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THE PRODUCTION OF KNOWLEDGE

IN ARCHITECTURE BY PHD RESEARCH IN THE NORDIC COUNTRIES

Editors: Anne Elisabeth Toft and Magnus Rönn



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The Nordic Association of Architectural Research (NAF/NAAR) is an independent association of architectural researchers from universities and schools of architecture in the Nordic countries. Its primary function is to facilitate the research collaboration of its members and their dissemination of research results. It welcomes researchers ranging from PhD to senior researcher level, providing them with critical mass and an engaging and supportive research community.

The symposia of the association are widely recognized as important platforms for critical reflection on architecture and architectural research. In order to ensure their dynamic and democratic format, the events are conceptualized and organized in collaboration with various partners and each year hosted by a different university or school of architecture. Every symposium focuses its discussions on a topic or theoretical framework representing the current research interests of NAF/NAAR and its collaborating partners.

With the present publication, the association wishes to shed light on architectural research and its knowledge production by taking a closer look at PhD research. Other books have addressed the same subject, but from different vantage points.¹ Particular to this publication is its interest in pursuing architectural research, and the notion of it, as a social, cultural, and political construction. It follows in the wake of the 2016 NAF/NAAR Symposium titled The Production of Knowledge in Architecture by PhD Research in the Nordic Countries, which took place in Stockholm, Sweden, at the KTH School of Architecture on 19–20 May 2016. The symposium, which was a joint venture between NAF and the KTH School of Architecture (KTH Royal Institute of Technology), was primarily aimed at PhD students and their supervisors. However, its discussions were relevant to anyone who works with research and knowledge production within architecture and who has an interest in the epistemological questions raised by the way the concept of architecture and the concept of research are interpreted in various research-related contexts.

More than forty abstracts were submitted to NAF/NAAR prior to the symposium and twenty students representing very diverse research interests, backgrounds, and methodological approaches lectured at the event together with invited keynote speakers from Denmark, Finland, Norway, and Sweden.² The students who lectured were either at the beginning, in the middle, or towards the end of their doctoral research, and their presentations therefore reflected a work in progress. The invited keynote speakers included newly graduated doctors with very different research profiles. Sharing their individual PhD research experiences with the audience at the symposium, they provided valuable insight into research and career building - pointing out different professional avenues one may take after finishing one's PhD. The invited keynote speakers also included Professor Emerita Halina Dunin-Woyseth from the Oslo School of Architecture (AHO). Acclaimed for her lifelong engagement with and research on doctoral programmes, as well as her knowledge in design professions and epistemology of architecture and philosophy of science, she provided the symposium with a contextualized background for its discussions.

Motivated by the many essential research questions that were raised during the symposium, but which still needed reflection and answers, NAF/NAAR on 4 November 2016 curated a second event on this subject matter: The NAF/ NAAR Open Hearing: The Production of Knowledge in Architecture by Research in the Nordic Countries. This hearing, which broadened the perspective of the discussions of the Stockholm symposium, took place at the Nordic Pavilion in the Giardini during the 15th Architecture Biennale in Venice, Italy. The invited keynote speaker at this event was Associate Professor Henrik Reeh, PhD, researcher and PhD supervisor from the Department of Arts and Cultural Studies at the University of Copenhagen. His lecture "Relational Architecture: Education, Research, Transformation", which has been developed into an article and included in this book, gave a critical meta-reading of the discussions which took place in Stockholm, pointing out the relational function and practice of architecture and architectural research in society.

The present publication collects eighteen articles and essays based on presentations given at the symposium in Stockholm and the open hearing in Venice. All of them – except those by invited keynote speakers Halina Dunin-Woyseth, Johan Linton, Ann Legeby, Marie Markman, and Henrik Reeh – have been submitted to a double-blind peer review process, following a peer review template developed by NAF/NAAR. The collection of texts by PhD students in the book may be considered a representative sample of the research in architecture that is currently being carried out at the Nordic PhD schools. It embraces a wide range of topics, and looking at it, it is difficult to identify any coherent and consensus-building theme or pattern that connects the texts. This is also reflected in the heterogeneous structure of the book, and the meeting of different epistemologies in it. The articles and essays in the publication are loosely compiled and grouped within given categories, such as for instance subject areas which also framed the symposium sessions and their discussions. The book falls in two parts – Section I and Section II – separating the written contributions by keynote speakers and those by PhD students. In this way, part one creates a conceptual framework for part two.

