Aarhus Documents 01

A Beaux Arts Education for the 21st Century

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Anne Elisabeth and Anders were supported in their teaching program by an enthusiastic and highly engaged group of tutors who provided a valuable resource in terms of communicating the school's program in fine detail. Of these tutors, Louise Heebøll continued her involvement in the project as Content Manager for the book. Louise coordinated the delivery of the book content and personally photographed many of the student projects that appear on the following pages. She was also an important interface with Gilbert Hansen who must be thanked for the graphic design and layout. Finally, Louise's understanding of Ander's and Anne Elisabeth's separate approaches to teaching was of constant assistance and this knowledge informed many of the detailed decisions required to resolve the layout.

I want to thank the students of first year 2009-2010 who are listed at the back of the book. The energy and vitality of the student body at the Aarhus School of Architecture provides an inherent reason to be engaged within the school and this group were exemplars in this regard. I could also have individually thanked some particularly engaged and enthusiastic members of the student body for their contribution to the success of the study trip to Australia, but I suspect that they know who they are already.

The study tour would not have happened without the support of the University of Technology, Sydney.

The Rector of the Department of Design, Architecture and Building, Desley Luscombe, must be thanked for allowing such an ambitious invasion of her campus to occur at all, while Head of the School of Architecture Anthony Burke must be thanked for backing the project from the outset, advocating the venture with the Rector and providing the necessary leadership within the school to make it happen. The second Year Coordinator, Joanne Jakovich, also deserves special mention for her efforts to integrate one hundred and twenty Scandinavian students with her student body and teaching program and for her resolution of the numerous organisational and coordination dilemmas that regularly presented themselves during the time in Sydney. My assistant, Rachael Annear, must be thanked for her role as proxy travel agent for the months before the trip. The combination of her delightful manner and organisation skills defused one potential disaster after another and without her regular intervention the trip would not have been possible.

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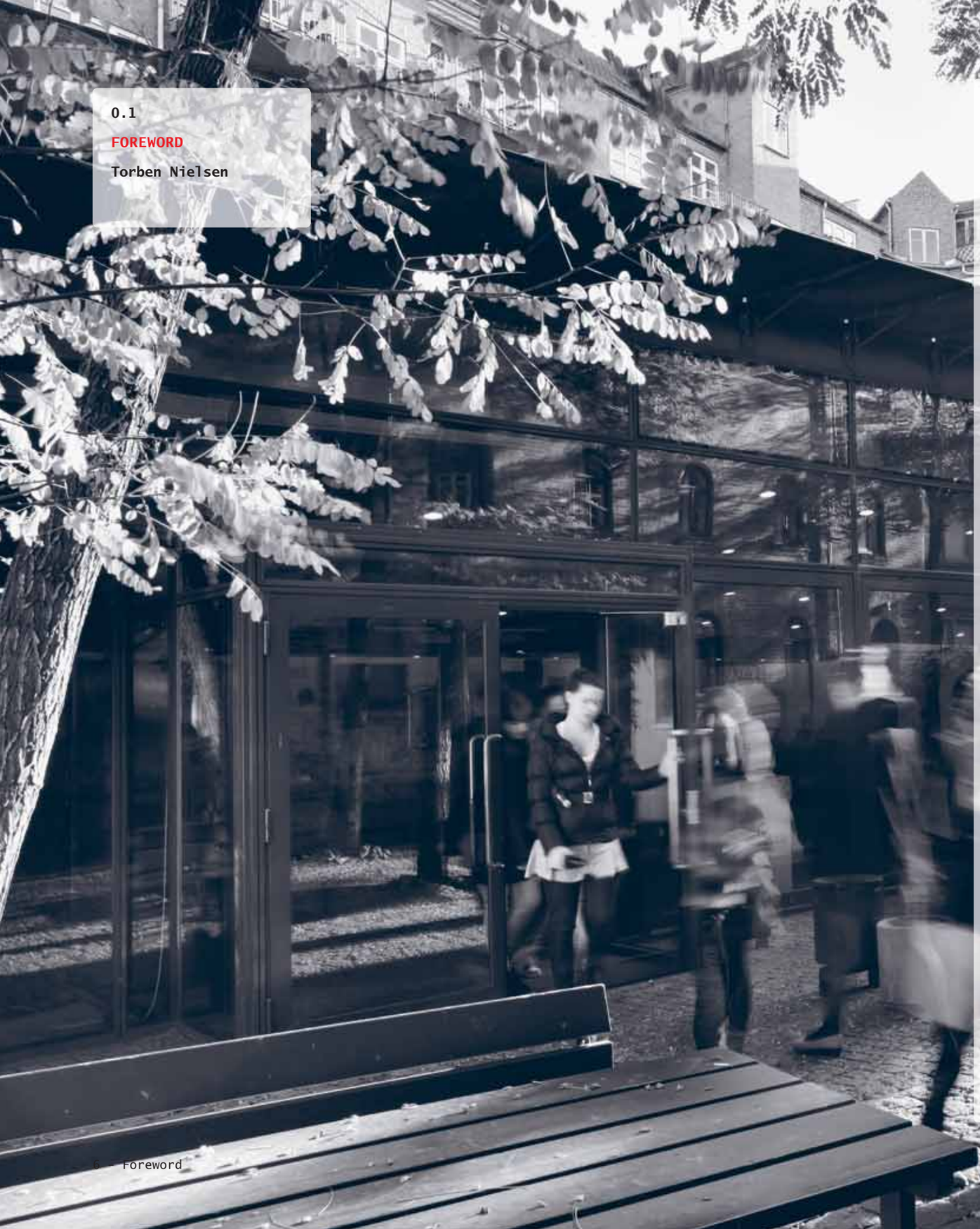
Finally I wish to acknowledge Torben Nielsen, Rector of the Aarhus School of Architecture and originator of my involvement in the first year experiment and of my role as Editor of this book. It is rare that someone in his position has the bravery to invite an outsider to intervene and critique a new experiment in education, particularly when this experiment is in many ways his personal project and has been closely associated with his ascension to Rector. To then ask me to be Guest Editor of a book on this experiment and to provide no intervention whatsoever in the content is quite remarkable. I hope that he finds this volume worthy of the resources invested in realising it and the lack of censorship to which it was subjected.

Gerard Reinmuth, Aarhus, December 2010.

CONTENT



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FOREWORD

Torben Nielsen

Dear Reader,

In your hand you are holding the first book in a new series called 'Aarhus Documents' which will be published annually by the Aarhus School of Architecture.

We have not edited the book ourselves but given a person – one who is not ordinarily part of our school and it's history – free rein to analyse, criticise and give a honest assessment of the Aarhus School of Architecture – for good or bad – so that we can be challenged.

The task has been given to the Australian architect and this year's Visiting Professor at the Aarhus School of Architecture, Gerard Reinmuth. He is responsible for the conception of the book. Reinmuth developed the book's structure and also collaborated with Gilbert Hansen on the layout.

While this book initiates a series of annual publications, they will not be yearbooks in the normal sense. There is no description of the school's present departments or projects from the first to the last year of study. On the contrary, the book focuses solely on the first year of study. A phase understood by all architects as the beginning of a long life in the puzzling and sometimes overwhelming world of architecture. A world of opportunities, frustrations and wonderful experiences, a world where it is about generating form and space for the benefit of human beings and their daily life. So, dear reader this book deals with the first year of study at the Aarhus School of Architecture in the academic year of 2009/10.

The first year of study is perhaps the most important year of education because it lays the foundation for the rest of the architectural programme. This is where the standard is set. From a educational stance the first year of study must challenge and fuel the coming years. This should continue throughout the academic programme. You have to be kept focussed in order to get better and develop both as a teacher, a researcher and a student.

The Aarhus School of Architecture is in the middle of a process of change, with regard to both structure and content. Individual responsibility, the will to experiment and the development of artistic innovative work are intensified. This is what we wish to support and strengthen in both teaching and research. Concurrently we are focussing on a high academic level in both the bachelor and the master programme.

The book illustrates the initiation of a hopefully new development of the high-quality school that we already have; a school that for many years – and I suppose through its entire four five years of existence has had a strong position in Denmark and internationally. This must continue. It does require, however that we are also able to meet new challenges; that we respond to a world in rapid change; a change that requires that we develop the Aarhus School of Architecture both with regard to pedagogy and research.

We wish to thank Gerard Reinmuth for his work on developing the publication content and editing the book and for having had the courage to analyse and criticise. Thanks to Anne Elisabeth Toft and Anders Gammelgaard Nielsen for the huge task in heading the two project processes of which the first year of study has consisted. Thanks to all the teachers who have made the teaching and the students' studies interesting and rewarding. Thank you to Louise Heebøll whose efforts in gathering all the threads enabled the publication to succeed.

I hope that the book can trigger some thoughts and inspire both ourselves and others so that we can set the agenda for architecture and the architectural education of the future – equally when it comes to research and education.

Torben Nielsen, Rector

0.1

INTRODUCTION

Gerard Reinmuth

"Around the world architectural education is evolving in response to a new international agenda and there is a growing awareness that architectural practice has also changed. Advanced technologies, innovative business and partnership models and new modes of interaction have all assisted architects to adapt to, and operate within, an increasingly global workplace. In this environment there are heightened concerns for ecological and social sustainability and architects are ideally positioned to take responsibility for these issues. However, in order to realise this potential, architects must directly engage with the new knowledge economy and work in close partnership with their academic counterparts. In this way architects may be able to take advantage of the opportunities presented by the global workplace and take responsibility once more for the future of our built environment."[1]

How does a school whose practices are firmly planted in the Beaux Arts tradition respond to these emergent conditions? In 2008 Torben Nielsen[2], the Assistant Rector[3] of the Aarhus School of Architecture, selected a group of academics from the school who had varying research interests and pedagogic approaches and tasked them with reviewing the School's education from top to bottom. An ambition to increase the quality of Masters students' at the School led to an inevitable focus on the formative years of the Bachelor degree as the initial site for changes to the established pedagogy. The group was then asked to consider how the Bachelor degree might be reformed in light of a perceived disjuncture between education, research and practice at the school and a more pragmatic requirement to align the course structure with the Bologna Accords.[4]

While this all sounds fairly straightforward, the Aarhus School of Architecture is, like many schools, wrestling with a generational transition which makes for a particularly sticky and unwieldy context for someone with a transformative agenda. Simplistically, it could be said that the combination of generational factions and a Danish reliance on consensus building (with the consequently complex and indirect way that power is wielded) tends to result in radical change being difficult to implement within a single tenure as Rector. This condition will be familiar to many of our academic readers, perhaps with their own local contingencies.

Despite these complexities, a review of the Bachelor degree was completed in 2008 and a series of recommendations were put forward to the Vice Rector and accepted. Since 2009, the first year of education at the Aarhus School of Architecture has become a laboratory for testing the pedagogical strategies developed by the group and has resulted in a rolling set of transformations in later years which are now progressing into the second and third years of the Bachelor degree. The first year education has subsequently been rebuilt over the past three years in response to this transformative agenda, culminating in the first complete test-drive of the new education in 2009-10.

Why First Year?

First year is a formative experience in the student's education and often reverberates throughout their career. First year is often a shock, given the transition from a structured high school education to the demands of a higher education degree - particularly in regards to architecture where the curriculum and pedagogical models can be vastly different to anything students have previously experienced. First year is the moment when students first encounter formal lectures about architecture and where they initially come into contact with the enormous range of techniques and skills that will be developed and refined over their careers. Of equal importance is the immersive nature of the program. First year is the site where students encounter the work ethic of an architect in practice for the first time. This cocktail of information, sensory and at times physical overload leaves a strong impression which has a profound and continued effect on the way in which students develop an approach to design and the idea of the profession as a whole.

Given the significance of the first year program, why is it that this critical moment in an architectural education has little presence in various discourses relating to the training of architects? A survey of publications on education reveals a persistent focus on the more 'glamorous' Masters studios run by well-known practitioners, which are underpinned by their current research interests. Comparably little space is given to teaching first year architecture outside very specific arenas of discourse within the academic system. A proposed question to interrogate is why teaching in first year is usually considered a less desirable role in architecture schools? It is generally utilised by young academics primarily as a way into 'the system', a platform from where ascension to a teaching role at Masters level may commence.

A Contested Space

"In the early 2000s practitioners and the profession demanded that architectural education develop in one direction, while the requirements of universities and the wider community were gradually pulling it in another. Francis Duffy argues that this situation is inevitable; 'both the teaching and the practice of architecture are firmly embedded in society and, when society changes, both must follow.' The end result of this situation is that the fabric of architectural education had become stretched taut between the conflicting desires and commercial realities of its stakeholders."[5]

First year is a particularly difficult venue from where to address the tension between the roles of the educator, researcher and practitioner which defines much contemporary discussion about architectural education.

I will briefly flesh out this tri-polar contest starting with the role of the educator. My personal perspective is that first year is a demanding one given the responsibility of educating new students. While Master level studios are often run on the basis of the course leader's PhD research interest and might actually have little sense of responsibility toward the precise development of each individual student. Teaching in first year requires very clear pedagogic ambitions - coupled with the ethical requisite that students gain a broad range of experiences as a foundation for further exploration and ultimately specialisation of one form or another. That is, the pedagogic aims and ambitions, and the structure via which these are to be realised, needs to be thought through in the context of education and learning as opposed to the tendency for Masters level teaching to be self-focused on the studio leader, their ambitions and on occasion their own works.

The issue of research is equally vexed. As most countries demand greater research activity from their institutions, teaching time is reduced including the time available to prepare for it. Research output is a key measure of the quality and standing of contemporary universities. This has led to particular dilemmas for the discipline of architecture where the very question as to what constitutes valid research particularly in the areas of 'research by design' is contested. A number of problems emerge in relation to the very definition of research and how to integrate research activity with teaching. The requirement for a particular breadth in the first year program adds a further level of complexity for those teaching at this level.

This education-research debate is compounded by a persistent confusion of how to engage practice. As a practitioner with a heavy involvement in architectural education, I am constantly surprised at the way this issue is handled by career academics who are teaching the next generation of architects. There is a surprisingly limited understanding of what actually happens in practice or what its pedagogical potential is. This issue is hindered by the antagonism towards the academy which persists in the profession - a large part of which considers graduating students unprepared or at the very least ill-equipped to practice architecture as they define it. Only a very small minority cross these battlelines with the comfort borne of a mutual understanding.

While recent changes made to the first year teaching program at the Aarhus School of Architecture are the primary subject of this book, they have occurred in parallel with a complete restructure of the entire School, which thus forms a background condition for many of the discussions contained within it. While some institutions have addressed The Bologna Accords by the simple act of renaming or redefining certain activities, the Aarhus School of Architecture has used it as a prompt to restructure their entire degree. The focus on first year can be rationalised as it is a profoundly vital component of an architect's education and therefore has been the preference selected by the Rector of the School to start addressing these changes. This book is a record of the context within which this occurred, the steps that led to the development of the new curriculum and of the work undertaken in that year.

This book attempts to problematize these changes at Aarhus and in doing so hopes to offer other schools a suite of questions and provocations to stimulate their own course development. It is intended for a wide

readership – from those considering where to commence an architecture degree to academics in other institutions who are wrestling with similar issues. In addition to these specific audiences, it is also hoped that the broader profession will find the content relevant as they continue to reflect on their own practices in conjunction with their own educational experiences.

This book will unpack the process of this transformation, the content of the education and the issues it has uncovered in three ways. Firstly, the conceptual drivers behind the new first year education are explained by those responsible for redesigning and running the program. Secondly, the actual teaching program is outlined in detail by using examples of the work which resulted. Interrupting this core structure are three interventions I have authored – on the *contexts* provided by Danish architectural education and its history, on the school's environment and on the constellation of teachers and assistants responsible for the education at the school.

A Note on the Authors

The two key contributors – Anne-Elisabeth Toft and Anders Gammelgaard Nielsen– examine this general framework enacted through two separate but equally specific lenses. We will see how the research interests of each – which can be loosely described as *representation* in the case of Toft and *research by making* in the case of Gammelgaard have driven quite different responses to the same questions concerning first year. In both cases, we will see a research agenda which has been explored at PhD level that informs teaching in the first year of the Bachelor course, thus confirming the potential for a direct link between research and educational requirements at the first year level. My contribution to this experiment – centred on a study trip to Australia – is something of a slice cut through the program by an outsider and practising architect. In my specific case, perspectives on research and practice which had developed external to this environment were bought to the program and enacted in response to what I had encountered at the school.

As for my involvement more generally, the role as contributor and editor of this volume resulted from my engagement by the school as a Guest Professor in 2010 to engage directly with the first-year experiment. Yet, the request from the Rector to edit this book without censorship and from my own viewpoint was a surprise and exhibits a bravery that currently exists in the leadership of the school which I can only commend. Yet, it does leave me with the strange task - and responsibility - of somehow giving enough of an insight into Danish society, schooling and architectural education to sufficiently contextualise the content of this book about a School that I have only recently come to know.

Subsequently, the book is coloured by my first-hand perspectives and an acceptance of a certain naivety as is the luxury of the visitor. I am not Danish, I am not an academic (but a practitioner who sometimes teaches), and I have been a spectator, not an originator, in regard to the educational initiatives being discussed in this book. Therefore, I have allowed the various contributors to the education speak in their own words wherever possible. When my voice does appear I have attempted as much as possible to give an account of the education and context "as I see it". In doing so I have made numerous shortcuts in the interest of brevity ensuring the focus remains on the main content. Whether any value resides in this approach will be for others to judge.

Endnotes

1. Ostwald M. & Williams A., 2008, 'Understanding Architectural Education in Australasia: An Analysis of Architecture Schools, Programs, Academics and Students ', *Australian Learning and Teaching Council*, Vol.2, p. 4.
2. Torben Nielsen subsequently became Rector in February 2010.
3. The title for the Heads of the two schools of architecture in Denmark is Rektor. Although this title is rarely used in English we have translated it directly here to Rector. Using the more common title of Dean might imply a standard university structure, which is not the case with the two schools which stand alone as institutions within themselves.
4. The Bologna Accords were enacted in 1999 to underpin a common European Higher Education Area within which academic degree standards would be compatible.
5. Ostwald M. & Williams A. 2008, *Op.Cit.* p. 9.

Part One

A NEW BACHELOR

1.2

REDESIGNING FIRST YEAR

Gerard Reinmuth

At present, the Bachelor education at the Aarhus School of Architecture is structured around a two year introductory education after which each student would join a department for their third year. These discipline focused departments (Architecture, Landscape and Urbanism, Architectural Heritage, Design and Architectural Design)[1] then provide a home for students' from third year onward extending to the Masters degree. However, the requirement to align with the Bologna 3+2 model – a clear three year Bachelor education followed by a two year Masters prompted the rethinking of this structure.

It has been interesting to watch a number of schools of architecture respond to the Bologna Accord[2] over the past few years. Some have simply re-branded or re-named their existing courses and made minor adjustments to accommodate the minimum form of compliance. However, the more ambitious and self-critical schools have taken the opportunity afforded by the Accord to completely reconsider their course and this is exactly what happened at the Aarhus School of Architecture.

It is important to note that the Rector charged with seeing through these changes at Aarhus - Torben Nielsen - is very much a product of the environment he is now transforming. With an established profile in the field of light in architecture, Nielsen could be said to be a teacher and researcher with classic Scandinavian interests. He has been at the school since the mid-1990s and in 2006 became Assistant Rector – a period during which he set in place the agenda which is now being enacted. Thus, while Nielsen has the unenviable task of changing an environment of which he has been very much a product of, it is my opinion that to task an 'outsider' with this particular agenda would result in massive resistance and, most likely, no effect. Navigating the complexities and intricacies of any school structure and politic is difficult and altering these is near impossible without a mandate. It is critical to assert that this restructuring is by its very nature is difficult to achieve in the Danish consensus culture. You simply can't just do what you want.

Subsequently, Nielsen gathered together a small group charged with rethinking the Bachelor degree. Two of this group – Anders Gammelgaard Nielsen and Anne Elisabeth Toft – would go on to run the first iteration of the new structure. In the following pages, Gammelgaard Nielsen and Toft outline this process and the key issues they chose to address in this restructuring process and in the rewriting of the Bachelor degree which resulted.

The Aarhus School of Architecture has, like any school, its strengths and weaknesses. In the case of Aarhus a strong studio and teaching tradition pushes up against a weakness in the way disciplinary knowledge is transmitted to students[3] and, related to this, a weakness in research generally.

While this is a key structural issue which underpinned the design of a new Bachelor education, a number of other deficiencies in the way the Aarhus School operated were influential in the process of redesigning the degree. Many of these are difficult for an institution to publicly identify and some may not have been articulated in the formal documentation produced by the team working on the project. Thus the commentary below is something of a fictional account of my personal creation, based on my perception of the issues in play. The veracity of this account can be measured in that it survived six months of informal conversations with those involved in the Bachelor redesign and is supported by my observations of the new first year education in progress.

The first of these has been, until recently, a lack of a combined vision at the school. For, despite the incredibly networked nature of the staff body – most have taught together, have taught each other, or studied together at the school – in an institutional sense the School is quite fragmented. Members of staff are well aware of each other's interests and a great deal of cross-studio activity occurs in the form of visiting critiques and informal discussions, yet there are few public intellectual contests in evidence. The long-standing social connections among staff does not work as a resilient foundation for ideological contests but rather breed a fear of articulating difference. Further, there are no formal breeds research centres which organise or articulate the various research interests in the institution which would perhaps assist in depersonalising contests of this type.

This lack of clarity in terms of research interests results in a form of total cohesion which in fact shrouds myriad differences that are never formally articulated. As discussed in my reflection on the current educational paradigm at the school[4], the five departments[5] have had an organisational function based on disciplinary lines but very little organisation of the research agendas within each Department, particularly in the case of the largest of these which has been devoted to Architecture.

This lack of articulated difference in approaches presents difficulties for anyone redesigning a Bachelor degree as a complete education. The first two years have been run as silos with little interrelation between the two programs - if anything, the two years have until recently housed completely differing approaches to how Bachelor students should be taught. Then in third year, students have entered one of the five disciplinary-based departments, adding a third disconnected component to their Bachelor education.

While it may be argued that exposure to three different approaches is of value to students, the ill-considered way alternate approaches have been introduced to students is intellectually and programmatically inefficient. A unifying structure which can underpin a logical progression through the Bachelor degree and appropriately organise the way in which students come into contact with different perspectives has been absent.

This lack of combined vision and a unifying structure has perhaps inevitably resulted in deficiencies in the School's research culture and profile. Like any school, The Aarhus School of Architecture contains a small number of highly active academics who are able to forge out a reputation beyond their institution. However, the strongest schools tend to generate their research profile from a combination of clearly defined constellations with aligned research agendas. Perspectives are honed by public intellectual engagement and conflict. Considering this, it can be suggested that structural and cultural issues at the Aarhus School of Architecture conspire with the studio-teaching emphasis to create an environment which has been non-conducive to a strong research culture and profile. These issues also constrain the research culture in less direct ways - for example, the school lacks an organised publishing apparatus to enable the distribution of research content.

Another dilemma at the school is an uncertainty in regard to Danish tradition. This is perhaps unsurprising given the recent transformation of Danish architectural culture from a locally involved and reflective community to a practice based on the importation of foreign models and the export of services internationally. However, there are also local issues, not least of which is the mortgage held by the Royal Academy of Fine Arts on the idea of a Danish tradition and the Aarhus school's need to differentiate itself from that institution.

Having raised the issue of practice we are presented with another conundrum – how to engage the extended profession? As a mirror of the academic culture, the scale of the city of Aarhus and the intense connectivity between the profession (nearly all of whom studied at the school) and the school has led to a high degree of social interaction between the two architectural institutions. This social interaction leads to numerous informal engagements, roles as guest critics and so on. However, none of these interfaces are particularly strategic or of lasting value to either party.

Finally, the Aarhus school has suffered in recent times from a lack of international input. Academics with a longer history at the school[6] will recall how in the 1980s a very high proportion of staff were from overseas and the culture at the school was one of intense engagement with international architecture culture.[7] In recent years, the culture has ossified and internalised and nearly all new staff have come from a circle of familiar colleagues or former students.

Thus while the development of a new Bachelor degree was not officially based on these issues they are omnipresent in its conception and structure. The official account of this process is given on the following pages by two of its chief architects, Anders Gammelgaard Nielsen and Anne Elisabeth Toft.

Endnotes

1. Until recently the school has had 5 departments, which will be abandoned from mid 2011 as the result of a restructure of the institution which took place during 2010.
2. 1999 Bologna Accord was established to create a European Higher Education system allowing academic qualifications and quality assurance standards to be recognised.
3. As articulated in author's article 'Context 1: Architectural Education in Denmark', that identifies the marginalisation of theory and history studies that are dominated by the role of the design studio at the Aarhus school. p. 24.
4. *Ibid*. p. 18.
5. Refer to note 1.
6. The author has discussed this phenomenon with teachers at the school including Tine Nørgaard and others who bemoan the current lack of new staff at the school from overseas.
7. Until his untimely death in January 2006, Svein Tønsager was an energetic member of the school who is perhaps best known for his organisation of a series of international lectures that brought many of the world's key architects to the school throughout the 1990s.

1.2

RETHINKING THE BACHELOR DEGREE COURSE

Anne Elisabeth Toft &
Anders Gammelgaard Nielsen

This chapter contains reflections on the background for rethinking the bachelor degree course at the Aarhus School of Architecture.

Background

The initial ideas for this book originated more than three years ago. At that time – January of 2008 – the then senior management team[1] of the Aarhus School of Architecture initiated a comprehensive process of development, with the intention of creating a degree course in architecture that could hold its own with the best in the world.[2] According to the management's strategic plan, this process of development was framed towards 'international excellence' that would begin with a rewriting of the bachelor degree course.[3]

From the management's side there was a wish that an independent bachelor school should be set up, effective from the 2008 academic year. This would mean that the bachelor course would no longer be an entity with roots in the established five departments of the school of architecture. The existing structure of the departments with their divisions into a variety of disciplines was in many ways very static and out of step with the times. It was to be disbanded to give way to a more dynamic structure that would be organised around projects and networks.This would be a flexible model that, it was felt, would be more adequately able to live up to contemporary society's priorities rather than the exising department model.

Being responsible for the first pilot project, we believed that the new degree course in architecture constantly had to be subject to ongoing reassessment and development. We believed and still believe that this is vital in order to answer the challenges presented by society at any time.

The Aarhus School of Architecture was last restructured in 2002, when its current curriculum was formulated. Since 1994, however, the school has made conscious attempts on several occasions to work on developing the first component of the degree. This has been done in the belief that the foundation course is significant for the outcome of the architectural degree course as a whole, and that regularly upgrading the course will result not only in more qualified bachelor graduates but also in more qualified master graduates.

The aim of the new independent bachelor school was to give the bachelor degree a clearer profile, raise academic standards and promote the sense of an organisation with a common culture and a common set of values.[4] It was, at the same time, intended to ensure that from 2010 the course was compatible with other architecture courses in Europe.[5]

Forming a Vision

Rethinking the bachelor degree began when the school's management picked a small group of people to develop a vision of 'the best conceivable bachelor degree course'.[6]

The group consisted of five of the younger teachers and researchers from the school's five departments. What they had in common was considerable experience of teaching on both the bachelor and the master's components of the course. The vision statement was to be developed within three months. During this time an overall strategy and an action plan for the project was developed. Simultaneously, the idea arose that we would make a book documenting and discussing this experiment in developing the new bachelor course.

The initial stage of working on the vision consisted of an extensive period of internal and external research. The internal research consisted in reviewing a series of analyses of the School of Architecture by third-party consultants undertaken during the previous five years. Concurrently, we made a thorough study of the history of the school from its foundation in 1965. The external research consisted of a survey and analysis of bachelor curricula and schools in Europe and North America. These investigations were followed by interviews with local, national and international partners.

The final part of the project focused on developing the vision and formulating the description of it. This resulted in a thirty page text that touched upon all significant points concerning the operation of the bachelor school; its teaching and research along with its communication and management.[7]

The core of the vision was distilled into a series of new initiatives and focus areas for the Aarhus School of Architecture. At the same time, the vision plan identified and took into account the particular qualities that had developed from the time of the school's foundation. Among these were a tradition of self-organisation among the staff with a considerable freedom in regard to method and content of the developed courses and research. Conjointly teaching has been organised in studios with tutoring on a daily basis.

The vision statement was completed in May 2008 and implemented in September the same year. The authors of the vision statement were given the responsibility for the implementation of the new initiatives beginning with the teaching of the new first year units.

With the new bachelor degree running in its third year many of the initiatives have been implemented and considerable change has already occurred. Most of the changes are indentified within the first year course. However new initiatives are now appearing in the second year course resulting in radical changes. The third year course is still 'untouched', but will in the coming academic year be the focus for new initiatives. This will lead to the full implementation of a new bachelor degree.

Aims

In the following section some of the most important elements defined in the vision statement for a new bachelor degree will be described and discussed.

An international School

In a globalised society in which individuality and tailor-made solutions are increasingly in demand, students should be able to compose their own degree by following a variety of courses at different institutions of higher education. The course at the Aarhus School of Architecture has to be attractive to students both from Denmark and from abroad. In our view this means, for example, that in the long term the teaching should take place in English and that the course should as a whole be more internationally oriented.

Internationalisation should be present at all levels in the architecture course. The bachelor level courses should, therefore, be developed in collaboration with educational institutions abroad. In this way a basis is established for adding value to Danish and foreign courses through sharing knowledge and exchanging professional skills. We are convinced that such collaboration will contribute to improvements in the creation of networks and in cultural understanding, which will benefit the parties involved in a global context characterised by mutual dependence. In this context the idea is that in the future, academic staff in the bachelor course will develop interdisciplinary research collaborations with selected schools of architecture and design studios abroad. The internationalisation of the bachelor course will also occur through the presence of visiting professors from abroad, just as its international character will find expression through permanent teaching staff that ideally will include both Danish and foreign teachers.

An Arts Degree

The aim of the new bachelor degree is to maintain and strengthen the Danish architecture degree course as a so-called arts degree following the tradition of the academy of arts.[8] Taking the arts as a starting point it is essential that this tradition is challenged in order to generate innovation ensuring that in the future these artistic qualities continue to be relevant within society. In our opinion this can be achieved through a conscious awareness that the artistic tradition is no longer to function in an industrialised society but in a knowledge society.

Denmark has traditionally occupied a strong position in the area of architecture. Among several reasons this has to a great extent been attributed to the Danish degree in architecture.[9]

Danish architects have for many years been in international demand for a set of reasons. Among these are the Danish architects' approach to aesthetics, their democratic design and their ability to think holistically and to create architectural 'added value' in society. To maintain this position, at the new bachelor course certain emphasis is given to the artistic dimension. At the same time, the course agenda will primarily enter into teaching and research collaborations with other schools of architecture that follow a similar trajectory regarding an artistic approach to architecture.

The Extended Research Concept
It is our intention that the bachelor degree will be recognised in the future for its integration of teaching, research and artistic development work. This is due to establishing a number of laboratories that will nourish new concepts of research, which includes, for example, research by design and research by teaching. These concepts of research by design and research by teaching are to be in close dialogue with each other constituting a common platform for new forms of learning and discourse in architecture and research.

The research is primarily intended to be basic research.[10] This will qualify teaching just as teaching will qualify research. It is the ambition that a large proportion of the school's teaching material and students' work are to be included as actual research material for the school's researchers. In this way students' completed assignments are subjects to create a background for research reflections. Correspondingly, research results should be able to form a starting point for teaching and for courses for the school's students. The idea is that an academic set of values and a common culture can be developed in this interface that will unite the entire bachelor degree across year groups and courses.

Towers of Knowledge: a Strategy for Communication and Documentation
To respond to increasing demands for communication of the results of the degree course, a digital bank is to be established for the storage of assignments and projects. The bank's data are to create a basis for reflected communication of the degree results of the bachelor school.

The idea is also that the school's researchers will use this material to develop new areas of knowledge in basic research. The knowledge bank is at the same time a collection point for teachers and students in the bachelor course, from which they can draw inspiration for the course of assignments that lie ahead. Since the communication of the results of relevant work makes up a vital element in the drive to reform the bachelor degree, both students and researchers must be prepared to have their work made accessible to the public. It is to be believed that this will stimulate the quality output of the production and communication.

Study Practice
The core element of the new bachelor degree course follows the traditional problem-oriented project work.[11] This has proved its pedagogic qualities since the foundation of the Arhus School of Architecture.

The new initiatives are the systematic introduction to a broad variety of working methods and tools. This provides different perspectives. The introduction to diverse working methods enables the students to reflect upon their own design process with the intention to develop this as a dynamic and continuous process. Simultaneously, it enables them to combine different working methods and hereby covering a larger range of design solutions. Last but not least it prevents the students from taking normative positions in relation to the design process.

The increased emphasis on tools often enables the students to progress rapidly in developing ideas and designs. This occurs through the possibility of critical discussions at a high level when design proposals are executed with quality and determination. As the course places great emphasis on the development of the students' design skills, it also takes into account the reality that architect's work nowadays increasingly addresses the development of so-called 'immaterial' design. At the same time many master's graduates end up in what are termed new types of projects, such as the design of services, messages, systems or scenarios.

Analysis and the development of concepts are now considered as an architect's core skills. Therefore the new bachelor degree gives high priority to innovation, the generation of ideas and the development of strategies at all levels.

As the increasing pace of change in the labour market demands an ability to adjust and to think in new ways, the course responds to this by stimulating the students' entrepreneurship skills through integrating an Innovation and Entrepreneurship approach into the course. The teaching prioritises the development of interdisciplinary forms of studying and collaborating, team-building and group-based problem-solving.

In relation to the execution of courses, exercises and assignments, emphasis is placed on challenging students' abilities to analyse and to act in innovative ways. This takes place, for example, through students acquiring a process-oriented working method, whereby teachers and students discuss the studies in particular alongside the development of the students' ability to design reflectively and self-critically. Students are taught to identify, interpret, analyse and contextualise architectural issues. At all stages of the course, emphasis is placed on the students' working out an independent architectural expression, a response or suggestions for problem-solving the issues raised by an exercise or assignment. Furthermore, the aim is for students to be able to place their statements in a context (theoretically, analytically, politically etc). Writing programmes and reflected argument are, therefore, central elements in the teaching of the bachelor degree.

The desire to create continuity in studies on the bachelor degree course makes it important that from the outset methodological links and thematic transitions are established between individual sets of exercises, assignments, courses and lecture series over the three years of the course. To ensure this overall structure and to create cohesion between the syllabuses, certain recurring architectural themes are introduced, which are discussed and illustrated in various ways in conjunction with teaching. In the first year an overarching theme of the course, for example, is working method, and here students on both units are introduced to three working methods – the generative method, the conceptual method and the synthesising method.[12] These themes are also reflected in the research by teaching that is produced by the teachers of the bachelor course. Teaching and research are, therefore, in a constructive interchange with each other right from the beginning of the first year of the course.

Through recurrent discussions and through a process-oriented design approach to the selected interdisciplinary themes in the teaching, students gradually develop their architectural vocabulary. This also takes place in connection with the completion of analytical written assignments. These written assignments are typically developed at the same time as students work with problem-oriented project work. In the written assignments students can, therefore, reflect on their own production, In introducing these, we wish to promote the students' communication and linguistic skills. At the same time we wish to challenge their abilities to 'multi-task'.

The aims for the vision statement and for the new bachelor degree can be summed up in the following overall points:
- Teaching in a holistic yet unit based course that emphasises discussion of the subject's various approaches to method.
- Research and research by design in relation to teaching.
- Qualification of the pedagogical and didactic dimensions within the bachelor course.
- Documentation and exposure of the research results achieved at the bachelor school.
- Development of new models for project and network collaboration.
- Development of strategies for internationalisation.

ENDNOTES
1. The Rector Staffan Henriksson, the Vice-Rector Torben Nielsen and the Head of Administration Kirsten Præstegaard.
2. Henriksson, Staffan 2008-2011. Handlingsplan (Action plan). Draft of 21st February 2008 for an Action Plan for the Aarhus School of Architecture, p. 1.
3. *idem*.
4. Gammelgaard Nielsen, Anders; Høgfeldt-Hansen, Leif; Lykke-Olesen; Toft, Anne Elisabeth: *Visionsbeskrivelse af ny bachelorskole ved Arkitektskolen Aarhus*, p. 11.
5. Resultatkontrakt 2007-2010, p. 2.
6. The group was made up of the following: Boris Brorman Jensen, Leif Høgfeldt Hansen, Andreas Lykke-Olesen, Anders Gammelgaard Nielsen and Anne Elisabeth Toft.
7. The authors responsible for the formulation of the vision are: Leif Høgfeldt Hansen, Andreas Lykke-Olesen, Anders Gammelgaard Nielsen and Anne Elisabeth Toft.
8. According to 'Arkitekturnation Danmark' – regeringens arkitekturpolitik ('Denmark, nation of architecture' – the government's architectural policy) (2007), the arts academy tradition of the architecture degree course is seen as 'a Danish hallmark'. Source: 'Arkitekturnation Danmark' – regeringens arkitekturpolitik (2007), p. 48.
9. 'Arkitekturnation Danmark' – regeringens arkitekturpolitik (2007), p. 48.
10. We distinguish here between basic research and applied research.
11. This condition is defined by the Ministry of Culture, regulation no. 531 of 27th June 2002 on degrees in architecture at the Royal Danish Academy of Fine Arts, School of Architecture and the Aarhus School of Architecture (bachelor and master's degrees).
12. These working methods are made up of: a) a generative working method, characterised by an introductory description of a series of operative actions and their order, followed by their activation and execution (the process is known, whereas the outcome is unknown); b) a synthesising working method (also called the contingent working method), characterised by an introductory description of all parameters created by form and space, followed by idea development, which releases the parameters in a synthesis; and c) a conceptual working method, whereby 'image transferences' from one discipline area to another create the basis for the design process. The images can be, for example, linguistic, photographic, painterly or auditory in nature.

1.4

Context 1: ARCHITECTURAL EDUCATION IN DENMARK

Gerard Reinmuth

While this volume should sufficiently describe how the Aarhus School of Architecture is grappling with the education of an architect in contemporary context, it also needs to be acknowledged that this conversation takes place within the Danish context, which has its own particularities. This context penetrates almost every level of the education from the precise pedagogic strategies maintained to the manner in which cultural practices and politics are played out in the institution itself. This is important here as many of the best known teaching studios are now located due to very specific cultural constellations (Harvard GSD, the Architectural Association) rather than more general contexts (The United States, England). Thus, ambition is manifest in studio-specific activity which can be easily transferred from continent to continent. Boston can be understood here as not so much a context for an education but a location for a specific studio. Teaching in Denmark resists this tendency.

In fact, the Danish context and the practices institutionalised within it present a series of challenges for one aspiring to reposition the idea of locality and place in a globalised context. Stefano Boeri, current Editor of Arbitare and commentator-at-large on architectural education and practice writes about place as follows:

" . . not to be understood as a mere geographical context, or the localisation of a determined object (or practice) in a place of tradition and historic culture, but rather is a device capable of concentrating structural tendencies that – developed locally – unfold at the moment in which external flows of transformation enter into contact with a determined territory."[1]

Despite the veracity of Boeri's claim for place as a device, it is rare to find publications from the Academy which include reference to the context that gave rise to the specific pedagogy being examined. Those publications which do exist are generally devoid of contextual information beyond some scenographic images of the studio or teachers which at best acts as a sort of atmospheric wallpaper. This approach denies the placed-ness of the education and the instrumentality of that place in enabling a specific educational experience to occur. The Aarhus School of Architecture exists within a very specific historical and cultural context and by understanding something of this context the possibility exists to engage with the course material and student projects in a more nuanced way than would be otherwise possible.

Therefore, I have found it necessary – or perhaps it is better to say, feel compelled – to contextualise the accounts of an architectural education which underpin this book with a reflection on the broader cultural and educational tendencies pertinent to the formulation and enactment of this education. This should not be mistaken as an attempt to give a comprehensive treatise on Danish society or a history of Danish architectural education and should certainly not suggest that the audience for this book is specifically Danish or Scandinavian. On the contrary, the purpose of this intervention is to make clear that the content throughout the book is very much the result of an engagement in a specific cultural, pedagogic and urban context – as is the case with the best schools or arguably, the best architectural works, anywhere. I contest that without this understanding, applying any of the lessons contained within this volume in another context would be futile. I also contest that publications on architectural education which omit this perspective are incomplete.

In our twenty-first century globally interconnected reality - where the very idea of culture as a stable, shared condition is fundamentally questionable[2] - the stubborn consistency of Danish culture demands reflection and observation. The issue can be approached by invoking the Australian academic Waleed Aly who makes this contention in regard to the globalised condition:

"The much-mourned breakdown of community and of family has been accompanied by the corresponding emergence of new forms of these. Today's most vibrant communities seem to be virtual and de-territorialised (though not necessarily socially rich), and the traditional nuclear family is merely one (by no means dominant) feature of the social landscape. Combined with mass migration and the globalisation of information, this means that the historical continuities and social norms that matter to people have very little to do with their geography now, and far more to do with their identity."[3]

These conditions challenge most fields of endeavour, including the global tertiary education environment. In the English-speaking world in particular, universities are host to a diverse and multicultural demographic both in terms of the student and academic bodies. Architectural education reflects this trend, particularly at the most respected institutions which attract students and staff from across the world.

The quote from Waleed Aly can be considered alongside the slogan accompanying advertisements for the Danish People's Party, an openly anti-immigration party which currently holds the balance of power in the Danish Government: *". . .herfra min verden gaar"*. The quote comes from a song by H.C. Andersen and quite literally, means *"from here my world begins"*. While it will be uncomfortable for many in Denmark that an anti-immigration party has appropriated this phrase, equally I could posit the view that it is perhaps an accurate assessment of the general Danish attitude and thus captures in four words both the best and worst of the country's approach to everything from international relations to architectural education. Or, more bluntly and in the words of former English Ambassador to Denmark, James Mellon: *"The Danes are not a nation (...) they are a tribe."*[4] He goes on in the same passage to note:

"It is true, that the Danes have developed, adapted. They have travelled the world and had connections of trade and culture in all parts of the world. But they have never accomplished a synthesis of diverse elements, as is required, if Denmark is to be spoken of as a genuine nation. Their coherence as a people is in fact due to an emphasis on homogeneity. Here counts not both/and, but either/or."[5]

The sentiment contained within H.C Andersen's phrase and Mellon's critique accounts for both the strengths and weaknesses of the architectural education offered in Denmark. It is my opinion that both the schools of architecture in Denmark - the Architecture School in Aarhus and the Royal Academy of Fine Arts in Copenhagen – can be understood as outstandingly Danish in terms of course content, pedagogic approach and cultural practices. This consistency is so profound that any diversity or differences between the schools tend to exist within a relatively narrow bandwidth when compared to contests about educational approaches occurring elsewhere. Put simply, where in an Australian school we might see a debate between black and white, in Denmark the debate resembles more a discussion about which shade of grey it shall be.

A level of insulation has also reinforced this natural tendency towards a narrow bandwidth. I would go as far to say that in recent years the architecture schools in Denmark have acquired a steady stream of international visitors and collaborators while at the same time steadfastly resisting the tendencies toward internationalisation as it might be more fully understood. This is perhaps where one of the cracks between the two schools starts to appear. The Vice-Rector of the Royal Danish Academy of Fine Arts once explained to me that it is almost impossible for foreigners to teach at that School as the tradition has been that permanent Professors always speak Danish[6]. This is an extraordinary situation for an institution supposedly engaging with a globalised knowledge economy. In comparison this has not been the case with the Aarhus School of Architecture - which has in the past engaged a number of foreign Professors.[7]

This uncertainty in regard to the integration of international influences has recently manifested itself in a structural weakness within the Danish architectural practice. Despite the abundant resources available from a proud architectural tradition, Danish architectural practice has been hijacked in the last decade by a simplistic importation of overseas trends and models. That is, into a void created by a non-pluralistic and non-intellectual education, graduating architects are quick to

engage with current international tendencies but without the intellectual rigour to fully re-frame lessons from these tendencies in the Danish context. One can now pinpoint a raft of young practices trying to follow in particular the footsteps of head-figure Bjarke Ingels and his practice BIG. This group, who at best present a series of OMA-lite hybrids, have merged together into a constellation with equally witty names but little dividing consequence. The result has been a tranche of work which avoids the rich potential in synthesising diverse influences against the background of a tradition and instead has a created a band of younger architects who are remarkably similar in approach and who all look primarily to external models.

The schools of architecture in Denmark must necessarily be held responsible for this situation. The Aarhus School of Architecture is perhaps feeling this responsibility and are now subsequently rebuilding their education from the ground up. The next extract identifies some of the parameters the Aarhus School will have to address in the process of rebuilding.

Consensus Society

While it is a somewhat absurd idea to summarise a whole country in a few pages, it is an inescapable fact that a few observations on the broader context can greatly assist in unpacking the nature of architectural education, or in fact any cultural endeavour, in that context.

As an Australian, who is used to people with an extremely diverse mix of cultural backgrounds present in every aspect of their lives, arrival in Denmark always presents something of a shock given the genetic consistency evident in the population. This stereotypical observation is backed up by the numbers - as of 2010, 559,810[8] persons from a total of 5,557,709 million[9] were either immigrants or descendants of recent immigrants. In practical terms this means that with the exception of a few isolated pockets in Copenhagen and Aarhus one will rarely brush up against a substantive immigrant culture.

This homogeneity is not accidental. In the nineteenth century Denmark lost several wars and most of its territory, a period during which the first steps of democratization also took hold. This combination of democratization, forced ethnic homogeneity and a reduction in power and territory led to a consensus-focused, introverted 'enough-in-ourselves' mindset as exemplified in a common phrase adopted in Denmark in the mid nineteenth century, *"What is lost to the enemy must be gained on the homefront"*.[10] This tendency to focus inwards can be linked to the deep fear of revolution in the mid 1850s in the wake of a series of war losses to Germany and later, approaching World War Two, resulted in a defensive desire to bind the country as a singular project. Denmark - along with other Scandinavian countries – contains enough cultural residue from these events to still consider itself as a consensus society in many aspects of its organisation, political and cultural characteristics.

That this loss in territory resulted in greater internal consistency and a tendency toward internal reliance is perhaps also linked if one thinks of island cultures – not an unreasonable comparison given that Denmark's only land border (with Germany) is only sixty eight kilometres long. The remainder of the country is surrounded by water, and, with the small scale of the country, you are rarely more than thirty kilometres from the coast. As with island cultures, the issue of identity is handled in a very particular and protective way.

The desire to maintain a level of uniformity has led to a culture of extensive consultation and discussion in most aspects of political or business life. This emphasis on negotiation is not a caricature provided by a foreigner but is well documented, and can be immediately brought back to architectural culture, for example, by invoking words of a Professor at the Royal Danish Academy of Fine Arts in Copenhagen, Christoffer Harlang who is very direct on this issue:

" .. the discussion about architecture as a negotiation with the surrounding society and especially with its social and technical development, occupies a considerable portion of what the most prominent Danish architects have been writing in the twentieth century."[11]

Combined with this situation is the effect of one of the last surviving welfare state structures on the psychology of the inhabitants. While neo-liberal policies swept the western political and economic landscape in the past thirty years, it is only recently that a party with these tendencies has been in power in Denmark. The relatively intact welfare state model provides not only for housing and child-support but works in concert with a highly unionised workforce which (even in the professions) controls salaries, benefits and so on.

One dilemma bought about by the success of the Danish welfare state was a further tendency toward homogeneity in the population. Not only has the Danish welfare society *"proved poorly equipped for integrating immigrants"*[12] but a direct antagonism has worked with this failure such that Denmark now has the most draconian[13] immigration laws in Europe. Bo Lidegaard[14] writes:

" . . many Danes felt increasingly uncomfortable with a growing minority of poorly integrated migrants who appeared not to share the values common in the traditional Danish society. Moreover, the suspicion spread that many came neither to flee prosecution nor to seek genuine work, but rather to enjoy Danish welfare allowances without intending to contribute to the common wealth."[15]

Notwithstanding these conservative impulses, further criticism of this situation from a 'new world' perspective would be the potential for lethargy in a workforce that often will not see any great return for initiative and where the very act of working overtime is often discouraged[16]. In addition, employees are, in my experience, constantly being thwarted by complex power structures - often referred to as 'the invisible wall' even by Danes themselves - which make the exercise of power very difficult. This fuels a tendency to operate in complete isolation if one wants to achieve something. Thus a great irony of the tendency for consensus is that, in this academic environment at least – with a number of different and well-argued positions – no consensus is possible. Danish caricaturist Robert Storm Petersen summed up this paradox: *"One thing we agree on - something needs to be done. But what must be done, we will probably not agree on."*[17]

Trying to re-organise large systems - such as an architecture school - within this paradigm is complex, to say the least.

Architectural Education in Denmark: A Background

Having painted a very broad picture of the greater cultural context I will now set down an equally schematic account of the history of architectural education in Denmark as a means via which the particularities of the Aarhus School of Architecture can be understood.

Pedagogic Model

As with the tendency toward consensus building as outlined on the previous pages, many other institutions and practices within Denmark find root in the political changes of the mid nineteenth century. Therefore, it is somewhat remarkable to an outsider but perhaps not at all surprising to a Dane that when discussing Danish architectural education in a contemporary context we can refer still to the vision and influence of Pastor N.F.S. Grundtvig (1783-1872).

Grundtvig is universally credited as the key influence on the formation of the modern Danish national consciousness. Key tools in Grundtvig's influence were his contribution to national literature (he wrote numerous books and either wrote or translated over one thousand five hundred hymns) and his teaching based on what could in today's context be considered a fundamentalist reading of the Bible. That his teachings continue to reverberate widely in Danish education and society is largely due to his phenomenal influence in both religious and secular circles in the mid nineteenth century. As Danish democracy took hold, Grundtvig's views in a society whose fundamental values remain largely unchanged since that time continue to hold relevance.

The common denominator of all Grundtvig's pedagogical efforts was to promote a spirit of freedom and disciplined creativity within educational practices. He opposed all compulsory activity in the educational environment, including exams. His maxim *"only willing hands make light work"* exemplifies the spirit of freedom, cooperation and discovery that he wished to instill in students.

"Grundtvig felt strongly that the new school must be a centre of liberal education, a 'school for life'….while he was not specific about the subjects to be taught in the school, he did stipulate that they be cultural rather than practical as the school should provide education for life, not for living'...the 'schools to this day help their students to better understand life and contemporary issues, hone skills of responsible citizenship, provide the climate for discussion of challenging issues, and contribute to developing and sustaining a common cultural identity and thus a basis for cooperation."[18]

Christian Kold, a Danish educator, was one of the first to enact Grundtvig's vision for folk high schools. Kold confirmed this focus on building upon the natural potential of each student via a teaching method based on an oral narrative method. Tuition would be personally customised and guided by the combined interests of the student and teacher.[19]

This approach remains embedded in the Danish school education, from early childhood learning to university studies. Bo Lidegaard notes that this dual ambition of promoting the idea of the collective while promoting the intellectual development of each student has become impossible in Denmark to state a common goal for the education of children. He notes that the national

credo for the public school system includes the idea that the school *"prepares the pupils for participation and decision-making in a democratic society as well as for assuming co-responsibility for the solving of common tasks"*[20] while *"teaching and overall daily life in the school must be based on intellectual liberty and democracy"*.[21]

Architectural education within Denmark also operates very clearly within this paradigm. Readers will observe in the texts by Gammelgaard Nielsen and Toft that it is this understanding above all else that contextualises both these articles on teaching practice and the projects themselves exhibited within this book.

Two Schools, One Education

Architecture is taught at two accredited schools in Denmark – the Royal Danish Academy of Fine Arts in Copenhagen and the Aarhus School of Architecture.[22] The Royal Danish Academy of Fine Arts was founded in 1754 and was based on the French Academy model, educating artists and craftsmen until 1857 when it was agreed that the Academy would include an architectural education[23]. The tradition of an arts-based education was reinforced by the late industrialisation of Denmark which led to close contact between designers and makers until well into the twentieth century[24] and has continued to exert a substantial influence on Danish architecture until recently.[25]

Christoffer Harlang writes that the effect of this linkage with the Beaux Arts tradition has been that the Danish architectural education is based *"more on skill than on knowledge"*.[26] This emphasis on skill, and thus the inevitable focus on one's individual creative talent ties neatly into the concept of self-realisation which is fundamental to the Danish education as a whole.

The idea of the multi-talented and skilled Beaux Arts designer was re-framed in the 1960s at the Aarhus School of Architecture by Nils Ole-Lund (Professor at the School from its inception until his retirement in 2000). Lund suggested that the increasing tendency toward specialisation in the contemporary construction industry required architects to operate in a 'harmonising' role[27] that summarised and bought together their various inputs required to see a building realised. This idea of the architect as a central figure reflected the general Danish tendency to regard architectural practice as a discipline whose practitioners could generate a single concept linking together everything from utensil design to town planning.[28] It also reinforced the idea of the architect as an 'artist' who could work across multiple scales, relying on their artistic vision to unify everything from urban plans to a teapot. In this sense, you could say the approach is prescient of the late twentieth century phenomena of the 'starchitect'.

