch it? What will happen at a certain time of day when the light hits that surface? Does that surface need to be more or less reflective? And that is character, which is linked to decorum, which is linked to appropriateness, which is linked to language. And I think that takes the question of phenomenology away from a potentially narcissistic realm of experience. It is also about what is being communicated, what is the character of things. One could also extrapolate that into materials, that materials have certain meanings to people. You know bricks have a particular scale linked to the human hand. So is it appropriate to make a bank out of bricks, or a palace? Historically no, these buildings are more embellished and noble in their finishes. This links also to economics and to the memory we have of places. And I think the model allows you to get into all that, as opposed to just theorising about it.

I think that the reason that a lot of Koolhaas', Hadid's and Libeskind's work is characterless is almost because there is a sort of surfeit of rhetoric, a kind of fake emotion, which is not really thought through or which has not actually been experienced, and a total lack of ability to hand their work over to the natural world and to see how light will affect it and thus how other people might experience it. And although the work is described as being quite theoretical and process-driven, I suspect it is actually quite scientific. It's like you have a theory and then you just build the building. And then even then you do not allow yourself to reflect and learn from your mistakes.

What we call sustainability can be more naturally called the ‘phenomenology of the natural world’ – questions of comfort and human resources all linked to the amount of sunlight in a space. There is a revolution about to occur, but people’s paradigms are kind of stuck.

How do you think your modelmaking process is going to change into the future?

This is one of the latest models we made for a competition. It was very basic and produced some images by photographing it. We have had some very quick CAD models done by someone working here over the summer. This person was not a fan of CAD but had it kind of rammed into them, and was able to make sketch models on the computer very quickly while we were drawing plans. The models let us see very quickly we didn’t have a massing problem, so then the combination of the CAD model changing the physical model and the physical model changing the CAD model seemed to work very well. So I don’t think we are going to stop what we are doing, I think we are going to keep learning from new skills that we acquire.

I think that the point of all this is that human beings are really, really bright, but if we don’t draw something and we don’t make a model of it, your brain can’t go to that next step no matter how much experience you’ve got as an architect. Unless you make a model and shine a torch at a corner, then you will never have thought of that junction. I’m not sure how architects are meant to be educated, but like an athlete you eventually get a sort of muscle memory of types and of ways to solve problems. So very quickly you can make the program fit on the site, and you know it has certain scale and spatial consequences. But you are still always surprised by the next scale up in the work, and surely the whole point of producing work is to critique what you’ve done. It’s not to say: ‘*Aren’t I brilliant, aren’t I a genius?*’ It’s to say: ‘*I didn’t expect that to happen; that works surprisingly well; that looks shit*’. And not to get hung up on things that you think are mistakes, but also not to get hung up on thinking that just because you’ve had an idea it’s a good one. So it’s really about exposing ideas, bringing things into appearance. This comes down to caring about the appearance of buildings. If we don’t care about what they look like, no one else in the construction industry will. It’s also about exposing yourself to this process of scrutiny, and being honest. Because the great thing about the model is that when the sun shines on it, you can see which spaces work and which don’t during the day, and everybody can comment on it. It’s just there in front of you...

I have this theory, linked to this notion that you only use 10% of your brain, that out of the 10% at least 30% of the time you’re asleep. But before you turn this talking/looking mind off for the night, you should find a way to make sure the last thing you see before you leave the office for the night is the model. Then you make dinner, you go to sleep, but you’re using the fact that your mind will process the information in your sleep. So the next day you come into the office, and you can see very clearly. You can say: ‘*I thought it was a good idea, but it really looks shit*.’ It’s like feeling an itch that needs to be scratched – you just know there’s something wrong. So it’s like your conscience telling you that you thought something was good but it really doesn’t work. So as long as that is a way of working I’m not going to change that.

On the other hand it would be dumb not to embrace other people’s skills and other people’s ways of working. So even though this 3D printer model is basically wrong, I still am quite fond of it. It allowed us to see the building not as a series of things, but as a conglomerate. You start to see an order of things which have similarities to them. So you need to go down to the small scale, but it is hard to have the precision manually to work at such a small scale.

So you are approaching these technologies with a sort of open-mindedness? You see the positive aspects of it, as long as you are aware what they are and how to bring them out?

The open-mindedness is about learning from your mistakes. Its knowing that something you thought was good is actually bad. Because the mind is great at inventing stories, but not as good at accepting what is right in front of your eyes. But you know the London underground was built without computers, there have been many things built based on optics and the human eye. This seems to be the most accurate device we have in our bodies. So you don’t need a Mac Computer if you’ve got an optical instrument that has been tuned for however many years you’ve been in the world looking at buildings and bodies. So anything that encourages the eye to work as opposed to analytical processes will in the end make architecture more like art_

London, UK
September 25th 2008

An Interview with Nigel Coates

Royal College of the Arts, London

MARK SZCZERBICKI Can you tell me about what kind of modelmaking interests you?

NIGEL COATES The standard way of using architectural models is fairly dull. They are made by people who are specialists in that field and advances in 3D technologies have enabled the modelmakers to get more and more precise in 3D printing whatever the architect proposes. So you can do nicer trees and incredible details and door handles on a 1:100 model.

In general I am more interested in using the model in a much more creative way through the design process and carrying that over to the way architecture is communicated. A few years ago, I think it was in 98' or 99', I designed a show at the Royal Academy which was called *Living Bridges*. The central features of this exhibition were all models, and they were all made by one particular modelmaker in London. They represented bridges that were real or imaginary, and over a time span from the Middle Ages, the present, and even into the future. It was remarkable in that show just how communicative the model was. Rather than through paintings or drawings, we used the architectural model at its maximum capacity to engage the imagination of the visitor. And I think that, provided the model is presented in some kind of context, it enables people to very quickly transform their fantasies onto a model and be able to imagine. Like the doll's house or the train set when we are kids, it is that kind of imagination that I am interested in. One aspect of this is to get feedback, but more poignantly to present ideas about architecture to the public. In fact I think the most successful architectural exhibitions use models and maybe film, and not drawings. Drawing is evidence of a kind of code which architects use which is much more opaque than the model...

How do you think the digital technologies are affecting the use of the model in the design process?

Well, it means that digital technologies can actually bridge between the process of manufacture of a real thing and the process of the manufacture of a model. For example with the kind of installation pieces of Zaha Hadid, they are, if you like, full-scale models. They are just not in miniature. So what do we mean by the word 'model' now? We assume that the model is a smaller version of the real architecture. But isn't it interesting that you can make real architecture from the same data that you can make the model? So at the Venice Biennale Zaha Hadid has got these large open rooms, which are basically CNC cut, fibreglass covered models, but you can walk into them. I have also done pieces of furniture that use exactly the same technology to make the model and to make the real things.

Do you think the current trend is to use the computer more than the physical models?

It is interesting again from the Venice Biennale that the younger practices seem to have stayed within the comfort zone of Photoshop, which is a bit sad. What we do here at the RCA, and what I like to do with my own work, is to explore modelmaking in a much more playful way. So the students here will make very rough physical models, and draw, and make 3D computer models all at the same time. The models also combine lots of different materials, so parts of them are rapid prototype, some are made especially, e.g. stuffed, and there are other models which use found pieces in them as well. So for example in my *Mixtacity* project we had lots of found objects, and models made out of biscuits and shoes, and funny things bought at the markets. And this is my version of cutting edge. In terms of trying to create evocative suggestions as to how architecture could be this is perhaps the most successful model I have ever done.

Do you think using these items such as household objects and foodstuffs tap into some part of people's imagination that an image could not?

I think a rendering still could do that but there's a real difference between a drawing of a train set and a real train set. And that's the answer. Kids can't play with flat things that are drawn. In your mind you can sort of move these objects around. It is sort of filmic, the sensibility. It gives you the freedom to write your own script even if you can't get into the display cabinet.

When you studied at the AA here in London what was the attitude to modelmaking at the time?

I think it is fair to say that the model was not fore-grounded, it was the drawing. This was when I was studying in the 70's and as I became a teacher. That was just the practice at the time. Then from the early eighties there was a distinct shift in that my students and I started to collect objects that were not immediately architectural. We wanted to make models out of plasticine and electrical components. We used to go and buy outdated electrical components by the pound in Tottenham Court Rd, and we would come back to the AA with these boxes full of diodes and transistors and make pretend cities. And I am talking about this sort of post-punk time where part of the spirit of punk was to pick up what you've found and turn it into something else. It was a kind of mismatch with certain bravado and an aggressive aesthetic. And we started to think about how to bring that into architecture – how to bring in messiness in the modelmaking, and in some way this represented messiness in the city.

There does seem to be a strong connection in all your work to the city. Do you think globalisation is playing a part in making the connection to the city in architecture become lost?

Well we have to navigate both, don't we? There is no point pretending that we don't live in a globalised world. I mean America's banks go down the drain and so do everybody else's. That is part of reality. I do not think we have yet reached a point where it is thought to be good

for architecture to be a clone-able product that can just be plonked down anywhere. We have enough of that already: American hotels. But there is perhaps a culture emerging where the local can perhaps be more emphasised than it would have been previously. If you think back to 50 years ago, middle to late 20th century, Modernism was thought to be a foreign dial in England, where everything was made out of brick and very, very prosaic, and with low aspirations. But now we sort of exist in a global form of communication, as well as a global finance, and so something that Rem Koolhaas does in China is suddenly on somebody's computer and is all of a sudden more explore-able than some crappy building around the corner. And we need to be aware of that.

In London there are many examples of what could be called very contemporary architecture. Is the general approach of the public and planners quite open to new ideas here?

I think the attitude here is still quite conservative. I think we have the belief that there is a great amount of experiment in Architecture in Britain, but that resides mostly in the schools. The reality of the architectural world is incredibly safe, and occasionally extends to relatively risk-free practices. That is why Norman Foster and Richard Rogers are themselves corporate machines that can deliver a predictable product. I would identify that as an effect of globalisation. And obviously, I don't subscribe to that approach to architecture, because I think it should be a much more expressive medium.

Can you tell me about how throughout your career your practice and teaching have informed each other as far as the process of modelmaking goes?

I do think they have informed each other. As any teacher in architecture you bring your experience to the school, but the student also brings a different way of looking at things. So I see it as a kind of combined project of exploration. And I think that the model is more important now than it has ever been because of the pressure, through the influence of the computer, *not* to make models.

Do you think the physical model will be replaced by the computer?

No, but the physical model can now be made by the digital. That has sort of shifted the goal posts a bit. But I think people are getting fed up with the purely digital, and that the digital model has to be put into a context. There was a student here who had grass growing through their digitally printed model. This is the kind of wit and intelligence with which you can use a variety of media. I am talking about multi-media model making as a direction. 100% digitally produced models are rather bland.

Another thing we did for the *Living Bridges* exhibition was insist that the modelmakers put a lot of people on the models. Usually an architectural model will have one or two people on it to give it scale, but we wanted our models to be crowded. The people were also painted with different colours so that instead of just being grey ants, it suggested that they were real people.

Do you think that with the popularity of the computer-generated image, skills to do with the phenomenology of buildings, such as how light affects the space, are being taken over by skills to do with creating interesting forms on the computer?

I think we have been through a period where the digital was so taken for granted that people imagined that you could make any shape and construct it, and so 3D models didn't have any thickness. And I think generally speaking people have gotten so excited about blobby shapes that we have actually gotten bored with them. It is also true that it is quite easy for a person who is not particularly skilful as an architect to make drawings on the computer which appear to be more convincing than they ought to be. But that can actually apply equally to the 3D model, the physical model and drawings. On the other hand, if there are new horizons open to us, and if digital technologies have enabled us to see those horizons, then we should use them because otherwise nothing changes. My attitude to that sort of progress is not to forget other devices which can be used along with the new technologies, instead of getting sucked into the technologies without really understanding how to use them. That is why I used those bits of fabrics for models, because they're just stitched and you can very quickly make something. Clothes are round, they're not boxes. So that offers a sort of polemic as to how you can produce architecture through digital techniques.

It really is a sort of culture, isn't it? There is a *Wallpaper* magazine cover design behind you, which is derived digitally. It is just wallpaper. But is trying to appropriate or explore what a digital representation can be, how can it become decorative, how can it become explorative, or how you can affect the atmosphere of a room with it. How can it be humane and human in its nature? That's not throwing the digital technology away - it is adapting it to uses that connect it in unexpected ways.

What do you think the future holds for the model? Will it continue being used as an important medium?

There will definitely be a more and more important role for the model. But the model may not necessarily be only physical – it may be combined with the digital or with film. You have to be broad-minded about what the model is, and never forget that a model that celebrates its physicality, its playfulness, is a necessary component in the process of exploring architectural ideas.

London, UK

September 26th 2008

An Interview with Anthony Davies

Adjaye Associates, London

MARK SZCZERBICKI Can you start by explaining how the modelmaking process works here at Adjaye Associates?

ANTHONY DAVIES This is difficult, because there is no real standard process as such across all the models. There are five directors here and each has a slightly different approach. Sometimes we are given drawings to work off, sometimes it is much more vague and we must start from a more verbal position.

I think one thing about my coming from a sculpture background is that it leads to a different approach to form at this office. There is definitely a certain level of experimentation that goes on here...

Have you worked as an artist previously?

I did a BA at St. Martins, and an MA at the University of London. I have worked for the last 15 years as a writer, although the writing is more to do with art criticism, rather than a material process. I also ran the plastics department at St. Martins, and did product design and industrial design for 7 years. So I have a history in plastics and resins and vacuum forming. But I have no history in architecture, so with David taking me on he is much more interested in developing the sort of sculptural parts of the design. As far as I can tell this firm has its own very interesting design process. In terms of new technologies and technological process we believe it is still good to have a hands-on approach.