Articles and essays in the publication vary in terms of subject areas, research issues and approaches, theories, and methods. On a general level, the subject areas represented in the book can be roughly divided into an architectural history perspective and a theoretical perspective on contemporary design practices. Research approaches represented in the written contributions include case studies, archival studies, literature reviews, concept analyses, artistic research, and research by design, as well as experiments and investigations through practice. Articles and essays with a historical perspective reflect on the history of architectural education, the phenomena of space and spatiality, and changes in architecture as a "making discipline" in the larger context of academic research.³

As President and Vice-President of NAF/NAAR – and the editors of this publication – we extend our sincere thanks to the many colleagues who kindly contributed to it. We are very grateful to all the individual authors who submitted articles to the publication and to the many peer reviewers who have supported NAF/NAAR and its work by offering their time and professional expertise to reviewing the articles. We would like to express our gratitude to all of these people.

Our thanks are also extended most particularly to our close collaborators at KTH School of Architecture in Stockholm – Dr. Daniel Koch and Dr. Charlie Gullström Hughes, who were instrumental in organizing and hosting the 2016 NAF/NAAR Symposium. We also thank Pro Dean Anders Johansson, as well as Katja Grillner and Rolf Hughes, both professors at the school, for their interest in and support of the symposium. Equally, we would like to take the opportunity to express our gratitude to Karin Åberg Waern, Head of Exhibitions and Pedagogy at the Swedish Centre for Architecture and Design in Stockholm, for her invaluable help in and advice on organizing the NAF/NAAR Open Hearing in Venice. In this connection, we would finally also like to direct our thanks to Rector Alberto Ferlenga, Professor Enrico Fontanari, Associate Professor Francesco Musco, and PhD Fellow Alberto Innocenti from the Università IUAV di Venezia for their interest in NAF/NAAR and its hearing at the Venice Biennale.

The publication of the present book was made possible by the very generous financial support of the Stockholm symposium from FORMAS, J. Gust. Richart Stiftelse and Sven Tyréns Stiftelse.

It is our hope that the book will make a qualified contribution to the already existing body of critical work concerning knowledge production in architecture by PhD research.

Anne Elisabeth Toft President of NAF/NAAR Magnus Rönn Vice-President of NAF/NAAR

NOTES AND REFERENCES

¹ This book follows in the wake of previous conference proceedings on PhD education – for example the proceedings publication from the 2011 NAF/NAAR symposium When Architects and Designers Write, Draw, Build,? a PhD and the 2005 colloquium The Unthinkable Doctorate. The 2011 NAF/NAAR Symposium When Architects and Designers Write, Draw, Build? a PhD took place at the Aarhus School of Architecture, Denmark on 4–6 May 2011, and the 2005 colloquium The Unthinkable Doctorate took place at Hogeschool voor Wetenschap & Kunst – School of Architecture Sint-Lucas, Ghent, Belgium on 14–16 April 2005.

² Invited keynote speakers included Halina Duunin-Woyseth, Norway; Johan Linton, Sweden; Ann Legeby, Sweden; Marie Markman, Denmark; and Sari Tähtinen, Finland. Sari Tähtinen (PhD 2013), a postdoctoral researcher at Aalto University, chose not to develop her keynote lecture into an article for this publication.

³ The "making disciplines", a concept originally introduced by Halina Dunin-Woyseth in 2001, refers to the disciplines of art, design, and architecture. It includes art production, object design, industrial design, architecture, landscape architecture, urban design, and spatial planning. See Halina Dunin-Woyseth and Jan Michl (eds.), "Towards a Disciplinary Identity of the Making Professions: The Oslo Millennium Reader", *Research Magazine*, 4 (2001), Olso School of Architecture, p. 1. Anne Solberg, "Developing Doctorateness in Art, Design and Architecture", PhD thesis, Faculty of Humanities, Sports and Educational Sciences, University College of Southeast Norway, Kongsberg, 2017, p. 6.