The Royal Danish Academy of Fine Arts remained the only architectural education in Denmark until the school in Aarhus was established in 1965. However, the commencement of a new education occurred very much within the paradigm of the existing school and thus to this day the two schools form equal parts in which is considered a single Danish architectural education.[29] Both schools are uniquely located within the Ministry of Culture, further reinforcing the similarity of the two schools and as such they respond to different criteria and constraints than would normally be the case for schools located with an Education ministry.

A Responsibility

One constraint faced by the two schools is that collectively they are responsible for the education of all architects in the country. While larger countries may have twenty or even fifty schools of architecture – allowing for greater variation and opportunities for focused differences between schools – both schools in Denmark must necessarily be 'generalist' and ensure that their students are educated in a broad manner. For one of the two schools to move outside the agreed central agenda would skew the approach of graduates entering the profession in such a way that would be intolerable in a Danish context. Subsequently, this understanding of a greater responsibility is never far from the surface when innovations to the education models are being discussed.

Reconfiguring the Aarhus School of Architecture

Given the degree of homogeneity in the Danish architectural education system, one might ask what particularities define the specific education being offered in Aarhus? The answer relates not so much as to what is taught but in how.

The Aarhus school was established in 1965 in response to political pressure to help alleviate a lack of trained architects in Jutland. That is, the school was conceived out of an idea to create more practitioners and this emphasis continues to dominate discussions about the school's role. However, the education system and graduation provisions mirrored the Royal Danish Academy of Fine Arts, featuring a wide school curriculum which reflected the view of a single-concept architecture as previously discussed.

One aspect of the establishment of the school in only a generation or so ago was the simultaneous engagement of a raft of relatively young staff whom have subsequently remained with the school for their careers and - in the case of some - still have a presence. Not surprisingly, this dominance of an entire generation of teachers had a profound effect on the culture of the school and the content of the education. Michael Asgaard Andersen makes this observation about this tendency within the Danish architecture schools:

"While there may not have been a broad theoretical tradition, there has certainly been a great degree of continuity within the faculty of each school, which is partly because of the small number of schools and the limited exchange of teachers. Thus, one generation has taught the next, who has then taken over and so on."[30]

Despite the passing of forty five years, this relatively short history - and the continued presence of some original staff in and around the school even until now - has resulted in a culture where inter-generational knowledge is retained – quite literally by the retention of the originating staff-member and/or their disciples. However, as with any culture of this type, this retained knowledge comes at the expense of the diversity and number of new ideas and influences. As outlined previously, a number of long-standing cultural and social practices thwart the fuller integration of varied influences into the existing system. The long tenure of existing academics also made it frustrating for younger voices to penetrate the school and, even when they do, it is difficult to make a mark on the education as their forebears were able to in the 1960s and 1970s.

The 'Black Box'

An inevitable question to ask of those at the school in this moment would be - what does the Aarhus School of Architecture do best? Having put this question to a number of teachers at the school during the preparation of this book, the answers were identical. However this agreed strength has nothing to do with excellence in a particular research area or in the transmission of particular disciplinary knowledge. Rather, the commonly understood strength of the school is in its teaching approach.

This approach is perhaps embedded in the ideology which drove the school in the early years of its existence, known as the 'black box'. This was a concept established by Nile Ole-Lund and has been explained by Anne Elisabeth Toft as follows:

"His opinion was that the school of architecture should be a laboratory, where students should be given the opportunity to develop themselves, and that the mode of teaching should take the individual student as a starting point. For him, however, an important aspect was that getting an education should be the responsibility of the student."[31]

Despite many adjustments to the curriculum and new education theories since this time, an enduring aspect of the education has been this Grundtvig inspired and dependant 'student-centred' approach to education which remains the defining characteristic of the school. That it remains is not so much a strategic decision but can be attributed to the foundation of the school in the Beaux Arts tradition and the alignment of select aspects of this tradition with longstanding views on education and the individual within Denmark.

The Centrality of the Studio

The education of an architect in Denmark is exceptional in that it revolves completely around the design studio. Unlike many schools internationally[32] - which understand the studio in the context of a range of subjects aimed at building expertise in related areas (theory, history, structure etc) - the Danish schools position the design studio effectively as the sole subject while all other inputs occur through this studio environment. Australian Academic Michael Ostwald describes the Beaux Arts atelier as follows:

"First, the atelier was emphatically project-centred; a student had to complete a number of architectural design competitions each year to progress through their studies. Next, the atelier relied on students being self-directed in their individual projects, while remaining in close proximity to, and identifying with, a larger group occupying the same physical and conceptual space. The third characteristic was that the atelier operated under the stewardship of a talented patron. The atelier's patron was expected to be knowledgeable in the arts and sciences of architecture, but also to be able to model the intellectual and social qualities required of an architect. This latter dimension is important because it recognises that architectural education has always involved a mixture of education and enculturation. Finally, it is notable that, at the École the critique occurs outside normal working hours and is framed, simultaneously, as a time to learn and to socialise. This reinforces a further pattern, wherein students in a particular atelier tend to socialise primarily with each other".[33]

Ostwald's description is uncanny in the way it brings together key elements which in turn describe the stu-

dio at the centre of a Danish architectural education – a project-centred place, self-directed students and the studio as the centre of a social constellation. The key omission is perhaps in the absence of a patron in the Aarhus model, where all teachers are addressed on a first name basis – titles are never used – and teachers rarely attempt to exert some sense of higher authority within the studio space. In Aarhus the dominance of the studio leader is deliberately suppressed at every level from the way the studio is formulated, through to an openness to diverse techniques and the daily cultural and social practices that take place in the studio. I should briefly note that this is one of the greatest differences between this school and its sister institution at the Royal Danish Academy of Fine Arts where studios are run more like a series of kingdoms constructed around key figures. It is certainly the experience of students' who have been at both institutions that a clear separation between teacher and student is culturally ingrained at the Copenhagen school, while in the Aarhus school the culture is one of teacher and student united in common enquiry.

Therefore, students at Aarhus are taught very much in the Grundtvig tradition it would seem, where the primary emphasis is on self-realisation. This is where the Aarhus School of Architecture is at its most distinctive – a pedagogical approach which places the students' personal skills and interests as the basis for the direction of studio projects. Students are addressed as equals and their opinions are valued. So, a combination of a deliberate pedagogical approach from Lund and the studio-based approach as it is deployed at the school in Aarhus unites teachers and students in an enquiry around a specific design problem that will be tackled in as many ways as there are students involved. Assessment of the work is based on the veracity of each proposition and the ability of this proposal to engage with this group of peers who have all explored the same problem and understand its particular difficulties.

A negative aspect of the complete dominance of the studio is that theory and history studies are marginalised to the point that they barely exist. For example, while a series of lectures are available in history and theory in the early years, there are often few tasks built around them and thus little incentive to even attend the lectures. In the Masters degree, there are no other subjects at all beyond the studio. A common tendency is then to fill this intellectual vacuum with an over-reliance on contemporary references without the historical push-back, knowledge of local traditions or the theoretical frame with which to address them appropriately. Students' therefore, quite literally, often have only their own experience to rely on with any historical or theoretical material limited to that provided by a design tutor in response to their work. This issue is felt not just in the design studio but in research projects proposed by younger academics which to outsiders often appear very light in terms of historical or theoretical grounding. But then, this is not surprising if we turn to the words of Nils Ole Lund and his comments from 1966, a year after the school was founded: *"One takes the mode of teaching as the starting point, rather than the subject itself."*[34]

Therefore, this book deals not so much with the reform of an education per se but its focus is on the specific content of the design studio. For, within the current Aarhus School structure, once the design studio has been taken into account the education itself can be said to have been addressed. Until a new raft of structural changes deal with the issues noted above and the studio is repositioned or reconsidered in relation to them the architectural agenda is incomplete.

Education to Practice

A by-product of this emphasis on the studio has been the school's excellent reputation in terms of creating young practitioners who transition easily into architectural offices. Students' leave the education at the Aarhus school literally having already 'practiced' in some form for five years; attending a studio every day as one would attend an office. Students work through design problems often in group work constellations as they would in an architectural office. Yet, at present the role of the school in relation to practice is a particularly vexed issue as the school works through the reality that it has been a victim of it's own success.

This success dates to the manner in which the free-curriculum of the 1970s (and to which the 'black box' concept was attached) gave way in the 1980s to a return to core disciplinary focus, predominantly at the request of and due to political pressure applied by students'.

This return to a focus on design skills in particular had a massive effect on the school during that period and subsequently in the Danish profession in the decades since which is populated by students' of that time. A simple exemplar is the fact that four of the most dominant practices in Denmark over the past decade were formed around 1990 and consisted of graduates from the same department in Aarhus from 1983-4.[35] These firms are all noted for their design-focus and in particular their ability to reduce complex problems to simple and/or novel diagrams and the resultant buildings exhibit an intensely diagrammatic quality. Largely because of the success of these firms, all but one of which is still based in Aarhus[36], the school continues to be identified for its links with practice while the Royal Academy of Fine Arts in Copenhagen reputation is one of a more esoteric character and at least understood as a more academic educational experience. Certainly, many practices across Denmark still speak of their preference for Aarhus graduates.[37]

However, not surprisingly, there is currently a deep questioning in Denmark about the work produced in the past ten years up until the financial crisis in 2007. While the rush to participate in 'international' architecture culture has resulted in some successful practices and spectacular visions, much of the work is now being understood as of dubious merit. Further, in this rush to internationalise and to channel contemporary formal predilections in local projects a connection with the qualities for which Danish architecture has been known in the past has been lost. The result is, in my view, is a profession struggling to reconcile its advanced ability at marketing with a body of disciplinary knowledge that has been dispensed with. Although Christoffer Harlang has a very specific position on this issue, he nevertheless can be relied on here to sum up this situation:

"Danish architecture is now standing at the crossroads. The one way leads across smooth and facile recapitulations of foreign models, accompanied by simple rhetoric. The other seeks to generate its own meanings through reciprocity with the cultures that our forefathers have left behind."[38]

In this milieu, a review of the education in Aarhus was not only inevitable, but the timing of this review thus ensures that attempts to make change at the school provide, by proxy, a venue where all the angst and criticism regarding the current direction of Danish architecture can be played out. Many in Denmark who bemoan the current direction in architectural practice lay the blame at the school that generated the practitioners who are now so successful. It is therefore critical that the school, under it's new direction, starts to articulate what it stands for.

Re-structure

The publication of this book is a perhaps a first step in confirming this direction.

As I have outlined previously, the architecture schools in Copenhagen and Aarhus are borne of similar approaches[39], both exist within the same Ministry, operate according to the same criteria and are located in the same cultural context. Yet, the schools are different and in a contemporary education environment, it is important to be able to articulate what this is. The first key difference, and which has already been discussed, is the difference in the way studios are run at the schools. The second key difference is structural, and effects the way in which the academics develop and articulate their own research interests.

The structure of the Aarhus school has in recent history been divided into very generic fields – Architecture, Landscape and Urbanism, Architectural Heritage, Design and Architectural Design. The vacuum created by a typically Danish discomfort with a single authority has affected the manner in which these departments have been run – as gathering structures for people within the same field but with sometimes little causal relation beyond that. The result has been the existence of departments with flat internal structures which tacitly encourage a splintered focus among the staff in each department. Further compounding this tendency is the fact that in the Aarhus school, the continued dominance of the '68 generation and their impulse to critique as a first order response remains ingrained. Needless to say, this approach can be particularly unproductive if one wants to establish some agreed research areas upon which the school can start to build a profile.

The flat management structure has also meant that a series of individual research interests are allowed to survive with a high level of independence. This is not surprising given that the school is lacking a grand singular narrative or even a stated series of research agendas. There is no need to 'cluster' research interests or seek commonality in any way, and any such clustering that does occur is informal and emerges from connections built independently among staff. A benefit of this for students' has been the tacit encouragement of a pluralistic environment and the exposure to a wide range of views throughout the education process. A negative is that the school has a low research profile internationally as the fragmented structure provides little incentive to form research clusters or use the momentum borne of a busy constellation to create a strong research profile. That diversity in the research interests between teachers has been allowed to survive is testament to the silo-like manner with which studio's operate in respect to each other – despite their co-location in the same department.

Therefore, while clarity exists regarding the unified teaching approach at the school, this clarity is not mirrored with an analogous understanding in terms of a strong disciplinary approach – an issue which needs to be addressed in the coming months if the school is to take advantage of the restructuring process. Outlining key knowledge areas will have consequences among a staff body used to working on their own interests without the need to align to stated research groups. However, this change will need to occur if the school aims to articulate its position on a wider stage and compete internationally for students and research opportunities.

This is a major point of difference with the Royal Academy of Fine Arts in Copenhagen where the teaching and research structures work across each other in a matrix. The teaching structure is focused in a dozen or so departments, each led by a key figure who, to a large extent, constructs each department in their own image. Placed across this structure is a separate array of research centres which provide focus for a set of research activities considered fundamental to the current direction of the school.

A clear benefit of this model is a more explicit outline of the expertise held within the institution and the increased momentum possible with research groups working toward related goals in related subject areas. In terms of teaching, the top-down departmental structure encourages a more teacher-focused approach - the benefits or otherwise of which can be debated.

Yet, as I write, a vote is being taken at the School Board of the Aarhus School of Architecture on the adoption of a new structure for the school[40]. This new structure will end a reliance on broad disciplinary-focused departments in favour of a new structure focused instead on the content of individual studios. With less middle-management and thus less opportunity for building power centres, the new structure promises much in terms of improved research cultures and without the approach to teaching which currently predominates. Further, this re-structure should make the sort of teaching approaches we can see documented here for first year permeate the entire Bachelor course at the Aarhus School.

The Future

From this overview we can come to the conclusion that, in recent history, the school in Aarhus has lacked a grand narrative and has a structure which encourages this dispersed approach. The primary identifier of the school has not been research but its student-centred teaching approach which is both popular and successful. But what does the future hold?

The following pages may give a hint of how an increased focus on research in teaching will be enacted. But for this implicit direction to be enabled with greater focus and momentum it will need to be clearly articulated by the school management. Thus, the Rector's comments in the forward and postscript to this book constitutes the first statement of this new agenda.

Endnotes

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13. Traynor, Ian. Immigration: Far-right fringe exploits European coalitions. This article was first published on "http://www.guardian.co.uk/" at 17.42 GMT on Monday 15 November 2010. A version appeared on p.14 of the Main section of the Guardian newspaper on Tuesday 16 November 2010.
14. Bo Lidegaard is a writer on Danish foreign policy and history and since 2003 has served as Permanent Under-Secretary of State at the Danish Prime Minister's office.
15, Lidegaard, Bo. *op.cit.*, p. 353.
16. Danish union rules are so strict that the penalty rates for working overtime are often prohibitive for architectural employers. It is therefore standard practice for employees to have to ask permission to work overtime – a bizarre concept in many western countries and in particular in the architectural profession where a cult of overwork is perhaps greatest among the professions.
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18. Kulich J., 2002, *Grundtvig's Education Ideas in Central and Eastern Europe and the Baltic States*, Forlaget Vartov, Denmark.
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21. *Idem*.
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29. Toft E.A and Kjaer P. 2001, *Op.Cit.*, p. 6.
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36. In 2010, 3XN completed a 3-year process of moving to Copenhagen by formally closing their Aarhus office.
37. While anecdotal, this opinion is commonly stated by the larger offices in Denmark in public lectures and private discussions.
38. Harlang, Christoffer, *Op.Cit.* p. 17.
39. The institutions of the Royal Danish Academy in Copenhagen and the Aarhus School of Architecture.
40. This vote, taken by the School Board on December 2, 2010, resulted in the adoption of a new structure for the School.

Part Two

FIRST YEAR, A CONVERSATION

2.0.1

SLOW ARCHITECTURE

Gerard Reinmuth

First year students of architecture commence their education with an enormous range of knowledge to be acquired and skills to be developed in the coming years. The combination of multiple software platforms, architectural histories, theoretical discourses, design techniques and the need for a level of self-discovery conspire to form an incomprehensible territory. Aware of the scale of the task ahead, many architectural institutions attempt to cover all of this in its entirety via the creation of extraordinarily intense programs. The best documented[1] of these in recent years is the first year program at Swiss Federal Institute of Technology, Zurich (ETH). ETH have a structure which includes a weekly barrage of history and theory lectures along with introductions to a vast array of tools from drawing and model-making to most common software platforms currently in use by the profession.

In contrast, the education of an architect in first year at the Aarhus School of Architecture proceeds at a remarkably slow pace. This is an education which operates outside contemporary time in many ways as students sit in the studio for five days per week and patiently develop drawing and model-making techniques to a high level. Driven by the Danish emphasis on individual self-realisation[2], the course focus is on equipping each student with a range of skills in which they will come to excel rather than attempting to convey the full extent of the discipline. Toft and Gammelgaard Nielsen present an argument that through the development of excellent representation skills, students are simultaneously developing an ability to develop creative processes, to work together and to develop a spatial and formal sensibility. The emphasis is not on the extent of ground covered but by the depth with which students come to understand the limited and specific territory within which they are allowed to operate.

One of the outcomes of prescribing a new structure for the Bachelor education was that the slow pace of the course combined with the focus on developing a sensibility via the accrual of techniques would be institutionalised by the structure of the first-year education. Yet opinions within the school remain divided in regard to this approach - some see this as a return to a traditional Danish architectural education while others view it as an escape from recent tendencies to teach the Bachelor program as a sort of early preparation for solving typical architectural problems such as the single family house. Either way, this conception of the education of an architect is far from the ETH example, where the pace is frenetic and the breadth of information conveyed is enormous. Recently at ETH, the idea of 'the norm' has been introduced to anchor this expansive set of inputs with a familiar territory from where to develop an architectural approach. At the Aarhus School of Architecture, we find the opposite situation. Educational emphasis is on slowing the pace down to a crawl to provide maximum time for reflection. The bandwidth of information conveyed to students is limited, and any idea of 'the norm' is rejected. In the words of Anders Gammelgaard, *"the drawing of houses is not permitted."*[3]

Having set down a framework for the structure and content of the Bachelor education and first year in particular, Toft and Gammelgaard Nielsen elected to run the first-year course themselves. For an outsider this has been an intriguing example of research in action to observe, a live experiment where the parameters established for teaching first year in the new Bachelor would be tested by two diverse perspectives. Toft and Gammelgaard Nielsen therefore split first year into two halves of seventy five students each and ran separate first year programmes concurrently. These two programmes converged in terms of overall structure but diverged in terms of their separate research interests and separate approaches to managing a year-long pedagogical program.

As will be evident from the following pages, the two approaches vary enormously. Gammelgaard Nielsen frames projects in his studio around an extremely tight, step-by-step process. This tightness comes from a focus on fundamental questions around space, light and material, all of which are explored and represented at 1:1 scale. The pedagogic aims and ambitions of the program and the structure of the assignments implement an extreme precision- to the point that students almost cannot fail. The progression from the first project (The Motor) to the last (Earth and Sky) is incremental and controlled. Critics argue this cohesiveness and uniformity among students is a weakness, while Gammelgaard Nielsen insists there is value in teaching fundamental skills in a highly controlled manner. He considers this a substantive foundation year in which both a confidence and sensibility are developed by students and which they can expand upon in future.

In contrast, Toft ran a more agile and open-ended program. After some initial exercises which foreground her interests in representation, the studio then turns to projects which relies heavily on structural input (the bridge), a landscape project (at the University of Aarhus) and finishes with a youth hostel project in an idyllic landscape. In every project, an array of external inputs from consultants and artists are introduced to students to further extend the sense of what the project could be. This is an expansive program which varies constantly in the scale of task and area of expertise being covered. Without the precise constraints of Gammelgaard Nielsen's studio, Toft's project results vary more widely in their standard and also in the breadth of exploration. Students have a greater chance to fail.

The following pages outline three projects from each of the separate studios but are assembled here as a single body of work. Resisting the temptation to show both studios either in parallel or sequentially, we elected instead to structure this chapter as a conversation between two collaborators who are addressing the same questions with different approaches. The dialogue in this book in many ways represents then the conversation that occurred between the two studios during the year – some moments of direct exchange and a great deal of awareness of each others' studios initiatives and a constant adjustment in response to the successes and failures of the program occurring in parallel.

Each studio is introduced with a text which frames the precise approach of each, after which six projects are shown in detail – the key three projects which underpinned each studio. The relationship between each project in terms of its timing and occurrence is illustrated on the program of the year.

Readers will notice some differences between the 1A and 1B projects in terms of how they are presented, formatted, and the supporting information given to each. This is not an editorial error but stems from my interest in having Gammelgaard Nielsen and Toft present their studio in terms that are appropriate to their separate approaches.

These six projects form the heart of this book and constitute the material against which the various arguments, propositions and reflections expressed by the various authors in and around this material can be measured. In making their assessments of the work and the program which produced it, readers should consider that when compared to most publications of student work, the space given here to the material produced by the first-year students is significant. There are few overlays or other graphic effects as are regularly deployed in books of this type – usually to obscure the precise quality or resolution of the student work presented. This is a rare publication devoted to student work where the material published deserves proper engagement and is presented in a way that invites this from the reader.

Endnotes

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2. As discussed by the author in 'Context 1: Architectural Education in Denmark' in this book, p.21.
3. Anders Gammelgaard Nielsen, 'Unit 1a: General Approach to the teaching of Architecture', p.34.

1ST SEMESTER, FALL 2009

2ND SEMESTER, SPRING 2010

September
October
November
December
January
February
March
April
May
June

Unit 1A

MOTOR

GRAPHICAL ASSIGNMENT / PHOTOSHOP & INDESIGN

JACK IN THE BOX

AUTOCAD

DRAW AND ORDER

LIGHT MENU

ESSAY: THE AMORPHOUS VERSUS THE EUCLIDIAN

All of 1st year

ARCHITECTURE HISTORY

METHOD AND CULTURAL EDUCATION

Unit 1B

COMPOSITION AND DE-COMPOSITION

GRAPHICAL ASSIGNMENT / PHOTOSHOP & INDESIGN

SECTION AND MOVEMENT

ANALYSIS OF ARCHI-TECTURAL PROJECTS

AUTOCAD

BRIDGING THE GAP

UTZON SYMPOSIUM

BUILDING MEASURING

SYDNEY AUSTRALIA

AUSTRALIA

BROKEN HILL

EARTH AND SKY

WESTCOAST BUNKERS WORKSHOP

STRUCTURE, SERIALITY AND THE OPEN PROGRAMME

2.0.2

UNIT 1A: GENERAL APPROACH TO THE TEACHING OF ARCHITECTURE

Anders Gammelgaard Nielsen

An ideal Course

Ever since the founding of the Aarhus School of Architecture in 1965 there has been a tradition for lively discussion surrounding the content of the architecture program.

The discussion has often been conducted from ideological or normative positions, with the tendency to strive for an ideal singular course.

We probably have to admit that we have never succeeded in finding that solitary 'utopian' course – and at present we can perhaps thank our lucky stars that this is the circumstance. Experience tells us that our ideological and normative discussions have never brought us any closer to the truth about the ideal architectural paradigm. Experimentation and the continuing empirical construction of knowledge have, on the other hand, constantly developed the degree course.

Today we stand at a crossroad. There are many directions to choose between, and each has equal validation. It is essential that we make a decision and commit ourselves to pursuing our nominated path whilst, accepting the full consequence of our choices. This also means that we are obliged to exclude some of the content of our course, instead of covering the entire gamut of the architectural discipline, as we did formerly. In order to achieve higher levels of student qualification and competency we have to select and emphasise particular architectural themes. This modus operandi has proved to raise the quality of the course as a whole. In addition has also contributed to promoting the discourse of architecture at an elevated standard in the preliminary stages of the course.

In the following presentation of the course in Unit 1a, we take these overall considerations as a basis, while making no claim to be presenting the ideal course for first year students. On the other hand present a possible response to what might constitute an excellent first year course.

We will, therefore, resist proposing a definitive answer but will gladly present our pedagogical approach so it is available for all to see and, we hope, discuss.

Body Knowledge

Having taught architecture for a number of years, many people will, I am sure, be able to nod in recognition of the moment when speech suddenly seems to become mute and when the only way forward appears to be action. Many will undoubtedly experience this moment as a point of no return. One either has to continue as before or start all over again.

What characterises this moment is that we can on the one hand hear ourselves speak with an inner, well-practised voice, while on the other we have to recognise that architecture appears to be losing its momentum. The entire academic tradition passes us by as a déjà vu experience, and suddenly David Byrne's famous dictum 'Stop making sense'[1] makes complete sense. Verbalisation and intellectual reflection's pincer grip on architecture stand face to face with the bodily dimension in architecture. Language seems to create a distance from architecture and leaves us with a fundamental paradox in architectural teaching.

On the one hand architecture proves to be difficult to capture through the medium of language. Language only does poor justice to architecture, often resulting in architectural qualities being reduced to linguistic banalities. Jørn Utzon's activity as an architect stands as a good example of this. There exists countless descriptions of Jørn Utzon's architectural work, and even though these are penned with a convincing profundity, they succeed only sporadically in capturing the actual stature of this architect and his constructions. Ironically enough, Jørn Utzon himself wrote only a few articles about his own work.

On the other hand, language constitutes a tool that allows the communication of architectural reflections and as such makes up the foundation of the pedagogical situation.

Language is inadequate in the communication of architecture, but it is all we have at our disposal. Or is it? Do alternative solutions exist that can solve this paradox? Are there ways in which architectural qualities can be captured without them vanishing – like sand vanishing between our fingers, this appears to be the case when language is brought to bear?

Perhaps there is a way out? A method that allows us through didactics to transmit an understanding of architectural quality that may extend across the narrow framework language seems to offer.

This is the challenge we at Unit 1a teaching have undertook, our goal through our teaching attempted to present an answer. This response is by no means adequate but will provide a foundation for discussion.

We are trying to advocate an understanding of architectural qualities that occurs through bodily intuition. This initial reference to intuition, combined with the extension of architecture plays a decisive role in our perception of the world. In everyday life we are confronted daily with a constant stream of materials that stimulate our senses and through them affect our inner mental state. We see materials, touch them, walk on them and orient ourselves in relation to them. Finally, by virtue of our physical bodies, we have an eternal kinship with them – we are made of matter, just like materials.

The German architect Gerhard Auer (b. 1938) has described two leading tendencies that express our relationship to matter and calls them fundamental conditions for the spirit of the current age. One of them is represented through a world that is reduced to images and surface, with an increase in the number of non-material ways of perceiving. The internet is a representation of this world. The other appears through a regression into materiality, and then back to the recognition of the world through the senses. Extreme sports and active holidays represent this world.

In his article 'In the black Box' Professor Carsten Thau emphasises this need for sensual stimulation. Thau speaks of human beings, *"whose nervous system is charged up by variety and unpredictability."*[2]

Regardless of our choice of 'worlds' – material or non-material – Gerhard Auer's argues, as humans, we have the opportunity to choose, and it is this opportunity that people can create pragmatic use of 'shopping around'[3] between the two worlds.

In his article Staged materiality[4] the German philosopher Gernot Böhme further contributes to the discussion of the sensing of matter as an approach to architecture. Böhme's main thesis argues current materials have lost a large part of their constructive significance and have been reduced to conveyors of character and atmosphere. In its most extreme consequence this development has led to substantiality – i.e. the appearance of matter as matter – becoming an independent element that has divorced itself from the inner structure of substance. Architecture has become a skeleton that carries an outer skin of substance.

On the other hand, the character of materials becomes autonomous: materiality becomes pure outward form. Wood, glass, steel, and marble as elements of architecture and design no longer designate materials in themselves, but qualities of appearance, indeed the more characteristic, the better.[5]

In his reflections about the sensing of substance Böhme differentiates between three different forms of relationship that we create with materials. These are relations that each in their own way involves different aspects of sensation, namely: Der arbeitenden Beziehung (the working relationship), der wahrnehmenden Beziehung (the perceptive relation) and der mediale Beziehung (the medial relation).[6]

According to Böhme we use the working relation to build up a sense-based relationship to materials. This relationship involves a fundamental recognition of the characteristics of materials in essence their physical capabilities. We work with the materials and thereby appreciate their inner structure, elasticity, tensile strength, heat-conducting capacity and so on. Our earliest

senses of experiences are created by means of the working relation.

Through 'meeting the world' we establish a relationship to our immediate environment and thereby create close relationships with its materials. For instance, a child replaces work with play. Through play our surroundings are 'tested' and through this the child builds up a sense of familiarity with his or her materials – the stick that breaks when it is bent beyond its breaking point, the flint that is crushed under a piece of granite, the lump of clay that is dissolved in water and so on. In the same way both the artisan and the artist build up a fundament sense of familiarity with materials through the working relation. This familiarity later creates the basis for a free and intuitive shaping of those materials. To know a substance is to know its possibilities. The artist becomes one with his or her materials, and the materials constitute the artist's extended arm.

Teaching at Unit 1a focuses around such concepts about matter. At the same time through materials, we create a link to classical metaphysical thinking. This link also forms a dualism between idea and phenomenon and matter and form. In line with Aristotelian tradition we regard matter as being a prerequisite for the realisation of form. In addition we regard matter as possessing a number of possibilities for potential formal expression. It is furthermore our conviction that it is by working with hands, through handicraft, that we can use matter to instil into the body a sense of quality. This does not take place to the same degree via the intellect.

Finally, our fundamental approach is that architectural qualities arise to a greater extent from existential experiences and transformations of reality and to a lesser extent from diagrammatic constructions. This approach will no doubt be greeted by a fair number of critical voices in the current academic world, especially at a time when the shaping of architecture has become synonymous with the architectural diagram. This approach should, however, be viewed as a strategy rather than an attempt to provide an ultimate truth. This means that we regard it as our task to test the consequences of an approach by making it a strategy in the teaching course.

Art

The underlying paradigm for teaching at Unit 1a is that architecture is an art. This involves an acceptance that there are areas within architecture that are only possible to outline and whose core remains always inaccessible. In other words there exists a 'black box' that constitutes the artistic core of the subject and is unfeasible to articulate. The architectural endeavour represents an eternal striving to arrive at this inner core but without any certainty that this will ever occur. Even in the final completed building, for all the care and ingenuity that may lie behind it, there is no guarantee that the artistic quality is present.

Given that a course in architecture is situated within the field of aesthetics, the teaching constantly initiates reflection on aesthetic quality.

A precondition for such reflection only exists through the teaching and in particular in the completed assignments. There is a considerable degree of significance and precision in this structure. It is crucial that assignments are carried out in a meticulous nature both in their conception and in their concrete realisation. If this eventuates the best possible conditions are produced for pinpointing architecture's 'black box'.

In order for students to deliver quality and create conformity between concrete and abstract meaning, teaching must provide them with the opportunity for practising.

Fulfilling this requirement is one of the central elements in the educational theory on Unit 1a. Our motto is, therefore: We tolerate any mistake as long as there is a willingness to start all over.

Concrete – Abstract

As mentioned earlier, one of the bases of teaching at Unit 1a is that we study the fundamental phenomena of architecture using an approach that takes concrete examples as a starting point. In practice this means that we work primarily using full-scale models and accurate materials. It could be said that the teaching builds on the principle of 'face value'. As a consequence what is created is real architecture, since all assignments are made up of genuine presentations.

The rationale for focusing on actual examples as teaching tools relies partly on the tangible results it achieves. We are of the conviction that, rather than representing a subject outside itself, architecture is something in itself. Learning the abstract phenomena of architecture is supported through exercises and assignments that are concrete in nature. In other words, what is abstract is achieved through concrete means – and vice versa.

Expansion of the architectural Field

In a time that is characterised by a diversity of methods for producing architecture, we feel it is important that students are introduced to these methods and their possibilities during the course. It is vital for students to appreciate that creating architecture can take place through a process of development and not simply by mimicking or reusing existing architectural fragments. The former can lead to the production of architecture that the world has never seen and that expands the field. The latter can lead to architecture becoming 'in-bred', a risk that the architectural discipline contracts.

As always the preconditions for expanding the discipline are a combination of innovative thinking and a continual challenging of the boundaries of architecture. Today such innovative thinking seems to be linked to the above-mentioned working methods. We have, therefore, chosen to carry out a systematic process of teaching and working methods during the first year of the course. In a future perspective the pedagogic structure is an attempt to expand the field of architecture.

Research and Teaching

The basis for strengthening the student's awareness of method is created through the research experience possessed by those responsible for teaching the first year. This situation is unique within the Aarhus School of Architecture, where research has traditionally been related to teaching at the masters or PhD. Level.

The influence of research on teaching takes place primarily through the systematic learning of working methods that have been mentioned. In addition to this it also takes place through the direct use of elements in the discipline taken from research. For example, the emphasis on concrete precedents as a basis for the teaching of the abstract forms of architecture represents an approach to architecture that is a direct extension of research conducted by the present author. In this context it is hardly surprising that Martin Heidegger and Gernot Böhme are central figures in the approach to the phenomena of architecture. The same is true of understanding architecture based on the body as an active experiential tool.

The teaching Team

As with other schools of architecture worldwide, there is an express wish at the Aarhus School of Architecture to develop our teaching to the highest possible level. For all our good intentions, we do not always succeed. It seems as though success is dependent on a set of basic conditions. Of these, budget considerations are not insignificant. Nevertheless, it is perhaps not the most crucial factor. In other words there is, fortunately, no direct correlation between the quality of our teaching and the size of our budget.

However, responsibility and freedom of action appear to be central elements on the path of success. The prime conditions in which teaching can develop successfully are, then, the composition of a team consisting of enthusiastic and responsible teachers who are allowed a high level of personal autonomy while, subsequently given support from management. This is, however, not the same as saying that teaching will necessarily bring the results that are expected. Even with these base conditions implemented there is still the chance that fiascos and disappointing courses will occur. This is a necessary risk if the aim is to attain the highest results.

In composing a well-functioning teaching team, there are also a number of fundamental conditions that have to be in place. Most crucial of these would seem to be mutual respect, both professional and personal. If this respect exists, then everything seems to be possible.

Professional differences and a variety of pedagogical approaches can stimulate each other, and teaching can blossom with greater diversity.

As mentioned earlier, there have at times been tendencies for the Aarhus School of Architecture to strive for the ideal course of architecture without ever succeeding in finding it. This kind of normative thinking has proved to be fruitless as the ideal course of architecture is a utopian dream. In other words there are many possible avenues. What seems to be crucial is that the teaching collective are united in choosing a common strategy for their teaching methodology.

Finally having a flat management structure in the team is particularly helpful in the development of good education courses. This is crucial if personal initiative is to be promoted and if there is to be a constant influx of new ideas. As always, what creates good courses is individual initiative.

At Unit 1a the team has been made up of relatively young teachers with a mixture of practical and academic experience. The average age has been thirty one years. The team consists of:

- Louise Heebøll
- Lars Vilsgaard
- Lars Holt
- Ole Egholm Pedersen
- Rasmus Grønbæk Hansen
- Anders Gammelgaard Nielsen

The team have jointly dealt with everything required to be done in relation to the teaching program.

Their tasks have been:
- Preparation and execution of a joint pedagogical and didactic strategy
- Drafting and execution of a joint strategy for architecture as a subject
- Drafting and execution of a set of exercises and assignments
- Logistical planning
- Internal and external communication
- Everyday supervision of the students
- Drafting of pedagogical guidelines for the students

Exercises and Assignments in the Course

Architecture students in 2010 generally possessed good skills in dealing with difficult issues in a complex world. At the same time they acquire a well-developed critical sense in regards to both the content and the teaching methods of the discipline. All these abilities are important to becoming a good architecture student and in the last analysis a good architect. On the other hand when it comes to going into depth or detail student's abilities are often weak, with the result that academic presentations at times appear to be superficial and lacking clear architectural intentions. This is in itself a minor dilemma as long as it is restricted to a closed teaching context. Longer term the damage can be more serious if it is projected out onto a wider social context.

In order to deal with this issue it has proved necessary to strengthen the student's ability to carry out in-depth study. The overall strategy here has been to promote the processes in which architectural development takes place and at the same time to regard the end result as a consequence of the process. The procedural process becomes the aim. From a pedagogical viewpoint this finds expression in the aim of assignments often being 'blanked off' in addition to assignments being issued in limited doses. In the same way assignments are supported by lectures and readings that initiate working methods oriented around processes.

In the drafting of the course's exercises and assignments the teaching team have chosen to take a set of selected basic conditions and principles as the reference point. The aim of these principles has partly been to sharpen the profile of architecture as a subject and partly to make it clear that the teaching was experimental. The following five principles have been employed:
1. All assignments are developed from scratch.
2. Answers to all assignments are completed using full-scale 1:1 models.
3. Answers to all assignments are in the form of presentations (i.e. they are architecture rather than representing architecture).
4. Solutions to all assignments are exhibited.
5. The drawing of houses is not permitted.

Developing Exercises and Assignments

In the daily practice of teaching we seem to develop the exercises and assignments as an on going process. This is a practice that has changed dramatically over the years. In previous years we would develop the course with all assignments finalised prior to our first meeting with the students. By doing so the rest of the academic year would follow as an execution of the predefined course with no possibilities of change. At the end of the year we would evaluate the course with the aim of making changes for the following year.

Today we evaluate and redesign the course simultaneously. This enables us to make very quick changes and hereby optimise the exercises as we go along. In the extreme scenario we have managed to introduce assignments without knowing how they would end. By doing so we have been able to respond directly to the work already carried out by the students.

This technique of 'adaptive' teaching has proved to be extremely motivating for students as well as teachers. At the same time is has created a teaching environment where students and teachers more than ever before form a unit together. In this environment the teaching situation seems to be very transparent as the students are introduced to and fully accept that we as teachers develop the course as the course unfolds.

Hand-outs

Alongside each course a description of assignments has been prepared as a hand-out. Descriptions of assignments consist of a single A4 sheet divided into two pages. The first page contains the actual text for the assignment, which describes step by step its content and the various stages. The second page is made up of an outline of the content of the assignment.

The reason for this brief description of the assignment lies in a conscious pedagogical strategy, in which the aim is to stress the various processes of the assignment as opposed to creating an image of the end result. In our experience succinct descriptions of assignments with an operational focus have a positive effect on the procedural development of a student's response to the brief and, moreover, make it uncomplicated for the students to make a start on them. In contrast, in our experience long and complex descriptions of assignments with highly metaphorical text often paralyse the student's ability to act and anticipate their resolutions.

Since it is our primary strategy at Unit 1a to stimulate students to challenge the limits of building and produce architectural answers not envisaged worldwide, we have to pose questions that open up and promote architectural creative processes.

The outline of content on the second page fulfils a number of purposes. Its main intention is to describe the teaching objectives that students are expected to attain through the assignment. This is crucial for our ability to assess the student's qualifications and skills in a consistent manner. It is also essential to follow the student's general development in the subject.

This outline of the assignment content also contributes positively in providing students with an overview of their own learning process. This is a major help for first year students, who often find their architecture course to be very chaotic and incomprehensible due to the complexity of the subject.

This section of the handout provides a chart that makes it easier for students to navigate through the various elements, methods and tools they encounter during the course. Finally, this content outline of individual teaching modules creates an overview for the teacher's responsible ensuring further preparation of the course content as a whole. It is therefore, possible as the course proceeds for both students and teachers to get their bearings of which assignments the students have completed.

What follows is a survey of three of the course's teaching modules. Common to these modules is the fact that they integrate their exercises and assignments. This means that there is a set of assignments that introduce one (or more) basic architectural themes while at the same time provide exercises in one or more working methods and a number of tools.

Endnotes

1. Stop Making Sense 1984 was a live concert movie featuring David Byrne's band Talking Heads.
2. Thau C. May 2001, In The Black Box, *Arkitekten*. May 2001.
3. Gerhard Auer's reference??
4. Böhme.G 1995, Staged materiality, *Daidalos*, no.56, pp. 36-43.
5. *idem*.
6. *idem*.

2.0.3

UNIT 1B: A GENERAL APPROACH TO THE TEACHING OF ARCHITECTURE

Anne Elisabeth Toft

This chapter will present the overall academic aims of the teaching in Unit 1b and how these were implemented in the curriculum for 2009/2010. The section includes considerations about learning targets, method, discourse, pedagogy and didactics and so on.

Research by Design – in the Studio

"Because I am a practicing architect, my ideas on architecture are inevitably a by-product of the criticism which accompanies working, and which is, as T.S. Eliot has said, of
"capital importance... in the work of creation itself. Probably, indeed, the larger part of the labour of sifting, combining, constructing, expunging, correcting, testing: this frightful toil is as much critical as creative. I maintain even that the criticism employed by a trained and skilled writer on his own work is the most vital, the highest kind of criticism...".[1]
I write, then, as an architect who employs criticism rather than a critic who chooses architecture and this book represents a particular set of emphases, a way of seeing architecture, which I find valid.
In the same essay Eliot discusses analysis and comparison as tools of literary criticism. These critical methods are valid for architecture too: architecture is open to analysis like any other aspect of experience, and is made more vivid by comparisons. Analysis includes the breaking up of architecture into elements, a technique I frequently use even though it is the opposite of the integration which is the final goal of art. However paradoxical it appears, and despite the suspicions of many Modern architects, such disintegration is a process present in all creation, and it is essential to understanding. Self-consciousness is necessarily a part of creation and criticism."[2]

These are the words of Robert Venturi in the preface to the book Complexity and Contradiction in Architecture.[3] The quotation is very striking for the critical and analytical approach that the architect employs when he develops architecture but which he also employs when reflecting on it. The quotation indicates that there is a form of research by design constantly going on – both before, during and after the architect's work with the development of a project. It is well known, Venturi is an architect who can master both construction and the reflection about construction. But he also manages to reflect about the business of writing about architecture, and, as something quite separate, he and his wife, Denise Scott Brown, also reflect on their teaching of architecture in their book Learning from Las Vegas.[4]

Architects develop their ideas and their projects using a wide variety of tools, and they express themselves using a wide variety of different media and means. Their way of working is not one track nor, for that matter, linear. It is multifarious and operates constantly at the intersection between presentation and representation. At Unit 1b, we try right from the outset to introduce students to a 'mindset' of methodological freedom and diversity, and we therefore use Venturi's quotation as a basis for discussion and reference in many different contexts during the course of the first semester. We also use it to place our teaching within a disciplinary discourse.

The quotation gives rise to a fundamental discussion about creativity, about the understanding of architecture as a study, about methods and processes of working and about the significance of a variety of aspects of communication for our way of thinking and speaking about architecture and architectural experience. This also includes ways in which we as teachers teach architecture. Venturi describes the creative process as a self-reflective one, in which architects constantly have to assess and reassess their ideas, methods and forms of expression, and in which they constantly have to pose themselves critical questions about what they are producing, about conventions determining what is good and bad architecture, about functionality and application, about 'beautiful' and 'ugly' design - even questions as to what architecture is, or can be. Their work is experimental, but the experiment is intentional; is directed by conscious criteria that are regularly drawn up and qualified by the architect. The architect does not know what the result of the experiment will be; it does not exist a priori but takes form by means of various operational moves, which he puts into practice in the course of time. These moves reflect his personal involvement and motivation.

Teaching in Unit 1b is research based. This means that we are interested even in the first year of the bachelor course in linking research with design and teaching. We are interested in providing students with a basic understanding of method and in teaching them that systematic studies and analyses can be an important starting point for their architectural designs. For this reason considerations about and experiments with research also form a natural part of the students' project work. Many assignments are organised in such a way that they are introduced with a so-called 'research phase', which typically involves observation, documentation, data collection and analysis. Alongside this, students begin to develop their own individual angle on the assignment and thereby may also formulate their own overall design concept.

In this introductory 'research phase' we make use of scientific methods derived from, for example, ethnography, anthropology, sociology and planning. The aim is that the 'research phase' should generate both information and ideas for the student. The teaching is organised in such a way that students reflect not only on the results of their research but also on their visual communication. For example, we teach the students to pose critical questions about the tools and techniques they employ in relation to various research methods. Last but not least, at Unit 1b we try to formulate and to contextualise – both for ourselves and for the students – what the creative process is or can be defined as, and what core competences the architect may possess. Is the architect's work process and the development of design regarded – or can they be regarded – as forms of research by design? What does this consist of, and what experiences can we, as architects and teachers, derive from it? Is it relevant to submit even the teaching at bachelor level to a critical appraisal and regard it as a research area? Can the students' teaching materials and the results of their studies be included as actual research material for researchers from the school? In what ways can this research by teaching inform research by design, architectural design and teaching?

The Aarhus School of Architecture has been experimenting in recent years with a variety of approaches to research, a variety of research methods and a so-called 'extended' concept of research. This includes artistic development work, research by design and research by teaching. The ambition for the future is for reflected teaching, research and research by design to be in permanent close dialogue with each other and to constitute a common platform for the development of new forms of teaching and discourses in architecture and research. Completed study assignments will, therefore, ideally be able to form a basis for research reflection among the school's researchers. In return, research results will be able to form a basis for teaching and for the courses taken by students at the school.

Method and process

At Unit 1b, we take as our starting point the students and their individual skills. We attempt to teach them using a holistic learning model[5] that tries to include as many aspects as possible. We nurture their individuality and their independence. We listen to the students' visions and help them to pursue them. Teaching is about developing their creative potential. This means that they also ought to find that their architectural course is a continuation of and not a break with their former studies rather now they are just using other critical means.

At Unit 1b, we regard the processes of design, of process management and of developing analysis and concepts as the architect's core skills. Teaching gives priority, therefore, to innovation, to the generation of ideas and to programming at all levels. Teaching is, as mentioned earlier in this book, oriented around process and method. Our aim is to give students a thorough introduction to the phenomenon and an understanding that we are dealing with a particular approach to architecture and to the business of producing architecture – that it

is rooted in discourse and that it is radically different from what is known as a traditional formalist approach. At the same time we point out to them that, as with so much else, it is a cultural construction, and that in this course there is by large no 'right' or 'wrong' way of developing and creating architecture. As long as students are prepared to provide an account and a justification for their choice of approach and measures taken, we will even challenge them to experiment and to be critical of the working methods we introduce them to. We do this in order to sharpen their critical faculties as regards the teaching, the course and the school – and, indeed, the conventions of the subject and the discipline as a whole.

During the first year of the course we introduce students to a range of different working methods. The focus is, however, on the generative, the synthesising and the conceptual working methods as described elsewhere in this book. The aim is that students should acquire both knowledge and a concrete experience of these various working methods and that they should be enabled independently to choose between them or combine them. In the same way we introduce the students to a broad range of tools and techniques so that they can relatively quickly make use of a variety of graphic equipment both in draughtsmanship and modelling. We want them to feel the freedom and security of having a wide vocabulary. At the same time it is important that, within the wider generic use of this vocabulary, each develop their own 'language', their own way of using these tools or developing these techniques.

If architects start their design process having formal preconceptions, there is a danger that they will only reproduce what they already know. At Unit 1b, therefore, we believe that as teachers we constantly have to challenge the students – and ourselves – to break with conventions and reassess the employment of standardised methods and techniques. For the same reason we harbour neither ambition nor interest in miming the reality or the practice that exists in the architects' offices. We prepare students for the increasing speed of change to be found in the labour market by training their readiness to adjust and by teaching them to operate intelligently in a field of unknown factors. We propose an experimental form of teaching, one in which concepts are developed through techniques that, while they indicate the strengths of a given programme do not necessarily wish to instrumentalise them in a specific physical design.

Presentation and Representation

Just as it is essential for students to recognise the link between method and result or tool and technique, it is also essential that they recognise the link between representation and what is represented. As architects and future architects in training, we work constantly in and with representations. To a large extent our work is dependent on the interaction between various reproductions. But what does representation mean for the architect? What does it mean to visualise and mould architecture with the aid of representations? What is a sketch? And what implications does it have for our architectural designs and representations that we as architects often sketch in a wide variety of different representative scales at the same time? These are just some of the many questions that crowd in on us when we begin to reflect upon the relations between architecture and architecture's representations, and whose answers we therefore also ought to ponder when we as teachers introduce our students to methods and the use of tools.

Architects have always made use of representations. They have used them both as aids to development in the design process itself and as communicative statements in subsequent presentations. For the same reason, the emergence of new representational techniques in the course of history have had a decisive influence on the architect's work and thereby also on the design of architecture. At the same time the communication and spread of architecture via representations has been significant for the development of the concept of architecture and of architectural discourse. In the architecture course such representations and the media and technique associated with them have had a significant bearing on the teaching and its framework. They have a bearing on the working methods we introduce as teachers, and they have a bearing on the students' academic learning processes. Making use of a phenomenological appreciation of the fact that, far from being neutral, media filter our perceptions and our understanding of the world around us, this is precisely what Unit 1b's teaching focuses on. During the course of the year the students work with a variety of media in order to explore them and their characteristics as media. This gives rise to discussions about the media's various technological potential and of the cultural codes and connotations associated with them. It also gives rise to discussion about the relation between media and reproduction and of the factors or conventions that determine our choice of the media and the forms of representation that we use in various contexts and situations.

When we employ a particular medium and a technique or method specific to it, our perception of what we perceive is altered. Mediation affects a shift in perception and in doing so constitutes meaning. In the process certain qualities of the medium and the object of mediation are emphasised while others are toned down or disappear completely. The medium in itself determines the framework of our perceptions in and through the use of the medium, and it and its technology are, therefore, decisive in the way we read the world. That said, we rarely have our attention directed towards the medium while we are using it. The moment we make use of a medium, our attention is normally directed solely at the work we are in the process of carrying out or producing. For the same reason it can be difficult to reflect on the use of media and to understand the significance of the medium and of mediation as a framework for cognition.

As a researcher into the relation between architecture and the representations of architecture I chose, as Unit Master on Unit 1b to allow the discussion about use of equipment and about understanding media to take an absolutely central place in the syllabus. A persistent theme and a particular disciplinary angle in the course is, therefore, reflection about the relation between observation and notation, between presentation and representation.

The syllabus

The syllabus is based upon the guidelines laid down in the curriculum and the vision statement. It is conceived as a holistic model in which courses and exercises are integrated as far as possible in a course of assignments that are divided up into phases. It seeks to create a synergy and an overlap between assignments and it can therefore be seen as creating both a framework around one large and coherent set of assignments and a framework around a series of assignments of various lengths that are autonomous but internally linked. These assignments have a set agenda and function in relation to each other, and this means that careful consideration has gone into their thematic chronology. Each assignment is an extension of its predecessor, and they always contain elements of repetition and contextualisation in terms of their working methodology. The assignments can also challenge or reintroduce architectural concepts or issues that students have already studied in a different context – in a previous assignment or in relation to a course. The progression of assignments is constructed in such a way as to give students the opportunity to undertake focused studies, adopt an individual angle on their studies and develop a critical analytical outline that brings a variety of approaches to working methodology into play.

These assignments address the form, space, programme, construction and context of architecture. They alternate between being 'general' and being 'specific'. In what we call the 'general' assignments the students examine individual architectural concepts, tools and resources in isolation from the complexity of an actual architectural assignment, while the 'specific' assignments aim to synthesise skills and knowledge and result in modest architectural proposals. Emphasis is placed, however, in all assignments on the student being challenged to identify, interpret, analyse and contextualise architectural issues. In addition the aim is that students should learn to formulate their own architectural strategies and to be in a position to put their statements in a wider context. The writing of programmes and reflected argumentation are, therefore, central to the students' completed assignments.

The teaching

At Unit 1b, we believe that all students essentially have their own individual ways of learning. They have various preferences and abilities and these circumstances are decisive in determining how they function in various study contexts. Our experience tells us that they thrive in a variety of learning environments and require various forms of stimulus. This makes certain demands of the assignments scheduled for the year's course and of the way in which we as teachers supervise the students in relation to these assignments. At Unit 1b, we are experimenting with various forms and situations regarding supervision. The teaching takes place primarily in the drafting room, where students have their own drawing board and sit in a common study environment, or in one of the school's two studios. The school is open round the clock and the course is intensive. Teaching is based around drawing board supervision with discussion, which takes place several times a week. This form of teaching allows students to focus on their learning process and on their individual ways of learning. Individual supervision is also given by means of weekly pin-ups, assessments and in relation to oral and written pedagogical guidance.

Assignments at Unit 1b are so arranged that the students work both individually and in groups of vary-

ing sizes. Group work is prompted by, for example, courses and classes targeting teambuilding, communication and the work environment. The teaching of theory and history is carried out in parallel with project-oriented classes so that it can contribute to contextualising them.