I am trying to give you an example of a common approach, but perhaps I can show you this series of models. This is a plaster cast of a museum in San Antonio. David was working with some very complex geometric forms for the skylights. We were given drawings for those, but we had to create flat patterns in order to cast them. So this is an example of one of the patterns, and it has been glued together. We then had two casting processes. We needed to run a fast-cast process in order to produce this, so we can get a positive. Then we produced a rubber mould, and from that we did a clear resin cast. So this took four or five processes to get to the end result. With the fast-cast model I actually worked with a sculptor, so we were able to adapt it for use for use with the rubber mould process.

We know we could have put this in for rapid prototyping, but David really didn't want that at all. Often with his work you will find it is relatively sculptural. The final casts are in a resin which has a very jewel-like finish, so the light refracts in a very complex way across the form. None of that was really predicted. So from the initial simple rendering that is how we evolved the project.

How does the interface between the architect leading a project and yourself work? Is it based on a series of design discussions?

It depends on the project. For something like this museum there were no conversations really because it took four weeks of labour. I will take you through a similar project in a minute where we sat around and discussed what the architect wanted. With some architects it is very important to get a clear idea of what they are looking for, with others you can just work away and they will come and check.

There is a project we are working on now in Cornwall with a very complex roof. What happened with this project was that it became incredibly complex because we did not actually have 3D drawings, we just had a front and back elevation. So I essentially had two lines. From those two lines I had to work with high density white foam, and work out all the curvatures inside and on top of the form. We had to cut it into ten sections and it was a very complicated process.

So it seems it was more of a process of discovery, where the architect did a sketch and left it up to you to figure out a solution? I guess there was a number of ways you could have gone about it, and that would have affected the final result...

Yes, when I was first given this I actually started by making folds in copper sheet, which was what I thought they were looking for. Then, as the design evolved, the system which was being used for building the wings of aeroplanes and hulls for boats became much clearer, so we had to find a way to do that. So what would happen is we would make the basic form out of foam, and David along with the project director would come in with a pen, and decisions would be made directly on the model. So in that case the architect is not sure how it will look or how it will function and starts to adjust this on the model itself.

How do you choose a material for the modelmaking experiments? Does it depend on the character you are trying to achieve?

This is very difficult. I think it is up to the modelmaker to find out as best they can what the architect is after. There are two issues here: one is form, and the other is what the material is supposed to represent. Sometimes these can conflict. Generally speaking it is a kind of negotiation, but in most cases architects know what they want...

What is the relationship between the 3D computer models that gets used in the office and the analogue models?

This is variable. There have been a couple of cases where we were working with rapid prototyping. We are working with the Royal College of the Arts at the moment. We stay in close negotiation with them and they do the models. But at other times I just get straight elevations and work from those.

We always start with a material process and a series of experiments. So for example for one project I did a whole series of tests of casting surface textures.

Once you have come up with a material effect or a texture that everyone is happy with, how does that then get translated into the real building? Do the models then get translated into a larger scale?

Yes, one example is a temporary pavilion at Southbank here in London. You can see that the final pavilion is almost an exact duplicate of this model. The building was pre-fabricated by an American company and then brought to London and set up. This model was shown to the construction team during construction, so the building is almost identical. The model took 2 people 5 weeks to build. It is made up of about 2000 parts, and each part had to be cut individually. We had to start it from the centre and work our way out.

Also, at the start of the process of making the model the structural system was not exactly known. Once we built the first course of timbers we saw that the structural design of it was incredibly strong, and as we kept going we realised it was self-supporting essentially.

So there is an almost exact correlation between the model and the final building...

This is definitely the closest model to a real building I've worked on. Essentially if you photograph the model and the building and scale the image it is virtually interchangeable.

What type of equipment do you work with in the modelmaking workshop?

We have a very primitive workshop setup. We just have a band saw and a sander.

David also makes furniture. We do a lot of tests in foam, and they are often very complex forms. For our laser cutting we use a plastics company locally. For 3D printing we are very happy with the RCA, but in that case it is always a process of negotiation. We always have to go there to check what they are doing, so you have to know exactly what the architect wants.

The process of negotiation with the 3D cutting company is done by the project architect or by yourself?

It is done by me. It is funny because there was no formal process of negotiation when I started here. And there still isn't in a sense, but with one of the architects currently working on a tower project, who is very clear on what he wants, he just passes everything on to me. Then I go into negotiations with the modelmakers. But again you need to build up relationships with those people so they have a good idea of what you are after.

There must be a certain level of trust between you and the architects here if they leave you to make some of the design decisions...

Well, this is the area where all the problems can come up, when you are working with outside modelmakers or contractors, and something comes back and you are not quite sure what you want. But I think all the work is in clear descriptions, in written descriptions, and you go down and look at tests, and make sure it is exactly right. Often there will be a lot of running around, I will bring back 3 or 4 samples, and we will look at the samples with the architects and assess them. But that is not the case with all architects. Within the firm each project director works slightly differently.

We also have a New York office and a Berlin office, and that is when it is incredibly difficult to know what the architects want, when you have to do it all via email. They have to describe processes, but they are not sure what processes are available. This can create a lot of communicative problems. Generally it is absolutely essential that you have face-to-face contact with the architect.

Who helps you produce all the models around us?

Each architectural team will have at least two assistants who come in and out to help with the models. In some cases we have had projects where we had ten people working on a model.

Right now we have a situation where we have a tower to build and we only have 7 days to do it. It is at 1:500, so it's not that bad, but it only came in this morning.

An interesting thing about this country is that a lot of art and architecture schools have started outsourcing business units for modelmaking services. One of the problems with this is that of course they still have to service students, so they can't always meet the needs of business where everything has to happen very quickly. Very often architects here push the design and re-design to the very last minute. The problem then with the modelmaking is that you just have very little time...

Coming from a background in sculpture, how would you compare the process here with a process of creating a sculpture? Do you find the architectural constraints somewhat limiting in the process as far as choice of materials or formal exploration, or do you find a freedom in the process?

I don't know what other firms are like, so I have no real comparison, but in terms of design schools where I have worked, the process here is relatively experimental. It is more experimental than the industrial design school at the University of London where I worked.

I think David generally allows free reign for that kind of experimentation. Of course there isn't always a need for it, but it is there and it is encouraged. It is about problem solving, and there are some material processes which I can draw from. When I was first taken on I had no experience of architectural model making, and it didn't matter really...

How do you think the process you have established here is going to change into the future? Do you see it evolving somehow?

I think it is a discovery with each new project. I have gotten used to the slightly chaotic pace of this industry. It is hard to anticipate very much, or even to have anything in place to offset the kind of panic and chaos of each new project. Deadlines for competitions come thick and fast. The best thing you can do is to have a clear communication system_

London, UK
September 26th 2008

An Interview with Jean-Marc Kurczewski

With Jack Self Translating

Atelier Jean Nouvel, Paris

MARK SZCZERBICKI Can you start by telling me about your role at AJN?

JEAN-MARC KURCZEWSKI I am an architect in charge of the modelmaking workshop. I think it is important that I am an architect. We mostly make study models here. The people who work in the modelmaking workshop are mainly architectural trainees, students, people who have recently got their degree. They come from all over the world. The most important thing for me is that the architects who come here want to produce models. As I am not a modelmaker as such, my job is the facilitation of models made by other people. It is also about the richness of the models produced here. So even though I'm not a modelmaker I use my experience to teach people about how to make models.

The general structure of the office is very much like a pyramid. The concept comes from Jean Nouvel, and then this filters down. The genesis or inspiration for the models comes from Jean Nouvel.

When I first started work here, I had the opportunity to become the head of the model workshop. We first started with a small space in the corner of the courtyard, and we were there for 5 years. There is no minimum skill required to work in the workshop here. Ultimately all the tools are there for everyone to use, and I am responsible for everything that goes on. I also try to reduce the stress levels of the interns and make things a bit easier for them. I myself get asked to do only particular parts of the models. Jean or a partner of the office will sometimes ask me to make a particular model.

How does Jean Nouvel first formulate the concepts and how do they then get translated into the concept models?

Jean will mostly *talk* about a project. He will go to a restaurant and eat and speak. Then the interpretation for the concept model will depend on the design team leader. So it is usually a discussion about models, and very rarely a sketch or a drawing. Ultimately, it is us in the model room that decide on the type of models.

Jean likes to rest in things that are quite abstract. He can also be very descriptive. Sometimes he likes to just give the 'spirit' of the model rather than tell us the details of the model. It is never the same twice, but generally he is not a model man. He likes images. He often prefers images of models to the models themselves!

In the model room we have free reign – we can work with concrete, metal, plexiglass. The more traditional detailed presentation model work is done by an external modelmaker. We concentrate on working models where we can see the development of the concept. The models are constantly changing and evolving. There are no fetishist qualities about them – we work on them, they are very fragile, and when we have no use for them any more we throw them away.

The best case scenario is that we make the initial model first, then as the project advances the quality of the model advances in parallel. There is a constant inter-relationship between the model and the drawings. During this process we exchange ideas, we communicate, there is a constant discussion. Too frequently though, the model is simply used as a validation of an idea, as a justification. Then the model is the culmination of the design, rather than a tool in the design process. This can be a big problem.

Does this happen mainly due to time constraints?

It is a question of the desires and the philosophy of the team leader. It also depends on the educational background and the formative experiences of the architect. Each team leader has a different way of working. This is the richness of the profession...

Is there a certain AJN style of model, or does it depend on the project?

Well, there is always a discussion about this. If we do a project in the Mediterranean, we will try and find warm-coloured cardboard. If we work in Reykjavik, the sea will not be blue, but a mirror black. This is very important to me, but again the existence of this discussion comes back to the project leader.

It sounds as though you try to capture the character of the context of the model?

Of course, yes.

When I'm working on a model for a deadline, I really like to see images of the site and the project around me, to be completely immersed in the project. I lift my head up from the model and look at the images and really try to understand the 'spirit' of the project. This helps the model to become a more fair and precise representation of the meaning of the project. There is always an enormous amount of parameters

and limitations in the way of achieving this: who is the model for; why are we building it; what is the goal of the model? The more answers we have for these questions, the more hope there is of doing something good.

What is the dialogue in the office between the computer model and the analogue models?

The physical model is an autonomous object. It is important not to fall in love with it. I do not believe in the adoration of models as objects. One of the project leaders here is very fond of making models which are like jewels, like objects of seduction. But I say: '*Who do you want to seduce?*' But this is just the experience in one particular team. The people who do the 3D renderings come to see the models as well. There is always a bit of exchange of ideas going on. I am thinking in particular of a model I made for a project in Vienna. All the drawings were on CAD, so the difference between the computer and the model was a question of scale. The computer drawings are scaleless; they can be whatever you want. For the physical model we really distil the important information from the computer drawings. It is for this reason that I say the model is an autonomous object. The model is not an exact representation; it is the relevant ideas distilled into a physical form. So perhaps it is not the spirit of the project you are showing in the model, it is the spirit of the model... This exchange of ideas between the modelmakers and the CAD people happens too rarely, often everyone is in their own worlds. Ideally there would be more of this discussion.

Does it sometimes happen that a project is completed without physical model being made?

Yes, this is the case sometimes. Again it is a question of the desires of the project leaders. We are not really comparable to someone like Rem Koolhaas, or Frank Gehry who works straight away with the model. With us it is different; we do not have this culture of the model. Jean Nouvel doesn't make models himself and he never really has so there is no such culture. He is a very cerebral man. He works with discussion and the sensations of architecture. Jean thinks that the model is real, and at a given moment it can break your dream. But I still think that the model is a magnificent tool of discussion.

Are clients involved in the modelmaking process? Are they shown the conceptual models?

Clients are something else. We have within all of us a fascination with miniature things. Particularly men have this fascination. If a client is presented with an austere computer-drawn plan, and a little model next to it, you know they are going to be more interested in the model...

What scales do you use for the models?

All scales, from 1:1 to 1:25000. The choice of scale is also fundamental in the model. Even models in very similar scales are always completely different. Scale really is fundamental.

What are some examples of 1:1 models?

For a project in Vienna we did a 1:1 model to test the placement of the window sill for example. There was an enormous model created out of plywood for this purpose. We were testing things like how many centimetres from the ground the sill should be, and in general testing the placement of components in the facade. We have also done tests like burning wood to achieve a certain effect for a terrace. When you expose raw wood to sunlight it becomes lighter, so we did tests of the different gradations of the colour. This was to see if we could get the same effect from a real material as we got from an image.

Jean once wanted to see a facade that was like the hair of a woman. He asked me to make a model of what this facade could be. We used strips of copper to get the desired effect...

The image for Jean then is about a certain mood that he then wants to capture in the final materiality of the building...

Yes, the image helps him to create the building. It starts with a particular ambience or atmosphere, which then at a certain time become a building.

We use 'trashy' materials as much as possible, mainly paper and cardboard. We prefer easy materials to work with. We also try to design objects and build them, such as the lights here in the workshop.

You mentioned previously most of the models are thrown away once a design is finished. If this is the case how is the knowledge of modelmaking skills retained in the office?

We keep images of the models. Things are learnt directly from making the models, so there is no formal way to record the process as such. This is why the longer you are here at the office, the more value and knowledge you accumulate.

How do you think new technologies are going to impact the modelmaking process here into the future?

We used a CNC machine here previously, but we got rid of it. It will come back; we are just waiting for the technology to get better. It produced very toxic dust, the models were very fragile. We are not sure this is a process that we really need. You can't have all the technology in one place. Anyway we can outsource this, someone else can do it perfectly, we can pay them, and everyone is happy.

My philosophy is that modelmaking should remain a handicraft. I think this is how it will continue to be used in this office. For me, a really great model is one that still has defects, imperfections. It shows that it has been produced by human hands. It shows hesitations, thoughts, reflections. I have a really big problem with the sort of perfect presentation models. They are put into a glass case, you can't breathe near them, can't touch them... Of course it is OK to make things cleanly and precisely, but there should never be a point where you stop thinking about the design.

Our relationship with the model is very sensual. You cannot have that relationship with a screen. With a model you can move around it, you can touch it, it is very physical. You do not have that with an image. You can get emotion from an image, but it is not the same_

Paris, France
October 1st 2008

MARK SZCZERBICKI Can you give me first some general information about the Capella Garcia practice and your role here?