INTRODUCTION Anne Elisabeth Toft and Magnus Rönn

For more than thirty years NAF/NAAR has been a unifying key player for architectural research in the Nordic countries, and thus also an important representative for the different research cultures at PhD schools. With the symposium The Production of Knowledge in Architecture by PhD Research in the Nordic Countries, the association set out to shed light on architectural research by taking a critical look at the research projects that are presently being carried out by PhD students in Denmark, Norway, Sweden, and Finland.

At the symposium this was done by raising questions about the benefit, relevance, formats, explorations, and interfaces of PhD research – and about its current state and the perspectives for its future. As the organizer of the symposium, NAF/NAAR was particularly keen to learn about the research motivations of the youngest generation of researchers. More precisely, NAF/ NAAR was interested in exploring why architects today embark on PhD research, what they are researching, how they define and practice research, and what they think the future holds for them in terms of research projects and research positions.

In a self-reflexive manner, NAF/NAAR also had an interest in surveying and critically discussing the power systems or regimes which frame and direct the research that is being carried out. This interest concerns the governmentality of knowledge production put forward by the institutions, infrastructures, and frameworks that shape society's understanding of what research is and should be.

Architectural research is a business and a commodity, and researcher training in and about architecture supports an institutionalized process of knowledge production that, among other things, includes grants, PhD positions, professor positions, supervision, courses, peer review, and project work. Different research cultures and regimes set different standards for what counts as knowledge and research. The relationships between research cultures are mediated by power, which means that a dominant regime sets the terms of what is to be considered research – and what is not. The local contexts in which PhD programmes are developed are crucial to the researchers' interpretation of the notions of research, as different teaching formats, methods and discourses, languages and language systems condition the research and the knowledge production that are taking place at the educational institutions.

The symposium wanted to find out which research cultures and regimes are shared at the PhD schools in architecture in the Nordic countries, and it wanted to address its possible implications for the research being produced. It gave its participants an opportunity to reflect on their dissertation projects and to discuss their experiences from researcher training in a qualified context.

Seen from this perspective, the symposium was also a representative platform for the presentation of the different research discourses currently prevailing at Nordic universities and schools of architecture. At the symposium, various normative research practices were articulated through the presentations given by the PhD students. Some of the lecturers were self-reflexive and conscious of discourse, reading their own research and knowledge production through the lens of the theme of the symposium, but a greater number seemed not to take such meta-reflections into critical account when speaking about their work. This issue is also reflected in the present book. To some extent, meta-discussions are lacking in many of the articles and essays, which first and foremost act as presentations of the researchers' PhD projects and the subjects they explore.

The collection of texts in this book is a testimony to the fact that there are many different opinions and politics on what a PhD dissertation in architecture should include and how it should be structured – whether it should be a monograph, an article-based dissertation, or something entirely third – and if one compares the PhD researcher training at universities and schools of architecture in the Nordic countries, one will find that not only are there significant international differences between the programmes and their structures, but also that on a national basis there are often major differences from institution to institution in terms of what is emphasized in the education.

There are many reasons for these cultural differences, which can be traced historically. The first doctoral programmes in architecture were set up in North America in the 1960s.¹ In Europe – including the Nordic countries – they have existed since the early 1990s, when demands within society opted that higher education had to be research based and that educators teaching at the university level had to have a PhD degree.² It is thus only in recent times, within the last thirty to forty years, that architectural education in the Nordic countries has been methodically systematized and academized and made for an actual research study. Until then, the education of architects, which would often be arts and crafts based, was almost solely oriented towards design practice, and professors who taught at the schools of architecture would be practitioners without any formal academic research background or experience.

Doctorates in architecture have a much shorter history than many other doctorates, and several researchers in architecture would most likely claim that they are still in the process of finding their form within the whole of academic research. Others, however, would argue that they are transforming or changing, finding new and alternative forms of expression that break away from earlier hegemonic research models.