The teaching Team

The teaching team behind Unit 1b has been assembled from relatively young and newly qualified architects with an interest in the subject's theory and practice. They bring to the course considerable knowledge and experience of a variety of design methods. Their particular skills lie in the areas of architectural design, teaching, the theory of architecture and the use of media. Since they are all graduates of the Aarhus School of Architecture and a number have also taught there, they have extensive knowledge of the school and its academic profile. This background is extremely valuable in relation to the reappraisal of the teaching and its significance. This common history gives each of us a specific discursive reference to work with – and against. In the team we are very aware that this is at one and the same time our strength and our weakness – our blind spot. This common history, therefore, also determines a number of our strategies for external collaboration. Among these, for example, is our broad collaboration with colleagues from Unit 1a, professional sparring with a large number of visiting lecturers and invited experts, and the execution of several targeted courses at and with a variety of schools of architecture abroad.

In the spring semester of 2010 we further extended our team to include visiting professor Gerard Reinmuth from the University of Technology in Sydney. This appointment was intended precisely to put our course into perspective and challenge our professional dogmas. This collaboration has allowed us to look at ourselves from the outside and provided constructive criticism in a number of significant areas, and this has prompted us to develop new teaching models. Our collaboration with Reinmuth has also prompted the present volume – and a shared documentation and discussion of the last three years of experimentation with a rethinking of the introductory design course at the Aarhus School of Architecture.

The Development of the Syllabus and the Course of Assignments

Members of the teaching team all participate in the development of the syllabus and the various courses of assignments during the first year. The team work is according to a democratic model, and the syllabus typically develops through lively dialogue to which everyone makes their contribution. The syllabus is a 'work in progress' that is never completely fixed until the very last minute, being kept open as far as possible to allow for chance, experimentation and spontaneous openings that might crop up over the two semesters. We try to follow a similar evolutionary method in organising the long course of assignments divided into phases through the academic year. This evolutionary development means that it is not unusual for the students' handouts to be re-written several times as the course progresses. The advantage of this is that we as teachers are constantly critical of the assignment, reflecting on it, its construction, purpose and level of difficulty and on the students' and our own performance. If something unforeseen occurs, for example, we can quickly and relatively easily adjust the assignment and tailor it to the new situation. We can also refrain from defining our requirements of the assignment's outcome until very late in the day.

This relative flexibility in the arrangement of the course is also conceived as a conscious 'spoke in the wheel' for the students. One of the things we are attempting in using this means is to prepare them for the instability that often characterises the working conditions of the fully qualified architect. We believe that it is important even in the first year of their course to teach the students how to multi-task and to work in a targeted manner on an assignment without knowing what the requirements might be as regards its outcome. In a variety of ways, then, we train and test our students' readiness, innovation and willingness to take risks through teaching in which handling stress and performance anxiety are also addressed.

The many tasks of the teaching team are delegated in such a way that different teachers on the team are responsible for the development and organisation of the various courses of assignments. As teachers, we are continuously working on a number of parallel assignments and we are ourselves responsible for organising our time. The members of the team are in constant communication with each other, and their daily contact and close communication about the course and its progress are central to the discourse that takes place around Unit 1b. For the same reason, all members in the team are as far as is possible on a fulltime contract. This means that everyone is whole-heartedly involved in the course and all take responsibility for the work that is carried out at the unit. Regardless of their formal position at the school, everyone takes part in meetings, critiques, study tours, pedagogical consultations, academic assessments and so on. In this way everyone has the same frame of reference, and this has a bearing on the teaching, its organisation and our evaluation of it.

Depending on their specific interests and competence, everyone also has the opportunity to participate in working groups with other colleagues from the school. In these, various subject initiatives of a more general nature are developed, such as papers for study groups or alterations to the teaching of the bachelor course. This means that everyone also has the opportunity to reflect on the shape and content of the course in academic environments and contexts that are outside the remit of the unit. This further enriches the courses offered at Unit 1b, in that this also provides an avenue through which new views and perspectives can be acquired.

The Assignments

In this book three Unit 1b assignments will be presented. These formed part of the syllabus for 2009/2010, which comprised in all six phased assignments alongside a range of courses and exercises specific to a variety of tools. The first assignment presented here is 'Composition and de-composition'. This is an example of what we call a 'general' assignment. In these, individual architectural concepts, tools and resources are studied in isolation from the complexity of an actual architectural assignment. The working method introduced in connection with this assignment was the generative method. The second assignment presented is 'Bridging the Gap', which is the result of a more extensive interdisciplinary collaboration. The assignment is built up around a statics workshop, a course in construction and an AutoCAD course. It was developed in collaboration with the school's engineers, and the teaching was carried out by engineers and architects from Denmark and from abroad. The assignment introduces the synthesising working method. The third and final assignment presented here is 'Structure, seriality and the open programme'. It is an example of what we call a 'specific' assignment. These are characterised by the fact that they are synthesising and result in modest architectural proposals. This assignment brought into play a generative, a conceptual and a synthesising working method respectively.

These three assignments are very different. They focus on different elements and they do so in different ways. Nevertheless both individually and together they paint a representative picture of the discourse that takes place at Unit 1b. They illustrate the way we at Unit 1b, experiment with our teaching and the pedagogical and theoretical considerations that occupy us in relation to it.

The 'DNA' of the course is also embedded in the way that we as teachers formulate our hand-outs to the students. This is not uniform. Some texts for an assignment might be more 'open' than others. For example, we sometimes let the students themselves take part in defining the question the assignment is to address and the requirements as regards its outcome. At other times, this is not an option. The aim is for the students' to have the opportunity to develop their creative skills while at the same time allowing a focus on their individual learning processes and their particular ways of learning. Each of them, therefore, has the chance to dwell on particular aspects of an assignment. At Unit 1b, we believe that the challenge and the stimulus that is involved in working with different kinds of assignments and assignment questions can contribute to promoting the individual student's creativity, independence and ability to make a critical analytical outline.

Regardless of the difference between assignments at the level of form and content and of the way we at Unit 1b formulate them, they all include reflection about the relationship between observation and notation, between what we, so to speak, 'look at', examine or present in our work on an assignments and the way we do it. We regard method – and this includes our teaching method – as a medium and as one of a variety of language systems that constantly transform the way we think and speak about architecture and teaching in architecture. The aim of the teaching is also, therefore, to indicate this relationship and to isolate its thematic content.

At Unit 1b, we believe that 'meaning' is determined by context. It is, therefore, also a feature of the assignments at Unit 1b that they will all in one way or another discuss this relationship and this position. This can take place using a variety of approaches, and the concept of context can also be illustrated and interpreted in a variety of ways. However, the students' study of different architectural phenomena or themes is not divorced from this discussion – not even if the teaching is typically organised in such a way that the assignments hone in on the learning of a limited number of elements in the course. Scale and changes in scale in a de-

sign are also discussed in relation to all assignments. The discussion revolves around the relation between scale and conception and around how the choice of various working methods and tools – both analogue and digital – can be related to different conceptions of scale and space. The concept of scale is seen, then, as a cultural construction linked to the various cultural and technological paradigms in the history of art and architecture. The discussion also addresses the relation between scale and representation, and the way in which different media reproduce different scales in different ways.

Another central leitmotiv in the assignments is reflection about the relation between presentation and representation. As teachers we regularly conduct conversations with our students about this relationship, about what it means, and how we can experiment with it. The theoretical basis of the teaching lies in the theory of art and architecture, and it employs an extended concept of discourse that has links to the cultural field and to the interdisciplinary area known as 'visual culture'.[6]

Endnotes

1. Eliot, T.S. 1932, *Selected Essays, 1917-1932*, Harcourt, Brace and Co, New York, p. 18.
2. Venturi, R. 1966, *Complexity and Contradiction in Architecture*, 1966, second edition, 1977, reprinted 2008, The Museum of Modern Art, New York, p. 13.
3. *idem*.
4. Venturi, R. & Scott Brown, D. & Izenour, S. 1979, *Learning from Las Vegas*, The MIT Press, Cambridge Massachusetts, and London, England.
5. We base our teaching on, for example, research by the American professors Dr. Rita Dunn and Dr. Kenneth Dunn into the concept of 'Learning Styles'. Dr Dunn R. & Dr Dunn K.,1978, *Teaching Students Through Their Individual Learning Styles: A Practical Approach*, Prentice Hall, Englewood Cliffs, NJ.
6. We can say in general terms, echoing the American media theorist W.J.T. Mitchell that visual culture focuses on '(…) the cultural construction of visual experience in everyday life as well as in media, representations and visual arts.' Mitchell, W.J.T. 1995, 'Interdisciplinarity and Visual Culture'. In: *The Art Bulletin*, December 1995, Volume LXXVII, no 4, p. 540.

Unit 1a PROJECTS

2.1 THE MOTOR

2.3 JACK IN THE BOX

2.5 EARTH AND SKY

Unit 1b PROJECTS

2.2 COMPOSITION AND DE-COMPOSITION

2.4 BRIDGING THE GAP

2.6 STRUCTURE, SERIALITY AND THE OPEN PROGRAMME

2.1 THE MOTOR

Unit 1a

2.1.0

THE MOTOR

Anders Gammelgaard Nielsen

MOTOR is the first assignment that students at Unit 1a of the School of Architecture are introduced to. The purpose of the assignment is to shake up the students and their preconceptions of what architecture is. This is done by introducing them to a working method that allows them to develop architecture that resides beyond their own imaginative capabilities. In other words the core aim of the assignment is to equip students with an understanding that architecture can be developed through a predetermined generic process and that through this process opportunities exist to develop something original and genuine that decisively challenges the limits of the field of architecture. This understanding is important if students are to avoid mimicking an existing world of imagery in architecture or fragments of it.

The assignment takes as it's starting point experiences with generative working processes that the present author acquired while conducting research work for a PhD project. These experiences provided an insight into the possibilities that generative methods hold for developing architecture that transcends the limits of our own imaginative capacity. The assignment can, in fact, be regarded as a direct implementation of research experience transferred into teaching. This use of research experience early on in the new bachelor degree course at the Aarhus School of Architecture constitutes one of its most revitalising elements.

The ability to be able to develop architecture that lies outside the students' own imaginative capacity using a generative method releases a limitless potential of creative possibilities and in addition stimulates the students' ability to work in abstractions. Research and teaching are in this way linked together through the use of the same method. In both cases there is a search for an answer that the world has yet to witness. The artistic (architectural) exercise is just as dependent as the research exercise revealing new facts of the world.

The use of the research working methods in a teaching context represents an example of research-based teaching in practice. By contrast the MOTOR assignment also contains elements of teaching-based research. This means that the answers to the assignments that the students arrive at by means of this practical and rigorous research-based method become the object and output of research studies. As a researcher it is, therefore, possible to make use of this teaching output that becomes available through the students' completed assignments. In this manner research and teaching can contribute to one another.

In the MOTOR assignment students are introduced to the fundamental architectural themes of form and space. These principles for the creation of form and space follow either an additive or a subtractive method. This means that there is an enquiry into creating architecture either by adding material (constructing) or by removing material (excavating). At the same time a range of modelling tools are introduced that make it possible to develop models of high quality.

The point of departure for the MOTOR assignment is that a car engine is dismantled in order to cast a spotlight on the individual engine components. This means that an object (the engine) is removed from its original functionality and determined context and staged as an aesthetic object via a new contextual relationship being resolved. The decontextualisation is dependent on a reading and analysis of the formal characteristics of the engine component. This is crucial if the staging process is to succeed.

The reason for the use of a motor component in the assignment is that it represents an extraordinarily high level of precision. The necessary consequence of this is that the staging presupposes a corresponding level of precision. From a pedagogical viewpoint this reinforces the students' ability to work with great precision and to master the tools and techniques that are learnt during the course of the assignment.

The need to practise and reiterate processes repeatedly before the result is satisfactory forms part of a fundamental approach. In other words mistakes are made welcome. They are the precondition for learning.

Title:
THE MOTOR

Duration:
6 weeks

Objectives:
Developing precision in thought as well as in action
Developing understanding of space and form
Developing model and technical skills
Testing a generic working method

Description:
00 Disassembly A motor is disassembled and analysed in relation to its functionality. A component is chosen from the motor and cleaned with engine cleaner and water. All oil residue is carefully removed.

01 Drawing The component is placed on tracing paper with 20x20mm grid as underlying layer. The contour of the engine component is sketched and at the same time a frame is drawn around the component. The frame overall must have a distance to the component of at least 20mm.

An axonometric frame is drawn which envelopes the component. This envelope must be orthogonal and be an approximation of the component form. Furthermore, the smallest line segment should not be less than 20mm. The surrounding frame must as a minimum be 50mm higher than the covering of the engine component.

02 Casting mould This axonometric drawing forms the basis for the construction of a casting mould. From the axonometric drawing a set of working drawings in orthogonal projection accompanied by a list of elements required to make the mould with precise indications of dimensions is produced. Cardboard thickness should be taken into account.

Based on the working drawings, a casting mould is made in cardboard.

03 Casting A plaster cast is made. Before the casting the mould is reinforced on the outside with cardboard elements in order to resist the outward pressure from the plaster. The plaster element is revealed as the mould is removed. The engine component is placed in position in the plaster element.

04 Soldering A spatial element in wire is made which is the same form as the plaster element. The engine component, the plaster element and wire are combined to make a coherent composition.

05 Plywood discs The wire element is closed with discs as a refinement of the engine component is staged.

06 Drawing The plaster and engine component are sketched in orthogonal projection drawing.

Materials:
White cardboard 1.5 mm thick, wood glue, gas burner (proxxon or similar), wire 1.6mm thick (steel), model plaster, plywood.

Literature:

Herrigel. E 1953, *Zen in the Art of Archery*, Routledge & Kegan Paul Ltd, London.
Pirsig. R.M 1974, *Zen And the Art of Motorcycle Maintenance: An Inquiry into Values*, Morrow, New York.

		Introduction	Competancy	Mastery
Architectural theme				
Form		X		
Space		X		
Construction				
Context				
Programme				
Working method				
Generative		X		
Synthesising				
Conceptual				
Analytical				
Tools				
Drawing	analogue	X (axonometry, double orthog-onal projection drawing)		
	digital			
Model	cardboard	x		
	wood	x		
	wire			x
	plaster			x
Communica-tion	written	x		
	oral	x		
	visual	x (Indesign, Pho-toshop)		
Registration	drawing			
	photo	x		
	video			
History				
Theory				

2.1.1

DISMANTLING THE MOTOR

A mechanic demonstrates the function of a car engine and its various components after which he explains how the engine should be dismantled. Students are then invited to dismantle a number of engines after which the parts are separated and cleaned. A constant emphasis is given the precision of each engine component as these are given to be staged in the assignment.

2.1.2

DRAWING

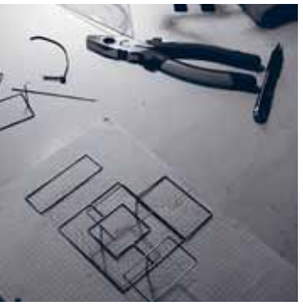
The engine part is taken from its original context and a new context is to be created for it. A series of orthogonal drawings are made to test how the staging of the engine part might be possible. The different options are discussed with tutors and one is chosen.

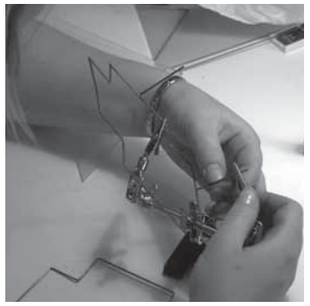
2.1.3

CASTING

Based on the orthogonal drawings, a casting mould is formed from cardboard. To prevent distortion of the mould a series of cardboard braces are applied externally. Plaster is poured into the mould and left to set for one hour. Once the plaster has set, the cardboard is removed and the cast is revealed.



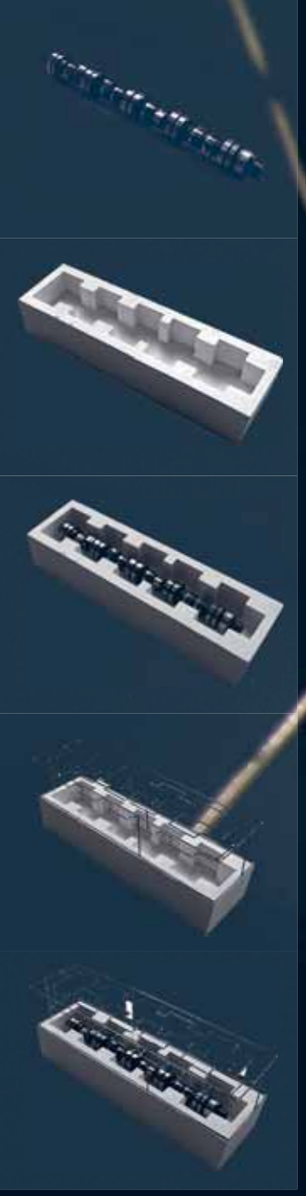





2.1.4

SOLDERING

A wire frame of the same outward dimensions of the plaster cast is added to it. The solid-void properties of the plaster cast are now augmented by the abstract figure of a wire frame.



Various stages of the process are illustrated adjacent.

2.1.5

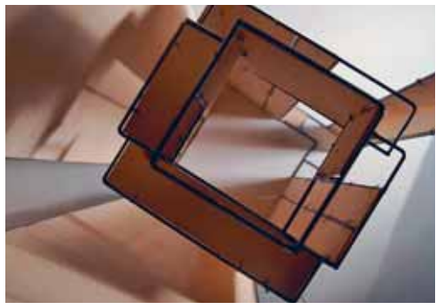
MONTAGE

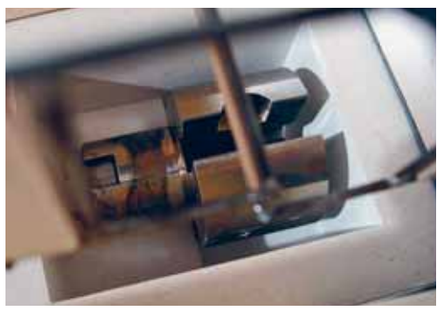
To emphasise the staging of the engine part in its new context a series of thin plywood sheets are mounted onto the wire frame via thin wire ties. The plywood sheets must fill the extent of each section of the wire frame where they are located. The location of these sheets must take into account the direction from which the engine part is to be observed in its new context.

2.1.6

DETAILS

A selection of the student work.

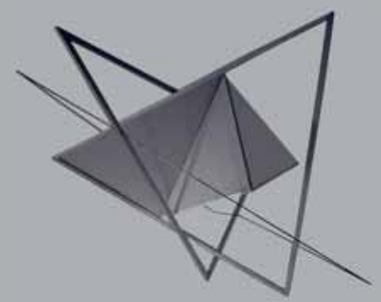




2.1.7

EXHIBITION

An exhibition is held where all projects are displayed. By collecting all projects in an exhibition students can observe how the constraints of the assignment as set can yield a surprising variety of results.



2.2 COMPOSITION AND DE-COMPOSITION

Unit 1b

2.2.0

COMPOSITION AND DE-COMPOSITION

Anne Elisabeth Toft

The assignment 'Composition and de-composition' is the first assignment of the academic year. In other words it is the students' first encounter with their architectural studies and the teaching that is carried out at Unit 1b. The assignment runs over six weeks. It is divided into phases and built up around a set of exercises in working methods, a drawing course and a course in chromatology. The aim of the assignment is to pave the way for discussion about architecture and a variety of design methods and processes. It focuses on the exploration of graphic techniques and strategies of representation, and attempts to give students a basic introduction to composition in architecture and the visual arts.

The introduction includes exercises in geometry and learning about points, lines, surfaces and spatial extension. It points towards a number of disciplinary 'cross-overs'. It explores, for example, the theme of how techniques, methods and concepts developed within the practice of the visual arts have been appropriated and further developed in architecture, and vice versa. The assignment also reconnoitres a number of graphic genres and their aesthetic effects. The teaching addresses the way architectural representation can be read as a variable, a labile concept and sign that can alter both category and genre depending on its context and function. The assignment brings together experiments with collage, mobiles, drawing and models.

The first assignment of the academic year is unique in that it constitutes the framework for the student's first encounter with the study of architecture and the architectural discipline. This factor necessarily makes a number of central demands on the teaching and on the way we as teachers tackle it. It raises questions about the way we assemble the assignment, about the way we formulate the students' hand-outs, and about the way we frame the discussions and topics addressed by the assignment. For how do we as teachers receive seventy-five new students of architecture? And how do we introduce them in a meaningful way to architecture and the course in architecture? How do we speak to them about these phenomena? Where do we begin? What can be called a 'good' start to the course? Who is it we are teaching? And why?

Because we at Unit 1b recognise the students' differences, their different educational backgrounds and individual skills, we arrange the first assignment in such a way that it does not require that they possess any particular previous architectural abilities. For example, in the first phase the students work with a set of graphic exercises that do not at any stage require them to be already able to draw. The exercises in this phase are all about perception. They focus sharply on the human sensory apparatus and on the students' self-reflection in their examination of the relation between media, images, perception and the construction of space.

The exercises deal with composition and spatial organisation in two dimensions. They challenge the students to think in patterns, proportions, number systems, sequentiality, hierarchies and in graphic contexts and to develop abstract pictures and motifs using a generative working method, which relies simply on the operationalisation of a variety of compositional principles. The exercises are repetitive in their form. By means of innumerable repetitions with minor variations or displacements in their compositional principles and in their graphic methods of presentation, a series of distinct visual typologies is developed. The medium is the collage, and the students work exclusively in paper and on paper in A3 format. In the collage the mutual interaction of figures and colours is explored. This is done using Johannes Itten's chromatology as a starting point.[1] Chromatology, collage techniques and compositional principles become the theme of lectures and discussions, which also put these into perspective and position them in a historical context. In this context, for example, we look at the surrealists' experiments with mechanical processes or 'automatic writing'[2] or at various visual strategies in Minimalist Art and Pop and Conceptual Art.

The first phase of the assignment lasts for one week. Production takes the form of an extensive catalogue of collages (twenty four in total), which are not produced with a view of being 'art'. They are self-reflective experiments, which focus on experiment for the sake of experiment and on the study of optical perception. In the second phase of the assignment, which also lasts for one week, the study is extended to include composition and spatial organisation in three dimensions. The medium that the students work with in this phase is the mobile. A well-known characteristic of the mobile is that its expression rests upon movement, either of the entire form or of parts of it. Students are therefore asked to undertake a series of systematic analysis of the relationship between perception and movement and to consider movement as a specific design parameter in four different exercises.

In these exercises students translate selected collages from their catalogue into mobiles. The challenge for them consists primarily in interpreting and transposing their graphic motifs into concrete spatial constructions. These exercises test their sensitivity to media and their understanding of materials and of the various latent constructive potential in various materials. The exercises also test their understanding of tectonics, scale and spatial proportioning. The mobiles can only be constructed out of specific materials, and this factor also makes specific demands on the students' projects. The materials the students can use are: Japanese paper, cardboard, wire and strips of wood (5x5 mm).

In the third phase of the assignment the students are introduced to the architectural drawing. This phase lasts three weeks. It focuses on various forms of analogue drawing, various graphic techniques and expressions, and on how these have been used and are used in a variety of design situations. The discussions take current and historical viewpoints to address the theme of drawing and the significance of drawing. This means that reference is also made to digital drafting and rendering techniques, even though the focus is on analogue drawing. This phase is introduced by a course in double orthogonal projection drawing that includes various exercises in descriptive geometry, in which students learn to apply and understand methods of parallel projection, central projection and axonometric projection.

The mobiles that the students worked out in the second phase of the assignment make up the point of departure for the representations that are developed in the drawing exercises. Emphasis is placed on graphical precision in the drawings and on the students' ability to interpret, reproduce and develop spatial relations in plan, section and elevation. In repeated drawing exercises the students explore double orthogonal projection drawing and the mechanisms that come into play in the making of parallel projections. The intention is that students' should be adept with analogue drawing and should learn to master a variety of drawing techniques developing a nuanced understanding of the potential of the double orthogonal projection technique. A drawing is not simply a note or a graphic representation, it is also an operation and a generative medium. The double orthogonal projection process can be read as a programmable 'drawing machine', the geometry and compositional principles can be used as tools for the generation of form in the development of architectural design.

The students' experiments are discussed in the light of work taken from so-called 'generative art', which is a particular branch of computer-based art. In digital generative art, a portion of the work's construction is left to autonomous processes in the computer. The framework for the creative process is determined by the algorithms of the programmer – the artist – whereupon progressive versions can be generated by the automated processes in the software.

On the basis of their knowledge about composition and of various compositional principles, the students continue to develop their mobile compositions. They try out various generative methods in double orthogonal projection drawing – such as scaling, rotation, displacement and repetition – and each stu-

dent lays down his or her own individual strategy for developing their composition. The strategy might involve drawing in a particular way or setting a specific process in motion. They can, for example, choose to contrast, reinforce or counterbalance different parts of the composition, or they can choose to import a new motif taken from one of their collages. The drawings are made using pencil on large sheets of white paper in A1 or A0 format.

In the fourth and final phase of the assignment, which lasts one week, they are asked to translate the drawn material into a model. It is entirely up to the students to develop individual strategies for this translation. However, the model must be constructed in white card. It has to be static, has to be able to stand on a table, and has to be in a scale of 1:1. As part of this exercise the students are asked to consider the potential and the limitations of the model material and how best they can thematise and exploit these in their translations. Are there, for example, tectonic solutions that are 'given' by the material? Do uncontrollable and unintended events always happen when we translate from one medium to another? Could we perhaps develop a strategy for generating form based on this? The exercise draws the attention of the students towards details in the drawing's transparency and to the physicality of the model.

As in the previous phases there is here a focus on perception and on the significance of the codes and connotations of the medium. In a variety of comparative readings summing up the process and referring to the earlier phases of the assignment, there is discussion of architecture's various forms of representation and the characteristics of their media and their performance. This takes place against the background of the students' own work in collages, mobiles, drawings and models. In addition there are discussions about the assignment, its presentation, content and structure, why we had set it and what the students have learnt from it.

Composition and De-composition: 1st Sept-9th Oct 2009
Concept: Anne Elisabeth Toft and Lena Kondrup Sørensen
Formulation of assignment: Anne Elisabeth Toft

Endnotes
1. Itten J. 1961, *Kunst der Farbe*. Otto Maier, Ravensburg.
2. Automatic writing; automatism: Automatism, or the 'dictation of thought without the control of the mind', is of decisive importance in surrealism and may even be said perhaps to constitute its very touchstone. Automatism implies the intervention of chance and the abandonment of the critical mind. Surrealist automatism is described in: Breton, A. 1924, *Manifeste du surréalisme*. Simon Kra, Les Pas perdus. NRF.

ASSIGNMENT # 1
COMPOSITION AND DE-COMPOSITION

Synopsis
The assignment gives a basic introduction to composition in architecture and visual arts. It consists of a number of tool exercises and a course in double orthogonal projection drawing (analogue drawing). These are illustrated by lectures on compositional principles, chromatology and representational forms. The assignment focuses on the investigation of graphic techniques and different strategies of representation. Furthermore, it deals with design methods and the process of design. Students will experiment, analyse and conceptualise in collages, mobiles, drawings and models. Taking the production of the students as our point of departure, we will discuss the use of media, the meaning of media, and the relationship between presentation and representation in two and three dimensions respectively. The assignment deals with fundamental architectural themes and notions, for example form and space, context, structure and scale.

The students will work individually or together in pairs.
Models should be developed for documentation and reproduction in photography of the total production.

The aim of the assignment
The aim of the assignment is to give you a basic introduction to composition in architecture and visual arts. The assignment focuses on the investigation of graphic techniques and different strategies of representation. It also deals with design methods and the process of design.

During the next few weeks you will work with architectural compositions in two and three dimensions. Through a number of tool assignments, you will become acquainted with different kinds of representation and graphic expressions. Working through the assignment, you will experiment, analyse and conceptualise in collages, mobiles, drawings and models.

Based on a simple set of ground rules, we will start a design process - or what we hereby decide to call a design process. Sometimes the process will bid you to work quite mechanically, at other times your personal choice and attitude will determine the continued process and the development of your work.

We will discuss your process; what determines it, and how different representation techniques and media influence the result of the procedure and your readings in the process. We will discuss the relationship between (graphic) expression and medium, just as we will discuss the relationship between two and three dimensions, space, form and context. We will also discuss your readings or analysis of your own work.

A selection of relevant literature:
Lise Gotfredsen: *Billedets formsprog*.
Johannes Itten: *Farvekunstens elementer*.
Johan Wolfgang von Goethe: *Goethes farvelære*.
Robert Lawlor: *Sacred Geometry. Philosophy and Practice*.
Kenneth Martin and Mary Martin: *Constructed Works*.
Brandon Taylor: Collage. *The Making of Modern Art*.

Hand-Outs

The assignment 'Composition and De-composition' runs over six weeks. It is divided into four media specific phases:
Phase 1: Collages
Phase 2: Mobiles
Phase 3: Drawings
Phase 4: Models
Daily students are given a number of exercises. Below you can see an example of one of these. The full assignment brief and all hand-outs can be viewed at: rum1.aarch.dk/index.php?id=120092.

Preparation for:
Collages - Compositions in Two Dimensions
Exercise 1-4

In groups of four, you mix black and white acrylic paints so that you get three different grey shades (see example).
Paint a number of A3-sheeets (glazed paper) with black, white and grey shades.
Use a small paint roller for an even covered surface.
Let the sheets dry. Repeat the process if necessary.

Collage - Compositions in Two Dimensions
Exercise 1

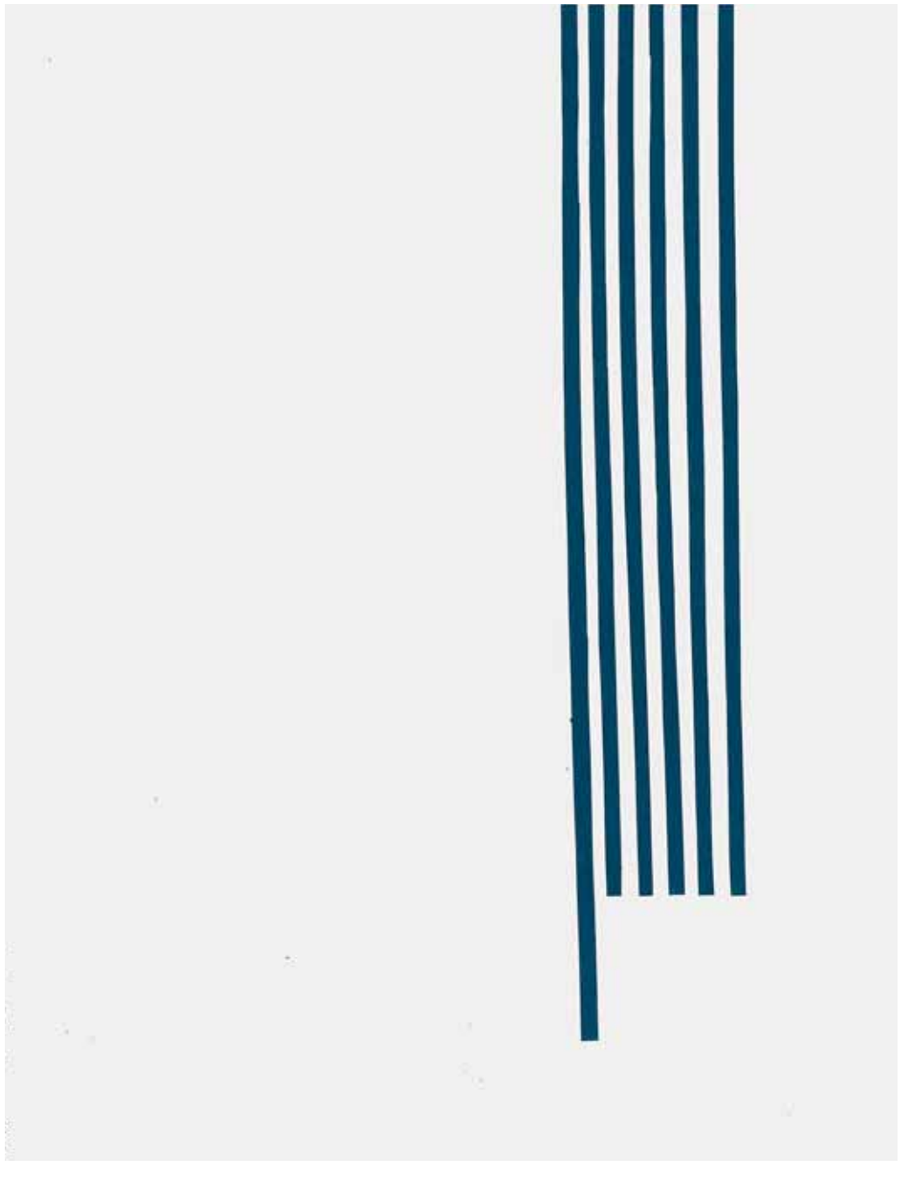
Make a collage which expresses the given compositional word. In your collage, you should only work with points, lines and planes. The collage should hold an aesthetic quality that you define and name.
Consider the format of the paper (vertical or horizontal format) and how you chose to compose your picture surface.
Consider how your composition relates to the centre and periphery of the A3 sheet.
Consider your use of the grey scale from white to black. Repeat the exercise with variations (at least three times).
Be as precise as possible when you work - both with regard to method, analysis and presentation.
Be self-critical and consider what you do, why and how.
In the bottom right corner of your collage you write: your name, the given compositional word, the title of your collage, and the number of your collage (in chronological order).

2.2.1

MONICA SKOVGAARD CHRISTENSEN

Phase 1: Collages - Compositions in Two Dimensions.
Exercises 1-6.

Students are asked to make a series of collages which express a given compositional word. In the collages they are required to only work with points, lines and planes. Compositional word: *Dynamics*.
Collage. 29.5 x 42 cm.



2.2.1

MONICA SKOVGAARD CHRISTENSEN

Phase 2: Mobiles – Composition in Three Dimensions. Exercises 1-4.

Collages are translated into mobiles.

Compositional word: *Dynamics*.

Mobile.

2.2.1

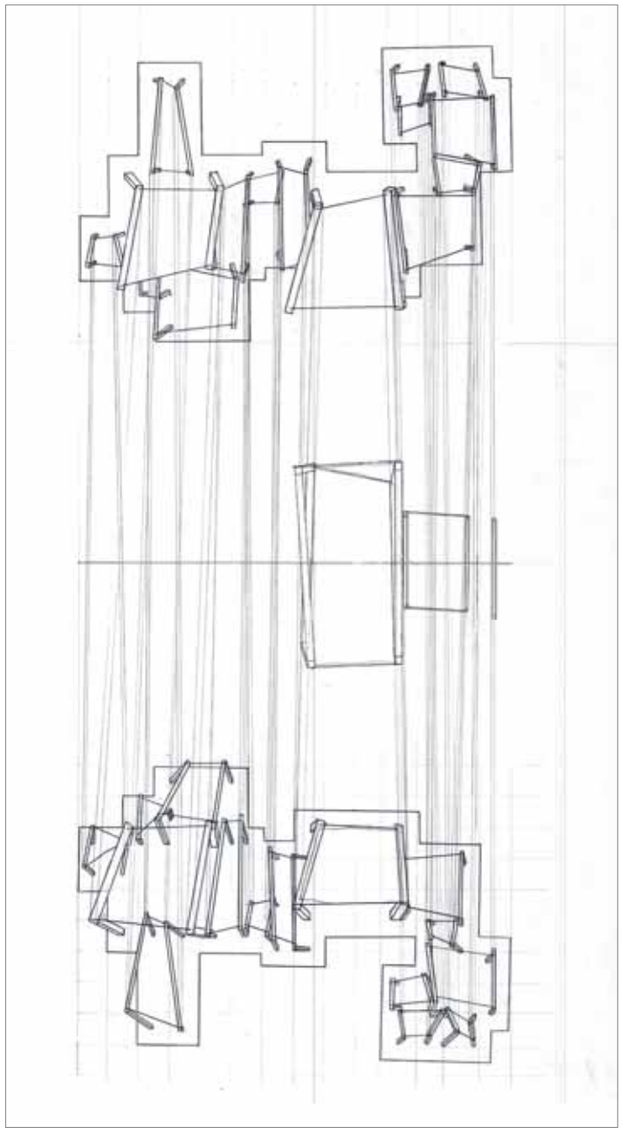
MONICA SKOVGAARD CHRISTENSEN

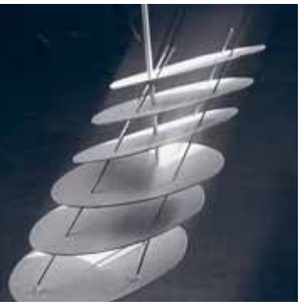
Phase 3: Drawing of Mobiles (Double-Orthogonal Projection Drawing) Exercises 1-3.

Students are asked to draw their mobiles as double-orthogonal projection drawings: plans and elevations.

Compositional word: *Dynamics*.

Drawing. Pencil on white drawing paper.





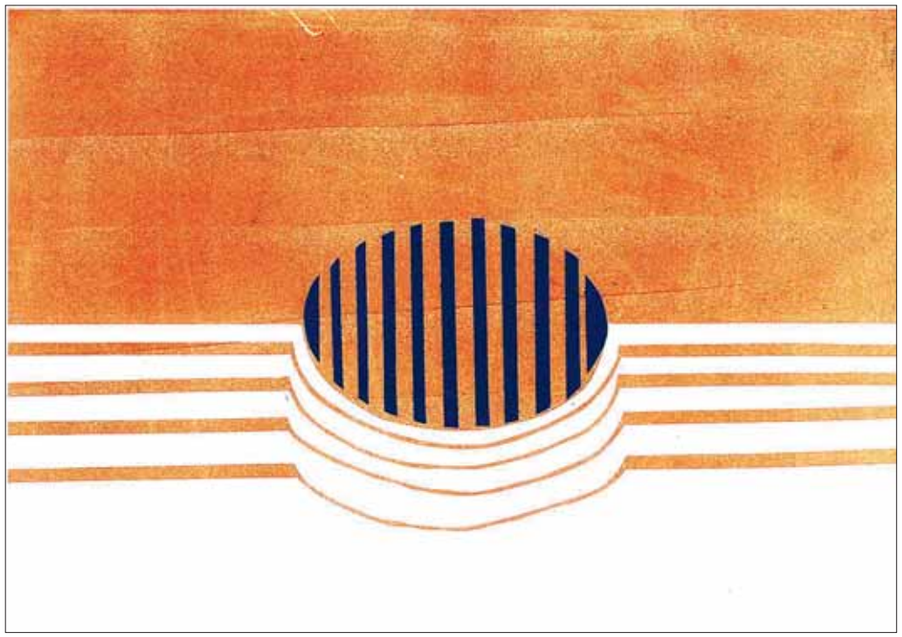
2.2.2

LINN THERESE FENES FORREN

Phase 2: Mobiles –
Composition in Three Dimensions.
Exercises 1-4

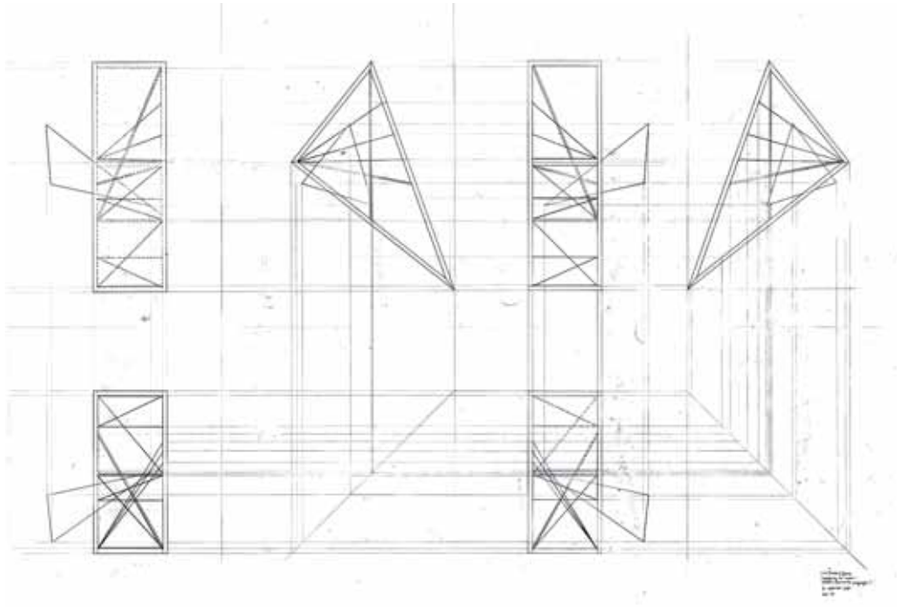
Compositional word: *Displacement*.
Mobile.

Phase 1: Collages – Compositions in Two Dimensions. Exercises 1-6.
Compositional word: *Displacement*. Mobile. Collage. 29,5 x 42 cm.

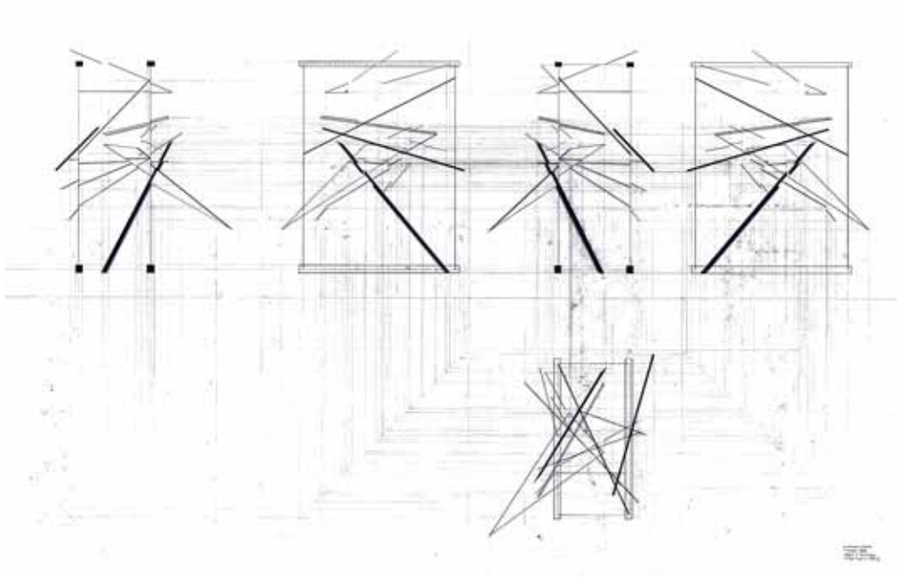


Phase 2:
Mobiles – Composition in Three Dimensions. Exercises 1-4.
Compositional word: *Displacement*.
Mobile.

2.2.3
LINN THERESE FENES FORREN
Phase 2:
Mobiles - Composition in Three Dimensions.
Exercises 1-4.
Compositional word:
Asymmetri.
Mobile.



Phase 3: Drawing of Mobiles (Double-Orthogonal Projection Drawing). Exercises 1-3.
Plans, elevations and sections. Compositional word: *Asymmetri*. Pencil on white drawing paper.



2.2.3

LINN THERESE FENES FORREN

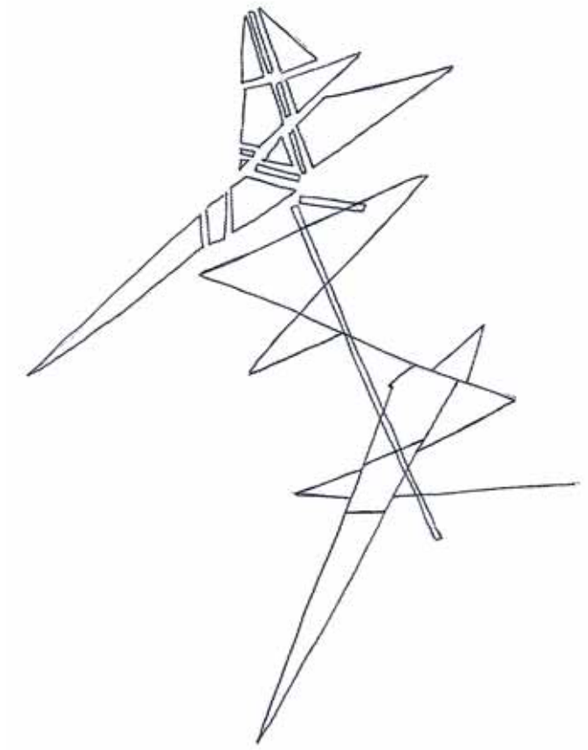
Phase 3: Development and Transformation of Drawing (Double-Orthogonal Projection Drawing).

Exercises 1-2.

Students are asked to transform their drawings of mobiles. Each student formulates his or her own individual strategy for developing their composition. However, the transformation should be based on the prescribed compositional word. Plan and section.

Compositional word: *Asymmetry*.

Pencil on white drawing paper.

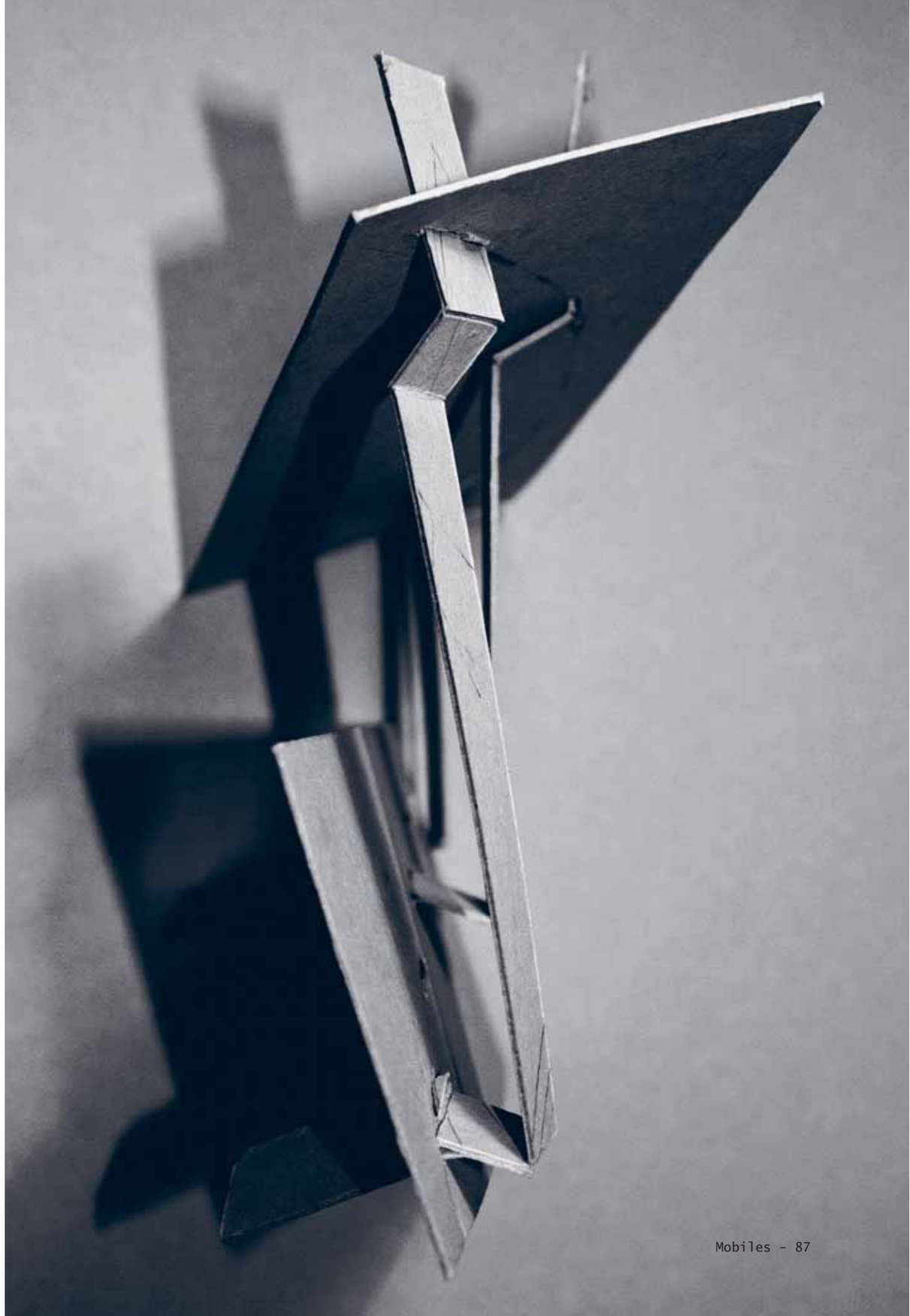


Phase 4: Model. Exercise 1.

Drawings are translated into models made from white cardboard. Scale 1:1.

Compositional word: *Asymmetry*.

Working model.



2.2.4

ANN PEDERSEN

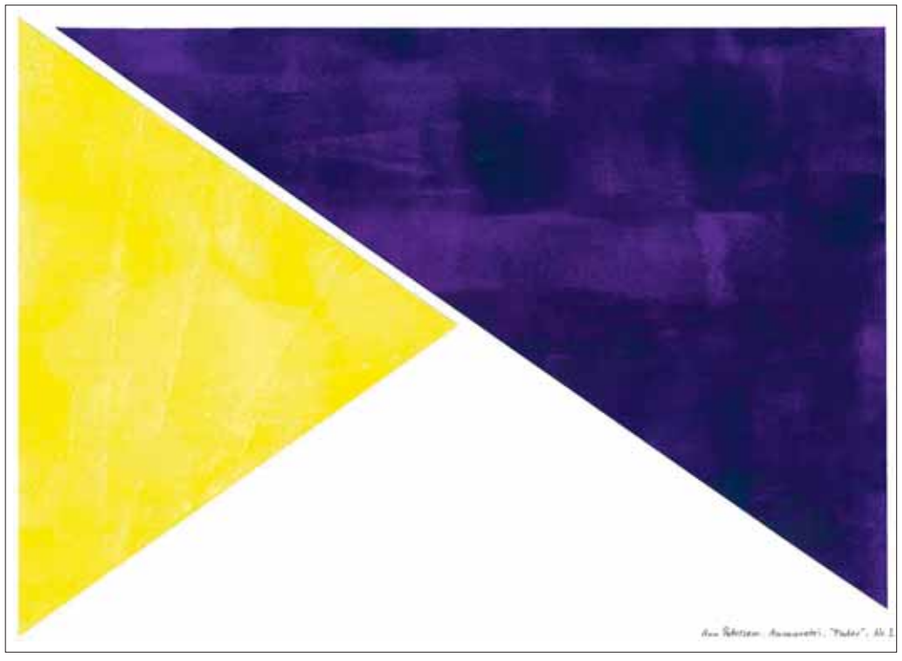
Phase 1:

Collages - Compositions in Two Dimensions.

Exercises 1-6.

Compositional word: *Asymmetry*.

Collage. 29,7 x 42 cm.



2.2.4

ANN PEDERSEN

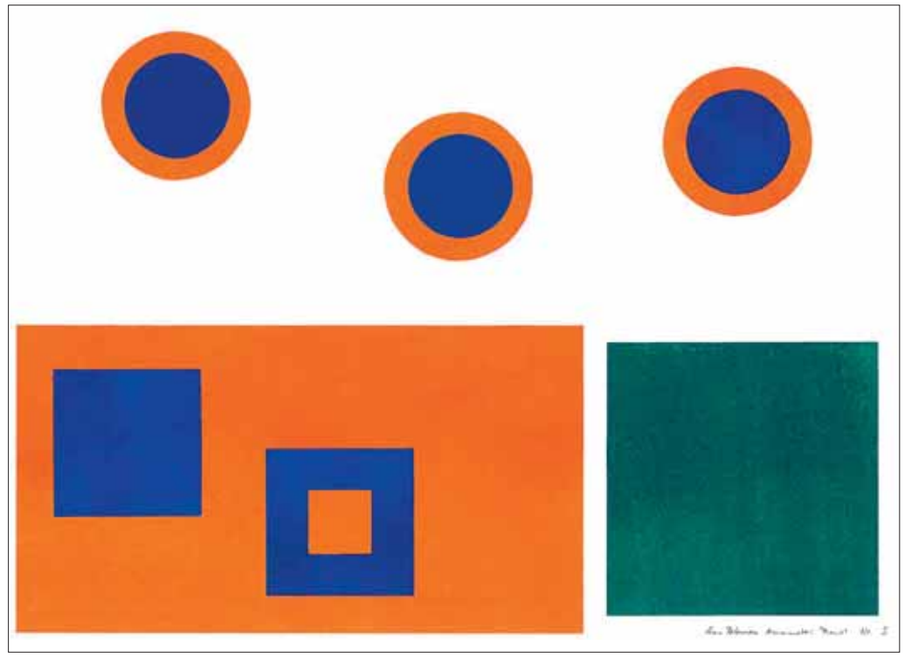
Phase 1:

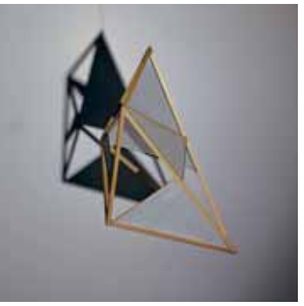
Collages - Compositions in Two Dimensions.

Exercises 1-6.

Compositional word: *Asymmetry*.

Collage. 29,7 x 42 cm.