MIQUEL GARCIA I have been working with Juli Capella for the last 12 years. In the studio I am a Partner, but I am also directly involved with the production of projects. I have good computer skills and part of my job is to act as a kind of CAD manager. This is not the usual situation, but this has happened because of the evolution of our office. At the beginning there were only 3 of us, now there is between 12 and 20, depending on the amount of work. So in the course of this growth I have maintained my role as a CAD manager: '*You must put this on that layer!*'...(laughs)... So as unbelievable as it may sound both Partners are very involved in the daily evolution of the projects. I know there are some studios where the Partners say: '*Go do this, and when you are finished come back and we will discuss it*'. We do not work this way –we are very close to the projects in many aspects.

Having said that we do say that to design is not a democratic issue, because all the people working with us are creative and they have their own ideas, but there comes a point when the project must take a particular direction. At the beginning of each project comes the most creative part as we are always searching for a concept for our buildings. Once we have the concept we want to make sure we develop the project accordingly. So if you are not personally very close to the project, it is very easy with every day to get a little further and further from the original concept. So it is our job to say: '*People, stop. It's time to drive our way back to the highway...*'

How does the use of physical models work with the process you just described? Has it been an important part since the beginning of your studio?

This depends on each project, as each project has a different type of conception. We do not have a standard method to design things. It is not a formula. For example for the *Hotel Omm Project* the concept came from a physical model. The model was this: a piece of paper with a section torn out from the middle and folded back to create a curve shape. It was as simple as that. This was the main idea. This worked well, because when you are able to find a good concept at the outset of a project, everything else is easy. I mean not easy in every respect, because the facade was very complicated, but easy to find the right direction forward in the project.

In the case of the *Hotel Diagonal* it was the same, but in this case we used the computer model much more than the physical one. We used both methods, but the concept was that of a facade as a musical partiture with notes located at different points. We tried many different facades, and we found that moving the elements on the facade in a 'musical' way was easier to achieve on the computer. Of course later in the process we also used physical working models to test the facade and make some final modifications.

Are there specific groups of people in the office who work exclusively either on physical or computer models?

We do not like this idea of specialisation. We like all people to be able to work on at least a part of all aspects of the design. Of course in reality this is not always true, as different people have different skills, and we do have people who specialise in renderings for example. We usually have at least one person who is very good with models, and right now we have someone who is trained as an architect but who builds models for us. So I guess the answer is that all our architects are able to build models, but not all of them *love* to do it.

I always say that making models is the same as designing. When you are making a model you are in the design process. You are not just delegating the design to someone else. When you need to build something in a model, you must also think about how it will be built in the real building.

When we design we use all the tools that are available and modelmaking is one of the tools. I do not think there is a competition between physical and computer models – they are compatible and complementary. It is like drawing with a pencil, with a pen or with a marker. One is not better than the other, they are just different.

When a building is generated using only the computer, how do you think it may be different to a building designed using both computer and physical models?

This is difficult to say, because as I explained earlier I think the good way to design is to find a good concept. Once you have the concept, the tools you use to develop it must not have too much influence on the final result. I think that the difference is in the speed with which you need to find something. There are some things that you can see immediately in the physical model. When you look at it you can see all of it at once. In the computer you are only seeing a part of the view. Of course you can navigate the 3D model, but it's not the same. There are things, however, that you can see faster on a computer model...

We work with ArchiCAD 3D software, and we also love the concept of BIM (Building Information Management). So we are always working with the 3D computer model from the start. For us the computer model is not just for nice renderings, it is used to control every aspect of

the project. Some elements, like a complicated staircase, are faster to generate on the computer than to build in a model. So every concept, every part of a design, needs to be matched to its own tool.

What was the attitude to modelmaking during your studies here in Barcelona, and how has this attitude changed since you started your practice?

When I was studying we did not yet have computers, so in order to test something we had to draw or build models. During the years since then the importance of the model has increased for me. At University we made many concept models. Since then I have probably made a mistake many times determining what type or scale of model we need to make for a project, but I have always been happy after we have built the models. Sometimes once a model has been finished we say it was not necessary, but we only know this having built the model. If we had not built it how could we have known?

Do you involve your client in the concept modelmaking stage?

This depends, because most of our models are working models used for internal purposes only. Then again you can show a client a beautiful rendering, a beautiful section or plan, but when you show them a model they understand immediately what you are trying to communicate. So the model for us is also a tool to communicate with the client. Sometimes our ideas are difficult to introduce to the client, who has their own ideas about the project. A physical model is a good way to convince the client we are going the right way. Many times clients take the models to show their partners or the city council. The model is a very good way to sell your ideas.

Does your office use large scale models and tests at 1:1 during the design process?

We try to do a materials 'table' for each project with samples of the real materials. We also always make sure the builder shows us 1:1 samples on site during construction. These are really 1:1 physical models. We believe the design process only stops when the building is finished.

We have three phases of a project here in Spain. The first is the concept design stage. This may be enough to take the project to the authorities. Then we have the construction documentation phase including all the structural calculations. Finally, we have the coordination of the construction works. We know that there are some studios who are not interested in the two final parts; they are only interested in concept drawings. They don't care about how this material meets the other, about insulation, waterproofing and so on. They only want to be the designer as *creator*. I think this is the wrong attitude. Of course it is fun to do the concept designs, probably the most fun part of our job. But we think it is impossible to draw all the details in a building. Also, I may decide in the documentation that a wall is to be green and brown. But when I ask for a sample and I see it I realise it is better to be green and yellow. This may be a very important change in the design. So we always say that when we are in the construction phase we are doing a 1:1 model...

Do you think your working process will change in the coming years?

I do not see any need for change in the near future. Working with models has not changed since the beginning of our practice. There are of course new materials, and now systems to build physical models directly from the computer with 3D printers. I do not know if this is the way for us. The kind of conceptual models that we build from time to time are not able to be made with these kinds of tools.

With computer modelling, every new version of our software has some sort of improvement. So the computer modelling is getting faster and stronger all the time. But the physical models I do not see as changing in the near future. Perhaps in 5 years time we will have a 3D hat with electrodes directly into our brain, and then perhaps we will make models in a new way_

MARK SZCZERBICKI Can you start by explaining how models are used in your office, if they are an important part of the process, and how their use has changed since the beginning of your practice?

FABRIZIO BAROZZI + ALBERTO VEIGA The answer is perhaps very pragmatic. When we started the office 4 years ago we did not have a good knowledge of 3D computer modelling, so the physical model was the principal way for us to explain our concept. During the first and second year of our practice the model was very important. During the last few years we have slightly reduced the use of the physical model. We have started work with 3D computer models and other technologies. This has reduced the time spent to do physical models. This is a bit of a pity, because working with models for us was very important.

The condition we are in now means that we have some big projects, but we only have a few staff members here. We are in a period of change in the structure of the studio. Perhaps for this reason we do not work very extensively with models. We mainly use models now to represent the final project. With a house we worked on this spring, because of the smaller scale and because it was less complicated, we were able to build some study models. So it does depend on the complexity of the building. For example the *Philharmonic Hall* in Szczecin, Poland is very complex with many different levels. This would take a very long time to develop in a model, and is much faster to do in 3D on the computer.

So the main reason to use the computer has to do with the issue of time?

Yes, but this is not something we *chose* to do. We do not believe this way of working is necessarily good - it is simply a result of the current condition in the office. For example with the *Ordos Private Villa* project we were developing the initial design with models. The models were very simple ones used to study the form. But we stopped using the physical models once we developed the form to a certain point - so the principal reason to switch to the computer is one of time.

How is working purely in the computer different than working with physical models? Do you find the same freedom with formal explorations in the computer?

Basically we prefer to work with the physical model where you get an overall view of the whole project. Computer models are only good to form an idea very quickly. Often we work with the computer for competition entries, then once we win the competition we start to use physical models to develop the design.

I found it very interesting on your website to see that with some of the project images there was an ambiguity about whether they were renderings or photographs of real models. How did you create the images for example for the *Philharmonic Hall*?

With this project we worked at first with a few models which were quite large. They were trying to get across an idea of transparency or lightness in the project and we just photographed the models here in the office. Then to get the iconic images we created renderings.

The model was used mainly to show the concept?

We first made a model to study the form, and then we made the final model for the competition. I think that the principal difference between the model and the rendering is that with the model we try to study the form of the building. With the images we try to transmit to the client or jury the atmosphere of the building in its *context*. This is the only reason we prepare these sorts of images. With the model we study things like how to develop the form and mass, and then the basic interest with the images is no longer to explain the form, but the relationship with a location, with the sky, with the light...

For the competition entry for the *Philharmonic Hall* was there a requirement to submit a model?

No there was not. If we can submit a physical model it may be interesting for the client, but in nearly all competitions they just ask for 2D panels, so we need another instrument to explain the project. This can also depend on the kind of jury – if it is not an architectural jury, then these kinds of rendered images are much clearer. When you have a Mayor of a city see this kind of location image, this is what they dream of. If they were to see a model it may be too abstract and too difficult to imagine the building in its context. Of course, if you show both 2D panels and a model side by side everyone looks to the model...

Do you believe that seeing the image in its context makes it somehow more real for people?

Well, with the case of the image for the *Philharmonic Hall* the public drives past this corner in their cars every day. They know the view and they can imagine a building on it easier. If they see a model it is more difficult to insert the building into the context...

Can you tell me about your education and how you found the attitude to modelmaking during your studies?

I (Fabrizio) studied in Venice, and Alberto in Pamplona. When I was a student at my University there was no interest in computer technologies, they actually did not like this field. Venice is a very academic school with very important traditions, so it was the opposite of the AA in London for example. The University was not interested in new instruments of work.

My educational background placed a strong importance of making models. The 3D software we are using we started with only 2 years ago. Before that, the model was the principal instrument. In the first few years of our practice we used to spend many hours working with big models in wood and then painting them white. Also, the Barozzi family has a tradition of producing wooden furniture, so for me it was easy to work with big wooden models. Now, as cynical as it may sound, it is just easier for us to work with the computer. A physical model may take two people a day to make, while a 3D computer model will take one person one day. Also, we currently do not have a big space to make models – maybe we will in a few years time...

I believe there are offices in Spain who give the drawing a very big importance. There are many young offices in Madrid, such as Estudio Izaskun Chinchilla, that produce very complex and very elaborate drawings. They are not working in relation to a tradition, but they use this kind of traditional representation to produce something new. This is a very particular attitude of many offices in Madrid; it is like a new language for them. They use a lot of colours, a lot of layers.

This may be a reaction against, or a type of code which is opposite to, something like the current Swiss style of very clear, simple and precise drawings. This new Madrid style is more complex, almost like a baroque drawing. Perhaps this is the condition of many young offices that graduate from the school in Madrid?

With your work is there a consistent language that you try to maintain for representing your ideas?

Yes, the type of presentation is the same, but of course the projects are completely different. The models are also most of the time similar – white, in wood or cardboard. You do not see any colourful models here. Maybe this is because we think that with our architecture we try to resolve many things with just one gesture or movement. Our projects are never very busy; it is usually one clear idea. We always try to intensify the one clear idea. It may be the verticality of the roof, or a spherical surface. So we try to work with very basic white models to explain the sensuality of the form. The other conditions of the project we try to explain with other media.

I think all the Madrid offices we spoke about before, with their new ‘Madrid style’, are just the opposite of us. We are trying to find a language with the models and images. We need to find ways to transmit more information with these tools. We are trying to make sure that they show a certain approach to architecture which we are interested in.

I like the quote of Alejandro de la Sota Martínez: *‘One material for the models, two materials for the buildings’*. We tend to agree with this statement...

How do you see the office operating say in 5 years time, if you continue to grow and expand? What would be your ideal way to work?

I don’t know. I would like to spend more time working with models. We are currently preparing the construction documentation for the Philharmonic Hall and are only working with drawings. In the future, when we are more established and have more staff, we would prefer to study all the spaces with models.

Barcelona, Spain
October 7th 2008

An Interview with Sonia Blasko

EMBT Enric Miralles/Benedetta Tagliabue Architects, Barcelona

MARK SZCZERBICKI Can you start by telling me about yourself and your role here at EMBT?

SONIA BLASKO I am originally from Barcelona. I studied here at the Technical University, which was the school where Enric Miralles studied. He was later a teacher there and he also was my ex-teacher, so I have always followed his work. I worked in the Architects Institute in the cultural department for several years, and from there I followed the work of this office very closely. I then met Benedetta and I ended up here.

My role in the office is not as a technical architect, even though I am trained that way. Here at EMBT we have a disproportionate amount of work that is not directly connected to developing projects. Of course we have work that is like at other offices; we are always looking for competitions and are looking for new clients for the future. But we also have what I think is quite an uncommon set of activities such as giving lectures, publishing books, publishing magazines, participating in exhibitions, etc. So what we try to do is to put a lot of effort not only to produce good architecture, but to explain that architecture to the world, and not only to the world of architects.

When we receive an invitation from a magazine to publish some projects we always say yes, and this always generates a lot of work. The work is different if it is for an architectural publication when the information is very technical, or if it is for a magazine directed to the general public. We participate in monographic exhibitions but also in joint exhibitions mixed with other architects and other subjects. So there is a whole department in this office dedicated to producing work that is not directly connected to the built projects. I am leading this communications department with 6 people working and external people helping as well, such as video artists and photographers. And we always welcome people like yourself to come and visit the office. Tomorrow, for example, I am doing a tour of our buildings for the Architecture Institute from Austria. So we are very busy...

Concerning the topic of modelmaking, it has always struck me as very important in the process of EMBT. You even see this when you come into your building and see sculptures, materials and models everywhere. Has it always been a philosophy of the practice to work with material concepts first before jumping to the computer?