A key issue concerning PhD research in architecture is still to this day *what* performing research in architecture actually means, and *how* architects, with their particular background in architecture and architectural education, should ideally practice research. An equally pending issue, also being discussed since the 1980s, relates to the relevance and value of PhD research in architecture for architectural education, the architectural discipline and society, and what kind of PhD training the PhD students should obtain in regard to the profile of their future positions in the profession.³

The first generation of American PhD programmes in architecture, or the socalled architectural sciences, was closely aligned with the PhD programmes and research discourses that already existed at universities, in particular in the humanities and social sciences, and they were therefore in many cases a specific model for imitation. Early PhD theses in architecture are most often monographs on architects or architectural works, history, historiography, theory, and criticism.⁴ They typically follow a research model, which is known from art history and critical literature studies, and they also adopt the conventions of the traditional text-based PhD dissertation common to these studies. The above-mentioned American PhD programmes in architecture functioned to some extent as models for the first European ones of the kind. For better or for worse, they too would emphasize the historical and theoretical study of architecture.⁵ It was only later that the research terminology and its notion were expanded, and the extensive pallet of diverse research concepts, approaches, and methods prevailing at PhD schools today would appear.

However, there are fundamental differences in the way of thinking about education between the Anglo-Saxon countries and the Continental and Scandinavian countries. On the subject of teaching and different ways of teaching, a distinction is often made between a curriculum tradition and a didactic tradition.⁶ In the curriculum tradition, based in American culture, the focus is on *what* needs to be understood and learned, while in the didactic tradition, which is German in origin, there is an educational focus on how a subject should be understood and learned, and what significance this has for the individual who understands and learns it. The curriculum and didactic traditions are not necessarily unambiguously separated, and in many educational institutions, including schools of architecture, their use more or less overlaps.7 Nevertheless, the distinction between the two may have an impact on what kind of research projects is being favored in different countries, and it may also affect whether the research institutions and their research cultures - consciously or subconsciously - have the tradition of nurturing so-called basic research or so-called applied research.

Whether PhD programmes in architecture are associated with an art academy or a university significantly influences the teaching and research being carried out at these institutions. At the former schools, which represent a long-standing artistic education of architects steeped in tradition, architecture is still regarded as an artistic discipline, and research carried out at these schools often draws upon methods and strategies from the arts. Research in architecture at these schools has traditionally been basic research. Conversely, at technical universities, research, often aimed at the industry, has traditionally been carried out as applied research. At these universities, PhD theses in architecture will most often focus on the technological aspects of architecture, reflecting the science and research formats typical of the specific educational discourses of these institutions.

How architectural research is funded – whether it is commissioned by, for instance, a private company, a university, a school of architecture, an archi-

tectural office, or a cultural knowledge institution – also plays an important role for the research that is carried out, its subject area, its form, and its research methods. In later years, based on the global economic crisis in 2008 and the advance of neo-liberal politics, it has become more and more common for researchers at public universities and schools of architecture to be made responsible for applying for research funding for their research projects through external funding pools. This is a circumstance which also greatly influences the research and PhD projects in architecture that are produced in the Nordic countries. Not only does it put pressure on the researchers and the research institutions; it may also discriminate and exclude certain kinds of research projects, as the decisions about which research projects and what kind of research are important and relevant for society, and the architectural discipline is now more and more distributed across executive bodies outside of academia.

Free researcher-driven research, which has traditionally been fundamental to research in the Nordic countries, may be at risk if research has to meet the demands and expectations of the body which sponsors this research. It may also be at risk if its results are to be continually legitimized – evaluated and credited – by society's changing research political establishment – an establishment which, at least in Scandinavia, increasingly favours and promotes so-called strategic research.

Globalization and the migration of researchers and PhD students have led to a mix of different research concepts and understandings existing side by side at many research institutions. Some PhD schools welcome the apparent freedom of the mix, while others struggle to make sense of and create consensus in an ever more labile research framework. For better or worse, it influences the content and the quality of the research being produced at PhD schools. It also influences the critical mass at the schools, as international researchers and guest professors tend to stay only for a relatively short period of time before moving on to other institutions. Unemployment amongst architects has led to more candidates pursuing a PhD and a career in academia, and it has also led to older architects applying for PhD positions. A new phenomenon in architectural research is the so-called Practice-Based PhD, which invites experienced practising architects to embark on research. Practice contexts are also sites for knowledge production, and many architectural offices today experiment with various kinds of research. In general, "practice-based research" is understood as an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice. In the "making disciplines", including architecture, the emphasis is primarily on the creative process and the works that are generated from that process.