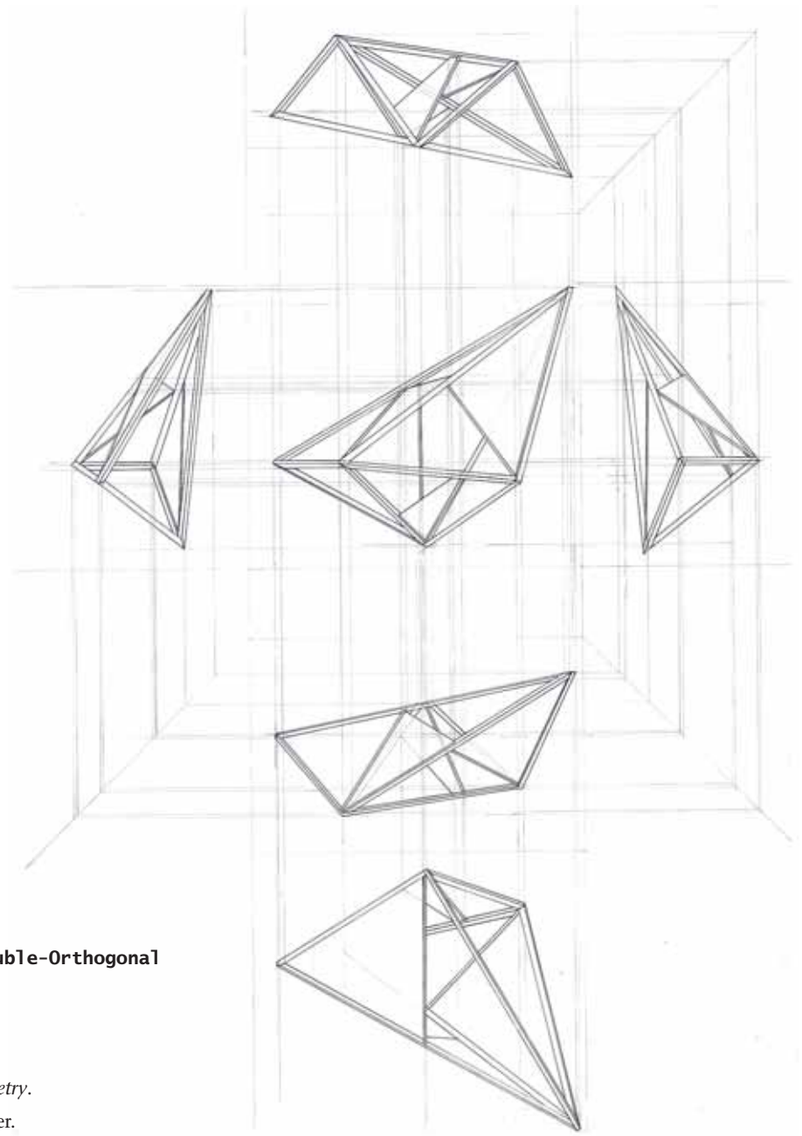




2.2.4

ANN PEDERSEN

Phase 2:
Mobiles – Composition in Three Dimensions.
Exercises 1-4.
Compositional word: *Asymmetry*.
Mobile.



Phase 3:
Drawing of Mobiles (Double-Orthogonal Projection Drawing).
Exercises 1-2.
Plans and elevations.
Compositional word: *Asymmetry*.
Pencil on white drawing paper.

Phase 4:
From Drawing to Model.
Exercise 1.
Compositional word: *Asymmetry*.
Model. White cardboard.

2.3 JACK IN THE BOX

Unit 1a

2.3.0

JACK IN THE BOX

Anders Gammelgaard Nielsen

More than ever before current architectural practice is characterised by teamwork rather than the result of individual performances. This occurrence is particularly evident in the milieu of architecture that exists in Aarhus, where the country's largest and most prominent architectural offices have their base. Not only is it a common feature of these offices that they are all run by a team of proprietors, but all their assignments, both administrative and architectural, are handled on the basis of collaboration. There is no argument that the background for this organisational structure is linked to the complexity that informs architectural practice, but it is also the outcome of a tradition. At the Aarhus School of Architecture the emphasis is on teamwork, and there is no doubt that this form of teaching transfers directly on the way organisations are shaped in practice. There is no escaping the fact the above-mentioned offices are run by teams whose first collaboration can be traced back to the Aarhus School of Architecture.

In the assignment known as 'Jack in-the-Box' the aim is to foster collaborative situations through managing a complex architectural issue. The aim is to conduct an integrated teaching course that extends from an introductory outline process through to the project development phase and finally to presentation and montage techniques.

Often a course of this nature is unfortunately very difficult to operate in practice within an architectural degree course. It is, however, absolutely essential for students to experience the role of a practising architect. In our experience, this type of assignment provides students with a defining experience, which can cause students either to confirm or to question the rightness of choosing a degree course in architecture.

In the assignment students design and produce a full scale spatial construction. The construction creates a framework around a communicative situation between two people. The assignment is carried out in groups of four to five students. It introduces students to a synthesised working method, in which a number of form-generating parameters determine the final result. This technique of working is well-known in architectural practice and is therefore critical to introduce students at an early stage of the course. It is characteristic of the synthesised working method that involves a great deal of communication while at the same time challenging the students in their ability to handle issues with a substantial degree of complexity.

Finally the aim of the assignment is to introduce students to spatial programming. Through the formation of these spaces students are able to translate these into structurally stable cross-sectional constructions. The course program consists of the establishment of a space for a communicative situation between two people. As part of the assignment students are introduced to a range of tools that as a whole constitute the preconditions for completing the assignment. Communication is the absolute and essential apparatus that forms the precondition for the group work to function and succeed in completing the assignment.

The assignment is introduced by an intensive course in collaboration, in which the students learn and train how to handle group-work situations. This component of the course is run by a professional team of coaches and team-builders.

Title:
JACK IN THE BOX

Duration:
6 weeks

Objectives:
Develop an understanding of construction
Develop an understanding of spatial and programmatic connections
Develop an understanding of scale
Develop a working method that enables the synthesis of different components
Develop competency in group work

Description:
Based on the defined domain of (2.400x1.800x3.600mm) and the defined grid (600x600x600mm) along with the handed out quantity of available material a spatial structure in wood is created.

The handed out material consisting of 12mm thick plywood boards that are cut into smaller boards of varying proportions, must during the whole assignment remain constant. The plywood boards must only be reconfigured within the domain and the defined grid. Boards cannot be added or subtracted.

The plywood boards are assembled by using wooden fillets (21x21mm) that are screwed on to the boards along the edges. The quantity of wooden fillets must vary dependent on the number of joints needed in the structure.

The construction must be structurally stable, and in the assignment, we will take our starting point in lectures and studio exercises that deal with braced structures.

During the course of the assignment, work will be undertaken in groups. The group work begins with a lesson dealing with the identification of personal competences and exercises in collaboration.
Work will then be carried out in groups of four to five students.

The programmatic component of the assignment will form the basis for spatial explorations. The programme is an action – or more precisely an interaction between two individuals. Each group is given one of eight such interactions. These are: to confess, to argue, to propose, to flirt, to order, to gossip, to seduce and to preach.

The interaction assigned to each group is to determine the way that the structure is entered and how the spatial form for this interaction is to occur.

Course of assignment:
Week 1
Is a focused construction course dealing with shear wall structures. Work is to be carried out individually.

Week 2
Each group analyses the specific type of interaction assigned, forming the background for the spatial explorations. The spatial structure is analysed in relation to static characteristics. Work is to be done in sketch models at a scale of 1:10.

Week 3 - 6
Each group's proposal is then realised. The digital drawing tool, AutoCAD is introduced and used for producing working drawings. Based on these working drawings, the plywood boards are cut assembling the final wooden structures at the scale of 1:1.

The spatial wooden structures will be exhibited at the Aarhus School of Architecture.

Materials:
Sign cardboard 1.25mm, wooden fillets 2x2mm profile, glue (sketch model scale 1:1)

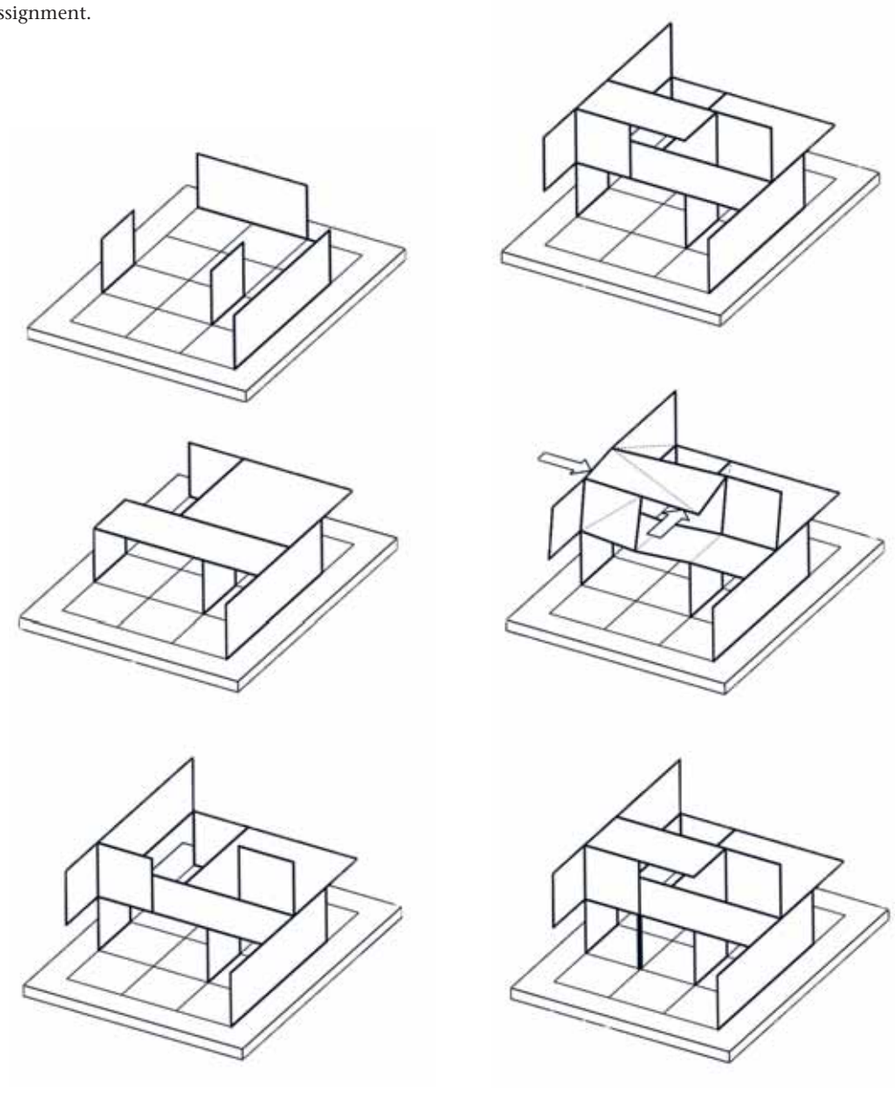
Literature:
Rasmussen. S.E. 1964, Experiencing Architecture, Chapman & Hall, London.

		Introduction	Competancy	Mastery
Architectural theme				
Form				
Space		x		
Structures (discs)			x	
Context				
Programme		x		
Working method				
Generative				
Synthesising		x		
Conceptual				
Analytical				
Tools				
Drawing	analogue			
	digital	x (AutoCAD 2D)		
Model	cardboard	x		
	wood	x		
	wire			
	plaster			
Communication	written	x		
	oral	x		
	visual	x		
Registration	drawing			
	photo		x	
	video			
History				
Theory				

2.3.1

A BRACED STRUCTURE

Rather than introduce concepts of structure via abstract lectures and assignments, this project seeks to familiarise students with structural principles via the act of designing and making. Therefore, the assignment starts with an explanation on the fundamentals of structure and in particular braced structures – which is the structural system is to be used as the basis for the assignment.



2.3.2

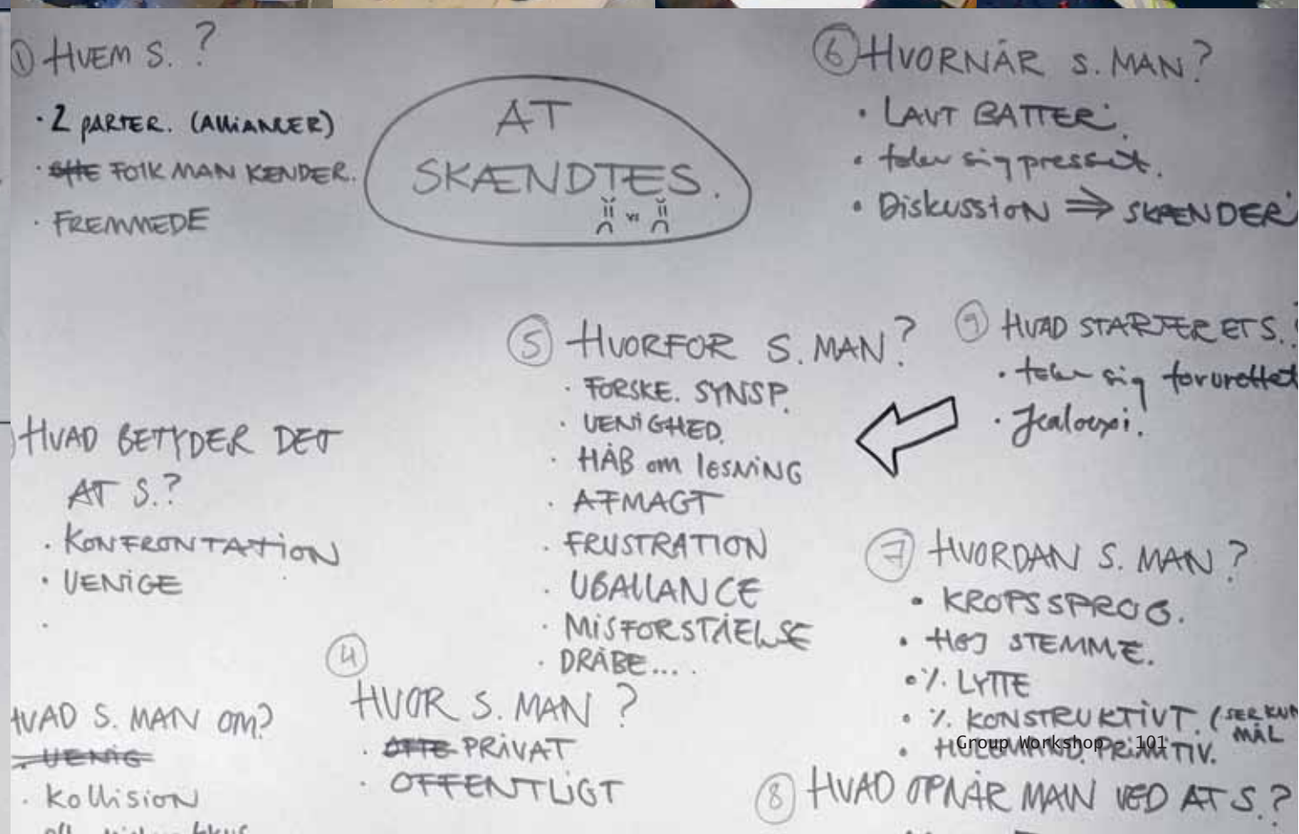
GROUP WORKSHOP

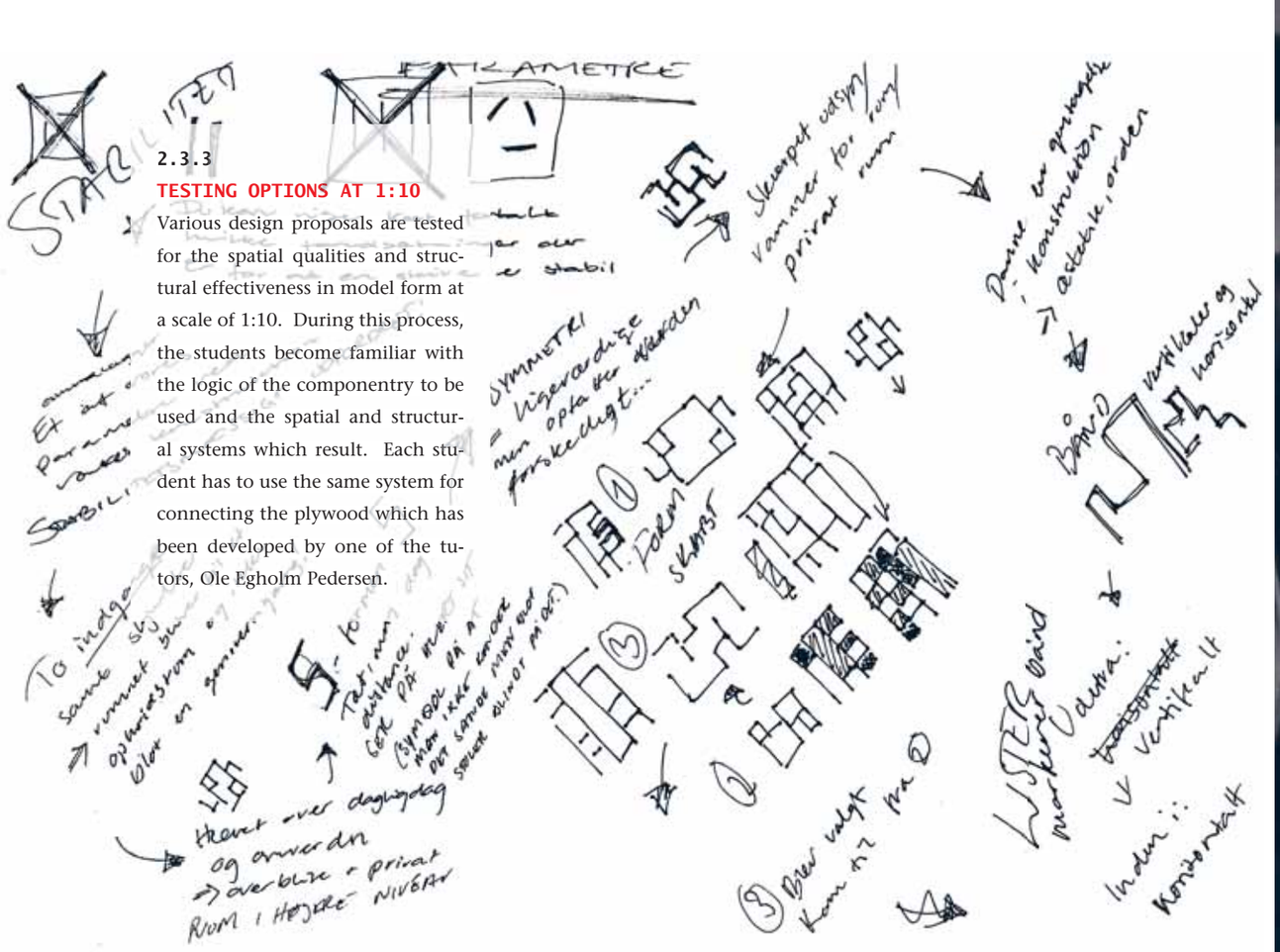
The students undertake a workshop with introduces the students to the concept of group work. The workshop is run by a team of professionals in group dynamics from both inside and outside the school. In this workshop, students are asked to reflect on their own potential and skills and that of fellow group members in the interests of forming productive working relationships. The medium via which this workshop is conducted is the actual assignment task which is explored in the groups that will work together for the duration of the project.

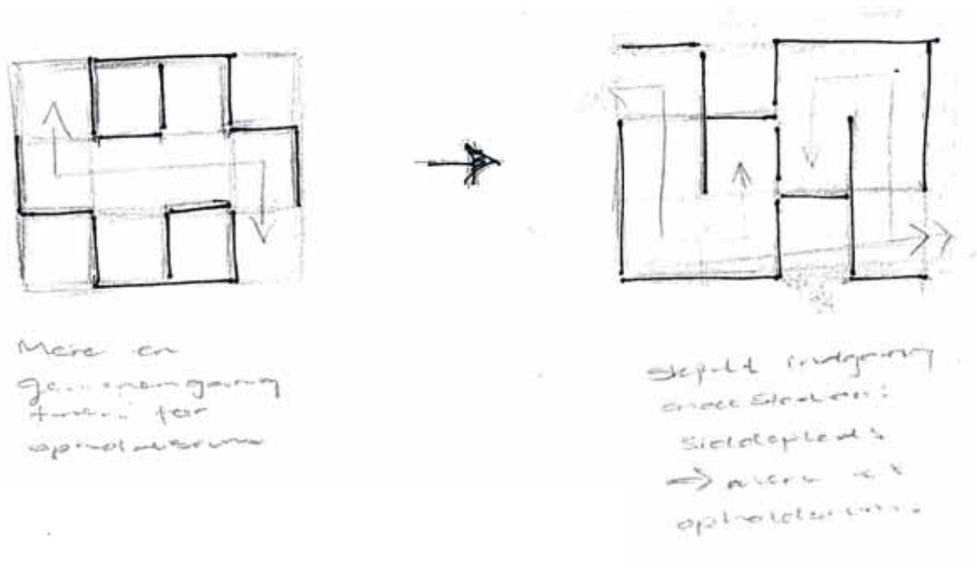










2.3.3
TESTING OPTIONS AT 1:10

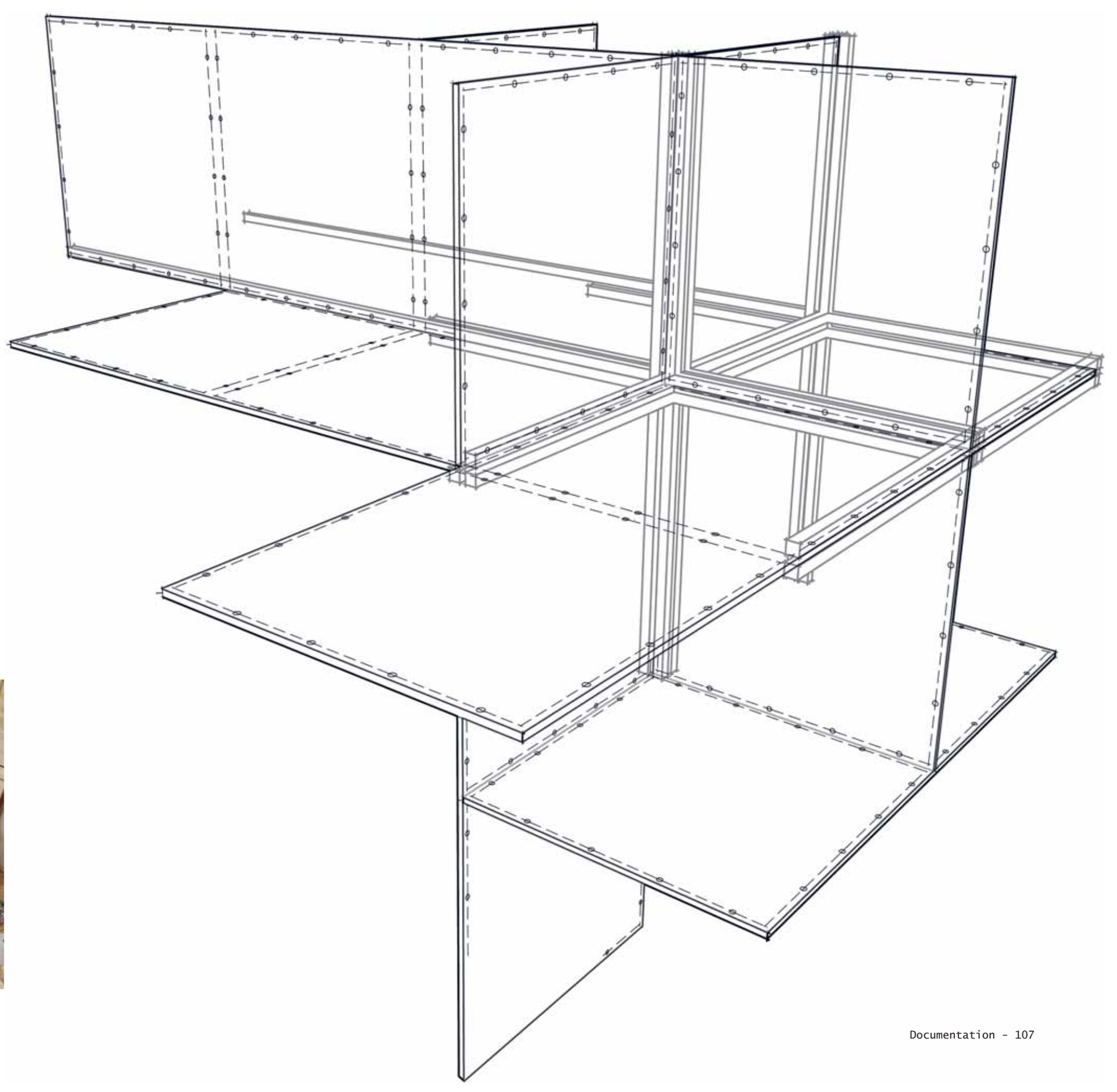
Various design proposals are tested for the spatial qualities and structural effectiveness in model form at a scale of 1:10. During this process, the students become familiar with the logic of the componentry to be used and the spatial and structural systems which result. Each student has to use the same system for connecting the plywood which has been developed by one of the tutors, Ole Egholm Pedersen.

Group working with the communicative situation of "gossiping".

2.3.4

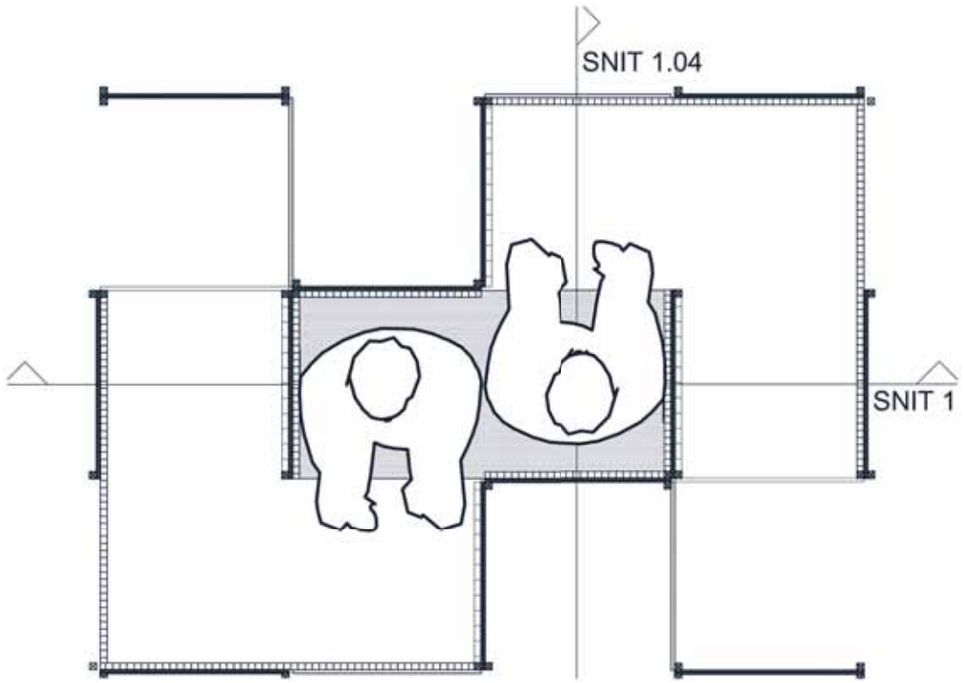
DOCUMENTATION

Students are taught the fundamentals of architectural documentation and in particular the function of working drawings, shop drawings and specifications. This occurs via the documentation of each of the component parts to be used on the construction along with specific details such as the location of screw holes and other connections.



2.3.5
CONSTRUCTION AND TESTING

Each group then constructs their project at 1:1 and test it at 1:1 to see if their spatial solution supports, enhances or triggers the interaction between two people that constituted their specific brief.

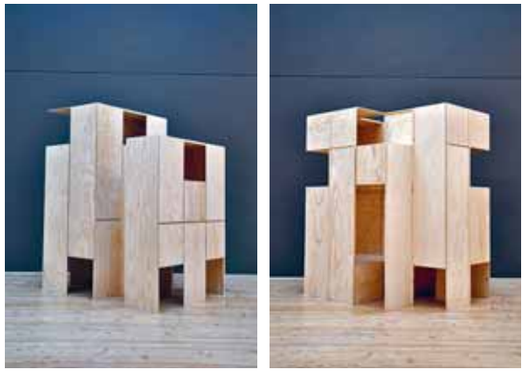


The images on this page are the final results of the group working with the communicative situation of “gossiping”.

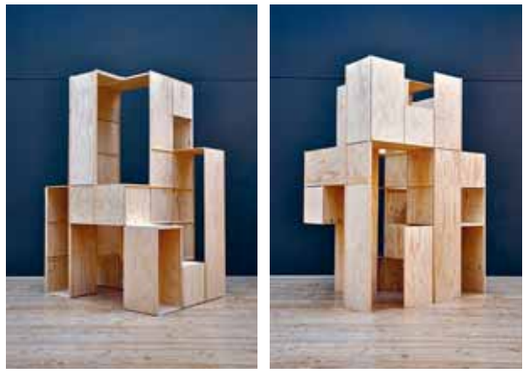
2.3.6

EIGHT INTERACTIONS

The illustrations below show two of the proposed spatial solutions for each of the eight interactions.

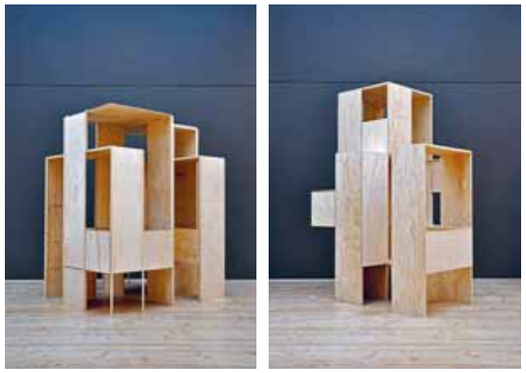


to fight



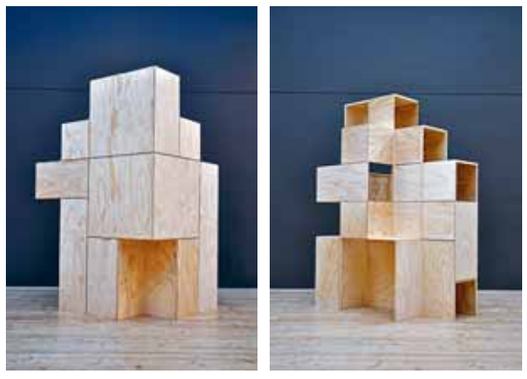
to flirt

to confess



to gossip

to command



to preach

to propose

to seduce

2.3.7

EXHIBITION

The exhibition bought together all projects completed at 1:1 scale alongside an adjacent display of all cardboard models at 1:10. Students could then see the transference in scale of each project and test each at 1:1 for its veracity in communicating or supporting the specific interaction required.

2.4. BRIDGING THE GAP

Unit 1b

2.4.0

BRIDGING THE GAP

Anne Elisabeth Toft

How do architects and engineers work together? How, when and why do engineers enter the design process? And what does the collaboration between the architect and engineer mean for the architectural result? What does the development of new technologies and materials mean for construction and for the ways in which architects and engineers work together? What new forms of collaboration can we expect between architects and engineers in the future? Such questions form the basis for the assignment 'Bridging the Gap', which is built up around a statics workshop, a construction course and an AutoCAD course.

The assignment focuses on interdisciplinary collaboration. It addresses the collaboration between architects and engineers. At Unit 1b, we believe that architects and engineers have to enhance their working and collaborative process. This goes for both the world of practice and of academia. Architects and engineers should jointly develop and design architecture, and it is therefore important that they work closely and at an early stage during the design process. Through the 'Bridging the Gap' assignment we aim to introduce students to this viewpoint. Through presenting examples, discussions and presentations we illustrate how the advent of digital media in recent years has revolutionised the working areas of the architect and the engineer. Digital media have not only made it possible for architects and engineers to work in new ways in the development of architecture, but digital media have also altered the understanding of society as a whole, addressing what architecture is or can be. Digital media have gradually transformed the design process and the way in which we understand it, and they have also contributed to the emergence of a new formal expression – an expression that is often the result of the algorithmic potential of a variety of software programmes. These media have also played their part in the development of new principles of construction. Because of these new principles we now think of the relationship between form and construction in quite a different way than we did just a few years ago. Furthermore digital media have contributed to the development of new materials and of an entirely new understanding of them and their performative capabilities.

At Unit 1b, we believe that it is necessary to rethink the teaching of building techniques and construction in the bachelor course. We are adherents of the notion of an integrated or holistic design process, in which architects and engineers work together side by side and in which students learn to lay weight on both the artistic and the technological aspects of architecture. In a way this form of thinking stands in critical relation to the degree course having its roots in what is known as the 'tradition of the art academy'.[1] Characteristic of this tradition is that it has historically categorised architecture as a form of art and that teaching has favoured the study of architecture's aesthetic and conceptual capabilities at the exclusion of almost all else. Teaching in building techniques and construction has been limited and has never taken centre stage in the students' project work. The course will continue to be grounded in aesthetic values,[2] but to keep in step with technological developments and their decisive significance for architecture and for its forms of production, it is necessary to think about this grounding in a new and different way.

The 'Bridging the Gap' assignment is conceived as a teaching experiment focused on architects and engineers conceiving and preparing an assignment jointly. The experiment requires that they enter into a dialogue with each other and that they are responsive to each other's competences. It is a matter of encountering a different culture, different discursive codes and conventions. It is about different disciplines learning from each others' expertise. This collaboration does not only present the teaching programme with a number of pedagogical challenges; it also opens the way to an examination of the interface between the two disciplines. In addition it provides an opportunity to reflect on the antagonism that still exists to a considerable extent between art and technology or art and science and that has been – and to some extent still is – a premise for a degree course in architecture in Denmark. At Unit 1b, we want students to act intelligently in a variety of cultural contexts and we want them to be able to work with people who have a background in other disciplines and degrees than their own. An important part of our course, therefore, consists in teaching the students to decode various backgrounds and to understand their significance.

'Bridging the Gap' introduces students to statics, tectonics, and the understanding of materials. The aim of the assignment is to arouse the students' interest in technical and scientific aspects, to encourage them to undertake interdisciplinary collaboration and to instil in them a reflective understanding of the relationship between construction and form. The assignment focuses on bridge design and the construction of bridges. It reintroduces and extends previous discussions that the students have conducted in other contexts – on, for example, context, scale, working methods and the use of equipment. The assignment is site-specific and design process is driven primarily via physical models.

Bridges represent a unique typology and design challenge wherein architectural and engineering aspects are inherently fused, form and function are united for a higher purpose, in which construction and design are interdependent. Bridges single out and connect places and contexts, but they also seem to demonstrate to us how separating and connecting are only two sides of precisely the same act.[3] As Martin Heidegger remarks in the text 'Building, Dwelling, Thinking':

"The location is not already there before the bridge is. Before the bridge stands, there are of course many spots along the stream that can be occupied by something. One of them proves to be a location, and does so because of the bridge. Thus the bridge does not first come to a location to stand in it; rather a location comes into existence only by virtue of the bridge."[4]

The context also does something to the bridge. It plays a part in determining the bridge's function, its construction and design. It is well-known that there are a multitude of different kinds, forms, and construction techniques for bridges. These differences are often the result of conditions of their context. These contexts and their significance are placed in perspective in the 'Bridging the Gap' assignment. As part of their assignment the students work with four different urban or landscape contexts[5] whose differences make different demands on their bridge design.
The assignment is introduced by a workshop in statics. The workshop is intended to give students a basic understanding of statics and construction principles. In order to lead this workshop we invited the Austrian architect Armin Kathan, founding partner of the design studio Holz Box Tirol,[6] which is well-known for its minimalist constructions in wood and its prefabricated building systems. In the architectural design by Holz Box Tirol considerations about construction and tectonic solutions play an essential role.

The point of departure for the workshop, are studies of Leonardo da Vinci's innovative engineering works, which include several bridges. His work is documented in his many sketchbooks, which contain thousands of drawings and notes. After a thorough analysis of da Vinci's bridges and bridge collections, the students test them and their construction principles in a series of small working models. The models are constructed of strips of wood and assembled without the use of glue or staples. The constructions are built using friction joints. Using the load tests of the working models and the results, these provide about stresses and tensions in the constructions, the students develop new bridge models according to their own design. Just like da Vinci, they make no mathematical calculations of the constructions but allow their assessments to rely solely on tests of the models and on studies of the growth forms of nature. Finally the bridges are constructed in the workshop in a scale of 1:1 and are tested by having the students walk over them. The workshop concludes with a public exhibition and a critique and discussion of the results of the workshop. For the critique and discussion we invited the Austrian engineer Chris-

tian Aste, founding partner of Aste Konstruktion and professor at the University of Innsbruck's Faculty of Architecture.[7]

The next phase of the assignment comprises of a contextual analysis and the registration of sites. The students visit the four sites and, with the aid of a variety of mapping methods and measurement techniques, carry out a documentation and survey of them. The students are divided into small groups, and each group concentrates on a reading of one of the four sites. During this phase the students make use of methods and techniques that they have learnt in previous assignments. The intention is that they should now be able to find applications for these in new and different contexts.

These readings are then translated onto large context models, which subsequently form the basis for the students' further work. In this phase they develop a bridge design that corresponds to the context that they have registered and analysed and which now exists as a model. The bridge design is developed using laws of statics and construction principles that the students' learnt about in their statics workshop. The teachers are architects and engineers, several of whom come from Aarhus' well-established circle of architecture studios.[8]

The assignment focuses heavily on the architectural model and on how we as architects can develop and test both concepts and construction principles through models. In the last phase of the assignment, which is built up around an AutoCAD course, the representational focus switches to the architectural drawing. Through a concrete notation of the bridge models, students transfer their knowledge about analogue double orthogonal projection drawing to digital format. There they zoom in on selected joints in the bridges to carry out a detailed reworking of these. The course focuses on basic functions specific to the programme and on the work flow from analogue drawing to digital technical drawing and back to the plotting of analogue drawings.

In relation to the assignment we hosted an international series of lectures, which took as their theme the collaboration of architects and engineers in the design process. It focused on the relationship between form, function, construction, fabrication and technology in a number of buildings. The lecturers invited were Armin Kathan, Christian Aste, Julien de Smedt and Fabio Gramazio.[9]

Bridging the Gap: 4th-22nd Jan 2010.
Concept: Anne Elisabeth Toft, Lena Kondrup Sørensen, Stefan Rask Nors, Jörg Kerchlango.
Formulation of assignment: Jörg Kerchlango.

Endnotes

1. According to 'Arkitekturnation Danmark' – regeringens arkitekturpolitik ('Denmark, nation of architecture' – the government's architecture policy), (2007), the 'academy of art' tradition of the architecture degree is regarded as 'a Danish characteristic'. It is the government's wish that this should be preserved. See: *Arkitekturnation Danmark - regeringens arkitekturpolitik* (2007), p. 48.
2. *idem.*
3. Simmel, G. 1997, 'Bridge and Door'. In: Leach, Neil (ed.): *Rethinking Architecture. Routledge,* London and New York, p. 67.
4. Heidegger, M. 1997, 'Building, Dwelling, Thinking'. In: Leach, Neil (ed.): *Op.Cit.* p. 105.
5. The four contexts are: Stevnstrup Stationsby, the area around Randers Rainforest, the area around Randers Bridge and the area around Fladbro Inn.
6. Armin Kathan (Holz Box Tirol), Austria. <www.holzbox.at/ >.
7. Christian Aste (Aste Konstruktion), Austria.<http://www.aste.at/>,<http://www.uibk.ac.at/gestaltung/studio1/>.
8. The teaching was delivered by the following: Engineering Architect, Jörg Kerchlango (course manager); Civil Engineer, Per Dombernowsky (course manager); Civil Engineer, Niels Havsteen; Consultant Engineer, Mikkel Frandsen; Consultant Engineer, Ulrik Kæsseler and the teaching team from Unit 1b.
9. Armin Kathan (Holz Box Tirol), Austria. <www.holzbox.at/>Christian Aste (Aste Konstruktion), Austria.<http://www.aste.at/>. Julien de Smedt (JDS Architects), Denmark/ Belgium.< http://www.jdsarchitects.com/>. Fabio Gramazio (Gramazio & Kohler), Switzerland.<http://www.gramaziokohler.com/>.

BRIDGING THE GAP
DESIGN OF A SMALL BRIDGE – A CHALLENGE TO ARCHITECTS
CONSTRUCTION WORKSHOP FOR UNIT 1B – AAA, JANUARY 2010

1.1 Aim of course:
- Acquiring basic understanding of construction and of the correlation between architecture and construction.
- Building a bridge between the architect and engineer.
- Showing the interdependence of the two occupations.
- The constructively conscious architect's cooperation with the creative engineer.

1.2 Course content
A proposal for a construction project is made; a bridge with average span.
In a given, limiting context, a new bridge design is outlined with a defined function. By way of introduction, a number of fundamental proposals are outlined whose potentials and limitations are identified. Subsequently a sketch is selected that is treated further.
The proposal is presented with an account of the working process and intentions. An account is given of reflections regarding the relation of the proposal to the existing context – with regard to space and form as well as choice of materials and construction principle.
The project must include a simple analysis of the construction.

1.3 Aesthetic requirements
Bridges usually appear as significant buildings in the city or landscape and deserve the same care in design and aesthetic as the rest of architecture.
Not only do bridges connect two points in the most effective and economic way; they have at the same time a high signalling effect.
A footbridge or cycle bridge in addition to the primary function of the bridge can also be a place where you stop to rest or observe the surrounding landscape – a 'place' in the land- or cityscape where you stay for a short or long time and get an unusual experience.
Structures of this dimension are very visible and can add visual experiences to the place regardless of whether they are located in the city or in the untouched nature.
Consideration for the context, i.e. the connection that the bridge is placed in, is very significant as a bridge in connection with a natural trail through a landscape with vegetation necessarily has to be designed differently from the bridge placed in a rough technical harbour environment.
Form, construction and materials should be chosen so that they are not in contrast with each other and the place.

1.4 Form of course
Project work consists of four member groups supported by inspirational lectures on the understanding of construction and bridge design together with a workshop.
Supervision at the drawing tables by both engineers and architects.

1.5 Course directors
Jörg Kerchlango, MArch., Engineer and Architect, Associate Professor.
Per Dombernowsky, Civil Engineer, Associate Professor.

3. Programme

3.1 Concept for a footbridge and cycle bridge

- The bridge is to be designed as a footbridge and cycle bridge.
- The construction material of the main structure is optional.

3.2 Location and functional demands

General requirements:

- The slope of the bridge should not exceed 1:10. The pavement selection must be any non-skid material.
- The bridge should have a railing of 1.2 metres in height.
- The bridge should be illuminated either integrated into the railing or by means of lamp standards that match the rest of the bridge design.
- The functional requirements below for the individual groups can be modified according to agreement with main counsellor. We have been aiming at the largest possible variation with regard to location, layout and passage height of the bridge in order to obtain a broad range of solutions.
- The bridge is to be linked with a newly established footbridge and cycle bridge to Randers,Denmark.
- The bridge is to be built in a width corresponding to a foot and cycle path in both directions.

The bridge must:

- Go across the stream perpendicular to the bank.
- Be one span and have a span of 30 metres.
- Be made with minimal slope.
- Have a free passage height under the bridge of 2 meters.

Site A: Stevnstrup Stationsby

Site B: Randers Regnskov

Site C: Randersbro

Site D: Fladbro

4. Working method

The visit to the place will be on Monday 4th January in the afternoon.
The first line is always the most difficult to make in sketching. Therefore, all you can do is start with for instance the layout of bridges and sketches of the first construction principles without determining a specific solution from the beginning. It is important to test as many options as possible in order to afterwards be able to choose based on a number of critical criteria: adaptation to the surroundings, functionality, optimisation of the construction, utilisation of the materials and aesthetic requirement to entirety and detail.
The number of proposals is then reduced to for instance three which are then thoroughly sketched in order to select the final proposal.

It is important that from the beginning you work with a physical model while at the same time are sketching with a pencil. You should alternate between the two tools as they each have advantages compared to the other. Model photos should be part of the process.
The drawings should consist of:
Plan (scale 1:100), Elevations (scale 1:100), Free-hand perspectives, Sectional drawing – cross section (1:20), Assembly details (scale 1:10 or 1:5), Model photos.

5. Presentation

The presentation by the group must include an account of the process and of the choices that have been made. It is important that you argue in favour of the chosen design and the correlation of the project proposal with the surroundings.
Great importance is also attached to the presentation having a high informative level and that a wide variety of the various presentation and communication tools are used that have been introduced during the first academic year.

Formal requirements for the presentation:
A poster in A2 format is produced. The poster must have graphics and text that gives an account of the idea and design of the project and also a basic account of the static principles and other relevant conditions.
The presentation must also have a visualisation of the project. Models and sketches may be included in the presentation. Also 'primitive' models that illustrate the working process should be included. Similarly, hand drawn sketches that illustrate the development from idea to result may be included in the presentation.

Practical conditions of the presentation:
The group presents the project for about five minutes followed by ten minutes of critique. In attendance at the presentation are all students and course directors.

A selection of relevant literature:

Peder Gammel: *Statik og Konstruktiv Forståelse*.
Hans Friis Mathiasen: *Grundtræk af Bærende Konstruktioner i Arkitekturen*.
Cecil Balmond: *Informal*.
Neil Leach, David Thurnbull; Chris Williams (Eds.): *Digital Tectonics*.
Bennett, David (Ed.): *The Architecture of Bridge Design*.

2.4.1

Phase 1: WORKSHOP BY ARMIN KATHAN, PARTNER, HOLZ BOX TIROL

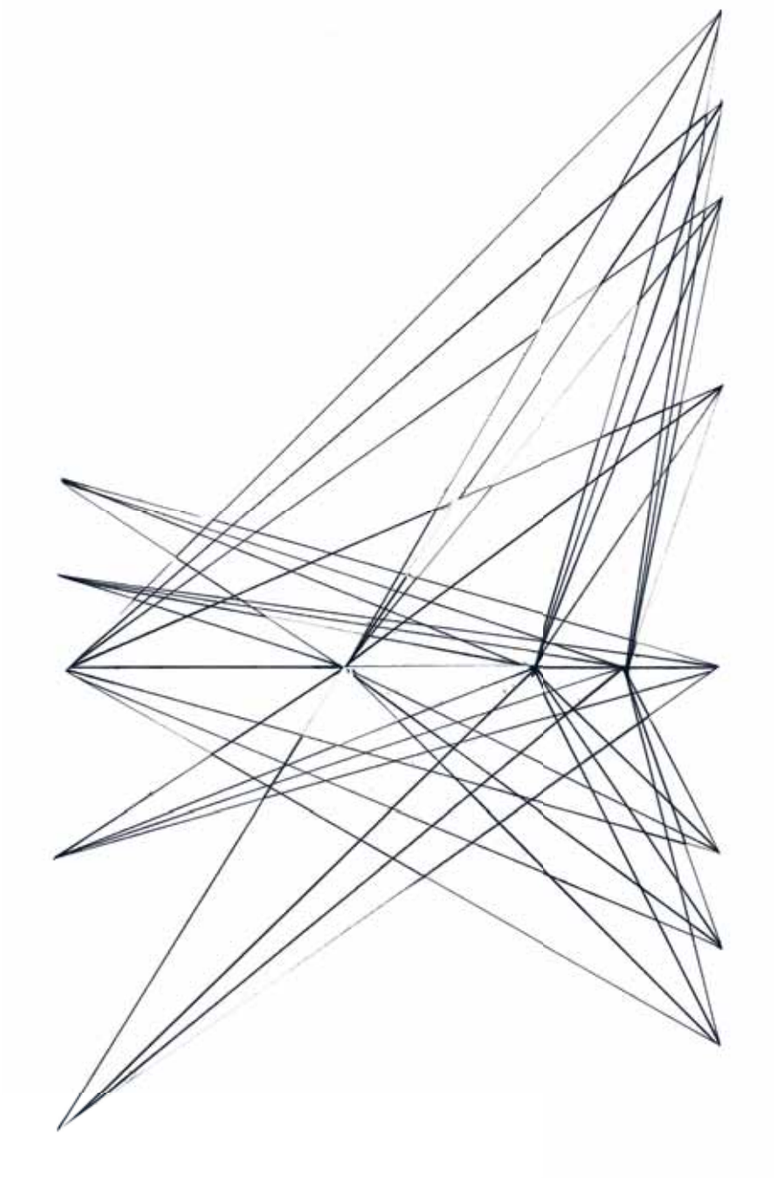
Students discuss their models with Armin Kathan, Christian Aste, Jörg Kerchlango and Per Dombernovsky.

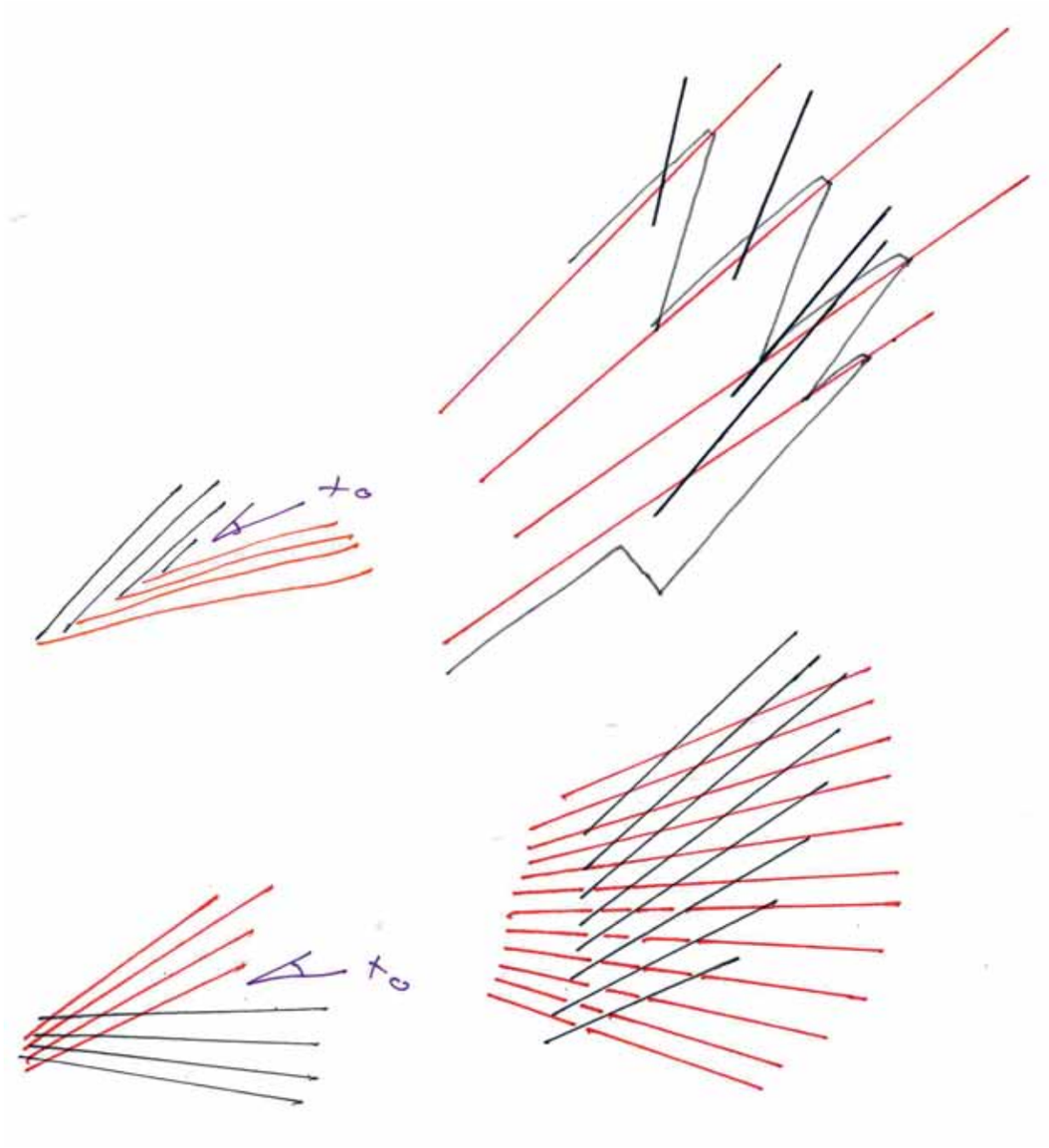
2.4.1

Phase 1:

WORKSHOP BY ARMIN KATHAN, PARTNER, HOLZ BOX TIROL

Learning from Leonardo da Vinci's engineering works: Students test different bridge designs by da Vinci. Sketches by Leila Sophia Keivanlo.