Yes, for example here on table we have models of the very first stages of our projects. These are very conceptual, very abstract models which we do very many of at the beginning of each project. This is probably the first technique we use to start thinking. We use it not only to start thinking and formalising concepts, but also to start analysing what we have before us as far as the surroundings, the context, the desires of the client. All of that is physically transformed into models. Some models are as abstract as the ones you see on the table. These would have been presented to the client, and even though it is very abstract it has been useful to have something on hand to help discuss our initial ideas and allow us to move on to the next stage...

Can you tell me about the project structure here? Is there a modelmaker, does the whole design team work on the models, or does Benedetta get involved with these early study models?

Yes, she does get involved in the early stages of each project. Generally the whole design team will participates in these first analyses. Then Benedetta gives some direction for the work, and there are several proposals generated which she filters and gives the direction for the next step. But this is not so much a genius doing a sketch in the corner of a book and then someone else turning it into an architectural project. I think we all get very involved in the project, and of course she gets very involved in giving the first and then the final decisions, which give the thing her personality. But the whole group is very involved in generating the shapes of the future buildings via these models...

There seems to be no set language or materials for these initial models. Is there a conscious idea to explore all possibilities?

Yes. We consciously do not make decisions about the materials until the last possible minute. We feel this would constrict our ideas and the whole project. We do not have a typical selection of materials in the library which we just choose from. We decide in the last minute, and this is why the materials of the models are various and we are free to change shapes and not get too hung up on construction details until the last stage. That freedom is what you see in the models. Sometimes we may make 20 models of the same thing using different materials...

Once you move away from this conceptual scale and you start making models of the final building is there a set process you follow or is it again quite a varied approach?

It really depends on the project, but what we do is refer back to the physical models along the whole process. You will see that all the project teams have some models on their table, and sometimes they will measure the model with their scale and go back to the drawing and go back to the model again. We also have a modelmaking workshop and the people who make the models are not specialist modelmakers, they are architects, the same architects that do the drawings. So there is continuous feedback between the models and the computer. Of course we follow a path of increasing the scale of the models, but we do that parallel in the model and in the drawings.

How then does the dialogue between the digital and the analogue work in the office. Are there 3D computer modelling experts in the office and how does their work fit into the process?

Yes, we have 3D software specialists. We need the 3D computer drawings because our projects have quite complex shapes. These shapes cannot always be documented just in plans, sections and elevations. They are too complex, and to sort out the details we need the 3D computer model. We also *experiment* with the technique of computer modelling, but we use all three techniques (models, 2D and 3D drawings) together. So for example if we need to see if a facade is to be more or less inclined it may be easier with a physical model in your hands. If we want to make sure all the parts of the building meet correctly and the structure works we may use the 3D computer model. We are taking advantage of this for example in the *Shanghai Pavilion* where the shape is very complex and it had to be done on the computer. It was beneficial for the behaviour of the structure and allowed for very thin profiles of the steel tubes and for a very rigid and earthquake-proof structure. The engineers needed the 3D computer model to achieve this, and the model had to be very exact and precise. This does not substitute the physical; it simply has a different aim.

I am interested in the general attitude in architectural offices in Barcelona to modelmaking and the design process. Do you think what happens in this practice is quite common or do you think there is a general reaction against the more traditional ways of working with models?

I think both tendencies are sharing the architectural space here in Barcelona. When I was studying, the model was very important, but on the other hand we did not have one computer or CAD program to be seen. I had to learn that once I finished my studies. For many people this step overtook the physical models, but not for me. I kept working and getting my hands dirty and dusty with models. This process was sharing the table with the computer and printer and plotter. Others have been abducted by the technology and have forgotten about models. They use very good 3D programs which are very good for many things, but we do not think they can be a *substitute* for physical models. We feel we need them both, and other people maybe don't feel like that. Other people may perhaps create respectable architecture without models...

When it comes to your modelmaking do you investigate new technologies such as 3D printing, laser-cutting etc?

No, we are very basic in our approach, very artisanal and very arts –and-crafts. We do the models all by hand and the machines we use are very basic. The 3D printers and laser-cutters need to be fed very precise information, and this is what we do not want to do. When we are building a model we do not have a precise plan drawn. We have some ideas and we cut and change and stick and break the models and we then turn the idea into an approximate plan. We then draw this plan and go back to the model and so on. The machines need precise information which we do not have until the end. We feel more freedom to move backwards and forwards throughout the process. This has always been a key part of our work and it would be the same if we had an office in Sydney or anywhere else...

I am interested in the attitude of the public here in Barcelona to your projects. Is there openness to your ideas, shapes and forms or is there at first a negative reaction?

I think the public here is very open, compared to the public reaction for example in Scotland (to the Parliament building), where a big sector of the public is very conservative. Here I think they are more open to new shapes and experimentation and risk. Maybe this is because we try to listen to the public; we try to use materials which we feel are friendly and noble like wood and stone; materials which give a sensation of warmth. We try to generate interior and exterior spaces that are friendly in terms of scale and touch and light. What the public have seen and experienced is for example a park that is friendly to children and older people, that is cool in the summer, that looks different, and maybe for some it is ugly but it is still warm and comfortable. So we generally have a very positive feedback.

Do any of your models get used for public consultation?

Not so much for public consultation, because for that there is a very set format. But yes, we do use them for all our meetings with the Council, with the promoters, with the construction team. Also, as much as possible we try to have clients come to our office for meetings, because we do not only have one model to show them but also 15 other models of their project and also models of other projects. We like to explain to them why we have so many models, and what is the thinking behind them, and that it is not so easy to deal with complexity. If they can see how you work they can put themselves in your shoes and they are more sympathetic to the explanation and more open to our ideas. So they do not get the final result as some genius epiphany that is showy and is meant to impress. They see it as something that had a start and an evolution and has reached a certain point for the presentation. They also feel that they can get involved, that you can move this to here and that to there and they feel more participatory. This is very good for us and we get good input for the process.

There is a fantastic openness about your process which does seem to make the work more approachable. Are there many exhibitions in the city to make architectural topics more accessible to the public?

We have a very active architect's institute which organises some exhibitions, as well as an organisation for the study of cities. There has been a lot of movement about urban design and architecture recently, and since public spaces and contemporary architecture has been so present in Barcelona in the last 20 years, the public is very sensitive to the subject.

Barcelona is not a very big town, but it is quite alive and there is a good general interest in architecture. The Council is doing great work in explaining to the citizens what the city is doing for them in terms of urban design and architecture, and they have been doing this for the last 20 years. So there is already a good level of education in the general public.

If you use both renderings and models to present to clients, how do you their reactions to the two mediums differ?

We find it necessary to use both techniques. The advantage of the model is that you can walk around it, turn it in your hands, see it from above or below, and it is a different reaction than to drawings. Imagine a client who has never seen a drawing, and we give them a drawing and a model. Of course on the drawing they can see where the bedrooms are and where the kitchen is, but with the model they have an instant illusion of something real and something that excites them. They can see that it was made with someone else's hands and that it is transformable and that feels much closer to them. They can see how you would move through the building...

Do you also build any final presentation-style models as part of the process?

Yes, we sometimes make models for the final presentation, and we also make them here in the office. It is very rare that for an exhibition of our work that we would need to make a new model, because we make so many for each project that we just use the last one for the exhibitions and this is close enough to the final building.

What is the biggest scale you go up to in the models?

Usually 1:10 or 1:5 is the biggest scale. We also sometimes make prototypes because we invent many things and we use funny materials to do uncommon things. Then we have to do prototypes to test these things. Our meeting room is full of those...

Can you tell me about Enric Miralles' attitude to models when you were his student? Was there anything in particular you remember about his approach as a teacher?

He wanted people to be productive either by using models or drawings. He said that just thinking is no good for anyone. Even if you have a good idea, if you internalise it and you don't share it with others, it will never turn into something like a building.

So one time he asked me why I had no drawings ready, and I told him I didn't have time to draw anything but that I have thought a lot about the building. He asked me to tell him what I had thought about, and he got a piece of chalk and he began drawing on a blackboard while I talked. So I was saying '*the building has to turn its back to the road because of the noise, and it will have a soft facade to the other side*' and so on. It took me about two minutes and when I stopped talking he stopped drawing and he let the chalk fall to the ground. He looked at me and at his drawing and he said '*So you already have it. So why have you not drawn it?*' He was always sketching when he spoke, and he thought that with a drawing or model you can see your mistakes straight away. If you do not see something in 3 dimensions you just keep thinking about your thinking but the mistakes are still there.

We always interview people who come to work here and their experience in modelmaking is very important. They must also *like* to make models. Many people say they do not like to do this and I understand, because it is physical work and it is dirty and it takes a lot of time. So if they say this we discard them ...(laughs)...

How do you see the process here changing into the future? Do you think new modelmaking technologies will become more utilised?

I hope that any new technology will come to help us and not to act as a prima donna around which we are meant to dance. This is our main worry as these technologies can easily take you over.

I do not see this process of making models stopping as it is fundamental to our work and thinking process. We sometimes have to sit down and think and allow ourselves time to analyse the new technologies so they do not take over the way we work.

We have an advantage that we have people from many countries working in the office. We have over 40 people and the other day we counted something like 19 countries that they come from. Having people coming from many different backgrounds is very enriching. They all have different favourite 3D programs, they use different drawing styles, and we have to keep finding a common language in which to work. This immediately makes any addiction to computer technologies impossible. The common language is the physical model and what really exists, so forget about which computer program each member of the design team prefers to use.

We have to keep talking and understating and producing buildings. This is very difficult and it is an expensive way to work to produce this many models and it makes our life into a battle ground. But it is enriching and it makes us very modest about new technologies. We use them all but we try not to be overwhelmed by them_

MARK SZCZERBICKI Perhaps you can start with a brief history of the office, and then give me a general overview of how models are used in your office?

MAURICE BERREL + RAPHAEL KRAUTLER We started out right after we finished University at the ETH in Zurich. We first had an office in our flat in Zurich, close to where we still maintain an office there. We started with a competition in Sierra Nevada in California for a mountain lodge. We won this competition against about 500 other firms. The model for this competition was very important, and from there we decided to establish our office here in Basel. Since then we have done mainly competitions.

And since that first competition you have maintained the importance of the model in your design process?

Yes, it is very important from the first stage. We start with the site model at something like 1:1000. We test what is the best insertion into the site, and how it fits with the context. We like to do this with plasticine for example, so we can quickly add to it and change it easily. This is the first step, and once we know that we have found the right way forward we usually cut timber pieces to study the form. So we end up with a range of shapes and we can look at them and compare them, because with plasticine once you change the model the previous version is gone.

Do you then move through a set number of scales, or does this depend on the project?

This definitely depends on the projects, but we keep working with the site model throughout the process. Maybe the next step can be 1:200, which we often use. This scale is similar to most plans we have to draw, so we can check the information we are drawing in the model at the same time.

Do you also use 3D computer models as part of the process?

We use computer models mainly to see the rooms and spaces inside the building, because this is easier to adjust in the computer than in physical models. We still build a physical model after that. Sometimes we build the computer model, and then we make the physical model to photograph it. This was what we did for the competition in Sierra Nevada.

What do you think is the advantage of photographing a real model over a rendering?

We find it easier to work with light in the real models, and the images have more depth. But now we are talking about presentation images. The danger with using 3D computer models for competitions is that it is easier to cheat somehow. You have fancy viewpoints and everything looks nice but perhaps you do not see a really big mistake in your design which would be immediately obvious if you built a model. This is probably the main disadvantage of the computer. With the real model you must be more honest...

Also, the physical model is always right there in front of you. With the computer you need to turn it on, open the file, work out how to turn it a certain way. Sometimes you want to alter something and depending on the complexity of the building it is better to do it with the physical model. Especially with a project like the *Beaux Arts Museum*, which looks very simple from the outside but is very complex internally, you really cannot understand it by looking just at drawings.

On the other hand, with a project for a fair stand which is very simple we did not build a model. This is very unusual for us.

Do you yourselves build the models or do you have other staff help?

Everybody does a bit of everything. I (Maurice) like to build the models myself because then you understand the building better. If you outsource it you don't get the same understanding.

Can you tell me about the ETH in Zurich? It seems that most architects here in Switzerland have studied there. What is the attitude there to modelmaking?

We both studied there. Of course when we were there the model was very important. Now with the new laser cutting machines and computer-aided modelling people have started to use the model as if they were just printing something. So instead of printing a facade in 2D they print it in 3D. I think this gives the model a totally new boost. People like to do models now and it is easier to do nicer models and it is easier to make them more precise.

I guess when we were there we used more of the hand-made rough study models that we also use in the office now. In the school the model is becoming more of a presentation tool...

Do you there is a problem with this? Are people losing some of the manual skills of making models?

This is perhaps the same danger as when people started drawing on the computer. Basically it is a good thing, but you probably tend to focus on one minute detail, which is not at all important in the overall design. But because you can zoom in and work on a tiny detail for a long time you can lose sight of the big picture.

We think that physical models, especially the ones made of plasticine or wood, are similar to sketching by hand. They are very quick and you do them intuitively. In the computer you can lose yourself in details...

Do you use the laser cutting or 3D printing technology in the office?

Yes, for some facades which could be done by hand we prefer to use the laser cutter. We do not have a laser cutter in the office because it is too expensive. Not even modelmakers in Basel have these machines; Herzog and De Meuron are the only ones who have it ... (laughs)... You have to employ someone just to take care of it...

There seems to be a very strong language in Swiss architecture that the media portrays as a sort of austere, silent minimalism. Is this something you are aware of here and why do you think this language is so strong?

I think this has changed in the last 10 years. This 'minimalism' is still there but it is no longer these cubic forms. Previously, even at the ETH, you couldn't do anything beyond a rectangle. It was not allowed. Nowadays it is different.

The language of architecture here has a long history. It comes out of culture. The climate and the mountains in Switzerland are very important. These things have influenced buildings in the way of keeping things dense, of optimising the architecture. I think it is in our culture not to do excessive things like Zaha Hadid or Rem Koolhaas. In Switzerland if you win a competition your building has to be optimised in terms of economy and ecology. And often this is done with a dense form.