By some architects, the Practice-Based PhD in architecture is interpreted as the culmination of a long-standing evolution within architectural research towards a more field-specific design scholarship. In the first article in Section I of this book: "Development towards Field-Specific Research in Architecture and Design: On Doctoral Studies in Scandinavia since the 1970s", Halina Dunin-Woyseth and her co-author Frederik Nilsson outline a history on doctoral studies in architecture that has exactly this perspective. Dunin-Woyseth and Nilsson's overall conclusion is that professional practice, teaching, and research in architecture initially acted separately in doctoral studies, then became oppositional, and just recently began to synergistically permeate each other in types of research that recognize so-called designerly ways of thinking.

Architectural history - once the hallmark of architectural research at most schools of architecture - is a subject in decline in the Nordic countries. According to Johan Linton, who teaches it at Chalmers University of Technology in Gothenburg, it is almost excluded from obtaining state research funding in Sweden. With only few research positions available in architectural history at the Swedish universities and architecture schools, it is a development which will most likely lead to significantly fewer students in the future specializing in it. In his article: "History of Architecture: Thinking Beyond the Present", Linton critically reflects on the cultural relevance and value of architectural history in the study of architecture. In doing so, he takes his point of departure in a presentation of his own PhD dissertation from 2013, a monograph on Le Corbusier's concept of Ville radieuse (The Radiant City). One of the passages in the thesis specifically deals with Le Corbusier's plan for Stockholm from 1933. Using it as a representative example in his argumentation for the relevance of architectural history, Linton maintains that having historical knowledge about this innovative and influential plan for the Swedish capital will give architects a deeper understanding of later urban schemes in Sweden.

In the article "Everyday Urban Life at Neighbourhood Centres: Urban Design and Co-Presence", Ann Legeby presents her 2013 PhD dissertation, *Pat*-

terns of Co-Presence. Her article sums up the many findings in her research, while putting into perspective her methodological approach and theoretical stance towards the subject of study. The author, who is a researcher in urban design at the School of Architecture at KTH Royal Institute of Technology in Stockholm, explores the role of urban design and urban form in relation to urban segregation. Legeby's aim is to contribute to and nuance the debate on this global issue by highlighting the role and impact of the built environment beyond residential segregation. Most importantly, she points out, her aim is to identify how urban configuration creates so-called affordances and limitations, and how urban configuration influences co-present situations in terms of its intensity and its constitution. In her PhD thesis, Legeby examines spatial relations and how public spaces, such as streets, parks, and squares, can become important "arenas" for co-presence and interplay between different kinds of inhabitants who are normally separated. Arguing that an important social function of a city is indeed to structure co-presence among people from different social categories, Legeby also identifies and examines various architectural typologies and institutions that are important for the development of social processes, specifically those related to work, education, and culture - for example, schools and libraries.

Marie Markman, a visual artist and landscape architect with degrees in both disciplines, aims to refine the work of integrating art, landscape architecture, and urban planning in her research. In 2015, she defended her PhD dissertation Landscape Sprawl: An Artistic Response to Living in the Anthropocene, which deals with new approaches towards landscape architecture and how to rethink the phenomena of urban sprawl. Taking her PhD thesis as her point of departure, Markman in her article "Open Research - Sharing Research Formats and Challenges", candidly refers to what it was like for her to be a PhD student and in what way she carried out her cross-disciplinary research project. She reflects on the intentions behind her dissertation, its concept, format, and structure, as well as the review it received when she defended it. Her article also includes critical thoughts on creative processes and her own PhD researcher training at the PhD school at the Aarhus School of Architecture, voicing an apparent need amongst many PhD students to learn more about specific research formats and methods. In her text, she furthermore comments on the discussions on research and knowledge production which took place during the NAF/NAAR symposium in Stockholm. Against this background, Markman, still drawing on her personal experiences as a researcher, refers to her present work and how she learned that her research

and research approach can be of use and great demand outside of academia. Markman, who basically believes that research is a creative act, and that art and research have many things in common, in 2017 established her own independent research laboratory which counts both private companies and public institutions amongst its clients.