2.4.1

Phase 1:

WORKSHOP BY ARMIN KATHAN, PARTNER, HOLZ BOX TIROL

Armin Kathan discusses statics, construction principles and modeling laws with students. Students operate in groups. Experiments are carried out in model. Models vary in scale.

2.4.1

Phase 1:

WORKSHOP BY ARMIN KATHAN, PARTNER, HOLZ BOX TIROL

Final critique with Armin Kathan, Christian Aste, Jörg Kerchlango and Per Dombernowsky.

"Leonardo da Vinci's mobile bridge was a milestone in the history of statics.
Twist and friction turns the system into a stable bridge.
All building elements get wedged together as a result of their self-weight, sustain themselves and there is no more need for any secondary fixing, like screws and nails.
This bridge had aroused the students' interest in statics and inspired them to long for more understanding how force works.
Explorations of new constructions the joy of experimentation played a very vital part.
The results of this exercise were impressive full of high quality and versatile and I want to proudly say thank you to all the attendees."

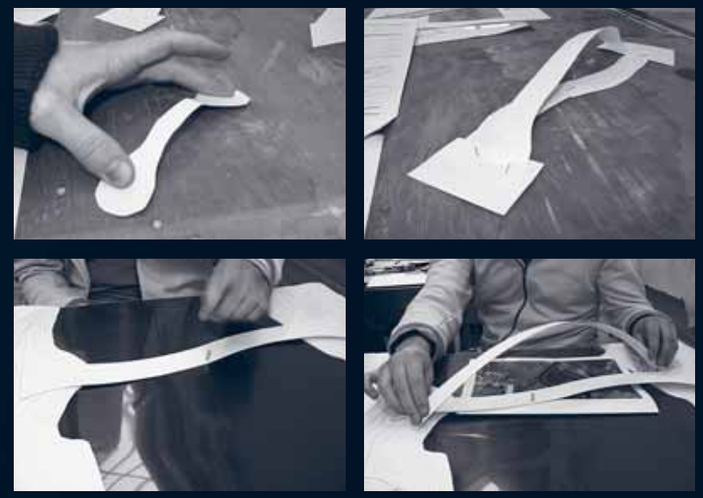
Armin Kathan

2.4.2

Phase 2: BRIDGE DESIGN

Bridge designs are developed and tested in model. Students work in groups.

Working models and the final bridge design.



2.4.2

Phase 2: BRIDGE DESIGN

Bridge designs are developed and tested in model. Students work in groups Working models and the final bridge design.

2.4.2

Phase 2: BRIDGE DESIGN

Students work in groups. They develop bridge designs that correspond to particular sites near Randers. Bridge designs are developed and tested in model.

2.5. EARTH AND SKY

Unit 1a

2.5.0

EARTH AND SKY

Anders Gammelgaard Nielsen

The assignment known as ‘Earth and Sky’ is the final course in first year at Unit 1a.

The aim of the assignment is to strengthen the student’s abilities to manage a project process individually. The process involves developing the ability to make independent decisions.

Students who embark on a course in architecture must possess and develop varying degrees of autonomy in relation to their studies. The majority of students come from a background in the high school system and are thereby extremely competent in solving assignments with problematic tendencies. On the other hand their ability to address assignments that they have formulated themselves is limited.

At Unit 1a it is our conviction that it is no longer sufficient to be able to address assignments set by others; we must be able to set them ourselves. We believe that this is what will characterise the elite of the future.

In our experience the current body of architectural students make up a heterogeneous group in regards to exercising self-discipline and self-management and thereby taking control of their own learning process. There are students who possess a natural ability to manage themselves, while others only attain this ability in the latter stages of their course. For this reason it is necessary to initiate learning situations in which students are given the chance to develop skills in decision-making. This often extends deep into the student’s personality and provokes questions of an existential nature. It can at times appear to transgress personal boundaries when we as teachers and educationalists concern ourselves not only with aspects of the teaching that relate solely to the discipline but also address the student’s personal skills.

Our experience shows, however, that the development of personal skills is decisive in strengthening professional skills. In other words we can no longer regard students exclusively as professional units but have to address them as complete individuals.

The point of departure for the ‘Earth and Sky’ assignment is experience students acquired during their group study tour to Australia. Building in particular on the research conducted on the Sydney Opera House and the architectural principles of spatial creation that this building represents.

The assignment investigated potential answers that project an airplane (either complete or in individual parts) using space and light as the essential architectural agency. Using their studies of the Sydney Opera House as a basis there is also the requirement that potential solutions relate directly to the two principles of formal creation, namely addition and subtraction.

Since the assignment tests the student’s abilities and skills at the end of the first year course, it carries particular weight in the overall assessment of their level of achievement in the subject.

To strengthen the student’s ability to handle the complete project process independently, we have chosen to recapitulate the architectural themes, working methods and instruments that have been introduced over the course of the year. The focus of the assignment is, therefore, not the learning of new elements and tools but the ability make use of existing learned techniques through a working process that is self-managed and disciplined and that leads students towards the final assignment solution.

Title:
EARTH AND SKY

Duration:
8 weeks

Objective:
Creating a project based on the exploration of light and space.

Description:
This final assignment gathers together the threads from the current academic year. In this way, a project proposal is developed that summarises the conceptual, thematic, work methodology and tool-related elements of the academic year. In addition, light is incorporated as the central form and space generating parameter.

The background of the assignment is based around two basic principles in the architectural formation – subtractive and additive form that includes the generation of space.

The subtractive architectural formation is characterised by material being extracted from a solid mass to form a void. This craft making methodology involves a manual process which results in the formation of space with a unique character.

The additive architectural formation is characterised by adding material whereby direct form and the generation of space occurs. The technique is often associated with industrial typologies and builds on the repetition of mass production whereby architecture in the same way obtains a repetitive nature.

The relation between subtractive and additive architectural formation can often be closely linked. For instance, the material that is removed in the subtractive process can often form the starting point of the architectural formation in the additive process. This creates a closed circuit in which the quantity of material remains constant. The assignment is divided into phases and consists of a group preliminary phase followed by a number of long-term individual phases.

In the preliminary phase, proposals are developed for formations of space. In which, the starting point occurs in sections of a polystyrene cube. The proposal builds on subtractive and additive processes specified. In the subsequent phase, these project proposals are further developed based on the individual programming.

Course of assignment
Week 1
In a polystyrene cube with a side length of 10 cm, three cuts are made in the x, y and z plane, respectively. The cuts are made successively as each cut is followed by the displacement and gluing together of the plane. Two of the cuts are made linear whereas the last cut can be made according to a self-chosen amorphous curvature. The produced shape is cast as the core in a plaster cube of a suitable size. One surface of the polystyrene shape is to be fastened to one of the sides of the casting mould. In the resulting plaster cast, a vertical and horizontal cut is made (with a saw) so that the polystyrene shape appears in the incision of the surface. The polystyrene shape is removed with mechanical aids and leaves a spatial imprint in the massive plaster cube. The produced spatiality is then observed and studied in relation to its light-related potential.

Weeks 2-8
A model plane at the scale of 1:50 is handed out. The model plane can either be assembled or remain in components, a project proposal is then made that stages the plane. The staging should be done using spatial, textural and light-related means. The assignment answer should also reflect a subtractive and additive architectural formation.

Literature:
Herrigel. E 1953, *Zen in the Art of Archery*, Routledge & Kegan Paul Ltd, London
Pirsig. R.M 1974, *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values*, Morrow, New York

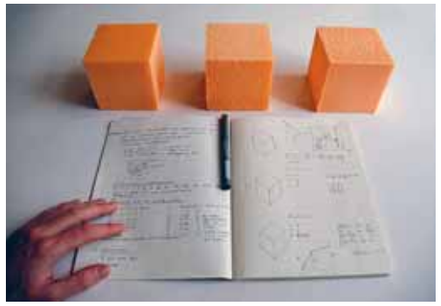
		Introduction	Compentancy	Mastery
Architectural theme				
Form			x	
Space			x	
Construction			x	
Context			x	
Programme			x	
Light			x	
Working method				
Generative			x	
Synthesising			x	
Conceptual		x		
Analytical			x	
Tools				
Drawing	Analogue		x	
	Digital		x	
Model	Cardboard		x	
	Wood		x	
	Wire		x	
	Plaster		x	
Communication	Written		x	
	Oral		x	
	Visual		x	
Registration	Drawing			
	Photo			
	Video			
History				
Theory				

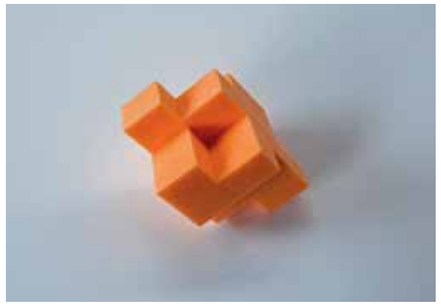
Staging an aircraft with light can occur in radically different ways. The aircraft can be considered in purely formal terms and to be staged through the use of light and space. In this regard, the aircraft can be understood as one finished object or can remain in its separate parts as delivered as the unbuilt model. Alternately, the aircraft can be considered as a phenomenon whereby the purpose of the staging is to show this phenomenon.

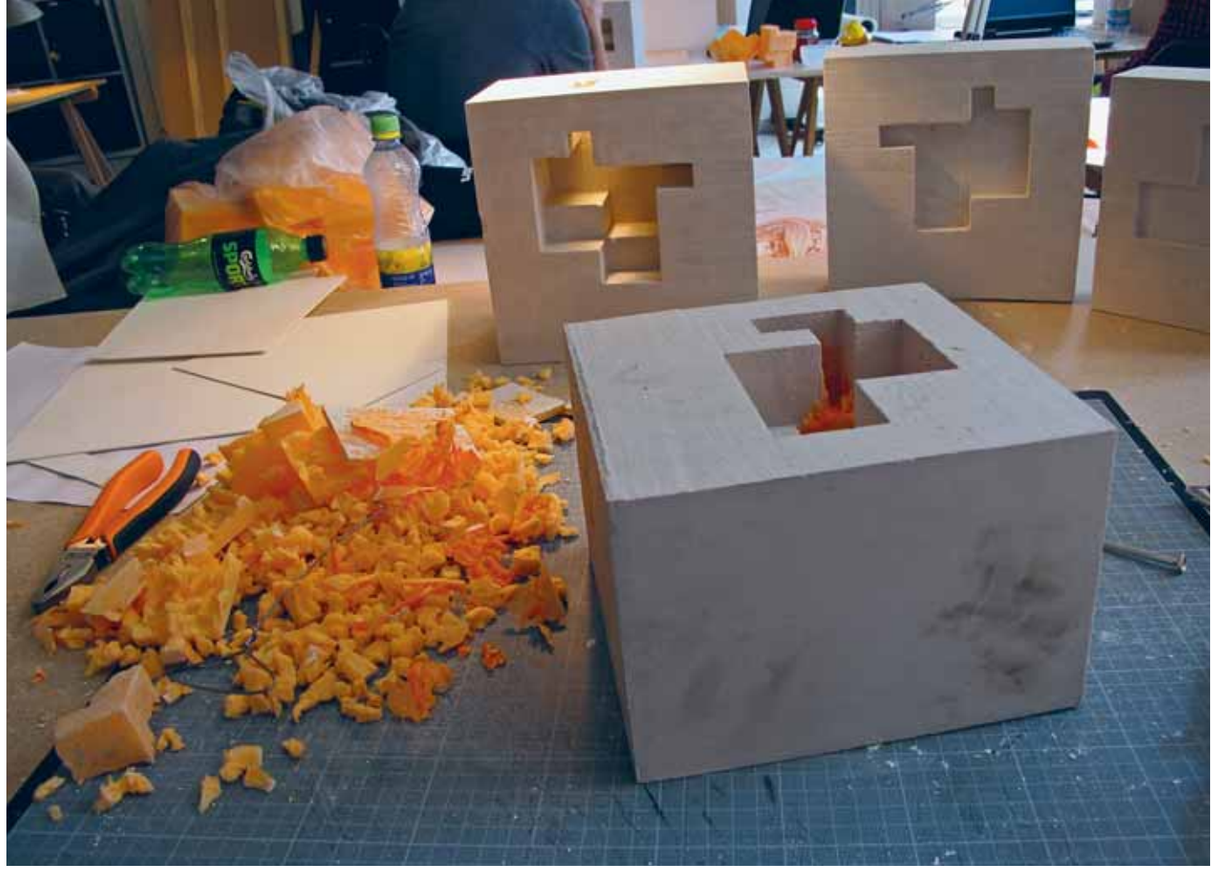
2.5.1

GETTING STARTED

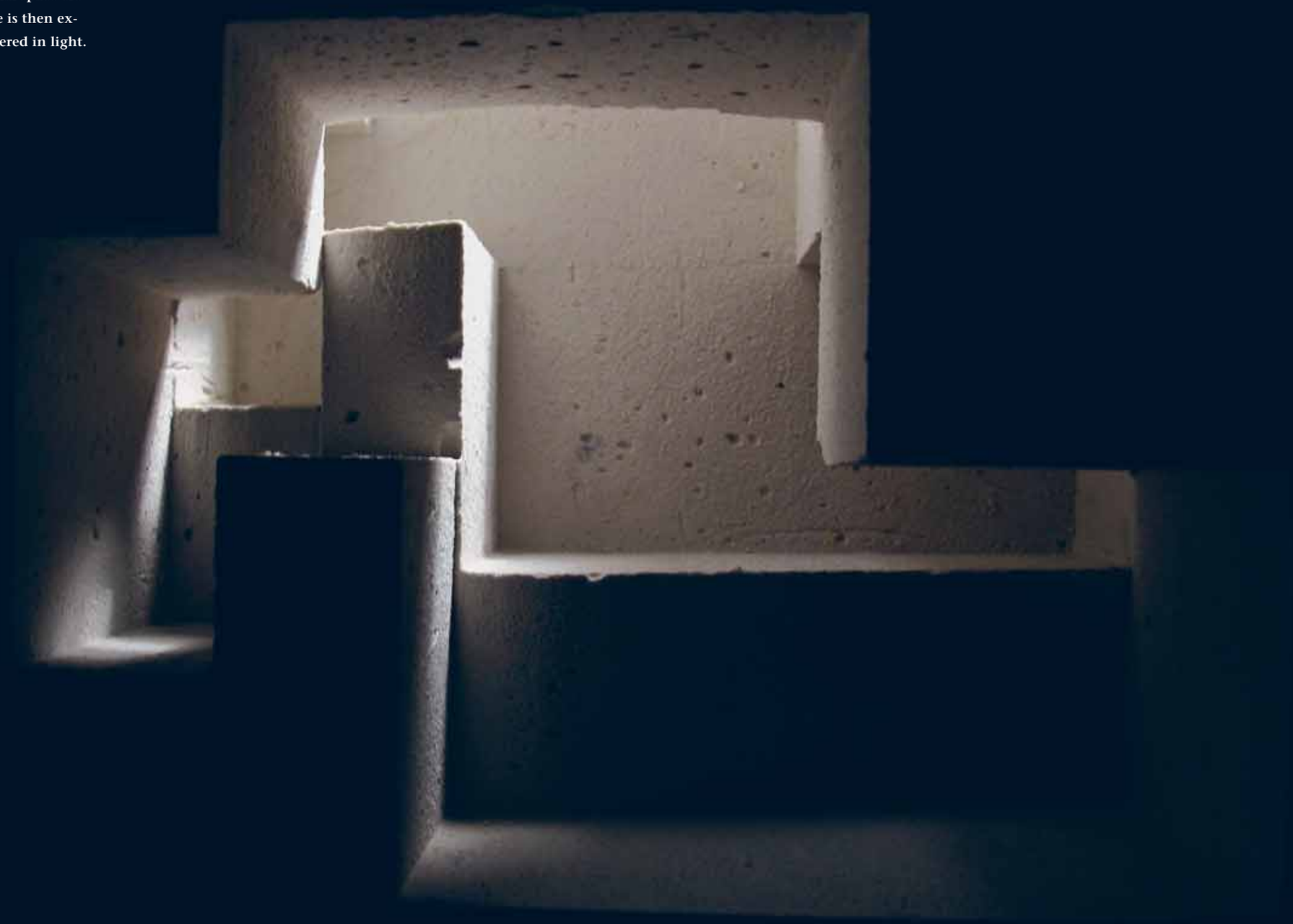
Each student is given an orange foam cube into which they are allowed to make 3 cuts (one each along the x, y and z axis sequentially). Therefore, each cut is followed by the displacement of a section of foam which is then slid along the cube and re-glued. The next cut follows the same logic and so with three cuts and three moves a complex form is created.







A plaster cube is then cast around this foam core. One the plaster is set, students cut down the centre of the plaster form to reveal an internal space created by the foam element. This space is then explored for its spatial qualities as rendered in light.



2.5.2

MODEL AIRCRAFT

A model aircraft is handed out and students are advised to work with the aircraft as if it was at a scale of 1:50. As the model aircraft can either be assembled or remain in its constituent components as presented in the box, students propose a project which stages the aircraft in one of these conditions. Each proposal must include both additive and subtractive techniques to stage the aircraft. The proposal must include a statement about how light and space can be configured to best stage the aircraft.

Small Shaft

Long Shaft with Extension 1

Long Shaft with Extension 2

Long Shaft with Extension 3

2.5.3

SIMONE FALDBORG JØRGENSEN

My ambition was to orchestrate the aircraft's tail with the use of light. For this purpose, I worked to achieve a constant and focused light on the tail, regardless of weather conditions and the inclination of the sun. My experiments focused on finding the best way to make an opening for light that achieved these aims.

2.5.4

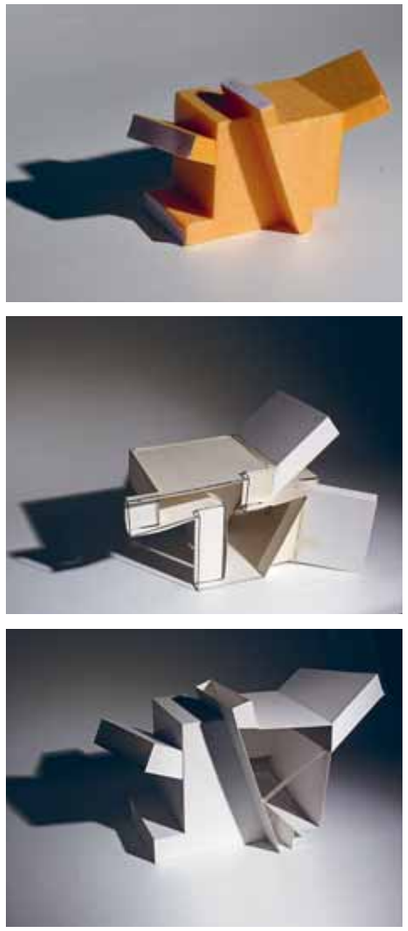
TINE KJØLDMOEN MOSENG

"In my light investigations I developed the apparition (note: or apperance?) of the aircraft. I experimened with the scale of light from light to dark to investigate the transition in the atmosphere, and to see how far I could go before the aircraft was no longer recognizable as an airplane, but an object."

2.5.5

IDA FLØCHE MØLLER

Light input has guided the creation of space. In particular I have worked with diagonal light intakes to create dynamism in the space. Light enters through these intakes to create cones of natural light which illuminate the aircraft and space from different angles during the day.

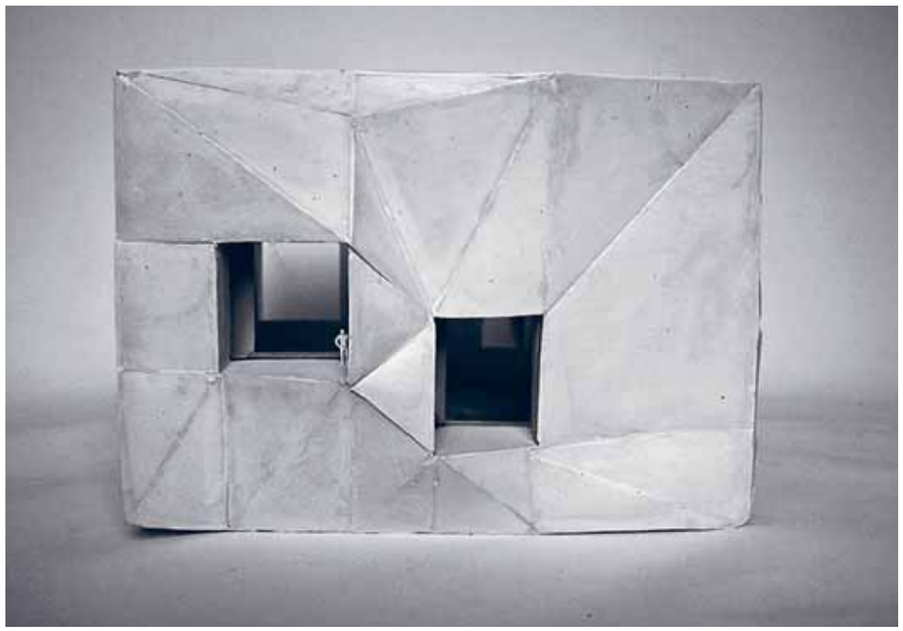


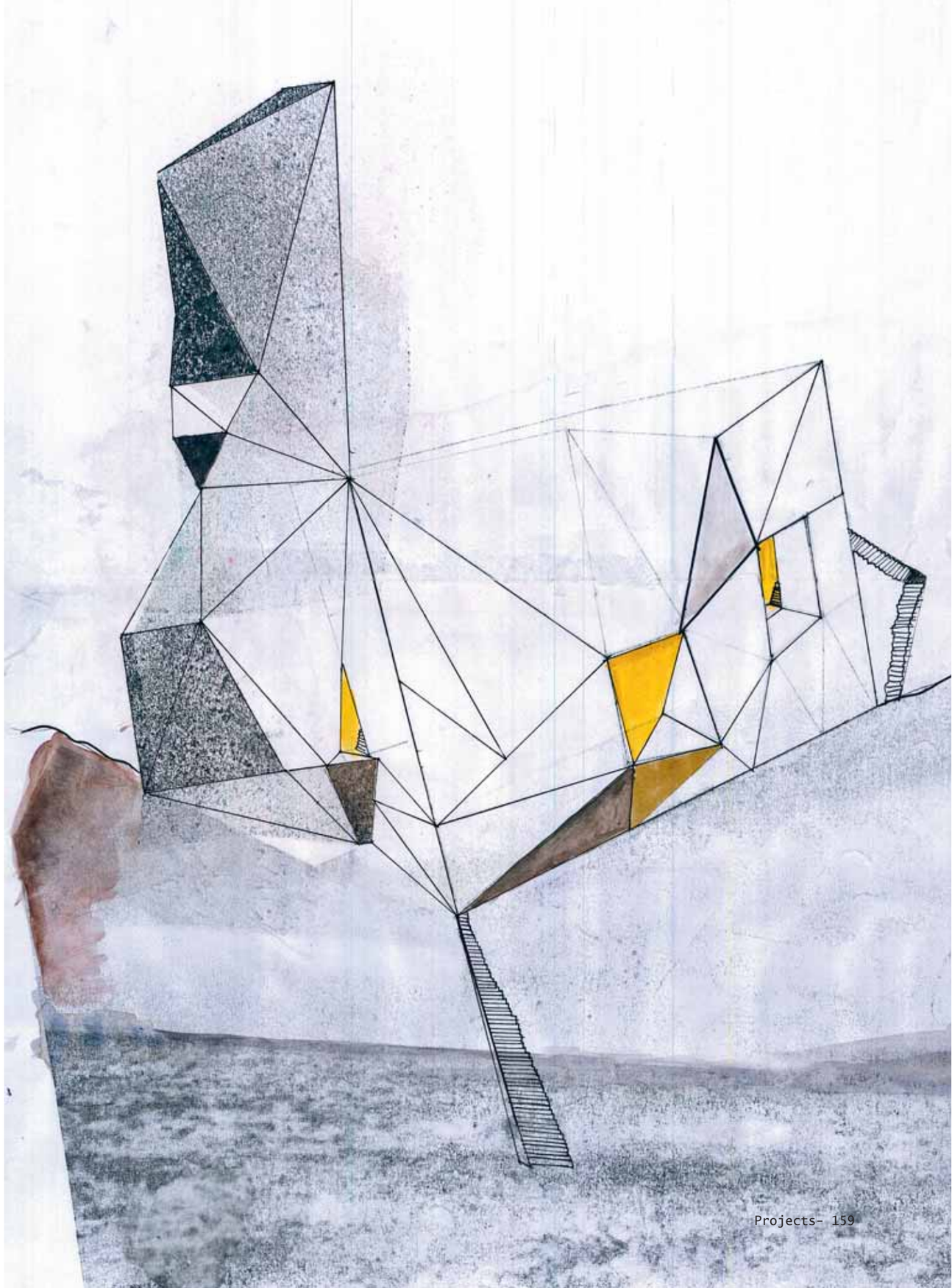
The aircraft is hung in the middle of the room to present it from all sides as it is a vehicle which moves in three dimensions. Viewers are led around the room and plane to emphasise the movement inherent in the plane. The model was built in plaster because of its lustrous texture. The solidity of the plaster emphasises the solid-void contrasts where the light intakes have been cut out of the mass.

2.5.6

MARIA-THERESE GRANT

The project worked with the phenomenon of melancholy. *"Melancholy hates haste and floats in silence. It must be handled with care"* Nick Cave's Love Song Lecture, October 21, 2000.

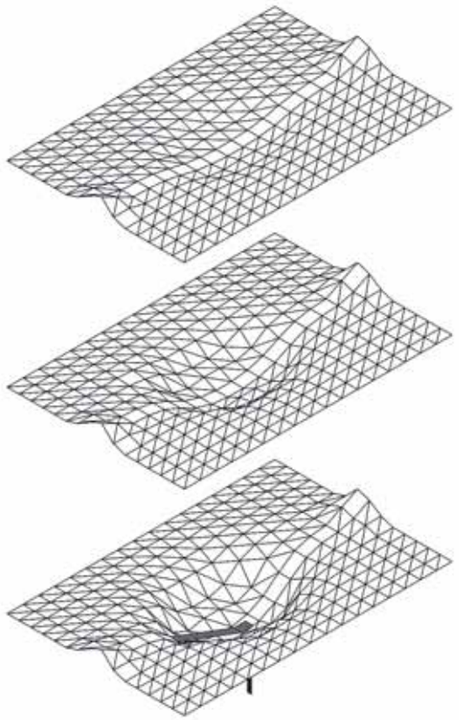


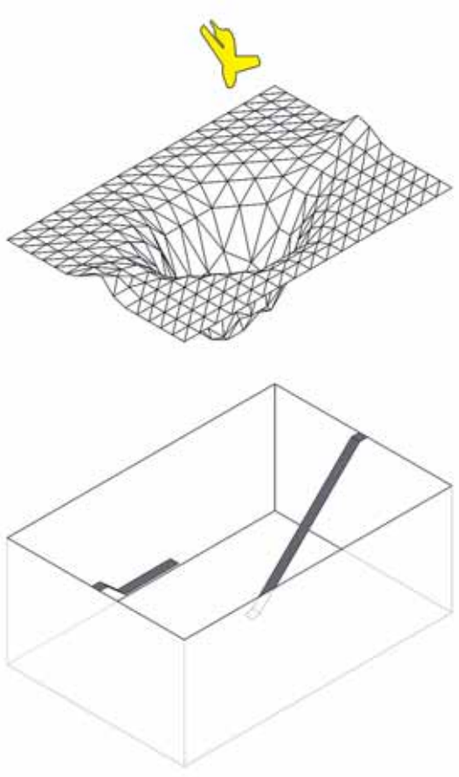


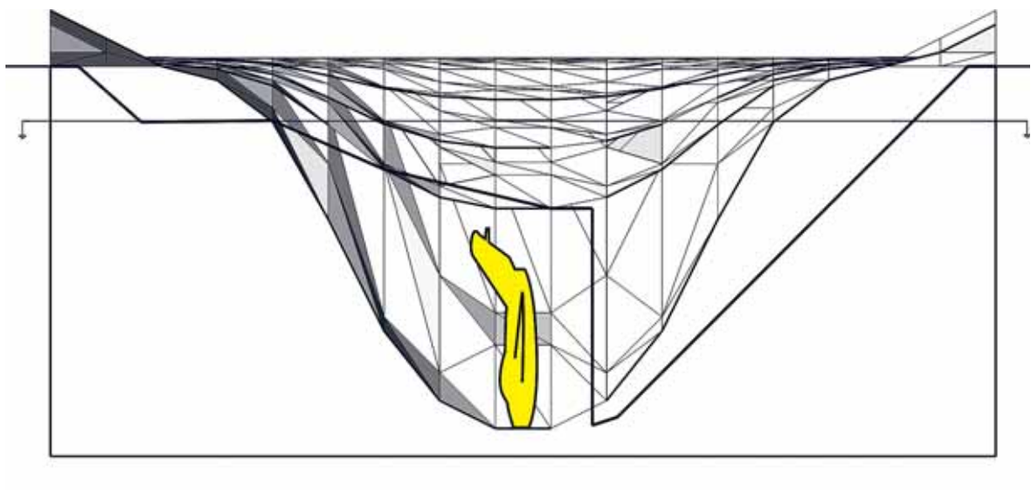
2.5.7

KARL ÖSTGÅRD

This project tries to negotiate the transition between void and solid – between ”Heaven” and ”Earth”. Descending from ground level, the journey takes you through a series of undulating surfaces exploring poche spaces of different spatial qualities. The deformation of the layered and punctuated surfaces, the penetrating light and the spaces created are a direct effect and almost literal reading and translation of a collision with the ground - the impact of the airplane, which at the bottom of the journey reveals itself in an unfamiliar territory.



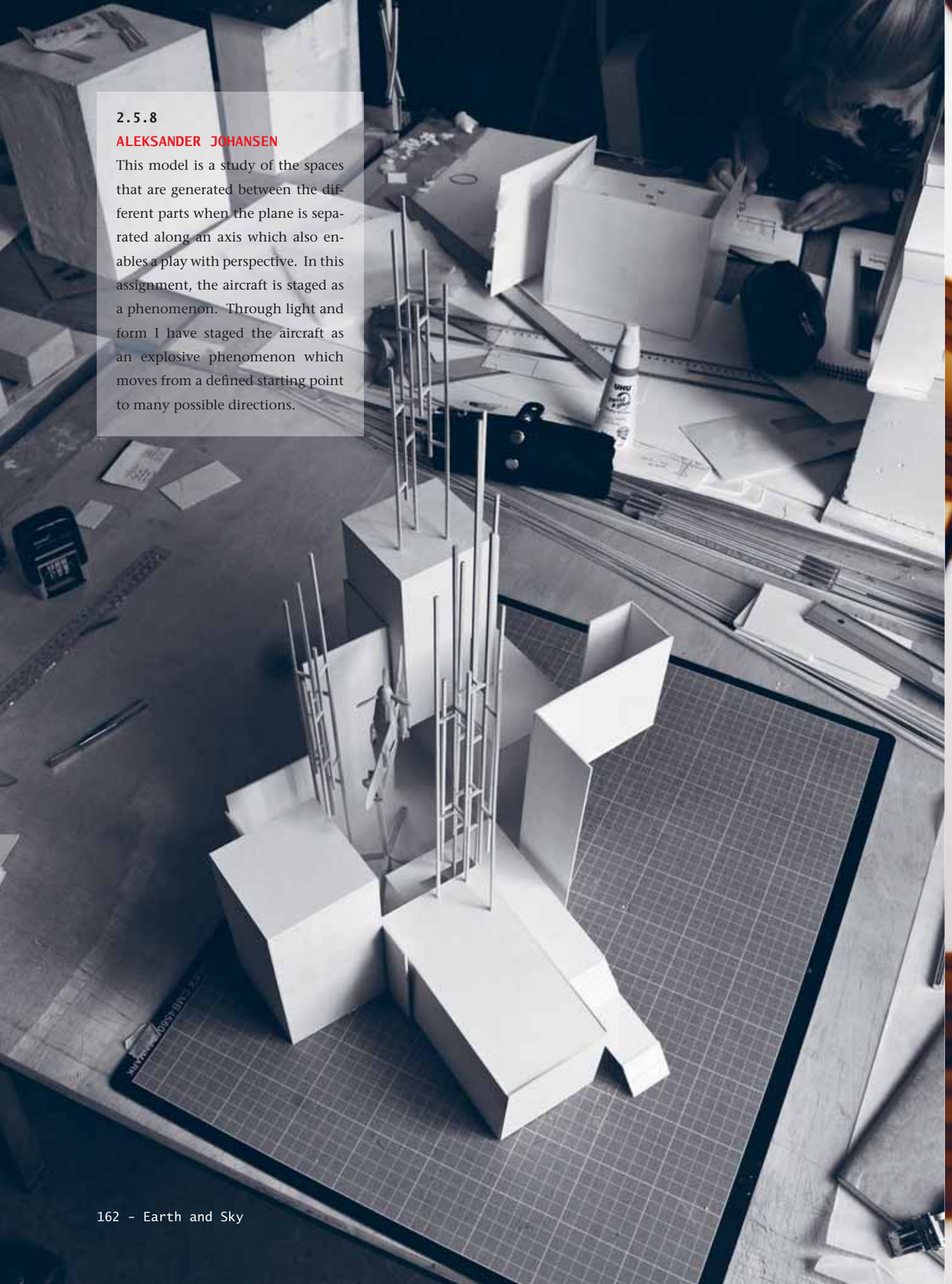




2.5.8

ALEKSANDER JOHANSEN

This model is a study of the spaces that are generated between the different parts when the plane is separated along an axis which also enables a play with perspective. In this assignment, the aircraft is staged as a phenomenon. Through light and form I have staged the aircraft as an explosive phenomenon which moves from a defined starting point to many possible directions.

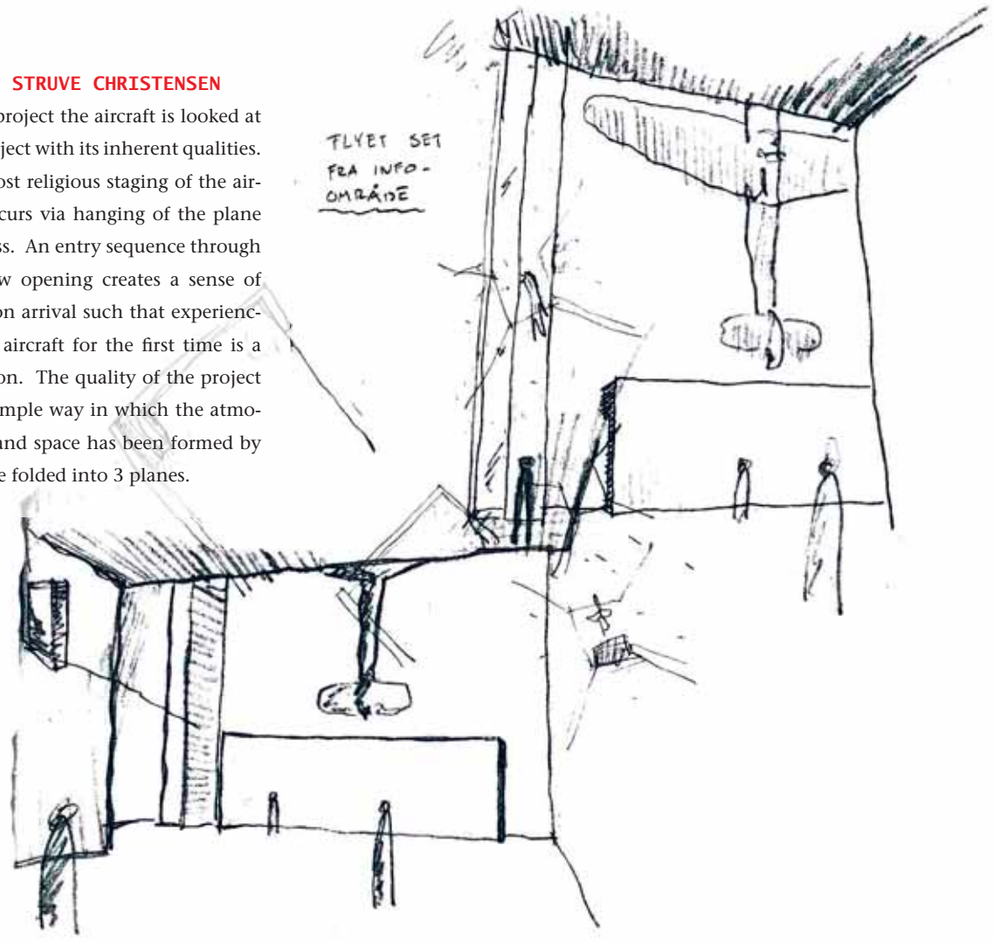


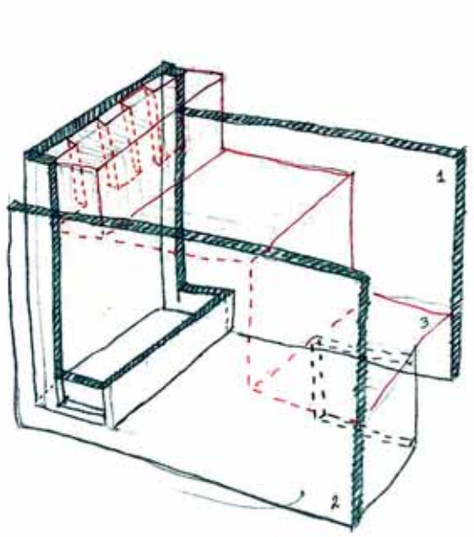
"Speed: Plywood strips point in the same direction as the aircraft and are cut into different lengths to emphasize its speed. The plywood is gathered at the point of departure and opens in the direction of flight, increasing the sense of speed.
Drama: A sense of drama is inherent in a plane of war. The plane is in its element avoiding crossfire. Copper pillars emerged via the process of creating a structure for the plywood strips and became associatd with a volley of bullets aimed at the aircraft."

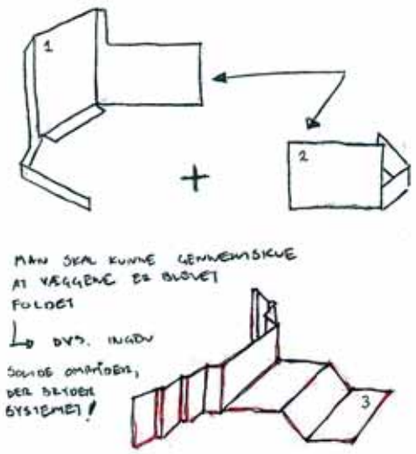
2.5.9

JESPER STRUVE CHRISTENSEN

In this project the aircraft is looked at as an object with its inherent qualities. An almost religious staging of the aircraft occurs via hanging of the plane as a cross. An entry sequence through a narrow opening creates a sense of drama on arrival such that experiencing the aircraft for the first time is a revelation. The quality of the project is the simple way in which the atmosphere and space has been formed by a surface folded into 3 planes.







2.5.10

CHRISTIAN SALLY JUNG JENSEN

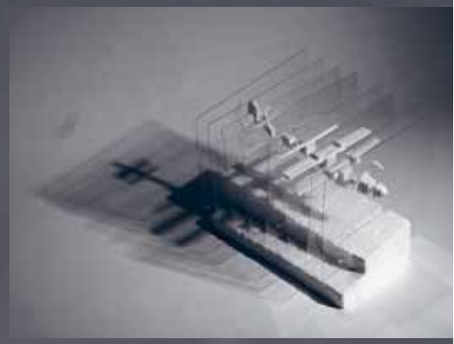
The aim in this project is to give the visitor a total experience of the aircraft in its element - the air. The structure has been designed to guide the visitor around the aircraft between chosen view-points.

2.5.11

ANDERS KJÆRGAARD

Taking its point of departure from the discussion on whether or not to assemble the pieces that make up the model airplane, this project proposes a more calculated approach to the question. Assembled and later methodically cut into individual elements the material no longer reflects any notion of the airplane as a formal entity - the airplane has disappeared into thin air. Separated and displaced, these elements now manifest themselves in an illegible context with no apparent relationship to each other. They reveal their true identity only in the collective shadow cast on the ground and seen from a specific angle where they make up the silhouette of the airplane in the sky.

"This model is a study of the spaces that are generated between the different parts when the plane is separated along an axis which also enables a play with perspective."

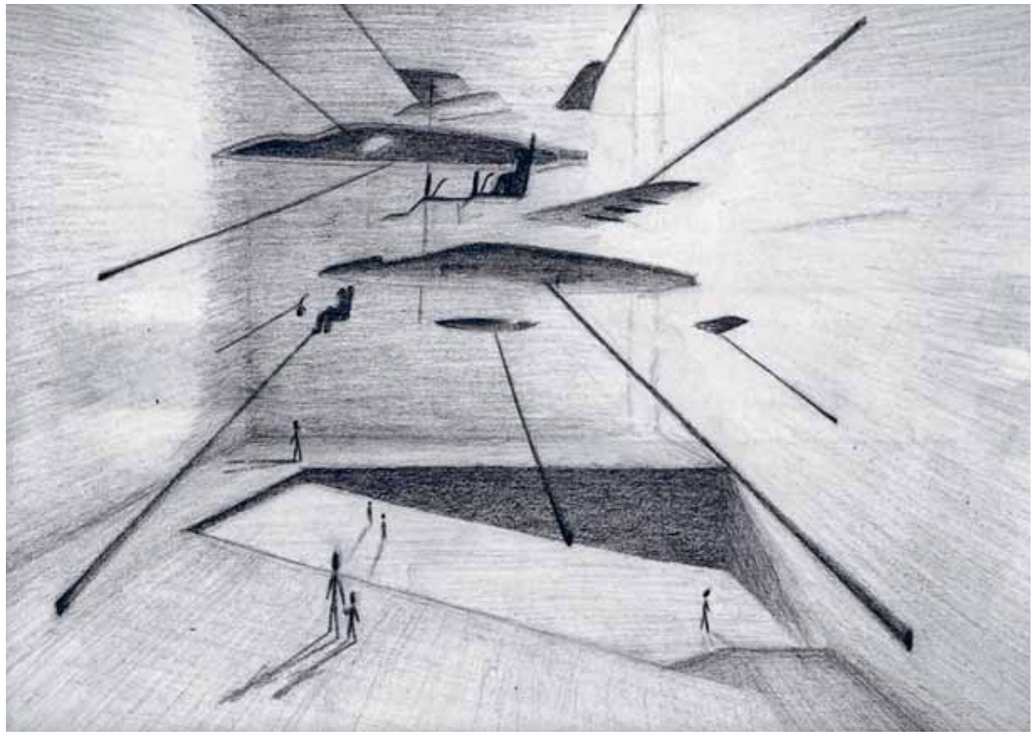


"This model shows how the object can remain fragmented so that a story about its component parts and the whole aircraft can be told simultaneously."

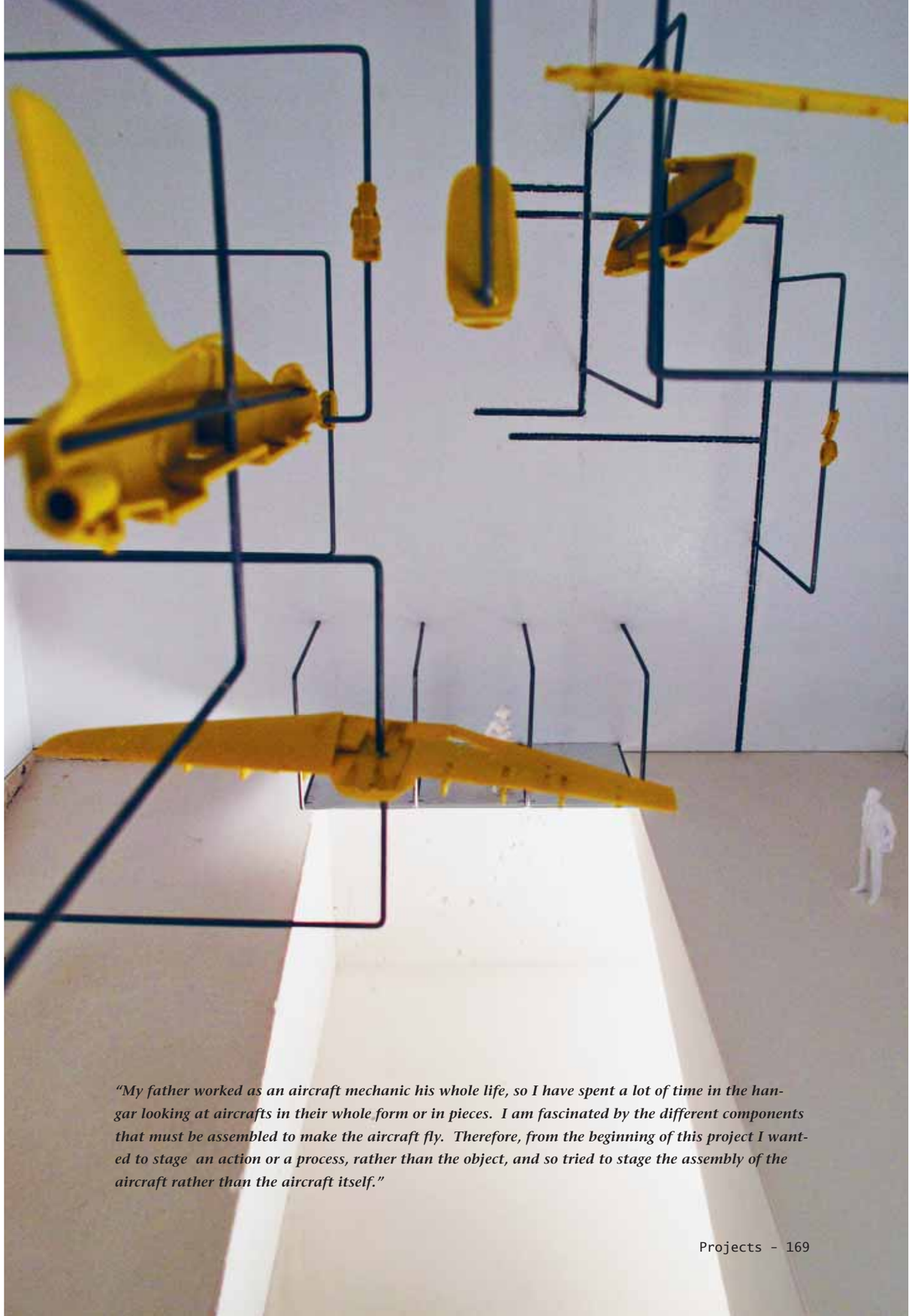
2.5.12

AVIAAJA MAGDALENE EZEKIASSEN

"Below is my first concrete drawing. It reminded me how the aircraft could be staged in the space I had made with the plaster cast and the subsequent effects of light and movement on the atmosphere of that space when it was occupied by the aircraft."



"I designed a frame to hold the separate pieces of the aircraft in place in such a way that the frame itself became part of the composition. A light source was placed below the installation, in a large opening which remined me of the atmosphere in the hangar as the doors opened. When rendered by light, the components and frame combine to create a new atmosphere".



"My father worked as an aircraft mechanic his whole life, so I have spent a lot of time in the hangar looking at aircrafts in their whole form or in pieces. I am fascinated by the different components that must be assembled to make the aircraft fly. Therefore, from the beginning of this project I wanted to stage an action or a process, rather than the object, and so tried to stage the assembly of the aircraft rather than the aircraft itself."

2.5.13

EMIL SCHARNWEBER

The Spitfire aircraft is known for its maneuverability. This quality is reflected in the a spatial design based on the rocking of the aircraft's wings. At the same time the form of the space results in a series of openings for the penetration of light in the manner of searchlight beams. The result is a space which recalls the Spitfire in action.

"The rotation of the aircraft wings was captured and frozen in a series of still images. The resulting geometry formed a series of strokes which underpinned the design of the wall, ceiling and floor surfaces. A focused light enters the space between these planes, emphasising the form of the space. The result is an experience of space and light which recalls the dynamics of the aircraft, even though the craft itself is a static object in the space. "

2.6 STRUCTURE, SERIALITY AND THE OPEN PROGRAMME

Unit 1b

2.6.0

STRUCTURE, SERIALITY AND THE OPEN PROGRAMME

Anne Elisabeth Toft

In the final assignment of the academic year, 'Structure, seriality and the open programme', the foundation is laid for a synthesising course lasting eight weeks. This brings together a number of the working methods and tools that the students have learnt to use over the course of the year. The assignment is linked directly to the major theme of the spring semester, which for both Unit 1a and Unit 1b was Jørn Utzon, his working method and his work. The focus of their studies was the Opera House in Sydney, Australia. The students visited this building in March, where it formed the basis for a comprehensive analysis of Utzon's work.[1] Through various readings of this work the students acquired an insight into and an understanding of Utzon's architectural vocabulary, his sources of inspiration and his choice of motifs. They also learned about his way of working.

In 'Structure, seriality and the open programme' we go behind the work to further explore Utzon's working method. This study leads the students to the development of a small sketch project that emphasises some of the qualities that Utzon strived for in his architecture. In this way their analyses of the Opera House are now put into perspective by their own design, which is brought about through a study of Utzon and a reflected application of Utzon's working method. For us teachers in Unit 1b, the study gave an opportunity to theorise about Utzon and his significance as an architect. This theorising took place through our teaching and through the students' work.

As a rule Utzon's working method included painstaking contextual analyses alongside study trips to the countries where he was going to create his buildings.[2] In conjunction with these he acquired knowledge about the cultures and building traditions of these countries. He gave himself the time to experience the local texture of the agricultural and urban areas and to study wind and light conditions, landscape features, fauna and vegetation at the sites where he was to build. For Utzon a reading of the place and of its characteristics were of vital significance in his architectural design.

In his text 'The Innermost Being of Architecture' Utzon writes:

'We put everything in relation to ourselves. Our surroundings influence us through their relative size, light, shade, colour, etc. Our condition depends entirely on whether we are in a city or out in the countryside, on whether the space in which we find ourselves is large or small. Our reactions to these circumstances are at first quite unconscious, and we only register them on memorable occasions, for instance in the sublime enjoyment of a detail or a happy alliance with the surroundings or by a pronounced feeling of distaste. But to elicit our unconscious reactions until they become conscious to us ought to be our starting point. By rehearsing our ability to grasp these differences and their effect on us, by being in contact with our surroundings, we find our way in to architecture's innermost being.'[3]

Inspired by, among others things, the book by the Scottish zoologist D'Arcy Wentworth Thompson 'On Growth and Form',[4] Utzon had early in his career developed what was called organic architecture.[5] This was a form of architecture whose structural principles were built on concepts he found in his study of natural growth forms. Here he found logical rules, harmonious relations and systems that allowed variation within the same species. These he could translate into geometry and mathematical formulae. In nature he could also study how various growing conditions influence the development of the species.[6] This relationship he translated into a conscious design strategy.[7] It is, then, the same underlying thoughts about organic architecture that can be found again in Utzon's so-called 'additive architecture', an architectural concept and building system that he developed in the 1960's.[8]

Utzon created a form of architecture that placed the human being at the centre, architecture that always seems to take as its point of departure the human individual and its perceptions, its resources, its needs, its creativity, its play. He himself writes:

"On the road from the first idea – the first sketch – to the final building, a host of possibilities arise for the architect and the team of engineers, contractors and artisans. Only when the foundation for the choice between the various solutions derives from the awareness that the building must provide the people who are to live in it with delight and inspiration do the correct solutions to the problems fall like ripe fruits."[9]

In 'Structure, seriality and the open programme' students are to design a youth hostel, a place where many different kinds of travellers with many different needs can live for longer or shorter periods. It is a democratic place that embraces both the individual and the group, a meeting point for many cultures. An important part of the assignment is that students' rethink the youth hostel as an architectural category. This means that, while the traditional youth hostel is presented to the students during the course of the assignment, they are given as an 'assignment within the assignment', the task of rethinking and critically reformulating this during the drafting process.

The idea of the youth hostel is that it is to be constructed by the coast near Moesgaard Beach, a little way south of Aarhus. The assignment is divided into four phases. It is not until they reach the final phase that the students are told that what they are working on is to result in a youth hostel. The aim of this secrecy is that the students' focus on their work should first and foremost be through the study process rather than on its result.

The first phase of the assignment, lasting one week, includes an exercise in observation and notation. This is an exercise that gets the students to carry out a painstaking study of some of nature's growth forms. At the start of the exercise, therefore, each student is handed a vegetable or fruit, which has to be examined using 1:1 measurements and a series of sections running at right angles across the object. The sections are photographed, and subsequently catalogued. Using measurements and photographs, the students construct a double orthogonal projection drawing, which represents the now bisected fruit or vegetable. The exercise now is about the student decoding the structural composition and growth principle of the fruit or vegetable. These features are illustrated in drawings and models, as the student keeps redrawing the fruit or vegetable in ever more purified and abstract forms. In the end a set of diagrammatic drawings are put together to give an optimised model that only represents the structural composition and growth principle of the fruit or vegetable.