You mentioned the office of Herzog and de Meuron? How are they perceived by the local practices, and how influential have they been here in Basel?

I think that what they do, other architects could do as well if they had the time or the chance. Most of us have more or less the same education as them; we went to the same school. What happens is that they attract many architects from around the world who start new offices in Basel so they are very influential to the city.

Perhaps they influence us subconsciously, but we look at references from all over the world. This I think is the difference between Basel and Zurich. In Zurich there are many architects, but all with very different styles. In Basel there are fewer offices, but they have a much stronger character - they are few but very influential.

Are models used in Switzerland to explain buildings to the public?

Yes, this is done quite often. With the *Beaux Arts Museum* project in Lusanne it was our idea to produce a model for the public to 'sell' the project. We think the model works very well for this purpose. With images people feel manipulated in some way. They know that of course an image will look beautiful. With a model people start imagining themselves inside the building.

We asked ourselves if it is worth building this model, because it was going to cost 40,000 Swiss Francs. The model was going to be in one place, and we have to convince 600,000 people who are going to vote in a referendum about the project going ahead.

The client took some pictures of this model and showed them in the newspapers, but it just didn't look right. So for people to really understand the building the model is the only way, especially with a complex building. The model ended up going on tour with a fair which will be seen by something like a million people...

Coming back to the question of scale, do you continue to increase the scale of the models throughout the project up to 1:1 scale to test final details?

We build single rooms to test how the spaces will work. We also test materiality. For the facade of the museum in Lusanne we worked with an artist from Geneva. We will soon do 1:1 mock-ups of this facade. People were concerned about the shoe-box appearance of the original concrete facade, so we had to find a new solution. We worked with the artist who had great ideas about how to reflect the surrounding landscape. We are using a special very dense concrete which has stripes of very rough concrete, allowing the concrete to reflect the lake and the sky. So even we do not know what this will look like. So it is very important to do a 1:1 sample...

Do you consciously try to have a similar character or style in your presentation images?

We may have a similar strategy in most projects. We see them as a kind of research where we start with gathering information and trying to search for a direction without having an image at the outset. Without this knowledge we cannot decide on a direction. Models are also very important in this stage.

It is not conscious that our architecture may look a certain way, but it is possible because we have our educational background, our previous experience. We do not set out to say '*We want to be like Mario Botta*', for us each site and each client has new meaning...

There seems to be a strong sense of environmental responsibility in architecture here in Switzerland?

Yes, this is a very important aspect. We have standards we have to meet in all competitions which tell us we need 30cm of insulation here or triple glazing there, or natural ventilation that re-uses the ambient heat in the spaces. This is mostly a thermal issue, so of course we optimise the solar orientation of a building.

But that is all just a part of it. I know from my studies in Australia at the University of Newcastle that this environmental issue was one of the most important things, like how do you place the building, how you capture the sun. This is of course one of the many important factors here, but it is not a starting point for design like it was many times in Australia. In Europe we have more importance placed on the city, the context, the culture and so on.

How do you think the modelmaking process was different at your University in Australia to what you use here in the office?

We built models there as well, but not so much as a spatial development tool. They were used more at the end to show the tutors what the final building looks like in 3D. At the ETH we were taught to try to experience the space through the model, and I did not feel that happened as much in Australia...

How do you see the process in your office changing into the future?

In a way things have changed already because we no longer make models only to photograph them for an image, we use renderings for that. It was very time-consuming to make huge models just to take a photo to produce one image. We also have had problems with models being too small, even at a scale of 1:33 we realised it should have been 1:20.

I cannot see us stopping to use models. Maybe there is a technology jump ahead of us so that everybody can have a laser cutter in the office; otherwise we will stick to what we're doing.

Basel, Switzerland
October 13th 2008

MARK SZCZERBICKI Can you start by telling me about how your office began?

TILO HERLACH The three directors studied at the ETH and in Lusanne, and after working for various offices 5 years ago we started this office.

We originally had a big project here in Basel, which is still under construction. It is a housing project. We then quickly stepped into international projects, at first with the *Baby Dragon* in Jinhua (China) and from there on we were able to get the chance to work with Ai Weiwei on some projects in China and the USA. Last year we won a competition in Berlin which is now under construction. There is also a housing project near Rome...

The small projects are still here in Basel. The conditions here are totally different of course than the projects abroad, because we can supervise construction here. With the other buildings abroad there is always a site office or an engineer who does the supervision.

Has modelmaking been an important part of the design process, and what are the three partners' attitudes to modelmaking?

We have always worked with models, mainly physical models and now also more and more often with computer models. The physical aspect of architecture is very important for us. When we started the office it was clear to us that we were interested in *constructing* buildings. We really wanted to follow the building process as closely as possible. So sometimes we did very small projects just to get the ability to build something and to learn something from the process.

The first step has always been the physical model. There are some shapes and forms which you just can't imagine in your head without building a physical model. We use the computer mainly to try and understand how a particular geometrical system works. The three partners work mainly in SketchUp; it is really easy to build basic shapes using this software.

Do the partners also build the physical models or do other staff members help?

Usually others build the models. We have some interns who help with this.

All of us built models when we started, but now it is a matter of lack of time. If we are working with someone in a team we give them a set of rules and the model is used as one tool to test various aspects of the same rule. We then produce series of models to test these rules; we stop at a point and decide a new set of rules...

How do you find the process of working with SketchUp compared to physical models?

Usually it is just quicker. Also, you can work with it anywhere you are, you don't have to be in the office with all the materials and tools. It also depends on what type of models we are making – some are used to test different phenomena, while others are made to produce an image.

Some models are like a puppet theatre, they are really big so we can photograph them and then work on the images in Photoshop. 3D models are normally only made to produce a rendering or representation in the end. But this is the less interesting part of models for us; we prefer to work with physical elements. We also see the model as a first step in the construction of a building, and we have never had an interest in a kind of blob architecture. We are always interested in the construction detail, in aspects of engineering, and with the model you have to think in a very constructional way...

Do you have a sense of the strong Swiss architectural style that the media around the world is currently portraying?

I think there was a very strong image of Swiss architecture in the 90's with the 'Swiss box'. Everything was reduced to the box. This has very much changed with the work of Herzog de Meuron, and now it is completely different compared to 10 years ago.

Perhaps what remains is that we are always working with a strong context, you really try to understand the history of the site and all the elements in front of you. In Switzerland this is very important also because of the high level of regulations, especially compared to for example China.

Also, Herzog de Meuron has helped many young offices here to step into the international scene, which has changed the local scene as well. Before there was this recipe for design coming out of the ETH that you look at the site and try and understand it as much as possible. This is not possible with projects in places like China where there is no solid context, and you basically have a clean slate. I mean of course there is a cultural context, but there is no physical context because every time you go to the site everything is completely changed from last time due to the construction going on. The master plan changes the whole topography..

So the historical context and the strict planning regulations may create this particular language of architecture in Switzerland.

Are models used very much in public debate about architecture and in discussions with the consultants?

At the moment it seems that all these photorealistic renderings are the way to do presentations. Then for large projects here in Basel in the town hall there is a model of the whole city, and if there is a new significant building the city architects will check it in the context of this model. This is used mainly for internal review, and not for the general public.

With clients we always present models as they are not used to read drawings. They understand models much easier, and you can't strategically hide things as in an image. For example today one of the partners had a meeting in London for a project for a house. For this project we are working with a model. The idea is that you have quite a big house for an art collector, with a public section and private rooms, galleries, etc. The owner wants to create one house first, and then copy the design on other sites. So we said that we want to make a model of a flexible module, which can then adapt to different topographies. We built different models based on different rules, and they are like toys that you can play with and put together in different combinations. This is the best way to explain to the client what the modules are, what the phenomena that we are thinking about are, etc. We can show that with a particular shape certain things are possible, and this would not have been possible to explain just with a plan...

Are any parts of buildings tested at very large scales?

Yes, if you want to see how something will work you must first build it at 1:1. For example we have made a prototype of a window system for a cafe. Or if it is about choosing materials we try to get the material and see it on site.

In the model a good working scale for us is 1:20 or 1:33 for testing details. Even 1:33 is a little bit too small for some things. The 1:20 models are really about an abstraction of materials, so if there is a wood floor we use a printout of a wood floor that we stick on. Of course this is not meant to be 100% realistic...

Is there anything unique about the process you use to make the models or do you use traditional techniques?

Our big problem is that we do not have a workshop so we are limited in what we can do. We cannot for example work with wood. We would prefer wood to paper or cardboard, which just gets destroyed after a while. We are actually moving the office next March and in the new space we would like to set up a workshop. Our only opportunity to work with solid objects is plaster, which is very nice because you have to make the cast first. It creates very nice objects, which after many years are still very haptic. Then there is blue foam, which is very ugly and trashy, but it is very fast to do some things with it.

Sometimes we do not have time to make the model during the design process, but we get one made after the building is finished. This is really a way of retaining the knowledge in the office. Staff is always changing, and sometimes we are working on the same theme in different projects. Then we can show someone what we have done before, and that this was the physical aspect of it. Sometimes issues like that can be understood better in a model.

That is an interesting point because some of the offices I have interviewed tended to throw away all their models once the design process was finished. I wondered in that case what happens to the knowledge gained from making the models. It seems that if the models are thrown away it makes the design knowledge more exclusive as it is limited only to the people who have worked on the models.

There are also models which we do for presentation purposes. For example with the *Kirschgarten Cafe* it was about dealing with an important historical structure. All the new work had to be separate from the historic building, and the way we resolved this was impossible to show in pictures. With the model we could take parts out, we could really show that no fixings are necessary into the original structure...

How do you think the process in the office is going to change into the future? Will the 3D computer model become more integrated?

Well, with the computer the testing of many configurations is very fast. You just do 'copy' and 'paste' and you do not have to rebuild things a 100 times like with physical models. So it may take one day to test something in a computer while in a model it would take 2 weeks.

I think we will always keep the physical model because it is just nice to have a real object. If you have a model in a meeting the communication is more open. In a computer model you must always present an image. Sometimes we have tried to rotate the computer model to show a building, but the perspective is never right and it is difficult for people to understand. Perhaps it is just a psychological thing of having something real in front of people...

An Interview with Christian Sumi

Burkhalter Sumi Architects, Zurich

MARK SZCZERBICKI Perhaps you can begin by telling me about how your office started, and how the use of models in the design process has changed since the time you began practicing?

CHRISTIAN SUMI The office of Burkhalter Sumi started some 25 years ago. Since the beginning the modelmaking has been very important. The model has been for us an alternative to the rendering. When we began, computer rendering was becoming popular, but it was never very interesting to us because you cannot control space in a 2 dimensional image. We also felt we could not control the character, style or atmosphere of the space.

Today we do have people who do renderings for us, but at the beginning definitely we felt that space was easier to control in the model. Of course we do some conceptual models which are an abstraction of an idea, but the kind of model we did at the beginning and that we still do today is a model which needs to be as close as possible to reality. This is the reason they take a long time to make - for us the model is not an art piece, it is a tool which assures us that the decisions we are making in material space are correct.

I can see that there are not many models here which are all white and which purely test the form. It seems they are testing the final materials and finishes of a building...

Yes, we are testing the final appearance of the building. Of course when we start they may be more abstract, but most models we build at 1:50 or 1:20 and we are really trying to pre-build reality.

So the iconic image of a building is not as important to you as the final detail of how it comes together?

Yes, that's right.

Actually, I would just like to make a historical point here. In Switzerland post-modernism was never very strong. I especially mean the American post-modernism, this icon or architecture as a symbol. We were not so interested in this; our research was about finding architecture beyond the sign. Of course there is no escape from symbols, but there is always on the other side the question of perception of form. So if you work on this side of the interests then materiality, light, surface and material are all very important.

So the idea was not to play with historical form, or to play with reference. Of course we do that but it is not the main issue, it is not enough. We are more interested in the 'inner core' and this is what we work on. So to give you a simple example, let's take the colour red for instance. It is very clear that red has a very strong political connotation, and we are aware of it. But red as a colour in itself also has some rules, it is a colour which enters into a space, it does not recede. There are similar rules with materials and so on. So our models attempt to be the final step before the realisation of the real object.

How about the production of the models? Do the same architects get involved in making the models as well as drawing the 2D representation?

The models are all done here in the office, all made out of cardboard. The production is kind of low-tech. The models are made mostly by students. Another point to make is that Marianne works very strongly with drawings. It is her way to somehow understand or guide the project. I on the other hand prefer the model. So the model production is more on my side, and Marianne handles other issues. Often also the architects working on a project will help the students with the model.

How do you think the use of computers has affected your design process? Obviously when you started your practice computers would not have been very widely used. Do you now use 3D computer models as well?

For us the computer is a tool and it is about speed. The computer is too precise and this is a big problem when we start. Of course we use computers but this is just another way to organise the office.

The computer has not really changed the way we think, and even though in the last two years we have been using more renderings, we do not use this technique to *find* architectural solutions. Sometimes we make some very simple renderings of a volume, and then we make a model.

Again this is about sensuality in architecture. We have a lot of materials samples, a lot of books, and this is the way we work. So the computer is OK, but it does not make us nervous. It is quite silly; you have to tell it what to do, so the results are no big surprise to us.

Can you tell me about what it is like to practice in Zurich where there is such a large concentration of offices in a relatively small area? Many people who work here have been educated at the ETH. Does the fact that they come from a similar educational background make any difference in the way they practice?

Yes, there is this thing people call the "Swiss German-Speaking Architecture". The roots go back to the Ticino people like Mario Botta, Luigi Snozzi and so on. In the 70's we liked Aldo Rossi and it is perhaps through Rossi that architects here found a new way to deal with form.

After 1968 there was a very neurotic situation here. Every line you drew was questioned, and our profession was completely destroyed by psychology, sociology and so on. I think that Aldo Rossi and the Tendenza, or the people from Ticino, through the notion of typology, showed us a way to deal with form again. The idea is that if you look at a form you look in the context of a history of its use, and so three concentric squares might become a traditional courtyard. And so this is a way of dealing with it in a less formal way.