Henrik Reeh, who was invited by NAF/NAAR to lecture at the Venice Biennale on the theme of the 2016 NAF/NAAR Symposium, in his article "Relational Architecture: Education, Research, Transformation" frames the impact that PhD education in the Nordic countries has on architectural research and its production. According to Reeh, the landscape of research and reflection on architecture has been transformed during the past three decades. This transformation has taken place in tandem with the strategic development and formalization of doctoral education in architecture. In his article, Reeh contextualizes this development and reflects on how it manifests, pointing out that PhD education today is a complex institutionalized system consisting of an ensemble of elements. Shedding light on five of these elements - categorized by him as the "Dissertation", the "Doctoral Student", the "Supervisor and Scholarly Institution", the "PhD and Profession", and the "Labor Market" - he further reflects on how they are connected and together amount to a dynamic system of multilayered and far-reaching relations. Reeh's analysis is based on six representative "cases" - six completed Danish PhD dissertations that he has been involved in as a supervisor.

Reeh's meta-reading of the production of knowledge in architecture by PhD research wraps up Section I of this book. Section II, which consist of essays and articles written by PhD students, begins with three essays in the context of architectural history.

Norwegian PhD student Mathilde Sprovin's architectural historical study is aimed at the Norwegian architectural education and its development from the opening of The Royal Drawing School in Christiania in 1818. Sprovin argues that the opening of the school, the first public art school for craftsmen, artists, and architects in Norway, was part of the process of constructing a nation state after the country gained independence from Denmark in 1814, at which time the country acquired a free constitution, creating the foundation of modern Norway. The ambition of The Drawing School was, according to the author, to be a Norwegian art academy, similar to other national art academies established in Europe during the eighteenth century. Sprovin's study largely deals with national identity, the symbolic value of architecture, and the political roles of architectural education and the architectural discipline as culture-bearing institutions. Even though, according to Sprovin, The Royal Drawing School in Christiania never obtained the status of a proper art academy, it held, by nature of it being the aesthetic centre of the nation in the 1800s, an indisputable position of power in Norway. In her article, "Architecture Education in Norway in the Nineteenth Century: From France with Love", the author pursues the history of the school and the training of architects there, placing the school's training in a European context of architectural education. She describes the leading theories in the education of the architects of the nineteeth century, and which influences were specific to the training that took place at The Royal Drawing School in Christiania, shedding new light on both the role of the school and its discourse.

Like Mathilde Sprovin, Ola Svenle, who is a PhD fellow in the history and theory of architecture at KTH, Stockholm, is interested in the history and historiography of architectural education. He presently carries out research into the development of Swedish architectural education. In his article titled "Lost Grounds: Architectural Knowledge Production as Crisis Management" he reflects on the social and cultural changes that occurred in Sweden at the end of the nineteenth century: the period in which the country went from being a pre-industrial to an industrial society. Svenle is interested in identifying and understanding how these changes affected architectural education in Sweden, its content and form. For instance, Svenle comments on how new artistic and scientific considerations began to appear in Swedish architecture and its practice, and how the break with tradition to some extent brought about a crisis in the construction industry in the 1880s. Drawing on the work of, among others, architectural historians Björn Linn and Finn Werne, he pursues the possible nature and consequences of the crisis.

Natalie Koerner, from the Royal Danish Academy of Fine Arts, School of Architecture (KADK), in Copenhagen, writes on the spatiality, temporality, and materiality of digital archives. In her article "Cloud Machinery and Memory Theatres: A Spatial Approximation of the Digital Cloud", she attempts to elucidate the spatiality of the digital cloud. In doing so, she draws similarities between the digital cloud and two historical theatre-related occurrences that deal with ephemeral data structuring: the so-called cloud machinery used in religious theatre since the fourteenth century and Giulio Camillo's sixteenth-century Memory Theatre, claiming that such a comparison is relevant in order to explore the spatial imaginability of today's digital cloud. Sustainability drawing headlines in the media and political debates worldwide is at the forefront of many current PhD projects in the Nordic countries. Not least among urban designers, planners, and landscape architects are considerations about sustainability absolutely central. A number of articles and essays in this publication reflect this trend.