In a new exercise, experiments are carried out with these. First they are subjected to a variety of influences – for example, pressure, traction, scaling and repetition. The aim of the exercise is that the students should use these experiments to make new discoveries about their structure and its growth principle. They are carried out in double orthogonal projection drawings and models.

In the next phase of the assignment, which also lasts a week, the area around Moesgaard Beach is studied. Using various measurements, the students are brought face to face with the site and its characteristics. They work in groups, but each student also has to make his or her own observations and carry out their own systematic registration. As part of the study students use a number of different mapping techniques and notation exercises such as 'Serial Vision'[10] and 'Body as Measure'.[11] On-site studies are set alongside readings of historical material – photographs and maps – that show the development of the coast around Moesgaard Beach. For the students the exercise consists of developing a variety of strategies for decoding and analysing the landscape's structural composition. The total sum of registrations subsequently forms part of a common analogue data archive, which the students establish at the drawing studio. Using their surveys as a basis, they construct a variety of landscape models that represent specific segments or features of the landscape.

After this exercise the students return to their optimised structure. This now has to meet the landscape in the representations. Using experiments in double orthogonal projection drawing and model work, the

students consider how the structure can be scaled and what implications scaling might have for the structure and its construction. There are a number of ways in which the structure can make inroads into the landscape. Through these both the structure and the landscape are transformed. Using a series of model studies, the students test the spatial consequences of incorporating the structure into different strategic places in the landscape – places that are determined by, for example, infrastructural considerations or light and wind conditions. The experiments are registered in photographs, diagrams and double orthogonal projection drawings.

In the final phase of the assignment the functional programme is introduced as a design parameter. The students are told that the structure has to provide the basis for a youth hostel with sleeping accommodation for forty people. The programme is very open. The aim is, as mentioned before, that students are to develop it themselves. In this final part of the assignment, which lasts three weeks, it is therefore entirely up to the students themselves to decide their strategies for their sketch plans.

In line with Utzon's thinking about an additive form of architecture, the students are, however, asked to design a flexible building complex, which consists of a number of related units or modules. The architecture has to be site-specific and it should centre around human beings and their needs.

Structure, Seriality and the Open Programme: 5th April-29th May 2010
Concept: Anne Elisabeth Toft and Lena Kondrup Sørensen

Formulation of assignments: Lena Kondrup Sørensen.

Endnotes

1. Fourteen students from Unit 1a and 1b respectively were prevented from taking part in the study trip to Australia. For these students a course was arranged at the Aarhus School of Architecture. This included an analysis of Bagsværd church, designed by Jørn Utzon. The person responsible for the preparation and execution of this course was the architect Jane Willumsgaard (Unit 1b).
2. Munk Hansen, H. 2008, 'Jørn Utzon - en fornyer af islamisk arkitektur'. In: *Hillenbrand, Robert (ed.): Islamisk kunst og arkitektur*. Forlaget Vandkunsten, Copenhagen, pp. 11-12.
3. Utzon, J. 2002. 'The Innermost Being of Architecture', 1948. In: Weston, Richard: *Utzon. Inspiration - Vision - Architecture*. Edition Bløndal, Copenhagen, p. 10.
4. Wentworth,T. 1917, D'Arcy: *On Growth and Form*. Cambridge University Press, Cambridge, 2nd ed. 1959.
5. Jørn Utzon was also inspired by, for example, Frank Lloyd Wright and Alvar Aalto's organic architecture.
6. 'The true innermost being of architecture can be compared with that of nature's seed, and something of the inevitability of nature's principles of growth ought to be a fundamental concept of architecture. If we think of the seeds that turn into plants or trees, everything within the same genus would develop in the same way if the growth potentials were not so different and if each growth possessed within itself the ability to develop without compromise.' Utzon, J. 2002, 'The Innermost Being of Architecture' (1948). In: Weston, Richard: *Op.Cit.* p. 10.
7. 'It [architecture] requires an ability to create harmony from all the demands made by the undertaking, an ability to persuade them to grow together to form a new whole – as in nature; nature knows of no compromise, it accepts all difficulties, not as difficulties but merely as new factors which with no sign or conflict evolve into a whole.' Utzon, J. 2002, 'The Innermost Being of Architecture' (1948). In: Weston, Richard: *Op.Cit.* p. 11.
8. Frampton, K.1995, *Studies in Tectonic Culture*. The MIT Press, Cambridge, Massachusetts and London. Second printing, 1995, p. 293. In the 1960's Utzon developed his principles of additive architecture, characterised by the synthesis between geometry, modulation and standardised products. This can be seen transposed into the so-called 'Espansiva' building system, in which a number of identical components can be assembled into a flexible house for the single family.
9. Weston, R. *Op.Cit.*, p. 12.
10. 'Serial Vision' is a concept and a tool developed by the English architect Gordon Cullen. In his book *The Concise Townscape*, 1960, he first introduces this concept, which defines the urban landscape as a series of related spaces.
11. In the 'Body as Measure' exercise our reference is to Maurice Merleau-Ponty and we take the body as a starting point as "the general medium [moyen général]" and the condition for having a world. Focus is on the body as both the organ of perception and the measure for perception.

STRUCTURE, SERIALITY AND THE OPEN PROGRAMME.
AAA, UNIT 1B, F10
6 APRIL-30 MAY

Utzon and his holistic and experimental attitude to architecture, his architectural basis of inspiration and his approach to creating architecture form the background of this term's final assignment.
We are here thinking of:
- his inspiration from natural phenomena and biological growth principles converted into structures.
- his breaking down of architectural wholes into small parts and structures in varying spatial sequences.
- his inspiration from and sensitivity to the context/site (i.e. location, plants, scale, materials, climate, sun and wind).
- his inspiration from imported building motifs and architectural themes (metaphors).
- his understanding of architecture as the framework of a social life and community.

In the final assignment of the academic year, we will be using many of the tools, techniques and methods that you have acquired so far during your first year of study. Compared to the previous course of study that has focused on composition, form, outdoor spaces, context and construction, the final assignment will add structure, indoor spaces and the functional programme as basic design parameters.

The course of the assignment will focus on:
- studies of the serial understood as a recurrence of elements that belong to the same order but entail and facilitate variation within this order.
- experiments with flexible, spatial structures that call for modifications in relation to place and allow change in compositional scale and rhythm, and allow programme-related openness.

The course of the assignment is divided into four main phases:
1. Exercise: From object to seriality to structure
2. Context
3. Spatial structure and context
4. Function, spatial structure and context

Phase 1
6-14 April
In the first phase of the assignment an object from nature - a vegetable or fruit – is to be cut up in a series of sections that document and describe the structure of the object. Subsequently drawings of it should be transformed into a spatial structure based on logics in the characteristic construction of the object and its growth principles. Each student will individually analyse the object that they are given.

Phase 2
16-23 April
During this phase, the chosen site at Moesgaard Beach is to be registered phenomenologically and cartographically, individually and in groups.

Phenomenologically:
The site is to be captured with auxiliary tools and all senses. Various information is gathered in groups for the construction of a common database. We will be experimenting with various methods of reading the atmospheres and traces of human activities at the site. The following must be recorded: plants, materials, textures, light and wind conditions, views, sounds, smells, sheltered and exposed places, and spatial characters.

Cartographically:
Landscape curvature, plants, buildings, paths and traces must be drawn on plan and sectional drawings. These must subsequently be translated into a landscape model (1:500).

Phase 3
26 April-11 May
With the starting point in the theme "The Serial", the spatial structure from Phase 1 is to be further developed. This should be done in dialogue with a given site at Moesgaard Beach, so that the structure goes from being without scale and context to being in scale and context-related.

The aim of this phase is:
- To test the spatial potential of the structure in relation to various site-specific situations and to test the flexibility of the structure in relation to growth, evolution and terrain adjustment.
- to develop interaction between structure and landscape in such a way that you read the architecture as responding to the landscape and vice versa.

Phase 4
12-28 May (excl. critique)
In the last phase of the assignment, we will introduce a functional programme for modification and clarification of the structural proposal and the site-specific registrations and observations.
In this way, the assignment moves from working in an investigative and testing way with a flexible, open and purposeless structure into a specific building structure with a specific spatial programme, a given materiality and a given scale that interacts with the surroundings in an intended way.
The hostel should include a public function (a café), semi-public functions (common rooms) and private functions (sleeping quarters). It should be designed as a building structure that can take in guests all year.

The hostel must meet the following programme demands:
- Parking space on the existing parking space by the ice-cream booth.
- Bicycle parking.
- Reception with luggage room.
- Sleeping accommodations for forty persons.
- Common rooms (divided into a passive and an active zone).
- Common lavatories and bathrooms.
- Common laundry.
- Common dining room/kitchen.
- Public café.
- Common outdoor spaces.
- Cleaning room, renovation.

The following should be considered during the sketching process:
- The position of the public, semi-public and private functions in relation to roads, path systems and movement patterns on the site/access conditions.
- Location of building parts compared to the landscape relation and appearance.
- Location of functions in relation to connections or experience of visual connections.
- Clarification of scale.
- Clarification of structure as construction, form and material.
- Clarification of daylight intake.
- Clarification of spatial layout.

A selection of relevant literature:
D'Arcy Wentworth Thompson: *On Growth and Form*.
Kenneth Frampton: *Studies in Tectonic Culture*.
Richard Weston: *Utzon. Inspiration - Vision - Architecture*.

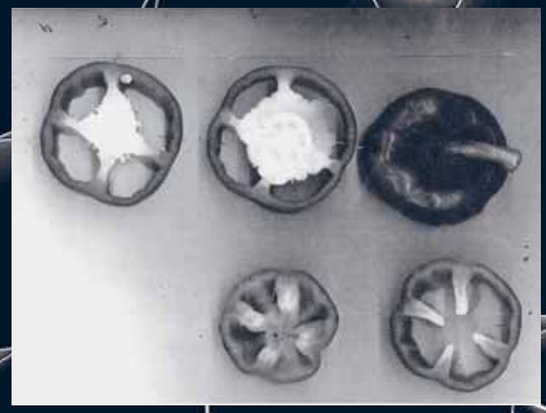
2.6.1

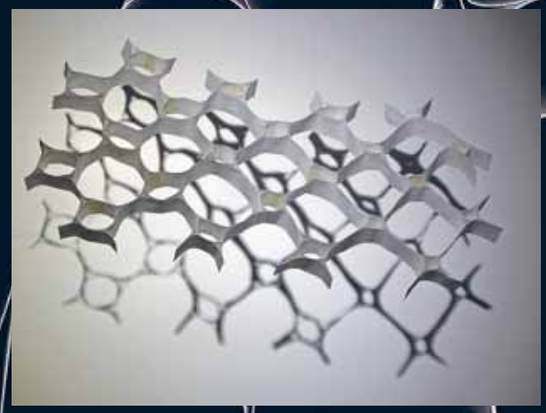
TRINE VARBO FANGHOL

Phase 1: From Object to Seriality to Structure

Studying natural growth forms students carry out systematic examinations of fruits and vegetables. Optimised models that represent the structural compositions and growth principles of the fruits or vegetables are constructed and tested.

Photo and model.





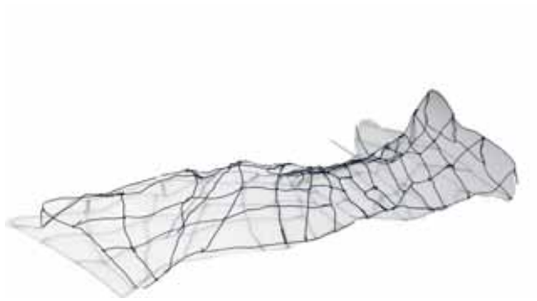
2.6.2

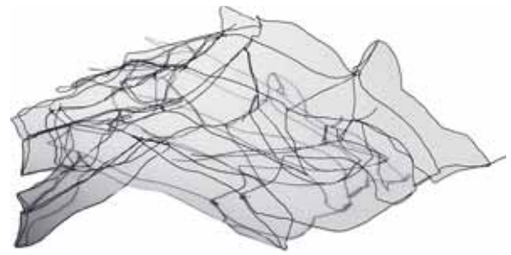
ANNE NØRBJERG MADSEN

Phase 1: From Object to Seriality to Structure

Structural studies of the flesh of a yellow sweet pepper are investigated.

Photo, drawing and diagrammatic model.



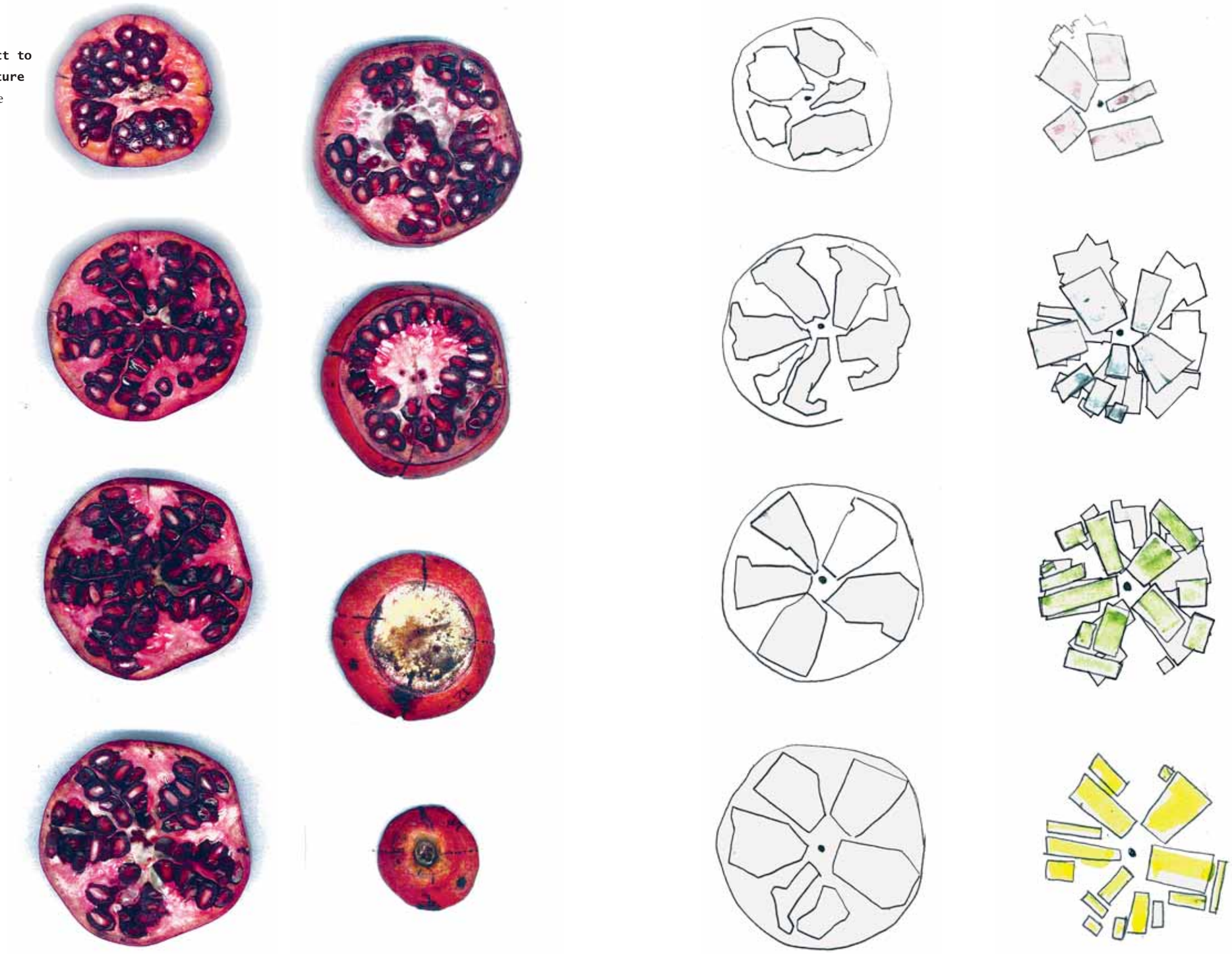


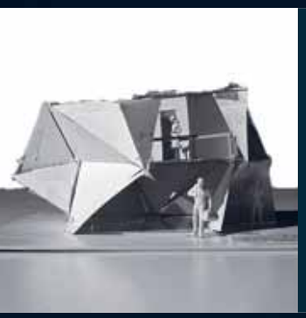
2.6.3

JESPER HENRIKSSON

Phase 1: From object to Seriality to Structure

A dissected pomegranate is being analysed. Photo and drawing.





2.6.3

JESPER HENRIKSSON

Phase 2: Spatial Structure and Context

In Phase 2 students are to further develop their optimised structure from Phase 1. The structure is to be transformed into an architectural structure. In model form students must carry out explorations of the spatial potentials of the structure.
Photo and working model.

2.6.4

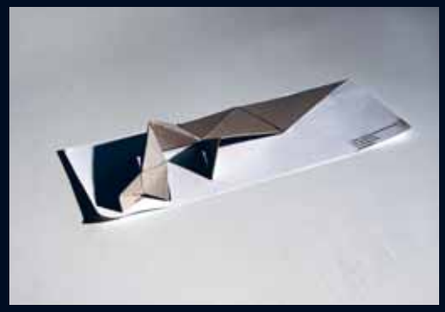
THEA CHRISTINE HØGH

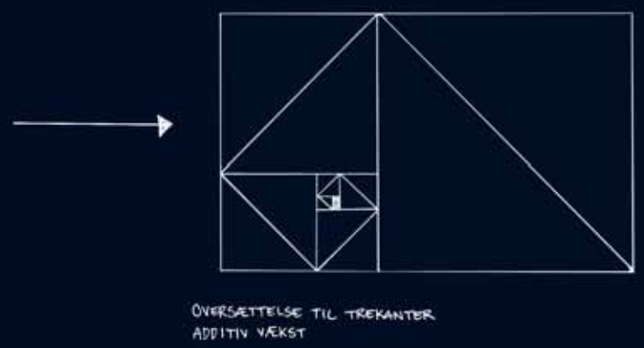
Phase 1: From Object to Seriality to Structure

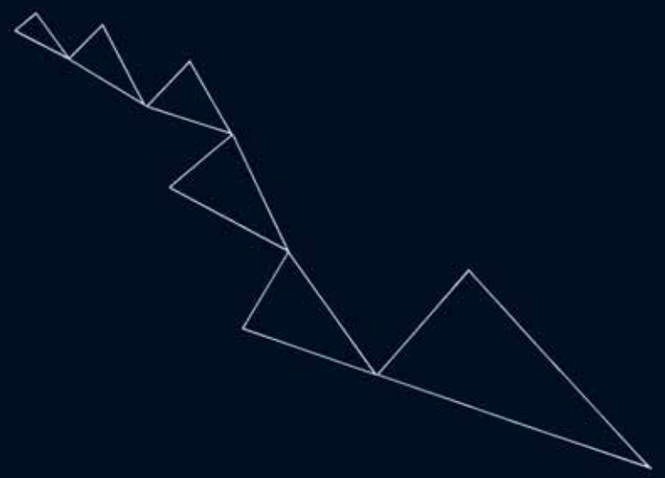
Studies of a broccoli.

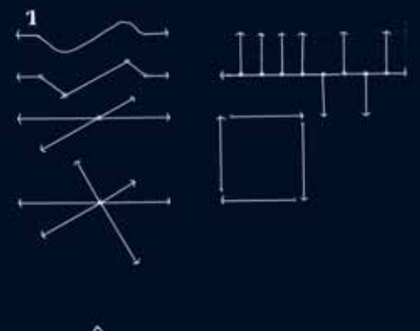
Geometric analyses.

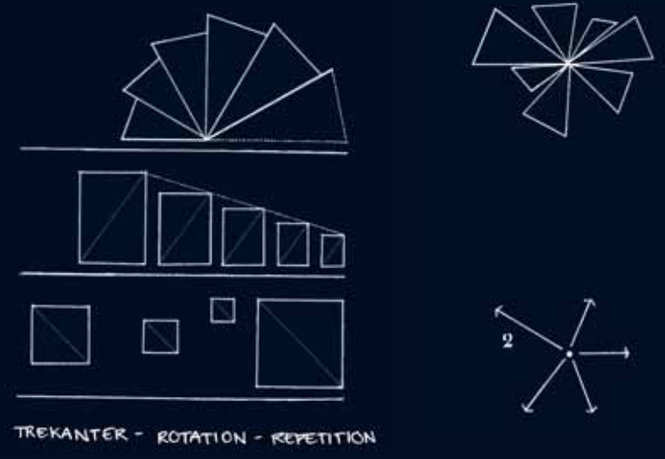
Plan, section and model.

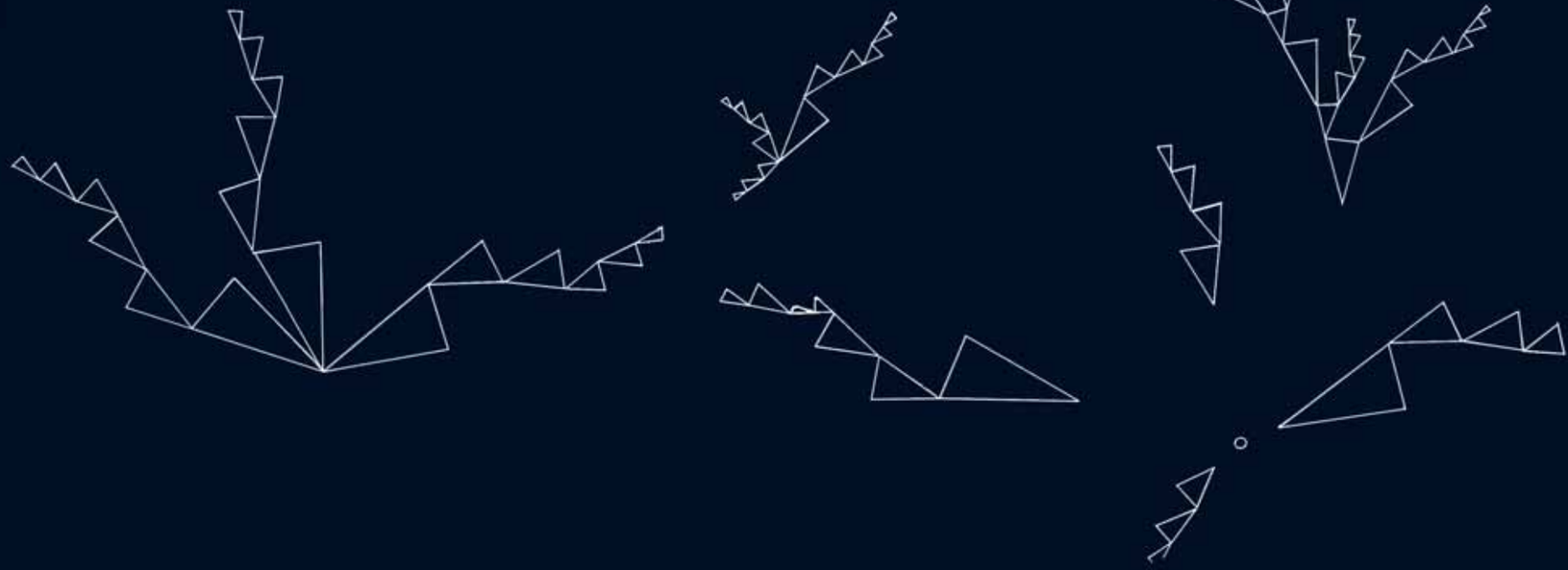












2.6.5

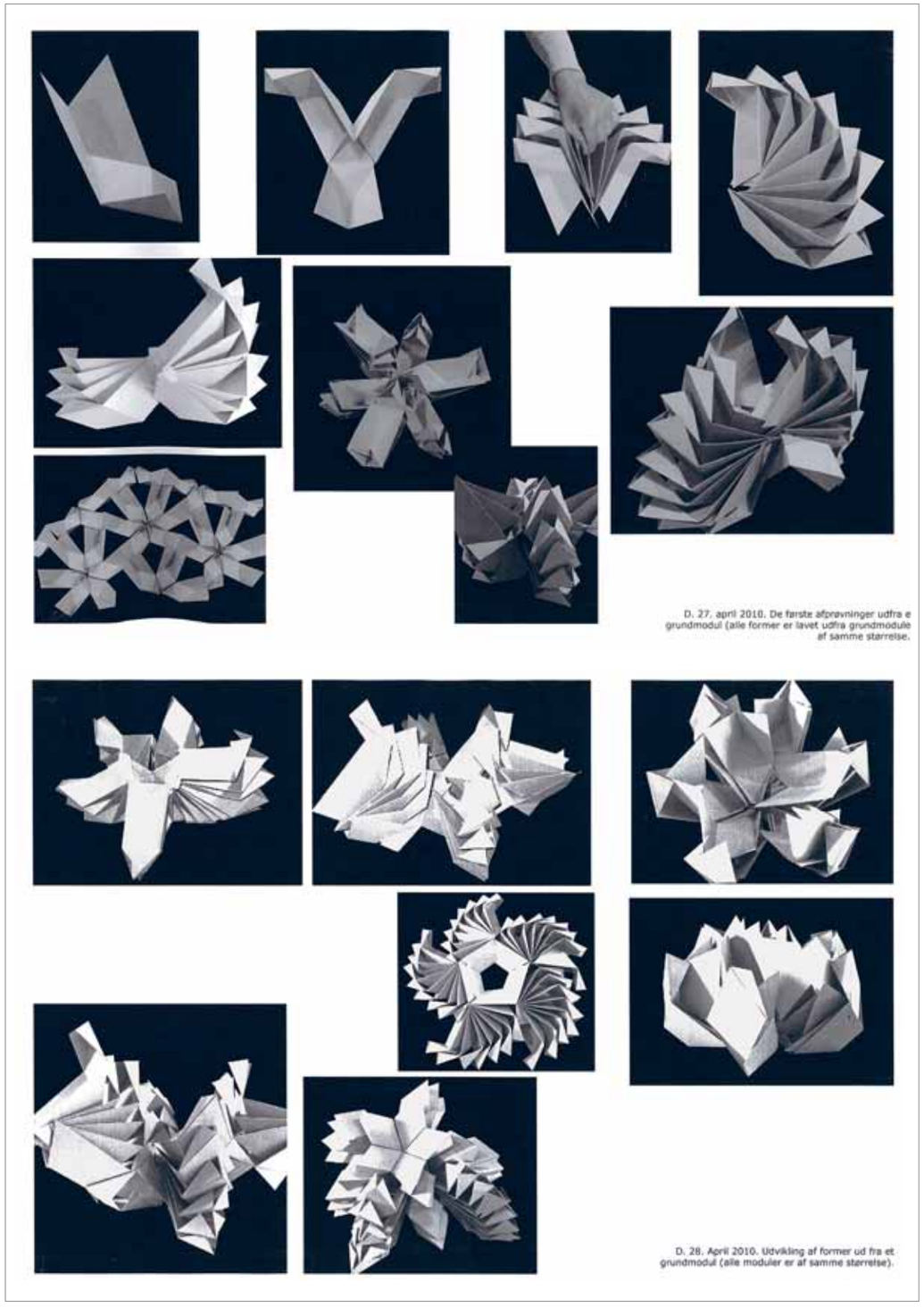
MERETE GULDAGER

Phase 1: From Object to Seriality to Structure

Development of geometric variations and typologies. Exploration of different combinations of the same module. Point of departure was an analysis of the structure and growth principle of an onion.

Drawing and working model.

Students reflect on and keep track of their working process in log books.



D. 27. april 2010. De første afprøvninger udfra e grundmodul (alle former er lavet udfra grundmodule af samme størrelse.

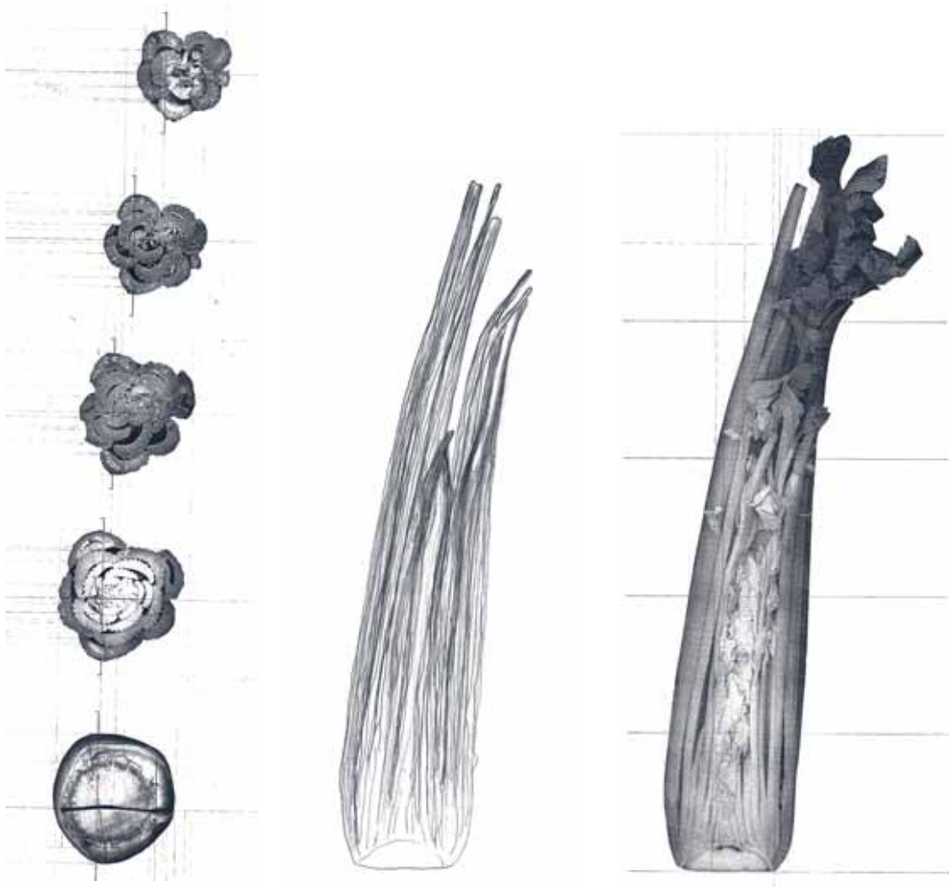
D. 28. April 2010. Udvikling af former ud fra et grundmodul (alle moduler er af samme størrelse).

2.6.6

LINN THERESE FENES FORREN

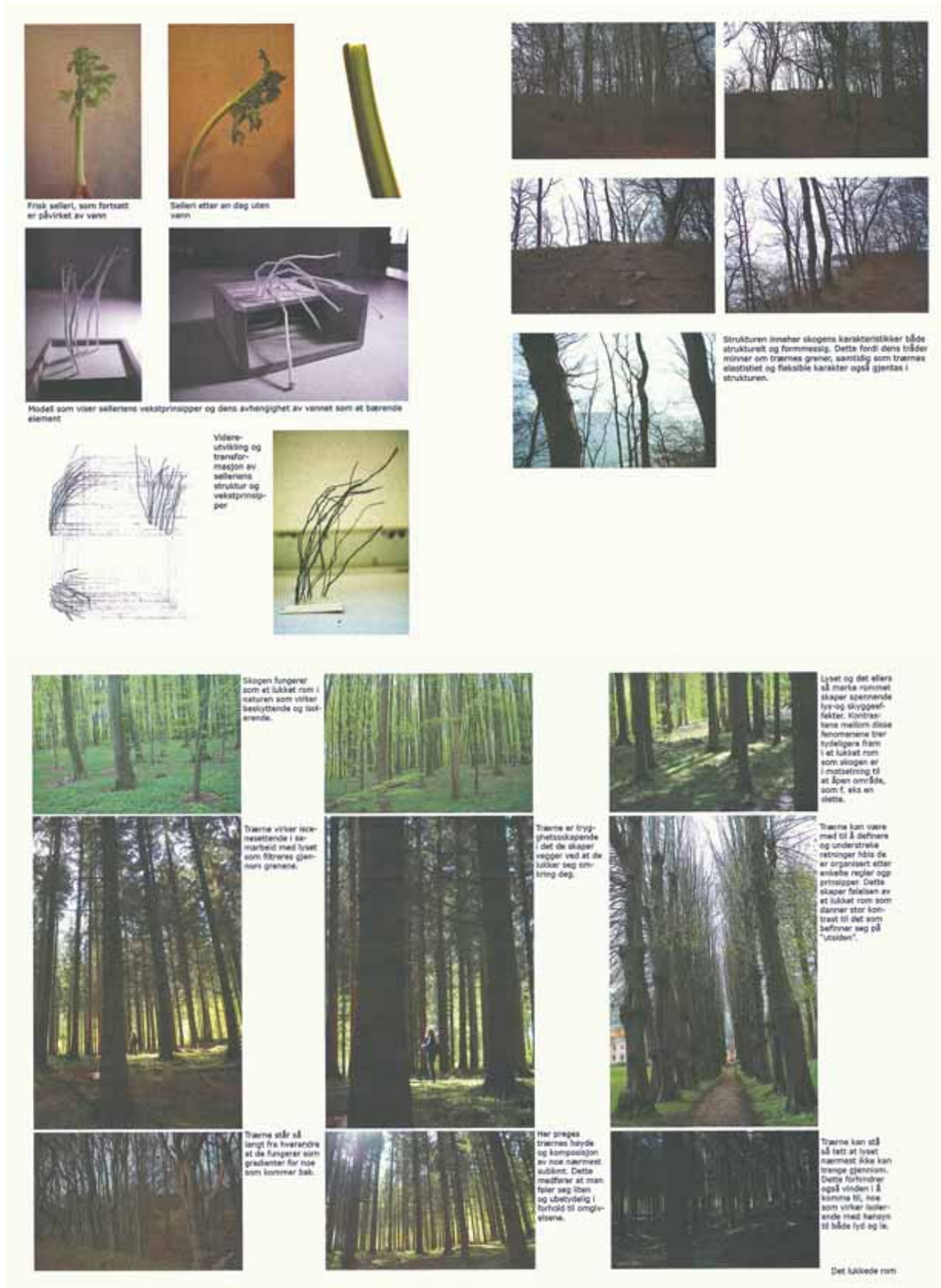
Phase 1: From Object to Seriality to Structure

Studies of a celery. The students were told that all drawings in the submission material should be hand drawn with pencil.
Photo and drawing.



Phase 2: Context

Readings, comparisons and translations of different natural growth forms. Photo and drawing.



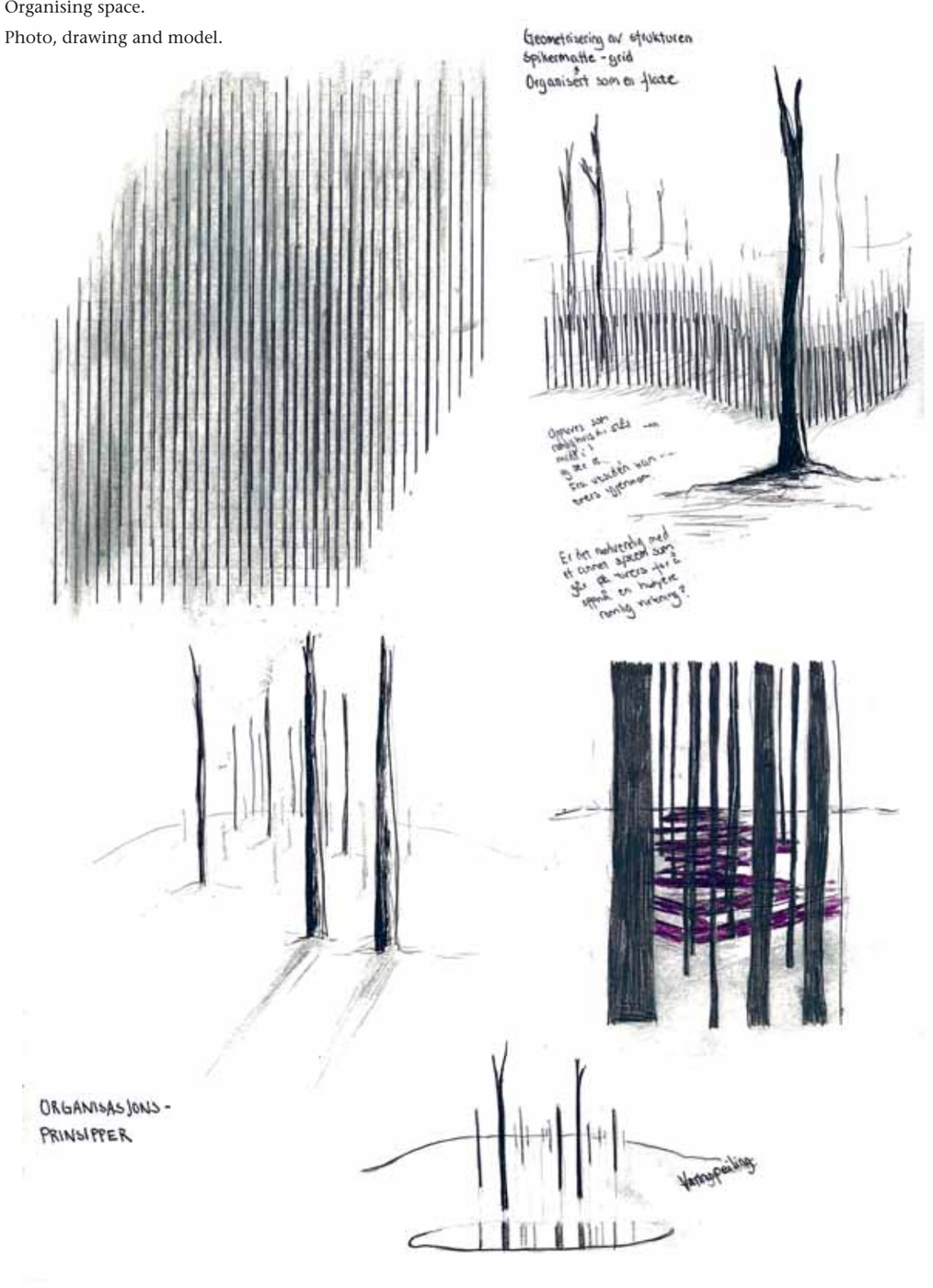
2.6.6

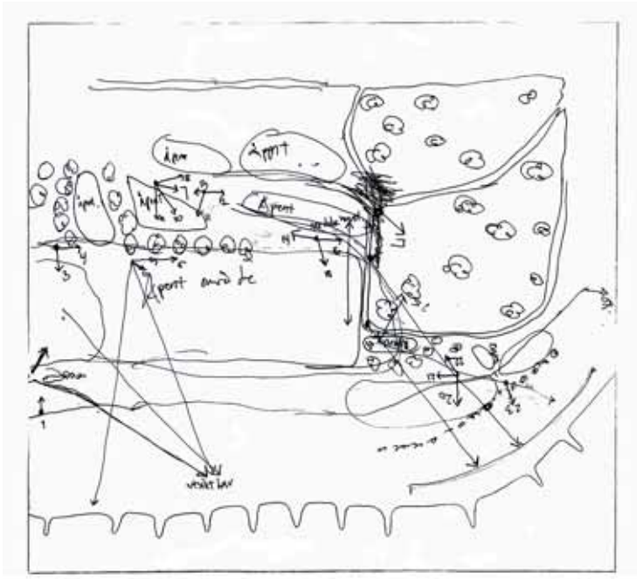
LINN THERESE FENES FORREN

Phase 2: Context

Organising space.

Photo, drawing and model.



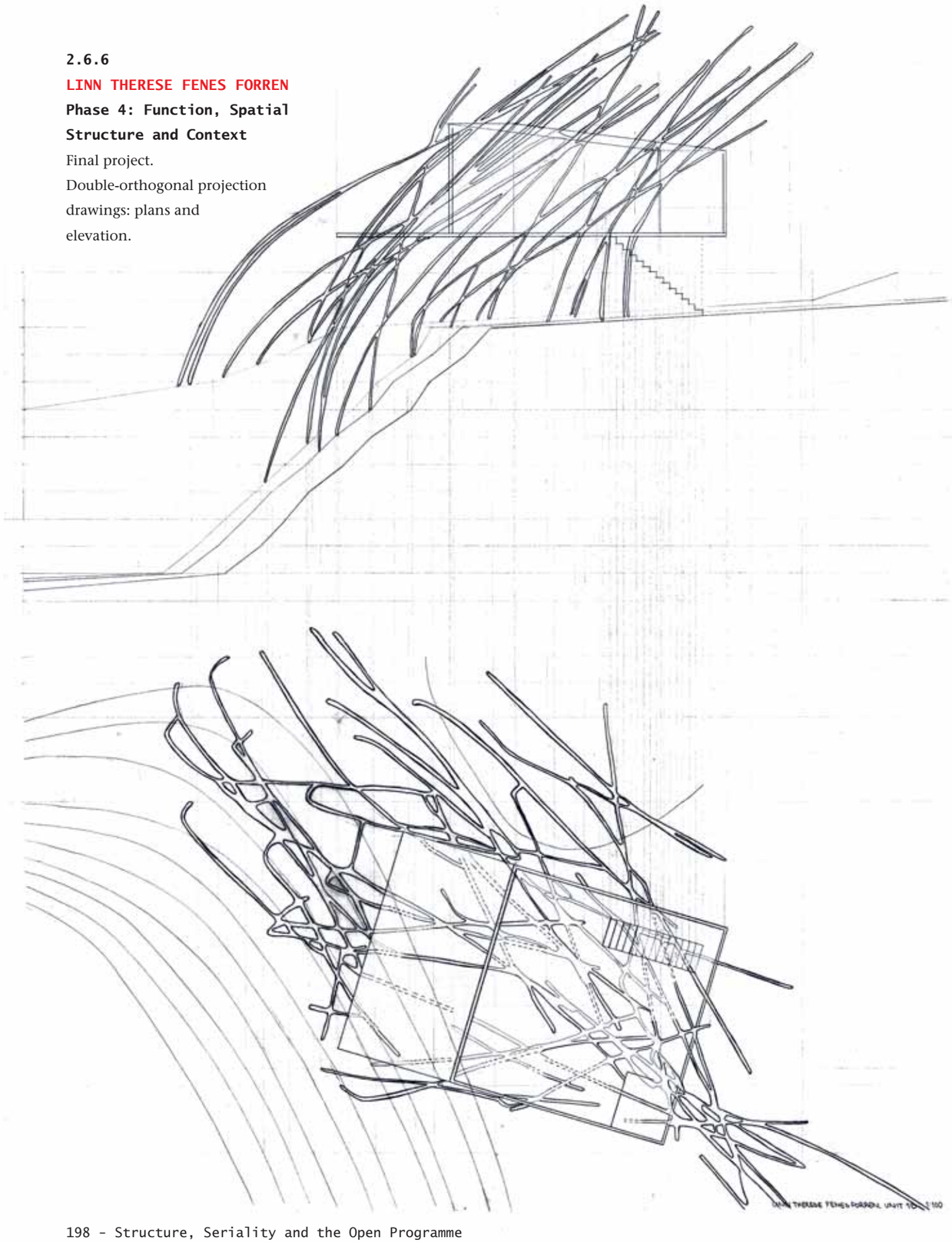


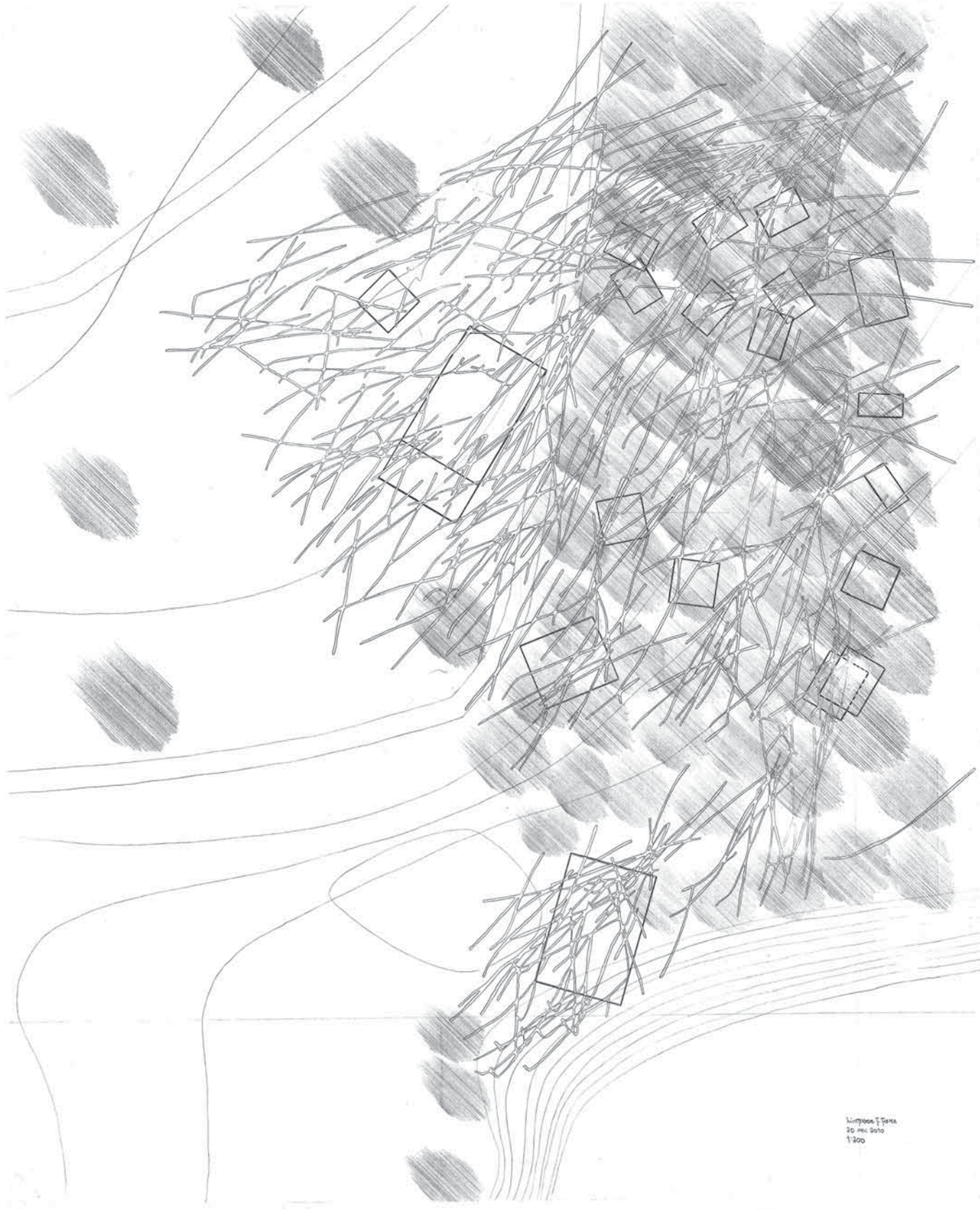
2.6.6

LINN THERESE FENES FORREN

Phase 4: Function, Spatial Structure and Context

Final project.
Double-orthogonal projection drawings: plans and elevation.





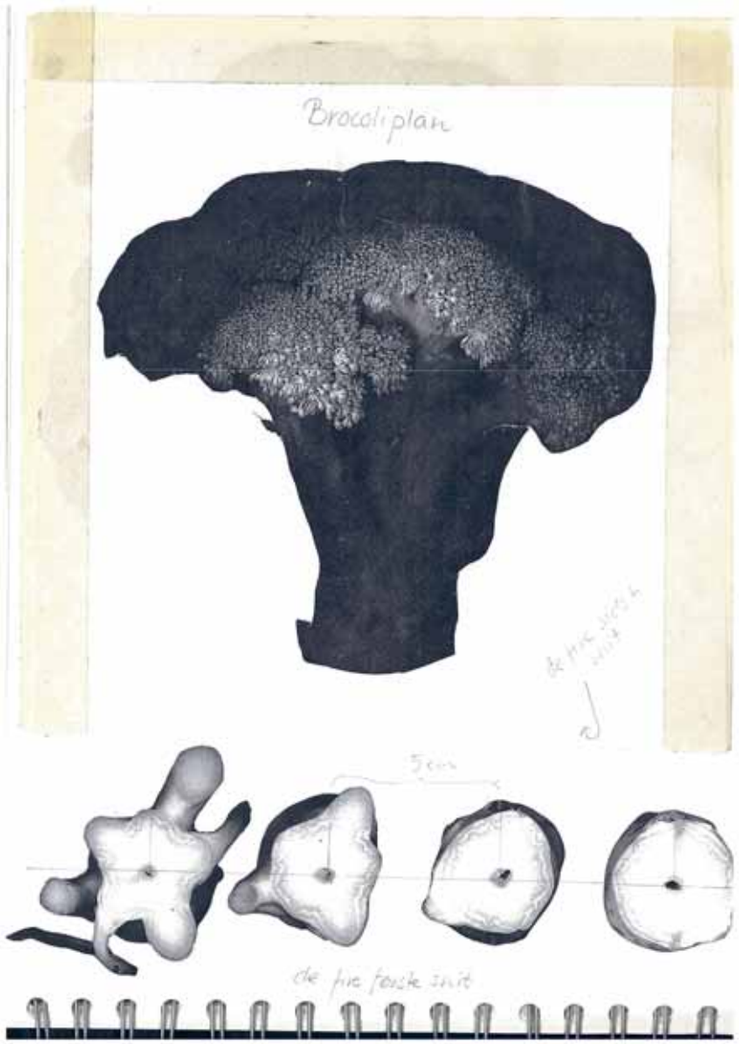
2.6.7

ANN PEDERSEN

Phase 1: From Object to Seriality to Structure

Studies of a broccoli.

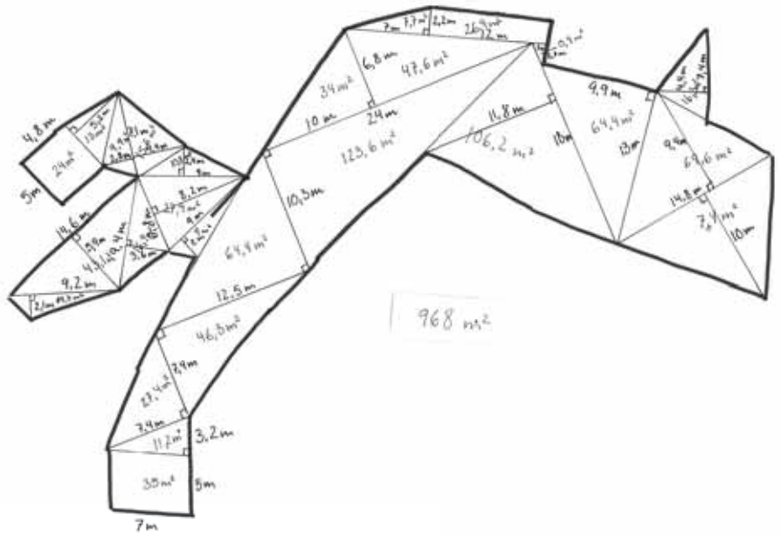
Photo and drawing.

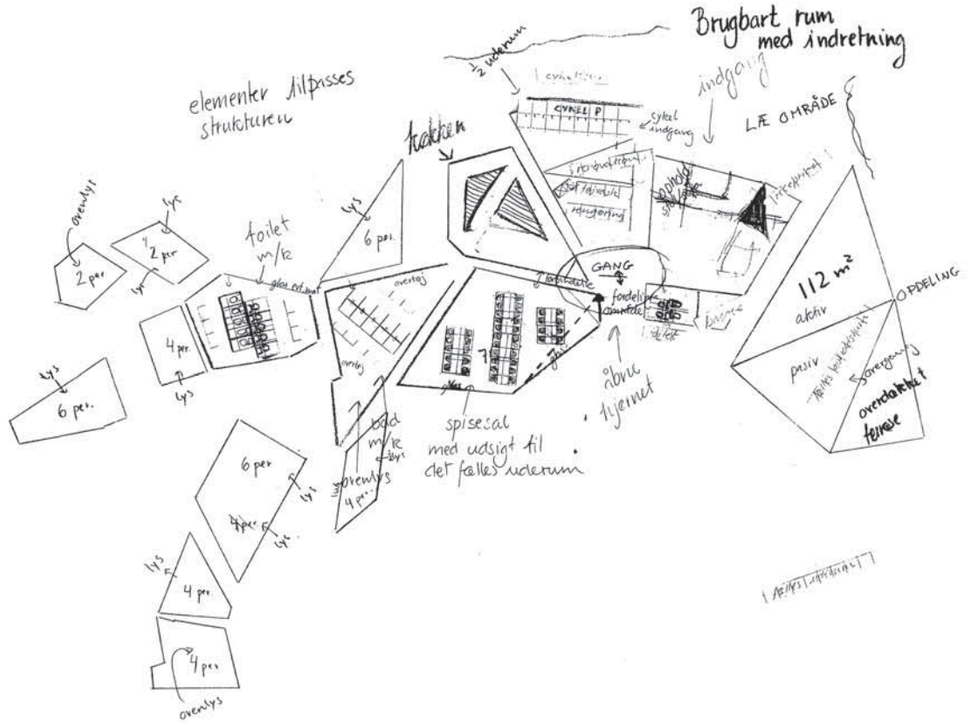


Phase 4: Function, Spatial Structure and Context

Analyses of the programme of the youth hostel.