Then somehow in the eighties there was kind of shift, a new step, and this was a reaction to the American post-modernism. So coming from this typological education we had an idea to find an architecture which is in the tradition of the typological issues but that is not dealing with symbols. So it dealt more with materiality. And the interesting part is that this type of architecture is still very big today. And I think architecture in Switzerland is quite well related to Spain...

It seems that Switzerland does have a very strong architectural language. There is a strong sense of materiality and a lack of excess in formal exercise. Do you remain aware of this while practicing here?

Yes, of course. In a certain way you can say that the *material* is the message. The architectural thing is that you are creating an object.

There was a very short but interesting text by Rafael Moneo; the title was something like '*The Solitude of Buildings*'. I think he wrote it in the late eighties. He said that when you build something you care about it, then the critics come, they say it's great or it's not great, and then comes the moment when the building is left alone. It comes into solitude. And this is the critical moment of a building. How does the building survive when everyone is gone? This is also important in our architecture, to make a building which somehow survives daily life. This doesn't mean that it's not intriguing or it's not amazing, but it has to survive without comment. The building itself is the comment. Good architecture doesn't need a lot of help to explain why it is so. I think it is about a research into architecture which is as direct as possible...

Of course the symbolic aspect is always there, but it's a question as to what degree. We are aware of the symbols, but we put them to one side, and we play more with the side of perception.

A key player in this theory of perception was Oderheim. He was a guy who already in the fifties was talking about perceptual form. If I look to your head what do I see first? Is it the line of the head or is it a triangle? What happens in the brain? This for us is important, so we ask if the building is more horizontal, or more vertical, or if you have a building that is in between?

The kinds of things you are talking about are very subtle in many ways. These ideas seem to be best tested in a model form. I guess that with a more 'loud' type of architecture such subtlety is lost and perhaps these types of buildings can be tested in a rendering - they do not have any deeper thought behind them. Perhaps it would be impossible to test some of the ideas you speak of on the computer...

It would be very difficult.

We have no problem somehow to make big jumps, where we try one thing, and then we try another direction just to see what happens. We have for instance a project now which is a huge hotel in the Alps. It is about heavy stone, light wood, etc. But in this project we worked very closely in the context of historical background. There is a huge tradition of hotels in the Alps, so we are aware of this. These are the models you can see behind you. These are not really beautiful models, but they show a competition entry where we had a very clear vision of an architecture from Italy in the fifties, and then we jumped to this, and we have to change the form, then we came to another idea, and now we are somewhere here. This still has the stone and wood and the tradition of the verandah, we are trying some manneristic things. And this sort of process is not a problem for us. The original model was done very quickly, and we had some ideas from previous projects, and we somehow won the competition, and then we started all over again...

So you do not get caught up in the beauty of the models?

No, they are really working models, and they get re-done and re-done. Today when you work in this business it is really about speed. You have to work so fast, and the model from this point of view is quite interesting. For example we have a model here of a concrete building, and it was re-worked about 10 times, and it now is very close to the actual building. Most of the models you see here are the last step in the process.

Sometimes we also make very small models, which can be very realistic also. The usual thing is that as you get bigger in scale you make it more realistic, but for us this is not the case.

Can you tell me about the involvement of clients in the modelmaking process?

We show the models to the clients, the models are always there. I think the clients like to see the models. I think they feel much surer about what they see. With the rendering there is always a bit of doubt about what the architect is trying to manipulate. The model is kind of brutal, you see things very clearly...

You think there is a degree of distrust with renderings?

Yes, there is a problem with renderings in that they are often very badly done. There is an opinion that architects do a lot of renderings to sell their bullshit. If you show a model and you can take it apart it works better.

Do you often jump to 1:1 scale models to test parts of the building?

Yes, very often we make a particular corner of a building, and we find this a very useful tool.

Sometimes we have trouble with the construction because we change our mind very late. The thing is already built and then we say '*Oh, red is wrong*'. For two years we say it should be red and then my wife Marianne comes along and says '*What the hell is this?*' But that's the way it is.

I think that to understand the building you might have to see the space built and then you can make the right decision.

When new staff enter your practice, do you then have to train them in a certain modelmaking style, or do they each bring their own experience into it?

I think it is again a question of time. We make the proposition about what question we want to ask with the model. What is the issue about? The architects here are very good in modelmaking and the method we use of cardboard and paper is very simple but very precise.

Sometimes in rendering we give the architect more range. We let them go and then we see how it can help us. In the future I think we will use both mediums more, in a more connected way.

In competitions it is different – you need one brand only, one image that tells the story. But if you build something then it is much more complicated.

Do you use the more recent technologies in the modelmaking such as laser cutting?

Not yet, but we may start to use these technologies soon. We are very open to using new technologies, but this combination of 1:1 models and smaller scale models is still the best way to test our ideas. As I said before, the model is really a tool for us.

An interesting thing we did was a big exhibition about the famous German architect from the 19th century Gottfried Semper. We made a model of a wash ship he designed, we took this ship and we also used it for the exhibition. The ship was built as a full scale room within the exhibition space at 1:1. Within the model of the ship there was the exhibition and a smaller scale model of the ship. Semper was very important from the point of view of colour and polychromy, and this is what the exhibition was about.

I think people like seeing models in exhibitions. We did an exhibition of our work, and it was basically a huge wall of models. There is a tendency these days to show the very first concept models of architects. This is OK, but it is very 'in', this idea to show how the big artist works. This is not really that important to us. I think that there are two reasons for this recent tendency. Architecture, at least in Europe, has hype behind it. This is an amazing thing, and its part of lifestyle. So as part of this lifestyle machine people are curious about how the architects work. People also think that architecture is art, that the models are pieces of art. I think there are also a lot of people who believe their architecture is a piece of art. We absolutely do not believe this. Architecture definitely has artistic qualities, but the building itself is not art. A good building might have sculptural qualities, but it is not sculpture. I think there are a lot of opinions in this area, but for us it is certainly this way_

Zurich, Switzerland
October 15th 2008

An Interview with Jan Stockebrand

J. Mayer H, Berlin

MARK SZCZERBICKI Perhaps you can start by explaining how the office started, how it operates and what your role here is?

JAN STOCKEBRAND The office can be considered one of the younger offices within Germany and Berlin. It was founded about ten years ago, with the first project being the *Stadthaus* in Stuttgart. This was fairly conventional, I mean it attracted some attention here and internationally, but it looked like you would expect a building in Germany to look like: solid surfaces and nice windows. But it was sort of twisted so it caused some irritation and interest, even though it was still on the rectangular side of architecture.

Then with the *Mensa* building we started drifting towards more sculptural, more freeform architecture...

Is this direction quite unusual within Berlin?

Perhaps not so much here in Berlin, there are other firms such as Graft who do use these freeform shapes, and some firms which at least in plan try to come up with some interesting shapes. But for Germany this is very uncommon. I'm sure you are aware in Germany there is a very classical, modern style. It is quite conventional and solid. So our formal language distinguishes itself very much from the majority of the offices here.

Right now the office has about 16-17 staff, with some interns now and then helping out. A big step in the development of the office was when we won the *Seville Metropol Parasol* project, which is in the centre of Seville in Spain. This was in the beginning of 2004 and caused the main boost for the office. It also attracted a lot of attention. This project is still going on due to its complexity and size. It is due to be finished in a year. The building is very much an innovation in using wood construction so it takes a while...

We are always trying to create an architecture which is more specific, more special, that produces some identity for the site, rather than just reproducing another facade. We try to really contribute to the public realm, to create a discussion. We tend to polarize public opinion – some people love it to see someone producing more free architecture, and then there is the big other half who say '*This is garbage, where is the true Bauhaus style?*'

In the end what is most important to us is for people to develop an opinion. So we are thinking in the tradition of the post-modern movement to add to the public realm. Architecture always has its inside, but it nevertheless has a public exterior and we cannot negate that. It has to do something more, and this is what we work on constantly...

How does the process work as far as the use of digital and physical models? An interesting aspect of the photographs of a lot of your work is that it appears almost seamless, as if it is not a conventional way of constructing. It looks more like it has been manufactured in some way. Is this a result of the working process in some way?

I think it mostly has to do with the philosophy of how we look at the building. One thing which is characteristic for the office is that we work on a large range of scale. There are the buildings, there are furniture pieces, graphics, master planning, and we are constantly switching between different scales. So we do not necessarily look at a building differently than we do at a chair. We look at the sculptural aspect of it. So if we look at a building in an urban context we look at what the sculptural form is saying. Then this overall image is what we have in mind when we are detailing the building and we try to carry this through to the end. This is the sort of abstract thinking about the building. We do not stress the detail as something the viewer then looks at and sees as a detail. We always enable the viewer to see the overall abstract sculpture, and not the fact that this is a door, this is a window, and this is where the water drips and so on. We prefer the abstract quality of the building to be expressed...

This is a unique way of looking at things. It seems a lot of offices are very interested in the craftsmanship aspect of buildings, and in making visible how things came together. Your approach is almost the opposite of this...

In many ways this thinking of ours has a lot to do with how we use digital technology. We are obviously not a typical office who tests ideas in the modelmaking workshop. There is always a model at the end of the process, but we mainly work inside the computer. We produce digital models, renderings, perspectives, and obviously these things are more abstract than anything you put together with your hands. This strengthens the thinking about seamless surfaces with no joints. Once we develop that kind of quality within the computer it obviously sets the direction of the building itself.

You mentioned the first *Stadthaus* project was quite conventional. Was the computer used less in the design process back then?

The house was pretty much before the computer was used in the design process in the office...

What has been the main reason for this shift to using the computer to such an extent and embracing the new technology?

I think this has a lot to do with the way we think in the office and what we would like to do, our personal preferences. Once you see the technology and you realise what is possible with it you realise '*wow, this is a lot of fun!*' You can do great things which you could not do before, and you start to see big potential. This combined with digital manufacturing processes allows a lot of fun architecture to be produced. Coming from an art or sculptural background it was a natural direction for us to take. To take the architecture off of the craftsmanship side and bring it to the artsy sculptural side.

So for 3D modelling we use Maya, it allows us a lot of possibilities and potential to study morphology, working with 4D, seeing how forms evolve with the passing of time and so on...

How do you deal with people with different levels of skills in 3D modelling?

Usually we have one person who is responsible for the 3D modelling for a project. There are then people who are also working on the floor plan, the sections and so on. But I guess the floor plan and the 3D model are the two main tasks that need to be brought together. There is constant feedback, they work in parallel...

When you present designs to clients, do you again usually use a 2D medium? How do you think clients deal with the understanding of the complex plans? Do they appreciate 3D walkthroughs and perspectives?

It really depends on the type of project. Right now, for example, we are doing the interior design of a very complex exhibition space. We felt at a point that we could no longer communicate this to the client with a perspective and there was the necessity for a model. With other projects it may be enough to have the floor plan to explain the functional aspects and then work within key moments that can be visualised. The fly-through we do not use that much, because we realised it was actually difficult for clients to understand the fly-through. It is easier if you have the perspective in front of you, you point to the plan and you say '*this is where you are looking from*'. While we are looking at a fly-through there are a lot of things happening very quickly and we usually realise we are constantly stopping to explain where we are. So if we do a fly-through it just ends up as a series of fixed images...

When you produce physical models, do you do it here, or do you outsource the production?

This depends. If the form of the model is simple enough we do it here, but for example with the *Metropol Parasol* project we had the model made by a separate company.

For presentation models we always use a modelmaker, there are a number of great modelmakers here in Berlin.

Do the 3D computer models get used by other consultants or do they just work off the 2D documentation?

We would like them to use the 3D models more, but we find the engineers simply do not have the tools to work with them. There is a project we are working on now where it would be of great benefit to calculate the areas and get the quantities to help with pricing, but they just can't do it. There is no one in the engineer's office that can open a 3D model, rotate it, and extract the surfaces...

So things end up getting done twice?

Yes, the engineers just work the way they always have. It would be big help, and the whole planning process would be more precise and reliable, if the 3D model was used more, especially when you are building complex buildings.

Can you tell me about where you studied architecture?

I started my studies in Aachen in Germany, and then I did a Masters at the Pratt Institute in New York.

What do you think is the attitude to the physical model in educational institutions here in Germany compared to places like the Pratt? Is the approach here still more traditional?

I guess as always it depends on the individual schools, but I do see a development in the last few years in German schools starting to embrace the technology more. When I decided to go to New York it was simply for the reason that digital technology was being used more in the US. Back then it was very hard to find a school here in Germany that would show you how to use software like 3D Studio Max for example.

Now with the international education system becoming more interwoven the knowledge transfer happens quicker between Germany and the US. I guess the basic training of the architect here is still based on physical model making and traditional methods of teaching and learning and developing space with cardboard and a craft knife...

What do you think is the reason for the digital technologies being more widely used in the US? It seems that a lot of offices in Europe are tied to the tradition of the manual modelmaking method.

I think that one of the main reasons the difference is so strong between Germany and the US is the way the way educational systems work. In Germany for a long time it was not possible for a teacher to become a professor at the University until they had run a successful architectural office. So every professor that came had an office that they had ran for a considerably long time, and they had a certain level of experience, and they were called to the University to pass on that experience to others. That was what every Professor did, and this system did not leave any room for experimentation, or treating architecture as a research field and mixing it with other fields. For a long time in Germany that is how things worked and the new ways of thinking took a very long time to come about.

I think that in the US they were much quicker in realising that the University should set the framework for doing great *research*. I mean someone like Bernard Tschumi at Columbia was a perfect example of this. He created an environment for students to do *research*. The fact that Tschumi took that big step towards establishing architecture as a research profession was very important for the US.

Now, during the last five years or so, this way of thinking has become more popular in Germany. Now you get professors here who have never built a house, which would have been impossible 10 years ago. Now there are obviously other considerations that are looked at...