The article "Changing Perspectives on Storm Water Management in Norway", written by Elisabeth Sjödahl from the Oslo School of Architecture (AHO), addresses a topical subject in urbanism and landscape architectural studies. Climate changes of recent years now very much make architects and engineers rethink many of the cities of the world and their infrastructures in relation to increasingly frequent and extreme floods caused by cloudbursts and storm surges. Sjödahl's PhD deals with water management, its productive and restructuring role, and the effects of climate change in the peri-urban area of Oslo. In her article in this book, which looks at the changing perspectives on storm management during the last fifty years as observed through literature reviews, she gives the reader an idea of current approaches within storm water management as compared to more historical ones. The article also presents the author's reflections on the needs within the Scandinavian climatic region – more specifically, on planning practices in Norway.

The city and its sustainability is also the subject of Fabio Hernández-Palacio's research carried out at the Norwegian University of Science and Technology (NTNU) in Trondheim. His research question, which is put into perspective in his article for this publication, is focused on the city and its density. More specifically, his study addresses Norwegian cities, which are, according to the author, amongst the least dense cities in the world. Through a literature review in his article titled "The Sustainable City in Norway: The Quest for Urban Densification", Hernández-Palacio sheds light on the many challenges facing Norwegian cities in the future, while also reflecting on whether they can become denser and more sustainable.

Anja Standal, architect and researcher at the Norwegian University of Life Sciences (NMBU), is drawn to the wider aspects of planning and architecture with a particular interest in the interdependent relationships between buildings and their contexts. In her present article, she claims there is a need for a morphological rethinking of the boundary in the interface between private and public space in cities, arguing that micro-morphological physical parts, which are easily overlooked in urban development, have great significance in determining successful urban performance. According to Standal, very little research has so far been done to develop a framework to assess and systematically analyse the micro-scale formal properties (morphological) and spatial relationships (syntactical) at the boundary between buildings and streets. In her article "Urban Micro-Morphology as a Framework to Assess Physical Public-Private Interfaces at Street Level", which draws on her PhD research, she therefore pursues these theses, while taking the first steps towards perhaps developing such a framework.

In the article "Observer, Expert, or Activist: Changing Roles in Design Research Project", Katja Maununaho, from the Tampere University of Technology, School of Architecture, presents aspects of her PhD research on urban housing design in multicultural neighbourhoods. She also puts forward her reflections on knowledge production in design research and considers what, in her opinion, is particular to design research and its methods as opposed to other kinds of research. In continuation of this, she writes about ethical considerations and responsibilities that she believes architects and design researchers have to keep in mind when doing research. Her reflections are based on her own PhD research experiences from the regeneration of a suburban high-rise tenement block in Suvela, Finland, entwining social life and spatial form, which in the article are put into perspective by current theories on the subject.

Housing design and questions of dwelling and domesticity are the themes of the following three articles written by Nicholas Thomas Lee, Ira Verma, and Turid Borgestrand Øien respectively.

"Dwellscape: The Contemporary Dwelling Interior as a Continuous Domestic Landscape", written by Nicholas Thomas Lee from The Royal Danish Academy of Fine Arts, School of Architecture (KADK), suggests a discourse on the domestic interior as a so-called inhabitable landscape. According to the author, who explores the spatial planning of contemporary dwellings in his PhD thesis, such discourse is generally lacking. Introducing it offers a counter-image to the traditional discourse, which often seems to be focused on the functionalist programming of space or the formalistic expression of the exterior envelope, leaving the interior as a mere consequence. Lee advocates that architects challenge a technocratic attitude to planning by engaging with an approach to the spatial organization of dwellings that allows for a more "nomadic" appropriation of the domestic landscape and which considers the significance of threshold "places". He elaborates on his perspective by incorporating theory and literature in the area and making a comparative analysis of House Vandenhaute by the Belgian architect Juliaan Lampens and Moriyama House by the Japanese architect Ryue Nishizawa – two representative examples of the latter design approach to the spatial organization of dwellings.

"Neighbourhood Planning and Housing for the Aging Population: A Case Study" by Ira Verma, a PhD student at the Department of Architecture at Aalto University, addresses a future-oriented challenge for the welfare countries of Scandinavia: ageing populations. The populations are ageing and especially the percentage of very old persons is increasing. This demographic transformation calls for new ways of thinking about housing, infrastructures, welfare, and services, as well as new ways of planning neighbourhoods that support people in their daily lives. Centred around the research question "How can the planning of the built environment promote independent living?", Verma, in her article in this book, sets off to reflect on experiments in subjectivity, collectivity, and environment. Her reflections are supported by her empirical studies, while also drawing on previous research on the subject.