Drawing.





2.6.8

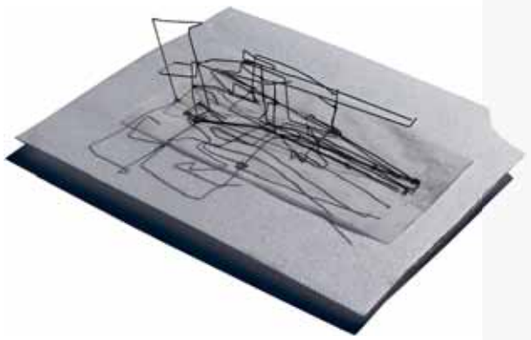
GITTE LANGBORG HANSEN

Phase 4: Function, Spatial Structure and Context

Final project.

Point of departure was an analysis of the structure and the growth principle of an onion.

Models.



2.6.9

SIMON MOURITSEN

Function, Spatial Structure and Context

Final project.

Point of departure was an analysis of the structure of garlic. Model.

2.6.10

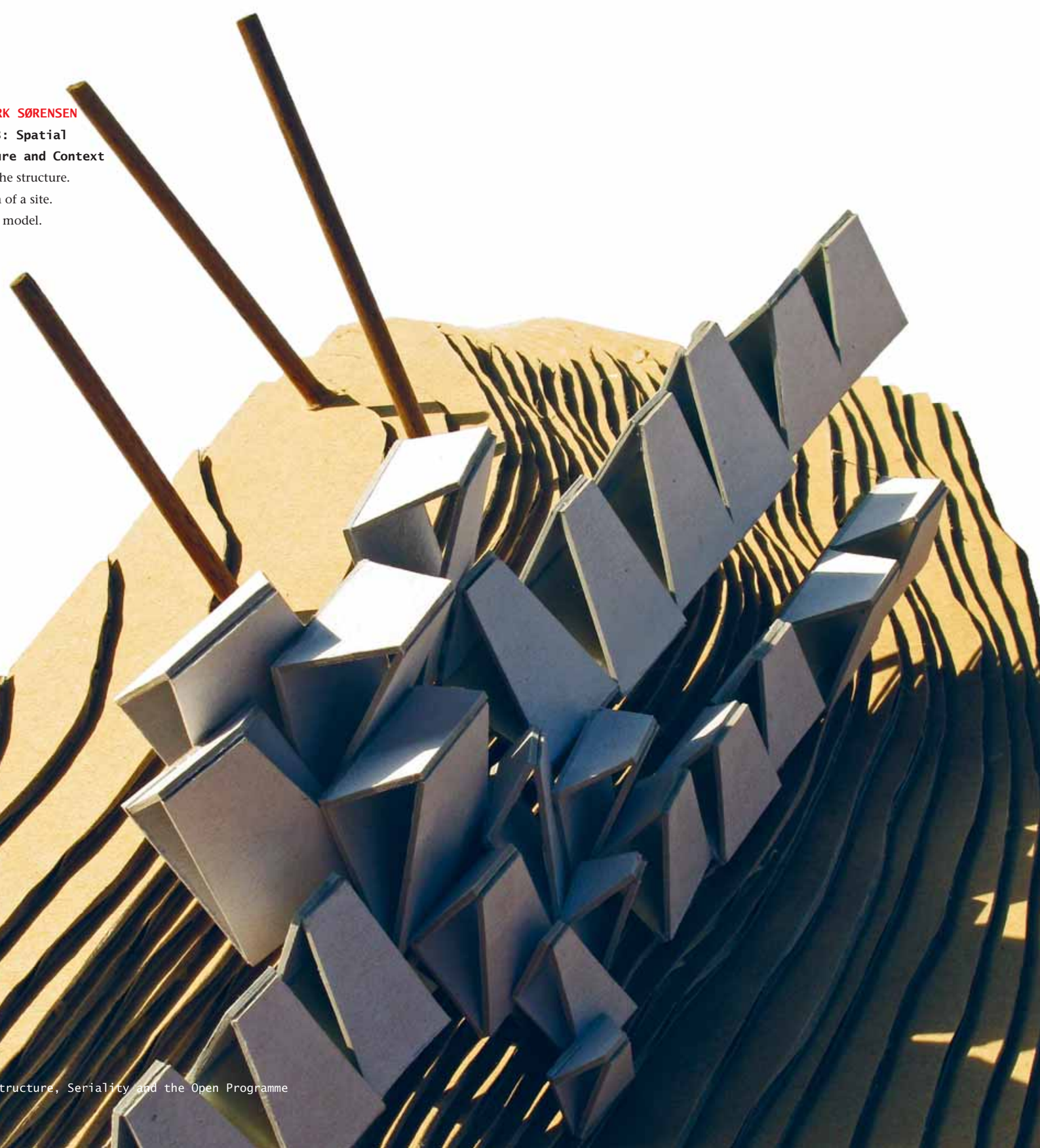
JAN PARK SØRENSEN

Phase 3: Spatial Structure and Context

Testing the structure.

Selection of a site.

Working model.



Testing the Structure

Point of departure was an analysis of an oyster mushroom.

Working model.

Context 2: SCHOOL IN A CITY, CITY IN A SCHOOL

Gerard Reinmuth

In this age of intense globalisation and the participation of cities in an international competition for inward investment – which includes the education industry – the relation between the physical aspects of a place and the intellectual capital assembled there is critical. The architecture school in Aarhus occupying as it does a network of buildings at the northern edge of the old city creates an interesting case study of the negotiation of a specific constellation of spatial conditions and the resultant cultural and education practices.

Aarhus is located on the east coast of Jutland, where the Aa River empties into the Kattegat – the body of water that stretches from Jutland to southern Sweden. This proximity to the harbour explains the city's existence - which stretches back until at least 700AD when it was founded as a trade centre which later grew in response to an expanded trade network which stretched from Germany to the Baltic Countries and the Jutland peninsula. This history has had significant impact on the form and structure of the inner city which, to this day is dominated by an industrial harbour which remains one of the largest in Northern Europe.

The city chooses to see itself through alternate lenses – as a provincial capital which competes for investment against a constellation of similar but smaller cities (which together form the recently labelled East Jutland Million City[1]) or as a hub within an international network. The most successful periods in the city's history – such as the 1980s when the music and arts scene exploded – emerged in the moments when this binary thinking was supplanted by another perspective. These moments saw a confidence in local practices leading to inward investment in them which in turn enabled the production of cultural or trade activity of international consequence.

The primary reason for the school's location in Aarhus was a desire to train more architects from Jutland – a pressing concern in the 1960s and 70s. However, Aarhus was the logical location for Denmark's second architecture school for a number of other reasons, not least of which was its capacity to boost an existing constellation of cultural and student activity. For example, the town boasts a significant university, The Conservatorium of Music and the Danish School of Journalism and Engineering College. On the cultural front, the city has a long visual arts history culminating in a major arts museum (ARoS) and the Aarhus theatre and is the home of a number of significant festivals of national significance. The focus on Aarhus as a centre for education and the arts has resulted in the city's population being younger and better educated than the Danish average - Aarhus University alone has fourty thousand students where the inner-city population is only two hundred fifty thousand. This university town status has made Aarhus an attractive place to study – it is not unreasonable to compare it with to other centres internationally such as Salamanca in Spain or Bologna in Italy.

However, recent history has not been kind to the city. This one time capital of the Danish music industry, home of innovative education practices and research and producer of the architects who currently run the biggest offices in Denmark[2], Aarhus has watched Copenhagen ascend over the past fifteen years from financial ruin to become a major international centre. With some clever strategic investments in the city and regional infrastructure along with a range of programs designed to build cultural production, Copenhagen has an enviable position in the globalised economy network as an internationally popular destination.

Aarhus has come to suffer from a 'second city' syndrome

whereby its inhabitants define themselves and their city in respect to the capital rather than focusing on the inherent qualities and potential which exist in their specific place. Recent commentary in the Danish press[3] has focused on this current malaise and suggests a continued trajectory of investment loss – in both cultural and financial terms. The city now feels threatened not only by Copenhagen but from nearby smaller cities such as Horsens and Herning who have increased their competitiveness in recent years. This rise of these smaller cities has further diminished Aarhus centrality and replaced it with the concept of the East Jutland, one hundred mile city of which Aarhus now merely forms a part.

The Aarhus School of Architecture has a significant role to play in the city given its mandate and its location on a key hinge point at the northern edge of the old town. Unlike architect CF Møller's[4] still remarkable Aarhus University Campus which abuts its western edge, the Aarhus School of Architecture is embedded directly in the fabric of the town itself. When this condition is extended by the constellation of bars, cafes, offices and retail outlets in and around the School's various built fabric and whose economy they depend, separating the School and city becomes difficult. To be in the centre of Aarhus is to be in an architecture school, and visa versa. This level of integration means that the transformation underway at the school will have significance beyond the immediate impact on school structure and education practices. For, any changes in the school will also be changes in the city. The opportunity exists for the school to be a catalyst for a new phase of confidence and growth in the city given its potential as a laboratory for the renewal of Aarhus in both physical and cultural terms.

The School in the City

The Aarhus School is located in the centre of the city - at the point where the old city centre and the harbour assemble around the major artery of Nørreport – the school has spread over the years from an initial site of two or three buildings to acquire a major part of the northern quarter of the old town centre. The result is a genuine city campus model, but in this case one that has gone positively viral. The School spreads through existing building stock and adjacent courtyard spaces, accepting the conditions of the city as given. There is very little adjustment to the buildings occupied by the school even though a range of functions from office, studio, library and workshop occupy similar spaces. The auditorium is the only major new building in the entire campus. The result is a rich spatial experience for students who find their work spaces constantly pressing up against the city.

To traverse the school is to traverse the city – not just on the ground plane but also in section. Any visitor to the school is engaged by this magical campus condition, threading its way through the north quarter of the old city and occupying whatever buildings were available via whatever means available. The extent of the school is perhaps best understood by connecting to its wireless internet service which seems to provide reception for much of the inner city, given the spread and thread of the campus.

This exercise in contingency - occupying available buildings as they become vacant and on whatever terms are possible - has resulted in some remarkable teaching and workplace spaces. Studios occupy a dizzying array of spaces from medieval storage buildings to an old school gymnasium and merchant houses. The spatial wonder has its negative side – there is a fragmentation of studios from one another and a disconnection of staff offices not only from their own studios but from each other. The campus is an obscured multi-division network, in short a great place to hide.

The Canteen

The canteen is heart of the school - as it is with any Danish workplace where staff still eat together at the same time each day. The canteen space straddles three adjacent conditions which form a courtyard space which functions as a suntrap, enabling outdoor dining well into autumn. The interior of the canteen is a typically Danish blonde timber room where everything is understated but of high quality. Seating is communal as it is in most Danish workplaces, which in this context means that staff and students eat together. Thus the informality of the Danish education system in regard to the teacher-student contract is manifest here where it is not uncommon to see the Rector eating their lunch alongside a group of first-year students.

Beyond the connectivity between staff and students the canteen also serves to represent the entire school to itself on a daily basis. Subsequently the Aarhus School of Architecture is very aware of itself, what it looks like, who is involved and what they do. This daily registration of the collective identity of the school nurtures a sense of this collective in cultural terms. To not attend the canteen for two weeks is to lose touch with the school and what is going on within it.

The Library

The library sits adjacent to the canteen in a two level building which has been subtly transformed for its new purpose. Despite its relatively small scale, the complex form of the library spaces and their extension over two levels makes its something of a maze – perhaps the archetypal nineteenth century private library as exemplified by John Soane's own house and library in London. Within this incredibly small space stairs and bridges intersect rows of book shelving and create nooks for private workplaces and small meetings.

The Studios

As has been discussed, the dominance of the design studio in Danish architectural education is significant. At the Aarhus School of Architecture, studios are located in a range of buildings from old industrial sheds to school chemistry laboratories or gymnasia - in each case thoughtfully customised to operate as a studio or critique space. The result is a wonderful collection of rooms, each with a distinct identity and environment. The raw base palette and loose-fit flexible form of inhabitation ensures that studio spaces are robust in nature and invite experimentation and engagement - unlike the anodyne 'office environment' studios space which can be found in many architecture schools today. Every student at the school has their own space which they occupy for the full academic year, reinforcing the curriculum which remains incredibly studio-centred and places the student in the studio as the centre of their educational experience. As students' progress through the school from year to year, each of these studio spaces is enjoyed in turn until, by final year, students have completed something of a city tour.

This combination of robust physical environment and the allocation of a space to each individual student results in two key outcomes in terms of the educational experience. Firstly, it is not difficult to encourage each student to effectively live and work in the studio, confirming the centring of their education on the place in which they occupy. In contrast to many other schools worldwide where students attend a 'studio' for a single day per week to present their work, students in Aarhus are visited by their teachers at their desk, sometimes on a daily basis. This leads to the second outcome - teachers are regularly faced with the full output of each student and are thus able to assess their progress with a full grasp of the material being produced. In this format, tutors are able to bring to a student's attention certain aspects of their work that may not have been considered important and would not have even made it into the studio in the weekly-contact model.

The location of each student year or masters unit in their own dedicated studio space also enables each student to constantly measure their progress against that of their peers. In this transparent environment, students are constantly able to assess themselves in the context of the wider group. The result is an enriched learning experience where knowledge transfer between students is maximised and where a subtle and positive form of competitiveness between students is constantly present.

The Extended Campus

The thread of the campus throughout the city has led to its extension throughout the city in conceptual terms in the form of a series of public venues located between the school and town centre. In particular, three bar/restaurants – all located within one hundred and fifty metres of the school and within eighty metres of each other – have had a significant role in the culture of the school over the years and in the interface between the student and staff body. The first of these, Café Englen, remains a sort of off-campus headquarters and is the site of many formal and informal meetings between staff. Across the road, Drudenfuss is predominantly visited by students and also provides a form of income for students' who sometimes work there. Around the corner, Le Coq is literally two venues in one – a cheap bar for students located side by side with a up-market restaurant where staff regularly host invited guests.

These three venues extend the school to the epicentre of the Aarhus city as defined by the church and town square. The resulting network of campuses' and associated connections takes in the full northern quarter of the old town. The school is the city, the city is the school.

Endnotes

1. Miljøministeriets Landsplanredegørelse, 2006.
2. The Aarhus Cluster of Architects: A (short?) story of Competitive Comradery. Presentation by Tine Nørgaard, 24.03.10. In the 1990s a new breed of architects who had trained in Aarhus in the 1980s effectively took over the Danish profession in terms of practice size and volume of work done. Key among these are Schmidt Hammar Lassen, 3XNielsen and CUBO.
3. For an example of this, refer to the major article in Danish daily newspaper Politiken in its weekend edition on May 8 titled "Kunstdirektør: 'Århus har storhedsvanvid'".
4. In 1931 CF Møller in collaboration with Kay Fisker and Povl Stegmann won the master plan competition for the new Aarhus University.

Part Three

AUSTRALIA

3.1

A PRACTITIONER IN THE ACADEMY

Gerard Reinmuth

"While other comparable professions have historically embraced research and have prospered in line with the reputations of their schools, architecture has tended to lack credibility in the academy precisely because it has been seen as overly focussed on the needs of industry."[1]

Being invited to the Aarhus School of Architecture as a Guest Professor posed a challenge precisely because I was not invited to participate in the Masters program. A role in this program would be familiar and a typical arrangement for an overseas Visiting Professor, as one can rely on the questions currently being asked in practice as a basis for teaching students in this context. This model can be seen in Masters Programs is most universities from the Architecture Association to the Harvard University GSD, where Visiting Professors run studios as an extension of practice or in the case of younger architects, in preparation for it. However, by asking a practitioner such as myself to engage in first year, Torben Nielsen and his team extended the paradigm they had established whereby the PhD-level research agendas of Toft and Gammelgaard Nielsen would now be complemented by a practitioner's research agenda which also had to be understood in terms that enabled its deployment in a first year education context.

Being asked to engage with first year students subsequently required a different level of preparation – both intellectually and in the terms of the content I would contribute – that might have occurred for an appointment to a Masters program. Rather than introduce students to a program based on current research questions that have engaged our practice, I was forced to reconsider the more fundamental relationship between the academy and practice to find a starting point.

A Tri-Polar Practice

Michael Ostwald's above quote – regarding the dilemma of practice engagement in the academy - is a core subject in the architectural office I co-founded with Richard Blythe and Scott Balmforth in 1999, TERROIR[2]. At the time, the split between the academy and practice in Australian schools had reached the point where the two fields were in considerable conflict. Michael Ostwald explains this as follows:

"In the early 2000s practitioners and the profession demanded that architectural education develop in one direction, while the requirements of universities and the wider community were gradually pulling it in another. Francis Duffy argues that "this situation is inevitable; 'both the teaching and the practice of architecture are firmly embedded in society and, when society changes, both must follow.' The end result of this situation is that the fabric of architectural education had become stretched taut between the conflicting desires and commercial realities of its stakeholders."[3]

We responded to this impasse with a tripartite practice structure which straddled the spectrum from the academy to practice in precise terms. Firstly, Richard Blythe - although an owner and co-Director of the practice – is a full-time academic. Richard's contribution is in the form of a critical perspective on the design of the practice itself and the way it designs individual projects. The second Director, Scott Balmforth, is fully engaged with the practice and the act of bringing the buildings into being (through designing, documentation and construction) while also holding a role as Adjunct Professor at the University of Tasmania. My role as the third Director is to straddle these two worlds, working on both the design and construction of buildings while also being engaged with the academy in the roles of Professor in Practice[4] at the University of Technology in Sydney and the appointment as Visiting Professor at the Aarhus School of Architecture.

This structure represents a serious attempt to address the conundrum around practice-academy engagement and collaboration and represents a substantive investment in doing so. It also positions us very clearly with a respect for the complementary forms of knowledge held between in the two arenas. Given this respect, we argue that the value of bringing a practitioner into the academy will not be found in attempts to simulate practice such as the preparation of construction drawings, having a simulated client situation or via the construction of small projects – that is, by compensating for a perceived gap in what happens at the academy. Rather, we see the value of bringing a practitioner into the academy is the potential to engage with critically with practice-based problems, most particularly by engaging in design as a research activity.

Design as Research

Given the schism that existed between the academy and practice when we commenced TERROIR, we were inevitably attracted to the one institution where this engagement between the two appeared to be most productive – at the RMIT University of Technology and Design (RMIT)[5]. For over twenty years, Innovation Professor Leon van Schaik has developed a program at RMIT which has effectively bought Australia's leading practitioners into the academy to reflect on their work as a research activity.

TERROIR Director Richard Blythe subsequently became Head of School at the RMIT School of Architecture and Design where his current focus is in further elaborating upon van Schaik's substantial work on research-by-design. Blythe describes research by design as follows:

"Design research operates on the premise that the very act of designing results in new knowledge, in other words, that design is not simply an application of knowledge gained elsewhere but rather through the action of designing we come to know the world in ways that we did not know it prior to designing."[6]

This distinction – that through the act of designing we come to know the world in new ways, is central to Blythe's position. He understands designing a projective activity – as opposed to the non-projective way in which the canon is addressed in other forms of research.[7] Research-by-design can then be understood as research based on the generation of new knowledge:

"Design research is that kind of design that is motivated by a question(ing) rather than focused primarily on providing solutions to defined problems. Design research is in this sense venturous because it seeks to move beyond that which is currently understood – it moves boundaries, both of practice and also of the tangential and associated fields in which design becomes entangled."[8]

Yet, the very concept of research-by-design remains highly contested, particularly by some career academics who, with little or no actual design experience and locked into existing research paradigms, struggle to see how design can in fact be research. Therefore, when invited to the Aarhus School of Architecture, it was somewhat remarkable to observe that this contest is however largely absent there. Founded as it was with a mandate to increase the size of the profession in Denmark, the school has never seen the academy and practice as being in conflict despite the art-based training at the school. The centrality of the design studio in the school – as discussed elsewhere in this book – embeds this free engagement between theory and practice at the centre of the education. Head of Research at the Aarhus School of Architecture, Claus Peder Pedersen, describes the situation as follows:

"Academic research at the school is trying to contribute to and enter into dialogue with design practices and at least respect the kind of knowledge being produced through this approach, while the approach to design is one of trying to incorporate academic knowledge without perceiving it as scientific corrective to intuitive rummages."[9]

Having established that a level of synchronicity existed between TERROIR and that of the Aarhus School of Architecture in regard to the academy-practitioner divide, the question turned to how one might find gaps between the two approaches to provide a productive site for engagement.

Visiting Professor

This gap was found in the disparity that existed between TERROIR and what I observed at the School in terms of dealing with the discipline itself.

Just as a craftsperson approaches a material with a particular type of knowledge common to those engaged in that craft but unavailable

outside that discipline, a practising architect has a specific type of relationship with buildings. This relationship is based on the constant use of buildings as a resource in the design process and thus might include knowledge about canonical works such as construction, planning, detailing, scale, light or treatment of services and structure. Thus, a practising architect may not know the full theoretical frame within which a building sits as established by the academy. However, via direct contact with and detailed knowledge of the work, they may be able to bring it into the design process as a live design tool.

The Aarhus School is aware of the advantages of their studio-centred approach which involves a high emphasis on problem solving.[10] However, as I have noted elsewhere[11], there are some disadvantages given the way that this studio-based education is not located within a broader education about the discipline. The result is a definition of practice which is narrowly defined to the studio activity rather than as an endeavour which encompasses a full engagement with the discipline and with the issues and constraints which guide the development of an architectural work in practice.

These structural issues impact most significantly in first year, where students start working on architectural problems without any detailed knowledge about the history of architecture or its practice. Engagement with practice has historically commenced in second year, but via an attempt to "simulate" practice via a studio assignment such as a house project which is then addressed in a level of detail said to engage with the world of practice. The disjunction between the two years is highly problematic. It has literally been a case of going from one extreme to another.

In an attempt to question this situation, The Aarhus School of Architecture therefore chose to commence my Visiting Professorship in first year and at the start of their second semester – after the students had been introduced to basic drawing, model-making and introductory studio exercises, but well before they had been introduced to buildings in any form beyond some introductory lectures on architectural history.

We can now reiterate the question. How can a practitioner make a substantive contribution in a school that sees little schism between the academy and practice? The answer was found in a single "event" that coincided with the duration of the Visiting Professorship and which is a traditional part of a young architect's training – the study trip and in this case, one focused on a single iconic work.

Australia

In collaboration with Nielsen, Toft and Gammelgaard Nielsen, a study trip to Australia was proposed that had the potential to address the questions raised above by structuring the trip around three key components. First, by making the Sydney Opera House a focus of the study trip the students would engage with a project that is familiar to Danish students. This familiarity is expressed both through its documentation but also through a number of distinctly "Danish" motifs and details used throughout the project that can be regularly found in work of that era in Denmark with which the students would be acquainted with - even though many had never actually directly experienced the building. Secondly, the strain and stress of working in another country, with other collaborators[12] and in another cultural context, was considered the most direct means of exploding student reliance on their (now familiar) studio environment. By forcing a direct engagement with another culture and another place, the students would have to re-think the knowledge and working methods they had gained in the first semester and consider how these might be deployed or need to be adjusted, in a new context. Finally, Australia simply presents in physical terms a profound contrast with the Danish landscape, climate, and understanding of culture and landscape.

The study trip was therefore designed in three parts.

Part One: The Sydney Opera House

The engagement of students with The Sydney Opera House started in Denmark, one month before the tour. After I had delivered an initial suite of six lectures[13] a symposium was organised which featured additional perspectives on the project. These were provided by the Director of the Utzon Centre, Adrian Carter, academic Michael Asgaard Andersen and Jan Utzon (son of Jørn Utzon) who continues the Utzon connection with ongoing renovations to The Opera House.

The purpose of these introductory lectures and symposia was to open up the students to the potential for new readings of the Opera House, as a result of their direct experience of it once in Sydney.

Part Two: Workshop

While the opportunity to engage with The Sydney Opera House could be considered substantial in its own right, the potential existed for Danish students to actually work in a different context. Therefore, The Aarhus School of Architecture engaged with the University of Technology (UTS) in Sydney in the form of a workshop hosted by UTS where two Aarhus students were joined with two UTS students, resulting in a two hundred and forty students working together for ten days.

The result was a workshop focused solely on the Sydney Opera House and the potential to use the building as a tool in research by design. This workshop is outlined in more detail in the next section.

Part Three: Sprawl and Desert

Whereas the Sydney Opera House workshop involved a stationary group of students visiting a single project every day for ten days, the final part of the study trip involved transporting the one hundred and twenty Aarhus students and their ten teachers to the far west Australian outback of Broken Hill , a one thousand two hundred fifty kilometres from Sydney.

This journey occurred in two parts. The first was a tour from the centre of Sydney to the Blue Mountains, via some of western Sydney's most engaging suburbs. The Danish students were able to experience a series of multi-cultural environments, McMansions, older suburbs and natural landscape. The second part of the journey was a twelve hour train odyssey from Sydney to Broken Hill, passing through the Blue Mountains and western New South Wales before terminating in the desert.

The Australian desert is an iconic landscape with characteristics that are extremely unfamiliar to a group of Danish students, not least of which is the sheer length of the journey required to get there. Once in the desert, the question was how to engage students with this landscape beyond the superficial gaze of the tourist, and how to apply the recently acquired skills of looking daily at a specific built context (previously the Opera House) until its potential to influence an in-situ project could be understood? In addition to this form of contextual engagement, we sensed that the abstract nature of the desert had the potential to stimulate innovation in terms of tools, logistics and collaboration. Subsequently, a workshop was designed to stimulate a multi-layered engagement with this place, the results of which are outlined in the next section.

Conclusion

The two assignments outlined on the following pages - on The Opera House and Broken Hill respectively – constitute a form of engagement between the academy and practice that attempts to address gaps in the education of which the students' had received to date prior to the commenced study tour. In both cases, a form of research by design has driven the projects, opening the students to the potential which lies in the canon and alternately in a specific place to inform projective architectural explorations.

The concept of embedding a major study tour into the first year program at Aarhus is now firmly established. It provides a future venue for the academy and practice to engage at the very commencement of an architecture degree, thus giving students an awareness of the potential of both arenas to contribute to a rich architectural education. Finally, these study tours have the potential to provide the ultimate proof of the value of embedding serious architectural research agendas in the first moments of education of a prospective architect.

Endnotes

1. Ostwald. M. & & Williams. A., 2008, 'Understanding Architectural Education in Australasia: Results and Recommendations', *Australian Learning and Teaching Council*, Vol.2, p. 24.
2. For a fuller account of TERROIR, its structure and its activities refer to http://www.terroir.com.au/.
3. Ostwald.M & & Williams. A.2008, *Op.Cit.* p. 9.
4. From 2005 Gerard Reinmuth was an Adjunct Professor at The University of Technology, Sydney, and became the inaugural Professor in Practice in February 2011.
5. This program was commenced by Leon van Schaik (who still runs the program to this day) and has since developed the course to become an internationally leading exponent of research by design. The RMIT School of Architecture and Design which hosts the program is now run by TERROIR Director Richard Blythe in his capacity as Head of School.
6. Blythe, Richard. Notes on Research by Practice provided to Research group at the Aarhus School of Architecture for a seminar in April 2010. These notes have been completed as preliminary work for a forthcoming book on practice-based design research.
7. Blythe notes 'Other kinds of research mistakenly claim to be design research. For example, some kinds of research deal with the social circumstance of designers as they design, a kind of observational model in which designing as a subject is observed, reflected upon and speculated about. Although relevant in its own right, this is not design research since the researcher spends most of the research effort in activities other than design. The work proceeds by means other than designing.
Research that deals with histories of design is a second example of a kind of research that is sometimes mistakenly represented as design research. In this case design is contextualized within a history of design and research proceeds on the basis of historical excavation, reinterpretation and description. Again it may be of interest to designers . . . but it is not a primary concern of design research. Usefulness or productivity of research for design is NOT evidence that the research is design research.
A final example is theory. All research, indeed most human activity, involves a level

of theorization. We develop reasons for the nature of things as part of our daily business. Design research also engages in this kind of theorizing of its own position but robust theories of design research arise from the practice and close observation of designing. Design theory does not proceed from other forms of critical theory to find application in design. Theory that proceeds in this way is design theory and may well be legitimate research, but it is not design research. Rather design research begins in designing, in the close observation and recognition of key points that result in an informed thinking that extends what has been observed.' Blythe, Richard. Notes on Research by Practice provided to Research group at the Aarhus School of Architecture for a seminar in April 2010. These notes have been completed as preliminary work for a forthcoming book on practice-based design research.

8. Blythe, Richard. Notes on Research by Practice provided to Research group at the Aarhus School of Architecture for a seminar in April 2010. These notes have been completed as preliminary work for a forthcoming book on practice-based design research.

9. Pedersen, Claus Peder. Email discussion with the author. Nov 13, 2010.

10. Reinmuth.G., 2010, 'Context 1: Architectural Education in Denmark' , Article in this book, p.24.

11. As articulated in authors article 'Context 1: Architectural Education in Denmark' that identifies the marginalisation of theory and history studies that are dominated by the role of the design studio at the Aarhus school, p.24.

12. The students from the Aarhus School of Architecture worked alongside students from the University of Technology (UTS), Sydney, where I have been Adjunct Professor since 2005 and Professor of Practice from 2011.

13. See the next chapter of this book, 'The Opera in Three Acts', pp. 230.

3.2 THE OPERA IN THREE ACTS

The Sydney Opera House

The Sydney Opera House is, for different reasons, a vexed project in both the Danish and Australian context. In Denmark, the problem with the Sydney Opera House appears to lie in its exceptionality. It is not unreasonable to say that the project – while deeply informed by a Danish sensibility – is uncharacteristic when considered in respect to the Danish architectural canon. The expressiveness and daring nature of the design is completely out of step with an architectural tradition that, until recently, resisted overt expression. Most of the key works over the previous century in Denmark rely on simple geometric figures and tight detailing, with this austerity balanced by a predominant use of brickwork to provide texture and colour to what are often extremely large unbroken surfaces. Jan Utzon has described the gap between this tradition and his father's work in a typically shorthand manner, referring to the fact that his father would often come second or third in Danish competitions, while the winner was always a 'boring box.'[1]

This aesthetic rupture was in my view a central but rarely acknowledged ingredient in Jørn Utzon's ostracisation[2] upon his return to Demark in the late 1960s and his subsequently minimal involvement in teaching or practice there for the remainder of his life. While Utzon's difficulties in Denmark have often been explained as a response to his actions in Sydney which had somehow let down other Danish architects working internationally - and the image of Danish architects generally - it might be closer to the truth to simply say that conceiving of a project so radically exceptional was in itself reason for punishment by a profession experiencing a collective bout of schadenfreude upon his dismissal.

In Sydney, the situation is no less problematic. While our practice engages passionately with Utzon's work as an informant to our design thinking on a range of projects, we have given a wide berth to the 'Utzon industry' in Australia. Utzon remains either a subject of worship among his followers and one of intrigue by those trying to piece together the 'whodunit' around his failure to maintain control of the project and ultimate dismissal. We have found neither of these perspectives particularly fruitful nor relevant in practice.

I did not wish to present the Sydney Opera House as a magical achievement divorced from the contexts of its making and the politics around its development during the 1950s and 1960s. However, our practice's interest in Utzon's work - and the design process which underpinned it – is not in these details but in the expansive nature of his design process.

Numerous possibilities, opportunities and suggestions are resident in each of his projects, built and unbuilt. Thus the great pedagogic value in studying Utzon's approach is

the way in which he would continually open up further possibilities at each and every stage of a project. Simultaneously, Utzon would resolve a project down to a 1:1 detail while expanding on the potential of the project in the same moment, letting each piece of information suggest new directions.

The expansive and suggestive nature of Utzon's design process has led to the development of a number of strands within TERROIR's work that have emerged through the utilisation of his work as a tool in the design of our own projects. That is, we have developed our own means of addressing Utzon's work via direct observation resulting in our own speculations rather than limiting our engagement with his work to the accounts of a few scholars. These means of activating Utzon's work in many of our own projects provided a series of frames through which to structure a series of introductory lectures on the Sydney Opera House and related Utzon projects to first year students at the Aarhus school.

The ambitions behind this approach were two-fold. First and foremost was the intention to illustrate how TERROIR use the iconic building on a daily basis in practice to encourage the idea that detailed observation of a built work can provide knowledge to inform one's own work and can thus make a very specific contribution to the education of an architect. Secondly, the potential existed to understand that the lectures might fill a gap in Utzon scholarship, for surprisingly little has been written about Utzon's design process in a projective manner beyond the significant contributions of Weston,[3] Frampton[4] and Mukami.[5]

Via a series of lectures which showed Utzon's work 'in use', it was hoped that opportunities we had seen in both the final realisation of the Sydney Opera House and his other projects - including the abandoned investigations from the journey toward realising his built work - would be made accessible to students. By creating this environment of raw accessibility - as opposed to the awe with which Utzon's work is often presented - I hoped to provide a portal through which they too might feel comfortable in approaching the project as a tool that could be deployed unsentimentally and productively in the design studio.

Introduction

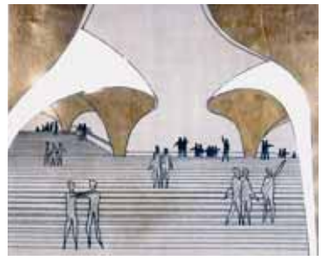
Defamiliarisation

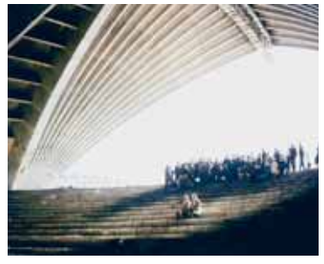
Importation

Mimesis

Inner-Outer

Design Process





Six Lectures

The series of six lectures were developed from a keynote presentation I gave at the second International Utzon Symposium at the Utzon Centre in Aalborg in 2008[6] where I first articulated the frames via which we used Utzon's work in practice. On this occasion, and faced with illustrious co-presenters including Richard Weston and William J.R. Curtis, the strategy of presenting Utzon's work as a tool in practice emerged as a way of staking out ground for the perspective of the practitioner as a complementary field of knowledge and perspectives in parallel to analysis provided through the lens of the eminent speakers also attending.

The lecture series started with an introductory presentation outlining the project in general terms and addressing the procurement issues that plagued it throughout its realisation and has subsequently marked its legacy. The idea in starting with these issues was to get this material 'off the table' providing a clean slate to the following five lectures presented to the students. The project could then be discussed on its own terms. This introductory lecture relied on a number of sources but two in particular deserve credit. A series of conversations with Richard Johnson[7] were important, in particular for the perspective provided, that while the Sydney Opera House has had a massive impact on the Australian cultural landscape, it has also been the source of many later issues relating to the politics around architecture and building procurement in that country. Another valuable source was Alan Murray's book, 'The Saga of the Sydney Opera House'[8] which, by painting an unsentimental picture of Utzon in practice using primary source material to structure his argument as an important tool for creating a space between the prevailing debates on Utzon as discussed at the start of this chapter.

Defamiliarisation

The second lecture, titled 'Defamiliarisation', used Utzon's use of sailing charts and actual sailing excursions around Kroneborg Castle in Helsingor as a means of coming to terms with the context of the project. My suggestion is that Utzon's remoteness from Australia enabled a productive defamiliarisation[9] with that place which in turn allowed him to 'see' patterns and qualities within the Sydney harbour and surrounding landscape that were missed by locals who entered the competition. This idea of using defamiliarisation as a critical strategy in the conception of remote projects promises a great deal in the contemporary context where architectural services are exported globally but a disappointingly low proportion of this work exhibits a successful engagement with contexts that are foreign and/or rarely visited. Yet even without Google Earth, Utzon's reliance on naval maps and his own sailing journeys around Kronborg Castle enabled him to construct an awareness of key issues with its foreign harbour site.

Importation

The third lecture, titled 'Importation' addressed Utzon's constant use of objects, artefacts, or landscapes from outside a project to unlock potential within it which may not be possible otherwise. Whether it was Mayan Temples (Sydney Opera House), coastal navigation markers (Svaneke water tower), Hawaiian clouds (Bagsvaerd Church) or Chinese mountain dwellings (Silkeborg Museum) Utzon possessed an extraordinary ability to draw from travels and research into other architectural traditions as he developed a specific project. Utzon's reliance on what can only be called artistic judgement provides a counterpoint to the neat conceptual development diagrams which hypnotise contemporary students with their reductive explanation of complex projects, reducing architectural strategy to an entirely logical outcome of brief analysis, a simplification of the contextual issues and the instrumentalisation of relevant financial and development pressures. Since this lecture, the publication of Additive Architecture[10], authored by former Utzon collaborator Mogens Prip Buus has filled an important space in Utzon scholarship by collecting Utzon's archive of key references in a single volume.

Mimesis

'Mimesis' was the subject of the fourth lecture. This can be a difficult subject in architectural scholarship and particularly so for first year students who struggle to draw a line between the imitation and representation of natural phenomena and the operative processes or formal logic of the phenomena being studied. Utzon's work is particularly useful in that it contains numerous exemplars of how observations of natural processes have fuelled architectural thinking at a variety of scales. Relevant projects include the interior of Bagsvaerd Church, inspired by clouds in Hawaii, and the design for Utzon's own house in Sydney where a roofing system was developed on the basis of the effect of light coming through gum leaves.

Inner-Outer

The penultimate lecture dealt with the use of the 'inner-outer' condition in architecture. In particular, we are interested in the tension between the inner and outer not as indifferent surfaces or conditions but rather exist in a relation to one other which defines the building's architectural presence.[11] Some of Utzon's key projects create a sense of wonder from the act of passing from the outer to an (unanticipated) inner condition, a wonder which serves to engage us with each other and, where relevant, the surrounding context.

The series concluded with a discussion of Utzon's design process in general terms and in particular this observation of its expansive quality as an inspiration for students first contemplating how to develop a design while first engaging with a canonical architectural work.

By presenting Utzon's work to students in this way I hoped to emphasize the productivity that can be gained from engaging with his work and/or the evidence which exists of his design process. Also, by presenting four insights[12] which have emerged from my own practice's research into Utzon's projects, the students were given permission to make their own speculations and/or projections in regard to the work

and start to think how they might deploy these speculations in their own projects. It was repeatedly emphasised that each of these four insights is rarely or never discussed in association with Utzon, thus placing an importance in the Sydney workshop on moving between scholarly research and direct observations. By showing how we use Utzon's work as a tool, in practice, I hoped to instil in these students – who had worked for a semester in a program which deliberately excluded the canon from the preliminary studies[13] - a sense of how and why a detailed knowledge of the discipline is so liberating when in the act of design.

Alternate Perspectives

One of the undercurrents of the lecture series was the ability to see multiple potential in a project or even in a single element of a project. It was therefore important to

balance my view with others, who, by talking about the same topic but from a different perspective, would indicate to students the breadth of scholarship possible about a single work and the cross section of perspectives which exist even in a closely knit group.

The symposium and lecture content is not covered in detail here. However, the exposure of students to five additional points of view meant that over a three-week period and in two countries students heard the same building (and in some cases the same stories surrounding the making of the building) retold again and again from different viewpoints.

The symposium was held at the Aarhus School of Architecture before the students left for Sydney. The event consisted of a series of lectures and a panel discussion featuring the following speakers:

- Adrian Carter, Director and Founder of the Utzon Centre in Aalborg, Denmark and perhaps the main figure at the centre of any discussion of Utzon and his work;
- Michael Asgaard Andersen, Academic and author of 'Danish Architects Write' who presented a particular perspective on Utzon's siting strategies;
- Jan Utzon, son of Jørn Utzon and collaborator with both his father and Richard Johnson (see below) on the Opera House redevelop ment works over the past 10 years;
- Myself (Gerard Reinmuth), as Chair of the Panel Discussion.

In Sydney, two additional lectures were held which allowed students to compare and contrast the views of the architect who worked with Utzon for the last 10 years of his life on the Opera House, and an engineer from Ove Arup who worked with Utzon on the project and after he departed, continuing to work on the project to this day:

- Richard Johnson – Director of Johnson Pilton Walker was the collaborator with Jørn Utzon and his son for over more than a de cade on the development of the "Guiding Principles" documents which sets down a framework for future adjustments to the Opera House;
- Richard Hough – engineer and Director of Arup who gave an account of Utzon and his design strategies not only from an engi neer's perspective but that of the very practice, Ove Arup that col laborated with him on the project for over a decade.

Workshop: The Opera in Three Acts

In March 2010, one hundred and twenty students and ten teachers from the Aarhus School of Architecture travelled to Sydney to engage in a ten day workshop in collaboration with an equal number of teachers and students at the University of Technology (UTS)[14], Sydney, resulting in a two hundred and forty student strong group working on The Sydney Opera House.

Against the backdrop of the conditioning given to students over the previous three weeks in terms of the lectures and the symposium, the emphasis of the workshop was on the students' own reflections and the development of strategies to communicate these. Students were asked to analyse and communicate aspects of the different strategies in detail, via an iterative process which progressed from observation, notation and reflection and back again. Thus, students were introduced to methods of strategic drawing and representation (as interpretation, not yet moving into deploying these for design) and were then asked to question how these abstract representations of space might influence design thinking.

The Assignment

The Opera House encapsulates various spatial and organisational strategies which are evident in its realisation. To frame this, In a workshop with year coordinators Anne Elisabeth Toft and Anders Gammelgaard Nielsen, generated a total of nine strategies that were selected and subsequently grouped into three

main areas as follows:

Spatial strategies
- Context
- Space
- Staging

Organisational Strategies
- Movement
- People
- The Opera House as a Machine

Material and Construction Strategies
- Base and Shells
- Light
- Materials

The two hundred and forty students were divided into eighty groups of four (two from each university), and rotated every three days between a total of nine different assignments. The result was a total of two hundred and forty separate submissions, each critiqued on the three day cycle. The workshop ended with an exhibition of student work and a party. Thus, every student dealt with only three assignments however gained design variation in at least one project from each grouping therefore giving a broad appreciation of the building and its' potential.

Pin-ups

As discussed pin ups were held every three days, at which the mappings, methods and process used were critiqued. In particular, focus was given to how various representation techniques and media influence the result of the procedures and readings in the process, thus addressing the relationship between representation and representative tools, therefore there was a strong dialogue between presentation and representation.

Work was assessed not just on the basis of the quality of what was mapped or what phenomena was been observed, but also on the intelligence brought to the selection of appropriate mapping techniques and representation methods to best illuminate the aspects of the building and/or its use which are under observation.

Exhibition

The project concluded with a pop-up exhibition in the space where students had worked for the past ten days. This exhibition gave a public face to the collaboration and engaged a number of academic and practitioners from Sydney with the project and the work completed by students in this short but intensive period.

Endnotes

1. Jan Utzon 2010, lecture to first year students at the Aarhus School of Architecture, February 4th.
2. This is widely understood although rarely documented. However, Jan Utzon will openly speaks of this in public lectures such as his participation in the Utzon Symposium at the Aarhus School of Architecture on February 4th, 2010.
3. Weston R., 2002, *Inspiration - Vision - Architecture*, Edition Bløndal, Denmark.
4. Frampton K., 1995, *Studies in Tectonic Culture: the poetics of construction in nineteenth and twentieth century architecture*, MIT Press Cambridge.
5. Mikami Y., 2001, *Utzon's sphere, Sydney Opera House: how it was designed and built*, Tokyo: Shokokuska.
6. Reinmuth, G. 2008, Second International Utzon Symposium, Utzon Centre, Aalborg.
7. Richard Johnson was Utzon's Australian collaborator on the development of a series of "Guiding Principles" for future work that would take place on the Sydney Opera House after Utzon's death. In numerous conversations with the author from 1998 until present, Johnson has recounted his perspective on Utzon's engagement and dismissal from the multiple perspectives of being a student at the time and his present collaboration with Utzon at the time the conversations took place.
8. Murray, P. 2004 ,*The Saga of Sydney Opera House*,Taylor & Francis, New York.
9. The concept of using defamiliarisation is a productive way of 'seeing' a context was first introduced to our practice by Zeynep Mennem at a presentation given by Scott Balmforth and myself at RMIT in June 2008.
10. Prip-Buss, M. 2009, Additive Architecture: Vol. 5 of *Jørn Utzon logbook*, Edition Bløndal.
11. For our understanding of these issues we owe much to Andrew Benjamin and his paper titled Surface effects: Borromini, Semper, Loos, published in: *The Journal of Architecture*, Vol. 11, Issue 1 ,February 2006, pp. 1 - 36.
12. Four examined insights previously discussed by author are 'Defamiliarisation', 'Importation', 'Mimesis' and the 'Inner-Outer'.
13. As articulated in authors article 'Context 1: Architectural Education in Denmark' that identifies the marginalisation of theory and history studies that are dominated by the role of the design studio at the Aarhus school, p. 24.
14. Special Thanks to the support of the University of Technology, Sydney's architectural facility in particular The Rector, Desley Luscombe, Head of School Anthony Burke and The Second Year Coordinator, Joanne Jakovich.

ACT 1 – SPATIAL STRATEGIES

1.1 Context

Much has been written of Utzon's strategies for placing the Opera House in context. In particular, we can remain astounded that Utzon did not even visit the site until well after the competition, yet the building fits so perfectly in context, even when considered from a variety of perspectives and scales.

Students were asked consider the various strategies used by Utzon and to make maps and diagrams of the Opera House in situ to measure how and why these strategies work. They were also invited to reflect on later development adjacent to the Opera House and how this has altered the way we experience the building in context.

Contextual strategies were tested at different scales, from that of the shells in the harbour, to the detailed way in which the podium links back into Macquarie Street, or how material selections have been used to make poetic connections between the building and its context.

1.2 Space

The Opera House is often understood as an exterior. Further, we know that the current internal spatial qualities of the Opera House are not as Utzon intended, beyond that contained by the concrete shells and the wide expanse of the podium.

The result of this assignment was a series of spatial studies which respond to the Opera House as built rather than imagining what Utzon intended. Students were then able to reflect on where these spaces are successful and unsuccessful and develop a critical position in regard to the changes made to the building during construction.

Rather than exploring Utzon's spatial resolution as drawn, students were asked to map the spaces of the building in situ as they are, paying particular attention to the in-between spaces. These spaces include that between the glazed envelope and the shells, the theatres and the shells, between the theatres and the glazing and between the shells themselves.

1.3 Staging

Utzon was very precise in understanding the possibilities of staging not only within the theatres but across the podium itself – as can be seen in his original competition drawings. However, the purity of these original ideas about staging of visitors against the building and the city have been modified – both by changes made to the building and impacts of operational and security issues (to cope with far more theatres than was originally intended). The result is a series of staging moments throughout the building, many of which vary considerably along a single pedestrian route (from the carpark to the theatre for example).

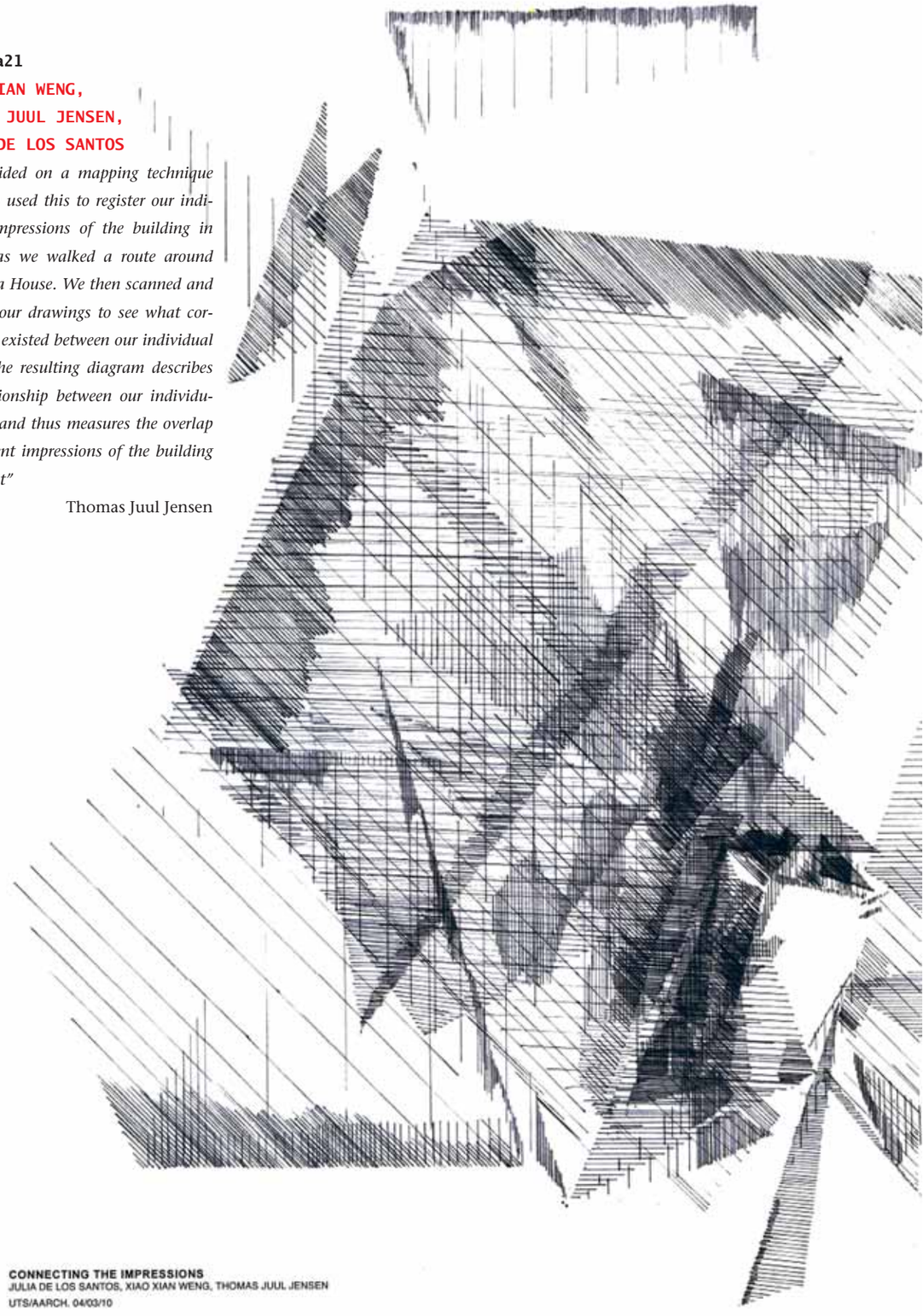
Students were asked to consider and map the expected and unexpected moments of staging that occur inside, inside/outside and outside the Opera House. Questions were asked - who/what is staging and who/what is being staged? Who is watching who? Further, students were invited to consider the different typologies of staging in relation to scale. This could be understood very broadly, from the scale of the whole of Australia as a context, to the scale of the building staging and being staged in Sydney to the scale of an individual standing atop the podium.

Group a21

XIAO XIAN WENG,
THOMAS JUUL JENSEN,
JULIA DE LOS SANTOS

"We decided on a mapping technique and then used this to register our individual impressions of the building in context as we walked a route around the Opera House. We then scanned and overlaid our drawings to see what correlations existed between our individual maps. The resulting diagram describes the relationship between our individual maps and thus measures the overlap in different impressions of the building in context"

Thomas Juul Jensen



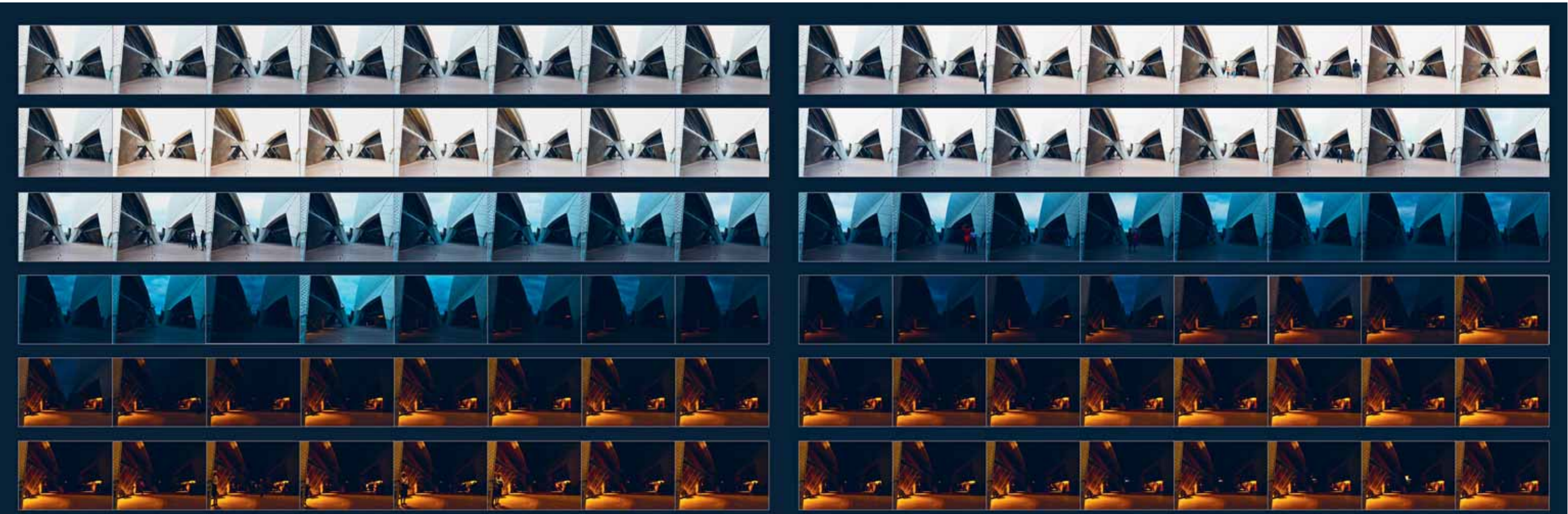
CONNECTING THE IMPRESSIONS
JULIA DE LOS SANTOS, XIAO XIAN WENG, THOMAS JUUL JENSEN
UTS/AARCH. 04/03/10

Group b8

CHRISTIAN SALLY JUNG JENSEN, ANNE NØRBJERG MADSEN, KERIM KEDICIOGLU, CATHERINE ZHUANG

"The windows of the building change in character throughout the day and thus stage people differently as light levels change. In the daytime, windows function as mirrors, unifying the external surface so that the building reads as a solid sculpture which people move around. In the evening, the building opens up as internal lights are turned on to reveal those occupying the building."