Something I find very interesting in the type of architecture your office produces is that eventually the jump has to be made to choose materials, colours and seeing how the light works, how the building will perform thermally. It seems that when you work with a physical model you are forced to imagine what the actual materials will be, whereas on the computer that decision can be delayed to the very end. How does the materiality of the building come into the process?

As you say we never think about the material until very late in the process. It is totally out of the discussion, and of course it is our conscious decision to work this way. If you start thinking about materials it will force you to think a certain way, to think about conventional detailing, and this is where we don't want to go. So we really keep the material out of the design process, and then once the design is nearly finished we start thinking about what materials will be suitable.

The *Mensa* building was very important for us from this point of view. We didn't think about the material until it was time to build the thing, and then once we won the competition we thought '*ok, let's do it in concrete*'. And of course concrete was too expensive, so out of necessity we thought of alternatives, and the idea came to build it out of wood and coat the wood in colour polyurethane. This had never been done before, because perhaps no one had the pressure to build these shapes for a certain budget. So if we had chosen concrete at the beginning we would have known it was too expensive so the whole design process might have gone differently. Not having to think about the material forced us to look at all possible areas of where solutions could be hiding. We found a company that could do the timber frame in large pieces, to work it out structurally, and then the company who do polyurethane developed their product especially for our project, and the two companies ended up working together.

How did you achieve the smooth curved surfaces in the *Mensa* project?

There are always little compromises you have to make depending on the materials. The structure of *Mensa* is all made out of standard timber profiles, and then the corners are smoothed out using special wooden infill sections that are CNC milled.

How do you test the thermal performance of your buildings? Can you use the 3D computer model, or do you use more conventional means?

Pretty much most of that is done in a more conventional way, but we do achieve a pretty high degree of precision.

How does the context of where you are designing come into the design process?

Again this depends on the project. For the *Mensa* building for example you could not tell so much about the context from a physical model. The site was just a vast open area, so it made no sense to build a model. But we dealt with this condition in a different way: we saw that we had a lot of greenery, so the idea was to pull apart the ground plane, lift it up, and what you have in between becomes the space. So we create new space, but the green space still remains on top of the building.

With projects which are located in urban environments, we definitely make models from the beginning. They just help us more, and it helps the client to see the models and how all the parts of the project work.

Do you find any differences in how the public in Germany perceives your buildings compared to other parts of Europe?

Well, here in Germany they do not exactly embrace new ideas as much. The fact that speaks for itself is that most of our bigger projects are not in Germany. The most specific recent project is in Spain, and we could not imagine it happening here. It would be weird for people here to build such a project, but in Spain people were not as irritated in a way...

I find it interesting that if a building goes through the whole design and documentation process in the computer there is never a point where you get to look inside a physical object before the building is complete. If this is the case how do you test the spaces, is it mostly through perspectives or in 3D-printed digital models?

Sometimes, when we are nearly done with the design development, we will print a 3D model. But we actually work a lot with the 2D drawings.

The plan is very important to us. We always work very much on the functional part, and this also tells us a lot about what the 3D space will be like. If you are thinking in an architectural way you are able to abstract the 3D space from the drawing.

Of course we work a lot with perspectives and fly-throughs. It also depends on the individual person working on the project, very often they have rotated the building model around with the mouse a million times while working on the project, and it then depends on the judgment of that person to look and decide the next moves_

Berlin, Germany

October 29th 2008

An Interview with Axel Schultes

Schultes Frank Architekten, Berlin

MARK SZCZERBICKI Can you tell me about the role of the model in your design process?

AXEL SCHULTES Well, we started our office with this kind of modelmaking using blue foam. By modelmaking I mean building spaces. I do not mean just urban massing models which are so widely used, or models with wood, plexiglass, everything... Our main interest from the start has been to build models in section, models showing the full space in relatively big scales, 1:50 among them, models you can really stick your nose into. We got really interested in capturing images of the models by using optical devices like cameras or even endoscopes.

The first discovery to prompt this way of working was I think in about 1970 or 72', when my friend Leon Krier came into the office with a little machine, which was pretty new at that time. It had a hot wire for cutting all this foam, initially using just the cheap white Styrofoam. We got really interested in this; I started inventing machinery to cut the foam. I made small machines to take to the United States to crits with my students, and we clearly indulged in this kind of work.

It also clearly influenced our way of designing. We found out very easily that everything that is either orthogonal, or has a sharp edge, or is oblique, even everything that is circular and cylindrical, can be made with this kind of modelmaking machinery very precisely, very easily, and very swiftly. There is even a faint resemblance to Roman architecture in our spaces. If you look at the Baths at Caracalla, or architecture in Rome, in Tivoli, all that is typically Roman... The orthogonal and the cylindrical mixed together into thousands of combinations and edifices. And something of these memories of old times is stuck in our heads even today; you can see it when you see the work up until the present day.

So I must confess this is not the full theology behind it, it is much more a practical influx; it's what you can say about a painter: he is painting what he can paint. So that was our first main interest and it stems directly from this kind of modelmaking. And this stems from space, because we think the quintessence of architecture is space and *not* form, structure or construction. So this all started with this little machine of Leon Krier which we developed it into a high precision tool of doing architecture.

Were the models you were making concept models or more to do with the way light was entering the space?

Yes, especially to do with the influx of light. This is really something very special. You either lie with the model or you tell the truth. Normally, when you build an interior space model using for example white cardboard, it is really as if you took a camera and made a photo of an interior against the window – there is no space. That is a model that lies because of the light that is simmering through it, through the joins in the surfaces. But a model that gives you a very similar feeling to the actual building when it is built it is very near to the true impression of the space. This is the special nature of the bluish Styrofoam. We have never experienced any other material that can do that.

It seems you also have a keen interest in photography and in testing different techniques of presenting the spaces you have modelled.

Sure, you can't avoid that. But I will get back to that point...

The crematorium project here in Berlin is one of our favourite spaces that we have done. It started with a competition, and we built this model of a space with columns in the centre. We started the competition with an *interior* model. Later on, years after, when you enter the real building, you will find a very similar expression in the space to the space in the model in the first competition entry 5 years earlier.

And of course photography is the main tool for representing the image to others. Usually it is impossible to get a client to stick their head in the model. When we were doing the Chancellery here in Berlin it was impossible to get Chancellor Kohl to come to the office. We had to present images of the models.

We have used in the old times every type of camera including the Hesselblad wide angle. We needed the wide angle for interiors. The Hesselblad was a marvellous device which we used to the full. If not that we used the 35mm small cameras. We used every type of camera, up to using digital in the last ten years.

Now we are stuck in digital, and we are stuck in modelmaking in a way. The new people in the office learn from others how it is done. You need this skill and experience to see what effect light will have on the wall, the ceiling, the floor. But the model-making is really painstaking, it takes a lot of time and energy, and when you come to projects that are not meant to go into the depths of an architectural expression, when it is just 'investor' architecture, all these things are much too delicate to handle and understand. There is no demand for this in architecture today, so only when we come to something that is at our hearts delight that we do these things...

With projects we do now we immediately go into massing models, into renderings, into decorating in Photoshop, making these things which 20 years ago we turned our nose up at as 'American perspectives' with nice people sitting or walking around leisurely... This is of no interest to us but it is what the clients demand when they say '*we need a booklet, we need to sell the idea, and we have to think about the cash flow*'.

But what we once had was a special culture of modelmaking that in my understanding was never copied by other offices. Even when I was with my students some tried this technique of ours and gave it up. It is not as primitive as a wooden models, even though wood at least is something nice to look at. These bluish things are not nice, but they are really good to see the light, and this is the kind of modelmaking that is not widely spread. I can imagine that it is dying out...

So it has been more a commercial reality rather than a choice that you have had to adopt the computer technologies?

Yes, absolutely. Of course it is much easier to change, to have options, to develop on the computer. You can have different choices in one or two hours, which you could never do with a real model.

Do you feel that architecture is losing out on something that physical models used to contribute, or is it just a different kind of architecture that is produced?

Well this is going into a whole different discussion about what the computer is doing to architecture, but of course it is definitely doing damage. When I say that a painter paints what they can paint, it is like someone working only on a computer who will never get back to the flexibility of mind when you sketch and layer the sketches, the feedback from what you see and produce with your fingers, the feedback into your brain...

The computer has the tendency of asking you what you already know, and not what you can discover. You are re-producing what you have done before even if you think it is something new.

Of course this is absolutely devastating and could mean the end of architecture as we know it (...laughs...) In terms of modelmaking the influx is not so grave. Anyway, if you know what you're doing and the building is built it doesn't matter if there were renderings, if it was a nice sketch, if it was a nice perspective, or if a model was used.

There seems to be strong tradition in craftsmanship in Germany, in detailing. Do you think that the fact you have to put materials together in a model and think ahead to how they will be built helps to resolve the building details?

No, not so much. We are more interested in what sort of space we are trying to create, what type of atmosphere, it is more conceptual. When you get down to working drawings, then you enter a special branch in architecture similar to what you see in Switzerland, what you see sometimes in Germany, and this is a special way to plan it down to the last screw...

But now we have to do projects in the Emirates for example, where there is maybe a concept, but you are not developing details for a special kind of building. And when you are not developing these details it shows in the final building. You give the project away to a facade company, to a building company, and then these things are just assembled like a bricolage. It is not even a gesture to reduce to a consistency and to restrict materials like my colleague Peter Zumthor is doing. What he is doing is absolutely contrasting to what 100 or 200 skyscrapers in Dubai are doing.

And of course we can have a long discussion about what end architecture is really doomed to come to. Perhaps we have this old way of thinking and a desire to do architecture in a certain way, but If we look at a Gehry building for example, even if it is not in Bilbao, it gives you a feeling for an hour that it is nice, and maybe this is enough... Our global civilization is not asking for anything more than that. It is not asking that you are not reminded of something that may be lost; there are the bigger things of utmost value. Design is not handling these issues today and not calling for that. It is only asking that something be useful, maybe even beautiful, but is not the full experience of mankind and a long term desire. For example if you enter a piece of Luis Kahn's architecture there is always a connection to the far beyond, to his own experience. There is something in it which makes you feel as if you are strolling through the streets of an old city. A mythical point you are reacting to which you can't find everywhere... Perhaps it is a matter of age...

Do you find that here in Berlin and in Germany in general most practices are going along with this 'computerised' way or is there some sort of reaction against this and the blob architecture it may produce?

As a tool to develop ideas I think the model is on a decline.

We are currently working on a big project in Monaco, and there is a very famous American firm working in parallel, and they flooded the client with little models done on a 3D printer. There is nothing you can learn by doing this; they are just done as if you were printing drawings. That's the end of anything that gives an opportunity of discovery that comes only when you put something together, or cut something out, and put it together again. When everything is conceived first, and then printed, there is no development, and especially not in your own head. You simply recall that for this problem we usually have this answer. You put it in the computer and then you just print it. I wouldn't call that a model, I wouldn't think about it that way...

You can do nothing except present with those sorts of models. There is definitely a need for them if you are presenting. Today we are forced to work with specialized firms that do these kinds of presentation models, and it's not something we would normally do but it is something the clients want.

Do you find with clients that there is a distrust of renderings?

Even if so they don't care, they show the renderings to *their* client. The client these days is someone who sells the building, or sells apartments in the building. They just want an image that can impress the person they are dealing with. So they don't care, they even ask you to flood a building with greenery so no architectural expression remains. Green is nice, people like it, so the less you see of the architecture the better. And of course this has to be done in high resolution; it has to be done at a premium quality...

It seems that working purely on a computer, especially in terms of context, is far removed from the way one might usually work with physical massing models. Do you think that with the use of the computer architecture is becoming more globalized?

Yes, I think it will widely spread that way, and this adds to the deterioration of architecture.

It is not that every kind of planning will be doomed by the computer - you still have ears and eyes of your own, and you can reject things that it produces. The computer *needs* to be used as a means of architectural production and interaction. But the risk is getting higher and higher that many of these qualities of developing something from its surroundings, where you have the environment and the program to rely on, both are reduced in impact. Nowadays a design has to be *fitted* to a program. Let us think of Luis Kahn and his famous saying of 're-programming the program' - testing whether the program is really consistent within itself, if it really fits what the building is meant to be doing, and then sitting down with the client and discussing things that don't fit... And the more pressure these things are getting from machines, the less that they will be accepted.

In our own practice we have a project with an apartment which needs to be 85sqm. And for many reasons it ends up 87sqm. And the reaction of the client is '*no, that's impossible*'. And we are stunned – this never used to happen before. There is a neglect to *think* about some things. All that there is just *doing*, and the best way to do things is with the computer...

Do you think this enthusiasm with the computer will wear off if people realise that buildings are becoming more soulless? Do you think there is a chance of a reaction against the computer?

In a way I think with these things there is never a way back. Some architects can refuse to work that way, and maybe there will always be someone who acts crazy and is not going the mainstream way and insisting that there is something more about architecture rather than just obliging to a client. But I think this is more and more outdated and more a complete luxury to work that way.

You can see nowadays how many architects just find a trick to get a name, or get well known. And they do this mostly when they are not under any financial risk. You can see it even when they are studying - they feel free, they are not obliged, and they can develop themselves and wait. They can wait 20 or 30 years and maybe they find a niche in the market and it can be something good. And the way this global civilization is relying on money, we now have a crisis and there will be the next stepping up and the next boom and the next crisis and bubble and whatever...

My experience in the last few decades working in this practice is that money and profit rules more and more and influences our decisions. This is overwhelming, and I am very pessimistic about the future. We mentioned Leon Krier previously, who is now saying we should go away from industry, to come back to the craft, to look back to the centuries of craftsmanship. But it will not happen...

Have you taught architecture extensively throughout your career as well as practicing?

Yes, although now I am not too anxious to work in the big Universities. I'm always very conscious about how much time it takes up. It is not just talking with students; it is much more time consuming than that if you are going to be very involved. I have had a job now for the last 5 years at the Kunst Academy in Dusseldorf, and this is dedicated purely to lectures and crits with students.

How do you think the current generation of students approaches modelmaking and how the computer affects their design process?

There is definitely this tendency to go into the web and to search for images. Of course I use all the influence I have to get them to think for themselves, to think about their own possibilities. On the other hand I feel a decline in the education system in Germany. I feel that knowledge of architecture, of literature, of ways to think about the world, is going to be more and more reduced. And you can worry about this quite a lot. The reason for this is a big field of estimations, I really can't tell... Is it bad education? Is it the influence of TV and the net? Is it the flooding of information? I really don't know... But you can see that there is a lack of knowledge. And this is with postgraduate students. I mean I can't imagine how you can go into architectural history and not know the Mosque of Cordoba? Or I mention the Hagia Sophia, and they don't know it! And these are postgraduate students after their full study...

So what are you looking forward to in future projects? It seems you are quite negative about the future...

Yes, I am absolutely pessimistic. The only thing is that we will fight for the way we are used to do architecture. But even our Chancellery project here in the Berlin is marred in its expression by the lack of the overall urban concept... We only can choose to be sad or be angry, and we are both.

And of course we will fight whenever we will see any chance for something good_

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Scales of reality

A discussion between Christian Kerez and Martin Steinmann

MARTIN STEINMANN Even in an era of «virtual models» that we can turn in all directions on the screen, cardboard models have not disappeared from architects' tables. For what reason do we build models? For what reason do you have models built in your workshop?

CHRISTIAN KEREZ When we work with models, it is primarily to carry out research into space. Models are predestined for this use as they are themselves a three-dimensional medium. The digital image is, on the other hand, a bi-dimensional representation, in the same way as a plan – even more so – as a plan shows its abstract nature, whereas a digital image simulates a spatiality that it does not possess. It is a sales tool, not a work tool, not a tool for architectural-spatial research.

The possibility of carrying out such investigations depends on the scale on which we construct the models. In your workshop, we find models on different scales. At which scale do you study which aspects? For example, on what scale are the models that you use to study the facades of the Witikon house? It seems unusual, more than 1:50...

These are models on a scale of 1:33. The facades are filters. 1:33 is the scale that allows us to see through the house. What is being studied here is the relationship between interior and exterior spaces. The facades command this relationship. This scale is large enough to show the immediate surroundings of the house and small enough so that we can still see the rooms with their furniture and the partition of the windows.

1:33 is the scale on which we work in a theatre. In this case are the spaces sufficiently large that we can see them as such? So that from these we can imagine the real space?

Spaces gain in visibility when we introduce figurines, which give them the scale. Most architects use figurines that come from miniature electric train sets. They are very detailed and give the spaces a cinematic dimension. We see the spaces in relation to the size of a head, an arm ... This relationship allows us to give the model a welcome evocativeness without too much effort.

What about the scale 1:10? Here, the figurines would look like the figures of Georges Segal, white, with the same paradoxical balance between the natural and the artificial.

1:10 scale models are no more real, nor more detailed than those on a scale of 1:33. However, what changes is the way in which we look at them. For example, we can put our head inside. We are then enveloped by the space. We see it from the inside, whereas larger scales only allow for an exterior look, like that which we give to a stage.

To avoid models being seen as objects, those that we will present at the Basel Museum of Architecture will, for the most part, be on the scale of 1:10. We hope that the quite small dimensions of the exhibition halls will encourage the visitors to explore the interior of these objects, their space. What's more, 1:10 is the scale on which lighting designers work. On this scale, the measurement taken can be adapted to reality.

When you plan, do you proceed by a linear progression in scales, for example going from 1:200 to 1:50, then to 1:10?

As I see it, no scale is more important than another. What is a deciding factor for us is the simultaneous comparison between several scales. This can be illustrated by the building on which we are working at the moment, the Zurich-Leutschenbach School: as long as we had only taken into consideration one model, we could not make a decision on the ribbed structure of the slabs. We were only in a position to do so from the moment that we systematically compared the different scales. One can only understand what wider, and therefore flatter, ribbing involves by looking simultaneously at 1:1 models placed at the real height and the increase in the effect in the 1:10 models. It is in this way that we were able to work out the dimensions of the ribbing in question. This is a procedure that we use systematically. The representation of the real and built space forms in our minds by the complementarity of these ways of seeing. This procedure does not come down to the different scales, but can equally be applied to other aspects of space, notably structure, materials, light etc ...

Models come somewhere between the idea of a building and the building itself. Of course, it is an object, like the building, but – to use a paradoxical formula – this object does not represent itself: it represents something else. But what? The building? Or the idea that underlies the building?

Models offer the possibility of observation more closely linked to reality. They are spatial, we can observe them during the changes in light, they are made of given materials, they are built ... These are characteristics that do not anticipate reality, but reflect it in many ways.

You reduce reality to a single and same material. This could create the illusion of a unit that does not exist in reality – and that influences your research.

Models must be considered as approximations of reality, nothing more. They are a means of representing real space, but they do not pretend to be realistic. To build with white cardboard on a scale of 1:1, pillars that will be in concrete, is misleading. They will be light years away from the reality. This is also the case for samples or «mock-ups» of facades. We assess an element differently depending on whether we consider it in isolation, or as part of a space, or a larger context. This kind of sample sometimes leads to error. I am thinking, for example, that Eschenbach's inclined posts, for which we made samples in concrete, are too thin. They could be 5 or even 10 centimetres thicker. The conceptual idea that the inclined posts, the slabs and the centres of movement form one mass should have been favoured, with regard to their relative proportions to the windows and the walls. This is why we should definitely have cast them on site. The proportions of the posts

would therefore have evolved from this process. The first model in grey cardboard, which showed the link between the different elements, was the closest to the built reality. Here, we gave way to a weakness which is widespread in architectural circles: design. One must never rely on models. We must always ask ourselves if they are bringing us nearer to a better representation of the built space, or if on the contrary, they are leading us away from this.

Leading us away to take us towards what? Towards a reality that belongs to a model but not to the built space? Or towards a space that approaches as near as possible the model, by a sort of inversion of their reciprocal relationship?

The more the model approaches the built reality, the more difficult it is not to just see an approximation of the latter. But reality cannot be reconstructed by models, even by life-size models. The bigger and the more concrete these are, the more dangerous they are, as one no longer makes the difference between the model and real space.

You insist on the fact that, when you have models made in your workshop, it is above all the space that interests you. However, these models are more often than not built in white cardboard, a material that obviously is not intended to represent reality.

In the representation of space, all aspects of architecture come together to form an indissoluble unit. But they only have a meaning in as far as they describe the limits of the architectural space. Every element of a building only acquires its meaning in its architectural and spatial context. The detail in itself is uninteresting, insignificant, anecdotic. Whether we like it or not, details only exist as parts of the building taken as a whole. As a result, this gives me the hope that even a very simple or banal detail can have a meaning. But precisely, not taken in isolation.

But the material from which the parts are made up, its surface, also has a signification ...

The perception of space depends also of course on the surfaces surrounding it. Do they have a matt or a brilliant finish? Does the design of the casing give them a scale? A structure? At Forsterstrasse, we made the casing design disappear.

But this also has the effect that the building looks like a model.

I can also imagine that the walls give structure. In Eschenbach, for the three volumes that contain the vertical circulation, we used relatively small fascia boards. To emphasise the plasticity of these volumes, we accentuated the design of the fascia boards. On the other hand, at Forsterstrasse we wanted to avoid the scale that would have been induced by such a design. The spatial concept of this house consists of creating a generous space by visual continuity, which would have been questionable if subdivided with partitions. These reflections lead to the surface of the cement being very different in the two cases.

Does your experience with buildings help you when you work with models? By that I mean does it help you to see the reality in the models?

I have built very little, so I therefore have little experience...

I am also thinking about the experience that you gained as a photographer and more generally as someone who is interested in architecture in its different forms.

Photography helped me to understand how light modifies a space. It mainly influenced my first projects. Certain models allow one to represent this aspect of reality. The experience must be as relevant as possible. This is why models are important. They are spatial studies that allow one to reach this relevance. The more we accumulate models for a project, the more chaotic our workshop becomes. At the same time, hope grows that the built space, as opposed to that of the workshop, possesses precision and clarity.

For your models you use a material «without qualities», white, smooth, like the Formica of minimalist art, that was intended to discourage associations ...

Most of the time we use white Depafit.

Does this material act as a surface on which you can project your ideas or visions?

Such a model is like a drawing, which unlike a picture, is composed of lines and not of surfaces. It shows the angles, the dimensions, the proportions, but does not itself possess any sensuality. This is also another reason for using Depafit: the fibrous surface of grey cardboard absorbs a lot of light, which modifies the space a great deal.

For the Forsterstrasse building, you still cast a model in cement. Was this to get nearer to reality, including on the level of the material? It is true that one cannot «scale down» the material. On a scale of 1:10, cement is different from on a scale of 1:1. To what extent does the «real» material allow you to come closer to the – future– real space than cardboard ?

I think that it offers this possibility only in a very limited way. We did not develop very much from this model in cement. It is much too difficult to create to allow us to really work with it. We mainly used it for photos destined for the sale of the apartments. People asked us all the time what the rooms constructed entirely in cement would look like. These photos are astonishingly close to the reality. We also tried to test the combined effect of all the materials used.

On one hand, these models therefore come closer to reality, on the other they move away from it, or more exactly, they move away from the illusion of reality.

One could qualify them as conceptual layouts – models. In this sense, a model is an object that allows one to understand complex phenomena by simplifying them. Because of this, it is at the same time abstract and concrete, an idea and an object. This is why conceptual models particularly interest me; they reproduce reality in an indirect manner. They offer the possibility to consider an idea in a different form: a concrete form. A conceptual model does not attempt to approach reality, it has its own reality. It is the concrete illustration of something abstract. It helps one to see the idea behind a building. This is a decisive factor in such an idea. It is an experiment into what we could do in the building. In this sense, this type of model serves to control the development of the project.

In the case of the Eschenbach school, the conceptual model is made up of the three volumes that contain the vertical liaisons. It was a question of doing things in such a way that these nuclei keep an identity after the subdivision of the floors with the partitions. The conceptual model here came at the beginning of the procedure. This is not always the case. Sometimes, the concept only appears to me clearly during work on the project. In the case of the Salzmagazin-Areal school in Zurich, we built a model in order to take photos of the interior spaces and it was there that we realised that it was in fact the corridors that made up the design of the project. Here, therefore, the design followed empirically from the model.

I once described your architecture as the expression of an attempt to determine the conditions of the project in such a way that this can follow on from itself in a manner of speaking. Is this the role of models: to identify the conditions necessary for that? To identify the concept determined by these conditions?

Exactly. The models allow us to test external influences exerted on the design to assure us that the technical requirements for the construction do not become independent, but on the contrary contribute to strengthening the design. Therefore, as far as possible, all the details follow on from the architectural and spatial design. A model always involves a simplification and an abstraction. This offers the opportunity to simplify and to reduce to the essential the questions that we ask ourselves about the built space itself. The idea here is to understand the buildings themselves like models that do not say everything. This implies concentrating on essential questions. These send us back to the difficult notion of understanding space, which for me is central. Architecture can only be defined from this notion.

From what I understand, you are trying to learn a maximum by means of the models. Doesn't this exclude certain aspects that cannot be understood from a model? We were talking earlier about details. Do you think that this way of working has led you to a reduction in means? Do you think that your interest in space «in itself» comes from this, or on the contrary that models provide a means adapted to your interest in «architectural research»?

For me, simplification is not a rule. It is more the consequence of certain concepts. I can imagine working in another direction, completely the opposite. But the work with models has nevertheless a lot of influence on the projects created. For example, it was from a model that I understood that the funeral chapel in Bonaduz should become as it was in the model, that is to say abstract and white, so that the diffused light makes it seem to be without limits. What characterises the scaling down as I understand it, is that it makes things much more complex, much more difficult too, and because of this they can become a determining factor. In the Forsterstrasse building, a great complexity resulted from the fact that the apartments were limited to a few walls, but that these walls took on functions over five floors, in terms of space, construction and installations. What is particular, is the degree of interdependence that the reduction of architecture to a few walls generates and the hope that is linked to this, that is that the design becomes a determining factor.

By that, do you mean to say that because of the degree of interdependence, the project could not be otherwise? That in this sense it is definitive?

I mean to say that certain things come about on their own, because of their interdependence. The complexity frees the architect from a shape for which the reasons do not reside in the things themselves. At least, this is my wish. Also, the scale model should not be considered to be an aesthetic goal, but a basis for work.

Why do you build so many models? The exhibition will surely give the impression of a plethora.

The models touch on something existential. They are – also – the expression of uncertainty, the expression of an attempt to stand up to this uncertainty by exploring all the possibilities, in the hope of arriving at something definitive, even if we know that this is not possible, that nothing definitive exists – exactly what all these models show.

You brought up the necessity of adopting a critical attitude towards the models. Is this attitude necessary to avoid thinking that we have, in the model, a bit of reality in our hands?

A model is a means of understanding reality, an intellectual means. It puts things into a connection that explains them, in this case a visual connection. In architecture, models are a very simple means of illustrating a building. However, we can interpret the model at a more fundamental level, as an attempt to explain the reality, as in the case of a scientific model. From this point of view, we can say that a building is also a model, that is to say a means of understanding reality.

What does understand the reality mean? What do we understand? How can a building help us – as a model – to understand reality? And what desires are expressed in this idea?

Richard Lethaby said that Man cannot understand the world as a whole. He therefore seeks to distance himself from it, to arrive by means of this detachment at understanding. In this sense, a house is a model of the world: it represents an order that we cannot perceive in the world, but which makes perceptible, in the scale model of a house, what the world contains.

In this sense, I think that my projects express the desire for an underlying order. Order allows us to maintain unity, within the greatest multiplicity, in such a way that it does not appear incomplete. It takes the form of the rules of spatial composition, but does not anticipate the built space. This order is not closed, it is open.