Christian Sally Jung Jensen



ACT 2 – ORGANISATION STRATEGIES

2.1 Movement
Jan Utzon noted that above all his father was perhaps best at ”moving people around” a public space or building and at making spaces where people can gather for different rituals, ranging from individual reflection to major ceremonies. Utzon’s skill was in understanding how people in these different modes could be accommodated within a single building element which incorporated by poetic and tectonic concerns.

There are numerous occupation patterns one can observe and map on the site of the Sydney Opera House. This assignment requires study of movement and circulation in and around the Opera House by starting with some questions - what do you experience, how do people occupy the space and do you think they occupy it the way that Utzon intended?

These questions can be addressed by selecting a part of the Opera House, observing movement and circulation there and then mapping the results. Speculations could then be made about how this movement reinforces or works against the way the Opera House was conceived.

2.2 People (a day I the life of)
As has been noted by Kenneth Frampton and others, the impact of the Opera House goes well beyond the immediate activities which takes place in the building itself. The breadth of this impact is one reason why changes to the Opera House have been so contentious - any decision has numerous follow on effects which include spatial, cultural and economic impacts.

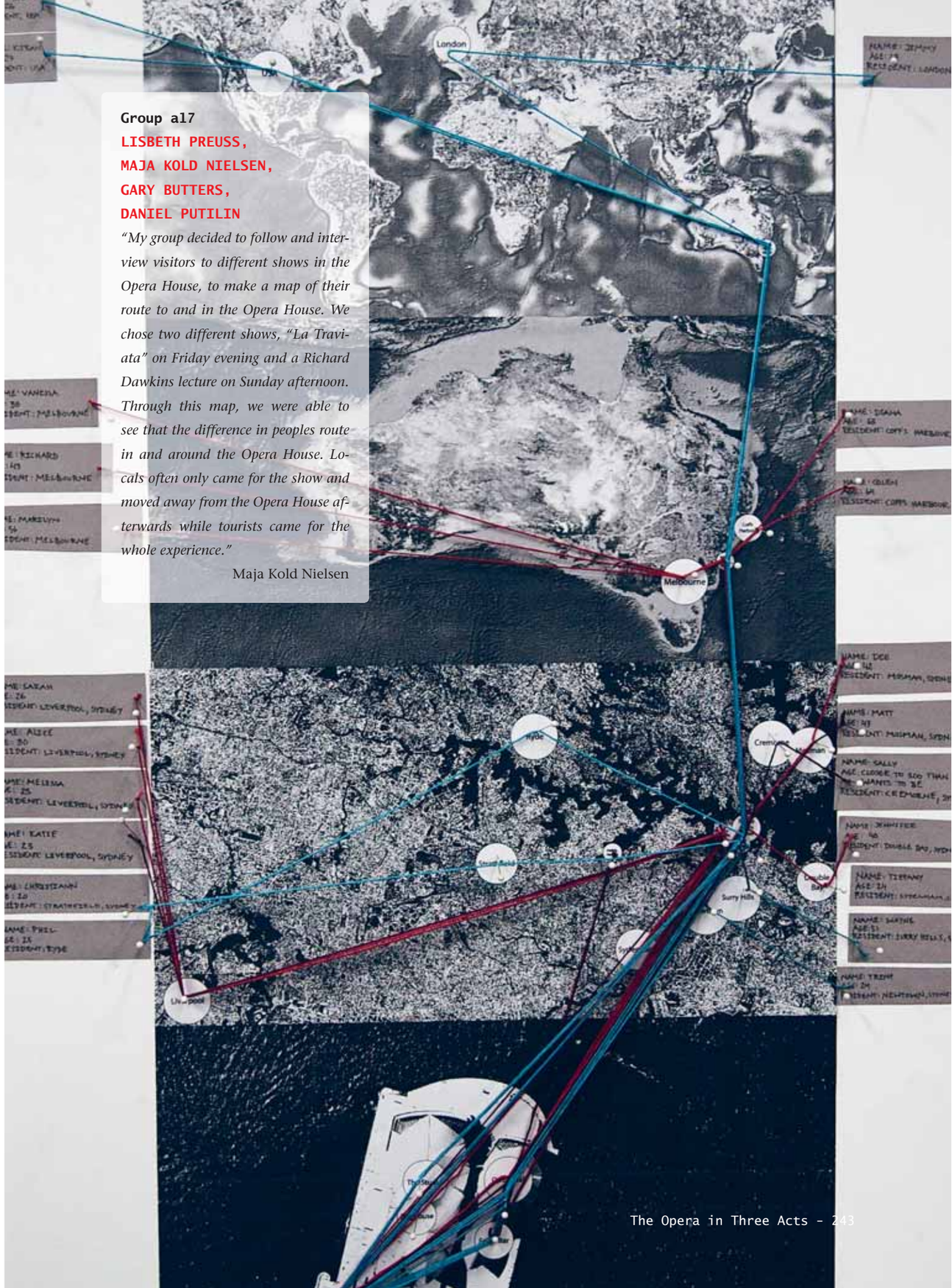
The Opera House is not just one house; it is many houses depending on who uses it - whether tourists, staff or audience members. The maps made by the lives of these groups – in and beyond the house itself – are maps of the city of Sydney. We can then understand the House not as an isolated object but as something which has surprising effects and impacts on the city.

This particular assignment asks students to consider a day in the life of a random person at the Opera House. By observing and notating how this person uses the house something will be learnt of the different programmes in it. Some of these are intentional and were anticipated by Utzon while others seem to be unintentional while others seem to be hybrids or programmes that have slowly transformed or mutated over time.

2.3 (The Opera House as) A MACHINE
While much has been written on Utzon’s two-part diagram of base and shell little has been written or documented about the inner workings - the machinery - of the Opera House required to support that clear diagram. This assignment suggests that practising architecture requires strategic decisions as to what to show and what to conceal or camouflage.

This assignment asked students to consider the Opera House as a complex machine, which, like a human body, has a skin or surface which is the outer-layer upon a complex system of inner workings which keep the body operative. As with a body, a building may reveal on its outer skin something of what is happening underneath.

A part of the Opera House will be studied on a functional level. These studies can be developed in the context of the flawless image of the building and how Utzon wanted the building to appear – for The Opera House contains a complex labyrinth of hidden carparks, lifts, security access and off-site set construction halls - all required to support the vision of the Opera House as three shells elegantly set atop a podium. The task here then was to reveal how this gap between systems can reveal something about the Opera House and the strategic decisions taken to realise it originally - and to keep it working now.



Group c13
MATHIAS MOURITSEN, KRISTIAN BOYE THOMSEN, JENS HOEKLIE ARNOLDSEN, BIANCA NGUYEN

"These models compared the secondary circulation in the Opera House as designed and as the building is now."

Kristian Boye Thomsen

ACT 3 – CONSTRUCTION AND MATERIAL STRATEGIES

3.1 Base and Shell
The Opera House demonstrates two fundamental concepts in regard to the creation of space. One of hollowing out space through the subtraction of mass such as the main podium – and another of creating space through the assembly of a series of structural components such as the shells.

However, as is always the case with the Opera House, the reality is more complex and reveals more possibilities than the two-part vision understood in simple terms. For example, due to time pressures during the actual construction of the building the two tectonic strategies were procured on separate time frames leading to some challenging junctions between the two. We can ask, is the resolution of these relationships what Utzon intended?

This assignment asks what we can learn from a close observation of the point of connection between these two systems.

3.2 Light
There are few visions more splendid than the sight of the Opera House sparkling in the Australian sun. In these conditions the building is almost dematerialised, existing as pure idea. The fact that the Opera House works so well with this context is surprising given that Utzon had previously worked in Nordic light conditions. Yet not only did Utzon exhibit an understanding of the Australian light, it could be said that he used this specific light as a material in the design of the Opera house.

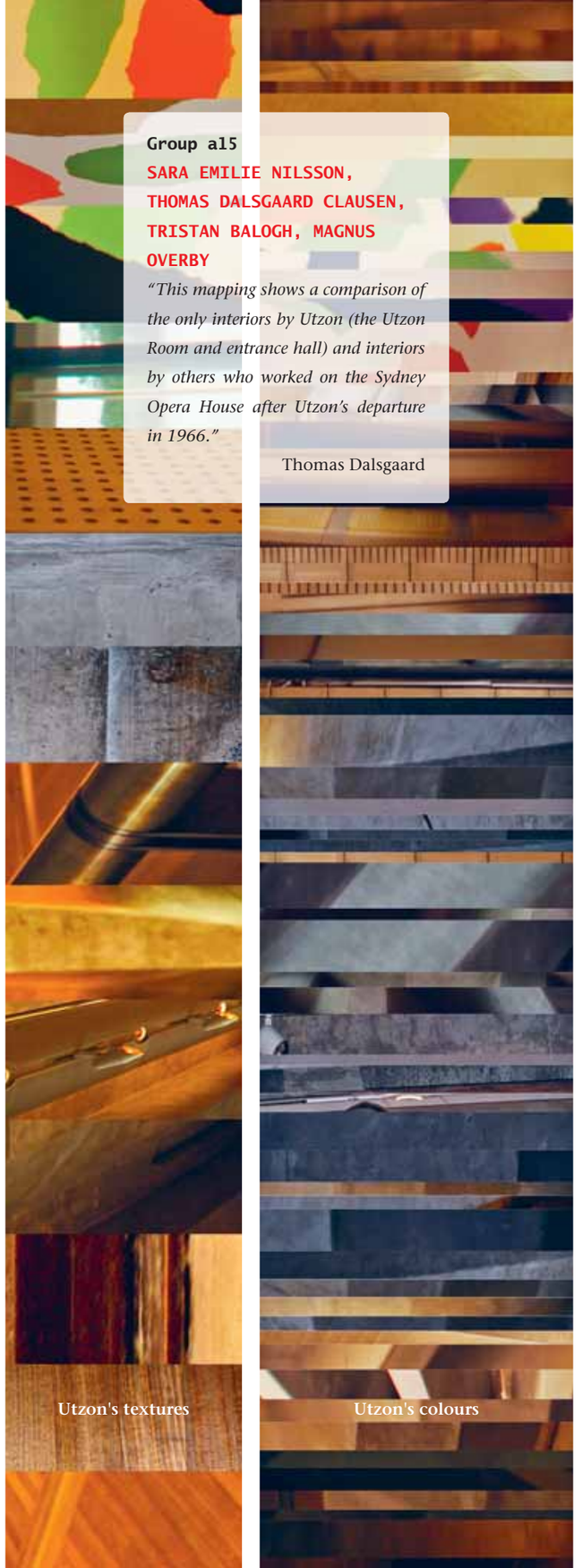
Students and asked to make suites of the Opera House in light, ranging from macro scale – such as daylight on the Opera house shells and base - to the micro scale such as observation of daylight on specific details or finishes. At the same time the light source should be considered – either sunlight, filtered light from the sky or reflected light from other objects and surfaces.

The light and the building rendered in that light changes throughout the day and year. Within this broad field students are to observe something specific about how light works on the materials and form of the Opera House, contributing to our collective understanding of the building as a tectonic construct and as an atmosphere.

3.3 Materials
Jan Utzon and others have spoken of the way that Utzon shifted from poetic explorations at the conceptual stage of a project to pragmatic studies during the development of the design and construction of the building. In particular, Utzon is well known for choosing materials to reinforce a poetic idea and then letting the capacity and constraints of the material he has selected contribute to the detailed resolution of the idea. However some surprises also exist, such as the materiality of the podium and its resolution.

Materials used in the Sydney Opera House are to be considered from two perspectives. One is the use of materials as a response to structural demands. The other is the use of materials in response to the conceptual strategies in play during the design of the Opera House. In this case, how do the aesthetic qualities of the materials emphasize the overall architectural idea?

The study can be initialized by the mapping of the materials in regard to their structural, textural, and colour properties. These and other observations shed light on the way in which Utzon's materials palette makes an essential contribution to the Opera House but might suggest how other materials would have allowed the building to develop in different ways.



Group a15
SARA EMILIE NILSSON, THOMAS DALSGAARD CLAUSEN, TRISTAN BALOGH, MAGNUS OVERBY
"This mapping shows a comparison of the only interiors by Utzon (the Utzon Room and entrance hall) and interiors by others who worked on the Sydney Opera House after Utzon's departure in 1966."

Thomas Dalsgaard

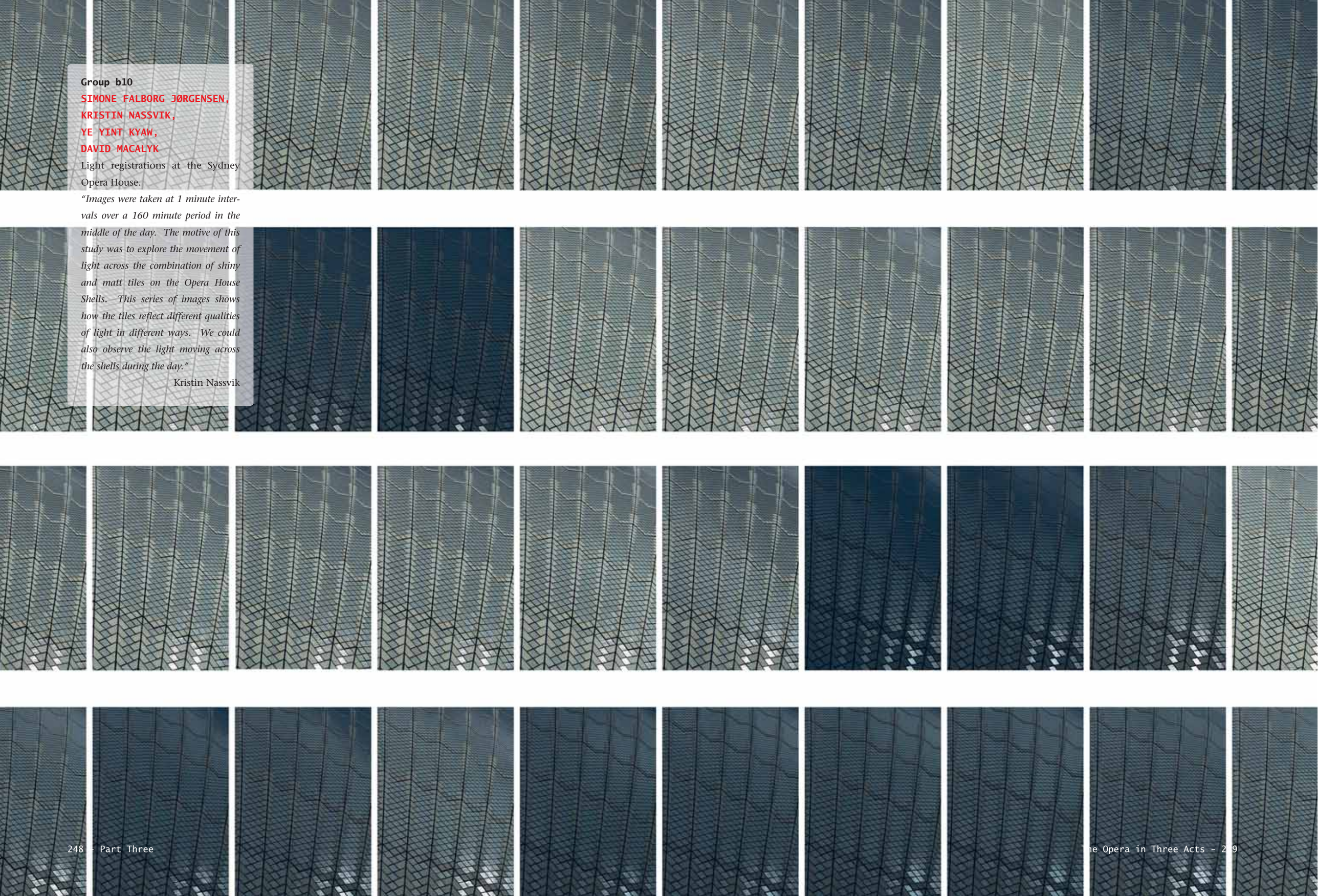
Group b10

SIMONE FALBORG JØRGENSEN,
KRISTIN NASSVIK,
YE YINT KYAW,
DAVID MACALYK

Light registrations at the Sydney Opera House.

"Images were taken at 1 minute intervals over a 160 minute period in the middle of the day. The motive of this study was to explore the movement of light across the combination of shiny and matt tiles on the Opera House Shells. This series of images shows how the tiles reflect different qualities of light in different ways. We could also observe the light moving across the shells during the day."

Kristin Nassvik



3.3

BROKEN HILL WORKSHOP

Rasmus Grønbæk Hansen &

Stefan Rask Nors

In March 2010, a seven day intensive workshop was performed in the far west Australian outback of New South Wales in Broken Hill.

One hundred and twenty first year students from the Aarhus School of Architecture participated in the project creating a solitary extensive site-specific work in the Australian outback. The Broken Hill workshop was a component of the five week course that formed the study trip for the first year students in 2010.

The Broken Hill workshop was carried out in concurrence with the 'The Opera House in Three Acts' workshop held in Sydney.

In comparison, the research project conducted in Sydney was an intellectual exercise in discovering hitherto hidden phenomena of the Opera House whilst, the workshop at Broken Hill was based on the direct physical experience of place. In Sydney it was a matter of conducting an extended study of a well-known subject, the focus resided on discovering new knowledge that had previously been bypassed by the traditional approach of architectural history. In contrast, the Broken Hill site was a completely unknown entity.
The Broken Hill workshop was inherently constructed around this quality of the unfamiliar and took on a different character from the period in Sydney. The Opera House workshop was an intense and tightly controlled event driven by clear and defined research agendas. The workshop in Broken Hill was built around student autonomy and a (necessarily) open approach to the site.

A comparative, cross-section of both workshops reveals distinct variation in output. The workshop in Sydney produced a large quantity of representative material that, involved registering and analysing the Opera House landmark. In opposition, the Broken Hill workshop generated works of authenticity liberated from debates regarding representative qualities.

It is important to understand the reciprocal relationship between the two workshops, the structure and conception of the Australian tour form the significant pedagogical position. The disparity between the urban and rural sites, altering academic considerations and the physical tour de force were essential factors in composing the overall research trip. The teaching program was further intensified by the specific development of the Broken Hill assignment.

The workshop

In conjunction with the planning and programming of the workshop a generated list of topics were appraised. The topics were subsequently placed unequivocally with a range of practical and pedagogical challenges that formed the final structure of the assignment:
- Site-specificity
- Collaboration
- The potential of mass
- Autonomy and ownership

Site-specificity is not solely about creating something for a definitive site that takes the site as its point of departure. It is also about giving the students a sense of awareness to the hidden qualities of a place. In this instance it is done by placing the students in a learning environment in which the disclosed qualities are intensified and therefore instantly accessible.

Collaboration allows two units of first year student's to collectively work together to employ individual differences as a basis for shared learning to transpire in an informal environment.

The potential of mass refers to the large work-related potential that lies in a group of one hundred and twenty students. The value is obtained in learning how far you can get when everyone works together through the creation of a community experience.

Autonomy and ownership were the cornerstones in the enterprise of getting a group of this size to work together under conditions that were predicted to be difficult. Only through a high level of ownership of the project was it possible to motivate all participants. This sense of accountability was generated by creating high levels of autonomy and ownership, whereby all crucial decisions were made by the students.

Planning

The distance of the trip became the first challenge to planning. To arrange a carefully orchestrated and site-specific workshop at a site, located sixteen thousand kilometers away and whose, phenomenological characteristics were unfamiliar required a unique approach.

Jørn Utzon's competition proposal for the opera house was founded on the architect's personal experience of Kronborg from the vantage point of sea. Utzon gained a sense of Bennelong Point to create a framework of understanding for his own project. The Broken Hill workshop relies also on drawn experiences of similar situations allowing the study trip to develop around these contextual parallels. In doing so, we could determine a general direction without affecting the student's autonomy in shaping the project.

In our search for other known parallel situations, images of Land Art projects from the late sixties continually surfaced as reference points. Works by Robert Smithson, Michael Heizer, Nancy Holt and Christo & Jeanne Claude suggested a way in which we could relate to the limitless vastness of the outback landscape. In this context the works of Robert Smithson acquired ever increasing significance. The relationship between what was often an academic investigation of natural history, and a geological basis in the artworks combined, with the extreme physical interaction with the site created clear comparable experiences whose dialectic was also present in the workshop.

Another familiar parallel was aboriginal culture and its relationship to the landscape, represented through the phenomenon of song-lines, the ritual of peregrination, and the walkabout, that signals the transition from child to adult. By using songs, known as song-lines, Australia's Indigenous People over the ages have defined and continue to chart the landscape and nature with which they lived in such close symbiosis. The songs are used to find their way and to define the territories of individual tribes. By means of a continuous narrative song about the specific landscape navigated through, certain characteristics are recognised such as, physical landmarks, waterholes, and other natural phenomena. This informs the Aboriginal people that they are on the right track. This technique of mapping the landscape is interesting as it captures time and temporality demonstrating something very specific and different in relation to traditional cartography.

The reference points discussed formed the initial point for discussions about the reading of the landscape, notation and charting, the execution of the project as well as, the final documentation of the completed work.

In order to ensure that there was a high level of impact from the place itself, it was a challenge to define the framework of the workshop in such a way as to leave space to incorporate the unforeseen or neglected considerations in the planning stage. The overall course structure also had to ensure progress in the project as a whole that was in accordance with the overall timeframe of the workshop. The balance between progress and autonomy was maintained by means of a set of deadlines allowing for the decision-making process residing solely with the students. The structure set up a framework which informed the students to make essential decisions at a particular moment in time but made no demands as to what that decision should be. The educator's role in this decision-making process was to act as a facilitator. The result of the student's work was to reflect their experience of the place, not the teachers. This meant that the assignment was written with a considerable degree of faith with the understanding, that one hundred and twenty students would be able to contribute far more originality, than we as educators would provide.

The workshop was structured into a set of thematic phases lasting from one to two days in order to ensure the above mentioned progress:
- Experience/ sensing/registration/ proposals/amalgamation,
- Intervention/ proposals/amalga mation,
- Planning/logistics/assignment of tasks,
- Execution/ realisation/documenta tion (process),
- Documentation (work)/restoration/ clearing up.

In addition to the overall themes, the structure contains a model for the development of the student's collaboration that enables one hundred and twenty individually created perceptions to be assembled into a final single expression. This part is called 'amalgamation' and sets up a series of fixed points in time. The students are forced to present their ideas and communally to point out qualities selecting one common project to continue to work on. This nominated project might be one of the projects presented or a combination of qualities from various projects.

It might be said that this is a model that is widely known in group work, but in this case it is taken a step further. The students are first divided into twenty groups of six. These twenty groups are amalgamated after one and half days of project work into five new groups through one of the above mentioned presentation and selection processes. The five selected or amalgamated projects are now developed for a further one and half days during which the students become accustomed to working in larger groups that now contain twenty four people. The amalgamation process culminates on day four with a presentation and selection of the project as a group consensus. Se-

lection takes place through an election process in which only the students have a vote.

Over the following days the project is realised by all the students. The assignment of tasks and the logistics are controlled by a group of students consisting of a representative from each of the five projects that were voted on to ensure students from non selected projects are given equal responsibility. The documentation of the project is carried out in parallel to it's execution by a small group of students.

Execution

As described in the assignment text, it was important for the students to make use of the open window of experience to create for themselves an unfiltered impression of place. The workshop commenced with an excursion through the landscape, a miniature walkabout from the hotel in Broken Hill towards Silverton, twenty five kilometers to the north-west. The students were given no destination, only pointed in a singular direction. Cameras, mobile phones and other instruments that could capture the landscape in pictures could not be used. The main intention was to experience through the action of walking without knowing a particular destination. The walk ended up being seventeen kilometers long before we were collected by buses, which drove us back to Broken Hill for cold drinks and a well-deserved rest.

After this first experience of the landscape, the students were introduced that same afternoon to the specific site, an area about three square kilometers located north-east of town whereupon the project was set in motion.
Heavy rains during the period leading up to the workshop had for the first time in ten years transformed the otherwise barren desert to a relatively green and fertile landscape. The blossoming of the desert was the first upset in our expectations of the landscape we were to encounter and created a set of circumstances that were to have decisive significance for the student's work.

Alongside work on the project, films were shown in the evening that related to the Land Art theme. The films were selected in accordance with the staging of the project. Precedent films included Robert Smithson's Mono Lake[1] (registration/sensing) and Spiral Jetty[2] (concept/execution/documentation), Francis Alÿs When Faith Moves[3] Mountains (collaboration) and Christo & Jeanne Claude's Running Fence[4] (execution/logistics).

After three days of intense work with repeated development and amalgamation of the projects, final presentations of the five final projects were made on the fourth day of the workshop and were followed by a vote. Each student had three voting cards with one, three and five points respectively, and these had to be distributed over three projects, which meant that the risk of an absolutely even distribution of votes was minimised.

The chosen project worked with two overall phenomena, both of which were powerfully present in the area. The first was the presence of quartz. These white stones varied in size and lay spread over large areas of the site. In some places there could be said to be concentrated deposits with quantities of exposed bedrock. The second phenomenon was the result of the large quantities of rainfall. Due to the heavy rainfall the dry earth had not been able to absorb the water, as a result erosion had brought about clefts that branched out across the area. In some places these were crevices a meter deep, while in others they ramified into deltas.

The underlying idea of the project was to combine the resultant phenomena's. Filling the tracks left by the water with quartz indicated a specific landscape situation that had been present at this particular point in time, in other words a specific constellation of time and place.

Over the days that followed stones were collected in large numbers and, following an internal principle of rotation, work teams were organised in turn to collect stone, lay stone or take well earned breaks in the shade of the pavilions that had been erected for the purpose of the project.
In the course of the following two days the project attained a scale that far exceeded the wildest imagination of everyone involved. The substantial communal effort resulted in leaving a mark of an extremely poetic and site-specific project.
A flyover occurred at four o'clock on the 22nd of March in conjunction with an aerial photograph of the work marking the conclusion of the project.
The owner of the borrowed workshop site decided that the project should remain in place after its completion. The site-specific project can still be seen at Broken Hill, New South Wales, Australia.

Endnotes

1. Holt M. & Smithson R., 1968-2004. *Mono Lake*, 19:54 min, colour, sound.
2. Smithson R., 1970, *Spiral Jetty*, 35 min, colour, sound.
3. Alÿs F. & Ortega R. & Medina C., 2002, *When Faith Moves Mountains, 'A Project for Geological Displacement'*,< http://geocities.com/francisalys/lima.htm>, Three-channel video installation with sound.
4. Christo and Jeanne-Claude, 1972-76, *Running Fence*, Sonoma and Marin Counties, California.

OUT-BACK– BACK IN

"The mud fell from their thighs, like placenta from a baby. Then, like the baby's first cry, each Ancestor opened his mouth and called out "I AM!. (…) And this first cry "I am!" this primordial act of naming, was held, then and, as the most sacred and secret couplet of the Ancestor's song. Each of the Ancients. (…) put his left foot forward and called out a second name. He put his right foot forward and called out a third name. He named the waterhole, the reedbeds, the gum trees – calling to right and left, calling all things into being and weaving their names into verses. The Ancients sang their way all over the world in a web of song; and at last, when the Earth was sung, they felt tired. (…) Some sank into the ground where they stood. Some crawled into caves. Some crept away to their "Eternal Homes, to the ancestral waterholes that bore them. All of them went "back in". BRUCE CHATWIN, *The Songlines*, Viking, New York, 1987

In the previous weeks, the study tour focused on the iconic building of the Opera House, Sydney.
Already before the first meeting, most of us had formed a more or less detailed picture of the architecture through drawings, photos and texts. This knowledge helped us in our understanding and reading of the Opera House – or did it?
Potentially our previous knowledge could become an obstacle to our immediate experience of the work. The danger is that we are not able to see with fresh eyes and as a consequence we had to fight our own prejudices to obtain a clear sensory perception of the building.
In contrast to the Opera House, none of us have been to the far west Australian outback of New South Wales, Broken Hill. As a collective we know very little or nothing about the place. This is the point of departure of the second workshop on our trip.

"While in the settler's eyes nomadic spaces are empty, for nomads these voids are full of invisible traces: every little dissimilarity is an event, a useful landmark for the construction of a mental map composed of points (particular places), lines (paths) and surfaces (homogeneous territories) that are transformed over time."

FRANCESCO CARERI, *Walkscapes: Walking as an Aesthetic Practice*, Editorial Gustavo Gili, Barcelona 2002.

Aim:

To develop the ability to relate in a specific manner to a context and subsequently through intervention emphasise the special characteristics of a place.
- To create an understanding of the elements of a project and their interdependence.
- To obtain knowledge of the cultural layers attached specifically to the Australian outback.
- To introduce the concept of Land Art and differentiate our understanding through first-hand experiences.
- To specifically explore notions of context and place.

Description:

The landscape surrounding Broken Hill is as remote as it can get from what we are accustomed to.
For a little while, the confrontation with the new or different gives an intensified frame of reference and can instead in this time span be sensed without filter. The smells, the visual impressions, the temperature and all the other layers of which the place consists, will affect our experience of an environment. In time, this sensitivity decreases, and we will forever have lost the ability to experience this place for the first time.
We will take advantage of the open sensory window of this first visit to create a project in the landscape.
The opportunity of one hundred and twenty students understood as a collective creates the potential for generating a unified project mutually read through the shared experience of a place for the first time.
When the sensitivity to the immediate first-hand sensory perception disappears, it is succeeded by a relative or experienced sensory perception; a sensory perception affected by knowledge, relations and culture. This relative sensory perception is based on experience and built on previous experiences – from day to day and from generation to generation.
In Australian culture, the early Indigenous Aboriginal's recognised natural phenomena as navigational routes through the landscapes that have been registered and maintained through the tradition of Song-lines. Content and rhythm bear witness to specific places experienced through a walk and changes over time, something absent in traditional cartography.
In the project, we will seize the opportunity to gain insight into the different ways of reading and mapping the landscape; a method that is deeply instilled in the Australian Aboriginal culture and has been identified as site-specific. We will let this way of registering the landscape inspire and influence our own studio's approach to the project.

A well-known way of experiencing a place or a landscape is by the means of cartography where through a distant and abstract look, you put your trust in someone else's notations and notes.

Utzon successfully achieved this in his competition project for the Sydney Opera House where his experience and ability to read the notations of nautical charts and relate them to his own experiences from other similar situations allowed an understanding of a foreign place.
As a medium, the cartographic notation has also played a significant role in the Land Art movement of the sixties and seventies when the map's almost divine comprehensive view of the spacious areas or landscape formations in interaction with the personal experience of the place were the basis of interventions of more or less extensive character.
The map has also played an important role in the documentation of Land Art, either in the form of presentation and specification of a specific but inaccessible work or as part of the so-called non-site works where elements from a specific place are transferred to another context whereby a new contextual sensory perception is obtained.

"Instead of using a paintbrush to make his art, Robert Morris would like to use a bulldozer"
ROBERT SMITHSON, *Towards the Development of an Air Terminal Site*, 1967

The project will be organised in five phases:
1. Experience/sensory perception/registration/proposal/fusion/
2. Intervention/proposals/fusion/selection
3. Planning/logistics/division of labour
4. Implementation/realisation/documentation (process)
5. Documentation (work)/re-establishment/tidying

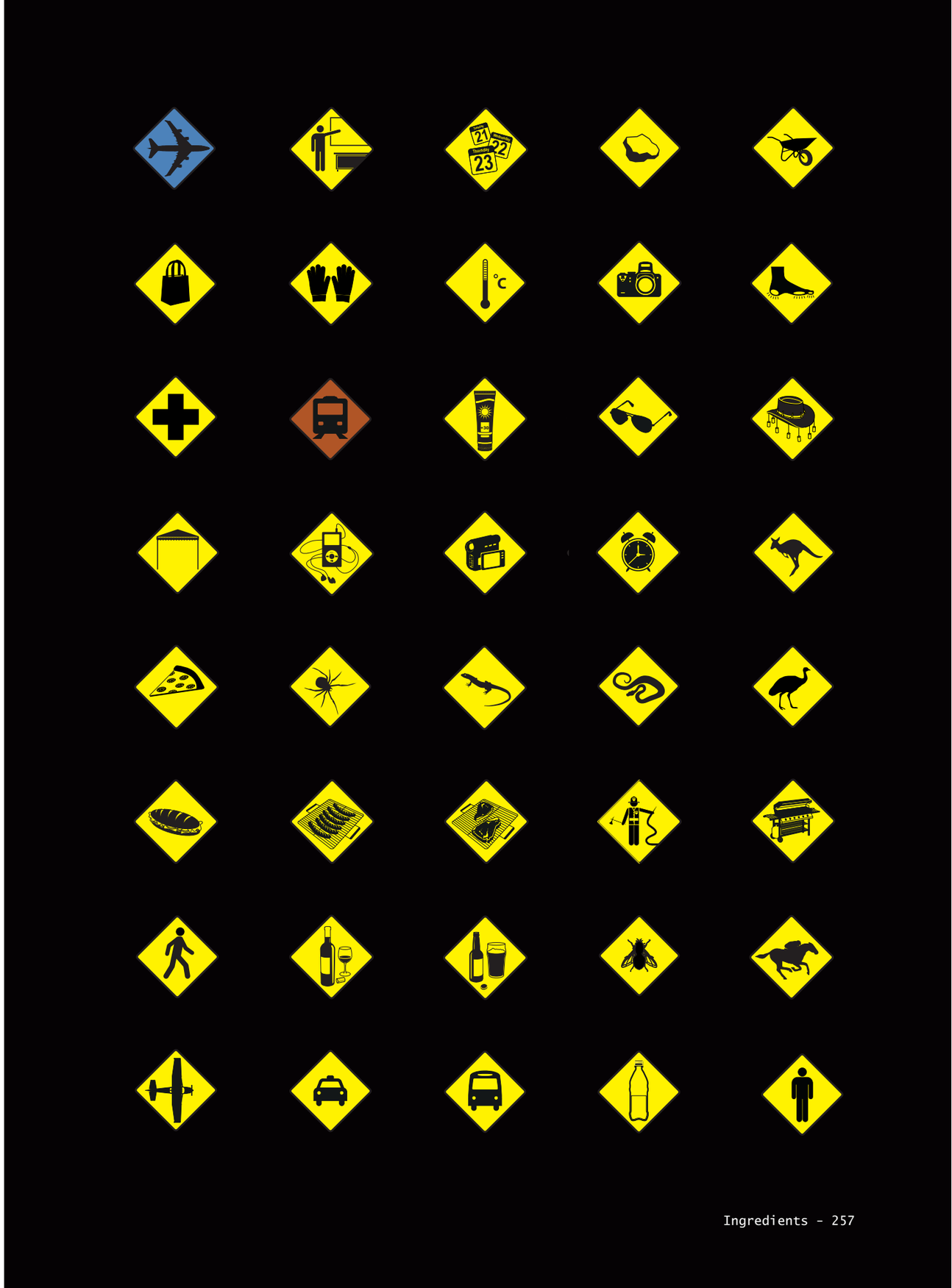
1. Experience/sensory perception/registration/proposal/fusion (Day One and Two)
In the first phase of the project, we will have an initial introduction to the place through pure sensory perception. The sensory perception is then followed by the registration of the landscape characteristics, geographical distinctiveness such as specific flora and fauna etc. The approach to the registration originates in the place and the personal sensory perception. Like cartography, it is important to be aware of what it is that you want to show/see which may exclude and include certain items.

2. Intervention/proposals/fusion/selection (Day Two and Three)
Experiences and registrations are dealt with in small groups and result in a proposal for a landscape intervention. The intervention may be large or small in scale but must take its starting point in the potential of the size of the working group and the possible material inherent in the landscape itself.
The proposal is made in constant dialogue with the landscape/place and not from a distant cartographic position. The twenty proposals are fused and prepared further into five new proposals.
Among the five new proposals, the whole group will choose which proposal will be realised.

3. Planning/logistics/division of labour (Day Four)
On the background of the chosen proposal, the project is planned.
Challenges are uncovered, sub-assignments are determined, working groups are established, the performance phase is prepared. In brief, the logistics and structure of the project is determined.

4. Realisation/realisation/documentation (process) (Day Five and six)
We will be working on site. Everybody will participate in the realisation of the collective project as irreplaceable elements to the greater group. The work is documented as an important part of the testimony of the project.

5. Documentation (work)/re-establishment/tidying (Day Seven)
The final intervention will be documented through photography, film, material samples, etc.
The place is re-established. Tidying insures nothing is to be left in the landscape.



Arriving to Broken Hill after a 14 hour train trip through the Australian Outback.

Experiencing and investigating the hot desert before starting one week of intense workshop begins.

The chosen project was to fill the tracks left by the water with quartz to indicate a specific landscape situation that had been present in a specific constellation of time and place.

Stones were collected in large numbers and, following an internal principle of rotation, work teams were organized in turn to collect stone, lay stone or take well-earned breaks in the shade of the pavillions.

Final presentations of the five final projects were made on the fourth day of the workshop and were followed by a vote.

At the opening, a local press contingent coverted the event.

"In the course of the two days the project attained a scale that far exceeded the wildest imaginings of everyone involved and ended up leaving behind a mark of an extremely site-specific and poetic idea and of a substantial communal effort."

A flyover at 16.00 on the 22nd March in conjunction with an aerial photograph of the work marked the conclusion of the project.

Context 3

A COLLECTIVE CULTURE

Gerard Reinmuth

A combination of language, the school's relative isolation, the presence of influence centres focused on key long-standing staff members and the structure of the institution itself have conspired to produce a remarkably intertwined group who have been responsible for educating students at the Aarhus School of Architecture over the past decades. With the exception of a period in the 1980s when a number of internationals were engaged – a period which tellingly coincides with a particularly vibrant period in the history of the city and the school – staff at the school have tended to be promoted from within the system while any new staff have been engaged on the basis of their existing connections to those already within the system. Staff academics tend to engage former students who, with their colleagues, in turn then engage a new generation of students such that at least four or five generations of staff-student interrelationships can currently be identified within the school.

A benefit of this interconnectivity is the presence of significant corporate knowledge within the institution, such that the emphasis on tacit knowledge which underpins the studio environment has become institutionalised across the whole school. However, in recent years, a structure which has loosely related to disciplines (Architecture, Landscape and Urbanism, Architectural Heritage, Design and Architectural Design) has lacked the specificity to foreground the various knowledge centres and their key figures. Although the decision to establish this structure came out of a desire to promote consensus building and collaboration among people of similar interests, the result was instead recourse to tribal modes of operation that were often founded in social relations rather than a contest between different intellectual or pedagogic positions.

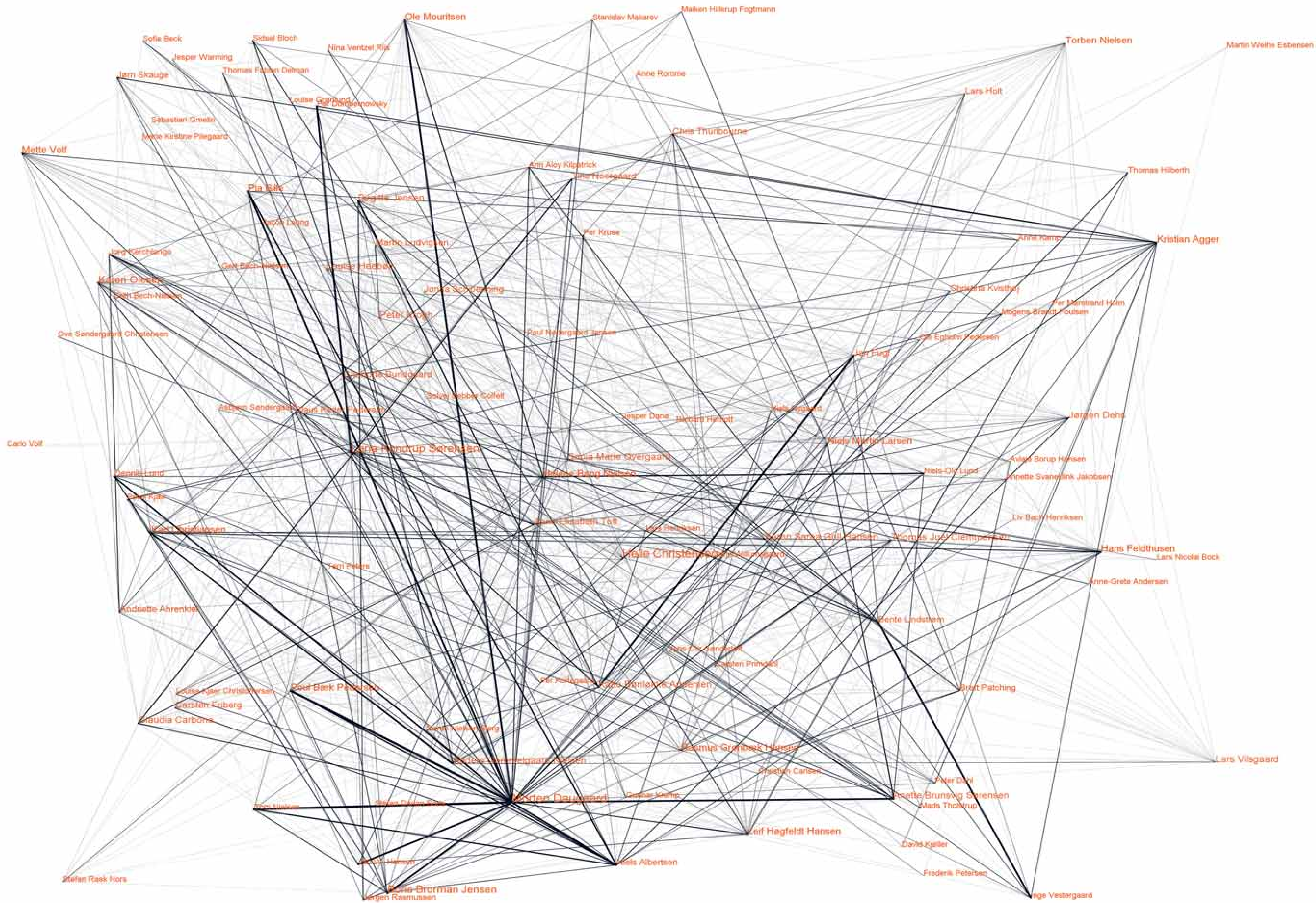
In this context, engagement of new staff from outside the system of inter-generational promotion has been difficult as the absence of clearly articulated research clusters leaves no armature for a new person to attach to. The only solution for internationals has been to exist as a satellite, forever preserving an outsider status, teaching studios which are singular in their existence and lack connectivity to the overall ambitions and direction of the school.

The new structure currently being implemented at the Aarhus School of Architecture will have a profound effect, replacing a generic structure with something that resembles a series of ideological contests. In this new framework, social connectivity will not disperse but will reorganise around a series of publicly stated positions in regard to the discipline. A renewal of the staff body will inevitably accompany this shift as those without a strong intellectual position will lose ground while prospective staff members (whether Danish or international) will have a clear sense as to how and why they might join the school.

The diagram on the following pages has arisen from my interest in this interconnectivity and the way it will change over the coming years as the school evolves in response to the new structure. The diagram has been developed by asking all staff at the Aarhus School of Architecture to fill out a questionnaire which posed four questions:
– Who, among the existing staff body, did you teach?
– Who of your current colleagues have you taught with?
– Who of your current colleagues taught you?
– Who of your current colleagues did you study with?

The answers to these questions formed the basis of a script which produced the diagram on the following page. The script was developed by a student at the school, Ragnar Zachariasen, in response to discussions with myself and Louise Heebøll about how these questions should inform a mapping exercise. More connected staff members are registered in a scale commensurate with their level of connectivity while the relation of staff members to each other is determined by the various clusters within which they exist. The scale of each name is a registration of the number of connections and therefore favours those who studied at the school or have taught for many years.

What does this diagram represent? It is not a corporate structure, a map of research interests or a diagram of social relations. While it is none of these all possibilities are in some way represented. The diagram generates questions regarding the nature of this connectivity, its extent, the levels of influence held by key individuals, the longevity of some staff members and the peripheral nature of others. It could be understood as a mirror held to the school which, if repeated annually, might reveal how the constellation of individuals at the school changes over time in response to this new era.


Ole Mouritsen
Stanislav Makarov
Maiken Hillerup Fogtmann
Sofie Beck
Sidsel Bloch
Nina Ventzel Riis
Jesper Warming
Thomas Fabian Delman
Jørn Skauge
Anne Romme
Torben Nielsen
Martin Welhe Esbensen
Lars Holt
Sebastian Gmelin
Mette Kirstine Pilegaard
Chris Thurlbourne
Mette Volf
Ann Aloy Kilpatrick
Thomas Hilberth
Pia Bille
Per Kruse
Kristian Agger
Martin Ludvigsen
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Jesper Dana
Jørgen Dehs
Niels Martin Larsen
Carlo Volf
Annette Svaneklink Jakobsen
Niels-Ole Lund
Liv Bech Henriksen
Hans Feldthusen
Lars Nicolai Bock
Helle Christensen
Anne-Grete Andersen
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Siri Saupstad
Emil Scharnweber
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Line Skovsen
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Karin Anna Charlotta Edlund
Ariel Eisenberg
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Henrik Møller Frich
Gitte Langborg Hansen
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Jesper Victor Henriksson
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Kasper Baarup Holmboe
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Iben Wenzel Nahmens
Kristin Nassvik
Kirstine Skyum Holm Nielsen
Maja Kold Nielsen
Amanda Nygaard
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Bjørn Alstrup Odgaard
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Elisabeth Toft Pedersen
Iben Degn Pedersen
Theis Grønkjær Kaustrup Pedersen
Ann Petersen
Aleksander Jul Qvist
Magnus Oved Askjær Rasmussen
Stephanie Søndergaard Rodwell
Louise Bjørnskov Schmidt
Runa Skeie
Mari Kornberg Skjeflo
Mathias Bank Stigsen
Line Marie Stærk
Jan Park Sørensen
Nicoline Koch Sørensen
Troels Bach Sørensen
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THE FUTURE

What does the future hold – how radical a break with tradition and what we are familiar with will be necessary?

Much will have to be introduced and acquired when our ambition for the future of our bachelor students is that they must attain the same level as our graduates have today on completion of their studies – with regard to methodology, the understanding of space and form, artistic capacity and an experimental approach to architecture.

Interdisciplinary Experiments

A new departure is necessary in our attempts to continually heighten the school's international standard – while honouring all of the excellent results we have already achieved, results that can and must be accommodated in a new organisation of research and teaching.

It is vital to maintain and further improve the organisational and administrative freedom of our researchers and teaching teams. Interdisciplinary development is necessary in a modern research and teaching environment. By removing or minimising organisational barriers in our ongoing efforts to renew our programmes, we will give interdisciplinary work the greatest possible latitude to make it even easier to experiment. New, interdisciplinary fields that will benefit the entire field of architecture and design will thus arise, not only during the course of studies, but from the very beginning. This involves increasing the freedom to choose research and teaching methods by providing the best possible conditions.

Network School

The experiment and new organisation that have now been established during the first year will continue during the second and third years. This will be done in several ways and from many angles. But the school must first and foremost make its mark as a network school that prioritises international cooperation. We must grasp potential cooperative relations offered by external partners and must ourselves initiate the development of new fields that can extend our external relations. I am in no doubt that architecture has a certain degree of autonomy in its own right, and this has great value. But the greatest benefit for the course of education, and its relation to and possible influence on the world around us, lies in a genuine commitment to the innovative potential of architecture in relation to the challenges of our times. We must commit ourselves to the world around us and to the issues it currently raises.

Art, Science and Practice

In future, the school must 'stand on three legs', which are vital for all schools of architecture: art, science and practice. These 'three legs' should be understood as a unity and a unit, but they must also be emphasised and elucidated individually. Only in this way can their individual significance become clear in an educational context. The artistic and scientific foundation must be laid during the first three years, while the graduate programme must focus on the ability to practice. In this way, we will train artistically strong, method-conscious students through the bachelor's programme – and architects and designers who are strong on practice through the graduate programme.

This naturally does not mean that practice has no place in the bachelor's programme and that art and science are excluded from the graduate programme, but that this is not their primary focus. A clear, constructive distinction must be made between the two programmes – without precluding continuity.

International Network

In future, from the first to the last year of studies, the school must engage itself with important international partners in the form of individuals, studios and universities. We must create a network with the best in order to promote the most distinguished research, teaching and artistic cross-border development work for the benefit of students, researchers and the world outside our protective walls and borders. A world that students must and can become an important part of.

Engaging through Architecture and Design

We must dare to ask important, basic questions – with regard to architecture and the way we as humans behave in the world – and have the ambition and courage to answer these questions, even though answers may be difficult to find. We must help to change the future by "ENGAGING through ARCHITECTURE and DESIGN".

An artistic approach is extremely necessary in the development of architecture. Especially in the future, because it makes fundamental questions and challenge the existing and the present - which may always be the core of architectural approach to the world - and especially in the education.

Every time we find an answer, it must be challenged anew and new questions asked. This is the only way we as a school can change and challenge the world around us. And this is precisely what we must do with the help of the trinity represented by architecture: art, science and practice.

Example is always the strongest argument, which is why project teaching and the development of projects and project proposals must remain central educational and technical tools and points around which teaching revolves.

The ambition is for Aarhus School of Architecture, throughout the engaged experiment, to offer teaching at the highest level. Teaching that, at bachelor and graduate level, produces projects that have decisive, positive meaning for the people they involve.

Torben Nielsen
Rector

CREDITS

Material Produced by the First Year Students
All student work illustrated in Section 2 and Section 3 has been produced by the student(s) named on the same page unless otherwise noted. Similarly, students have photographed their own work except where noted in the photography credits below.

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Emil Schwarnweber, p. 32-33 top, 110, 111
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Translations
Foreword – Translation by Jette Jansen

Rethinking the Bachelor Degree Course – Translation by John Mason

Unit 1A: General Approach to the teaching of Architecture – Translation by John Mason

Unit 1B: General Approach to the teaching of Architecture – Translation by John Mason

The Motor Unit 1A – Translation by John Mason
The Motor Unit 1A, handout text – Translation by Jette Jansen

Composition and DE-composition Unit 1B – Translation by John Mason
Composition and DE-composition Unit 1B, handout text – Translation by Jette Jansen

Jack in the Box Unit 1A – Translation by John Mason
Jack in the Box Unit 1A, handout text – Translation by Jette Jansen

Bridging the Gap Unit 1B – Translation by John Mason
Bridging the Gap Unit 1B, handout text – Translation by Jette Jansen

Earth and Sky Unit 1A – Translation by John Mason
Earth and Sky Unit 1A, handout text – Translation by Jette Jansen
Earth and Sky Unit 1A, handout text – Translated by Gerard Reinmuth, Anders Gammelgaard Nielsen & Louise Heebøll

Structure, Seriality and the open Programme Unit 1B – Translation by John Mason
Structure, Seriality and the open Programme Unit 1B, handout text – Translation by Jette Jansen
Structure, Seriality and the open Programme Unit 1B, caption text – Translated by Anne Elisabeth Toft

Broken Hill – Translation by John Mason
Broken Hill, handout text – Translation by Jette Jansen

Afterword – Translation by Tjeksproget.dk