Turid Borgestrand Øien, a PhD student at the Danish Building Research Institute (SBi) at Aalborg University, in her essay called "Healthy Housing Enacted: A Qualitative Approach to Indoor Environment" brings attention to healthy housing and what it takes to create and maintain a healthy home. The article, which reflects on the theme of Borgestrand Øien's PhD project, is written as a response to problems with damp and mould in Danish homes. The author's aim is to contribute to the understanding of healthy housing. In her case, this involves working across the fields of indoor environment, anthropology, and architecture, adding qualitative methods to an otherwise quantitative field of research. In her article, she reflects on her research methods and on how she conducted her investigations. Her approach to research and her reflections on this approach give the reader an understanding of the complexity of the relationships between housing, indoor environment, mould, and public health.

Three essays in this book engage in focused discussions of "designerly" or artistic ways of carrying out architectural research and what signifies this kind of knowledge production as compared to other modes of research. Taking her point of departure in reflections on the production of architectural knowledge – and on how theory, practice, and education can inform each other – Ute Groba from the Oslo School of Architecture (AHO) proceeds to discuss various principles for the design of low-rise high-density architecture as a sustainable housing typology in timber for Norwegian cities, the latter being the subject of her PhD project. In her essay "Making a Case for Urban Timber Housing – by Research, Teaching and Design", Groba puts forward some of the first results of her PhD research. With the essay, however, she first and foremost wants to make a contribution to the debate on architectural research and academic education. This Groba does by analysing and contextualizing how combining academic and "designerly" methods in her work has been fruitful for her, and how bringing her research into a master studio course gave her a discursive framework that offers her valuable feedback situations and a laboratory-like context for design experiments.

Espen Lunde Nielsen's PhD research aims to provide new knowledge about the city and practices of social interaction and coexistence in the city. Based on French writer George Perec's concept of the "infra-ordinary", Lunde Nielsen focuses on the everyday topography and unregarded spaces of the city, voicing their importance in the urban texture and how we as human beings understand it. The PhD project, which is carried out at Aarhus School of Architecture (AAA), is described in a self-reflexive manner in the essay "Situated Knowledge Production: Urban Biopsies, Frameworks of Perception, and Critical Spatial Practices". Lunde Nielsen's research method is characterized by being informed by a variety of artistic and interdisciplinary practices, taking into account and critically discussing the position of both the agency of the knowledge producer (the author) and the object of study. An important feature in Lunde Nielsen's PhD, which could be described as a research-by-design project, is his collection of so-called urban biopsies and his fabrication of instruments or "situated probes" that act as lenses in his perception of the city. Situated probes, the author argues, propel conversations between designers, people, situations, and places and provide ways that we as human beings can see the world differently and thus gain new knowledge. In the present essay written for this publication, three related urban biopsies are presented that demonstrate Lunde Nielsen's theory on the infra-ordinary and on practices of social interaction and coexistence in the city.

In Elin Tanding Sørensen's "arts based" doctoral study, carried out at the Norwegian University of Life Sciences (NMBU), there is also an ambition to integrate a variety of artistic and interdisciplinary practices. More specifically, Tanding Sørensen aims at fusing methods from the arts, landscape architecture, and science for the sake of arriving at visionary urban design propositions and a deeper understanding of the city as habitat. In a study of the cultural and biological enrichment of urban hard surfaces through the establishment of biologically active urban covers, she has curated and fabricated a series of "living labs", the first being an artwork entitled *Mosses/circuits*. In this outdoor-laboratory proposal, the main ingredients are mosses in combination with microhabitat reliefs inspired by electronic circuit boards. In her PhD research, Tanding Sørensen aspires to shed light on the underlying forms of knowledge particular to the fields of art and landscape architecture. Taking this aspiration as a point of departure for her article in this book, "On Urban Hard Surfaces", she proceeds to reflect on her fascination with mosses and its perspectives for her work, in which urban ecology and landscape design processes that may contribute to "better performing cities" are pivotal.

Architectural research – and the notion of it – is subject to different interpretations depending on its context. Discussions on its specificity as compared to other kinds of research are nevertheless evolving as it becomes more institutionalized and its history is written. Likewise, knowledge production in architecture is not a stable concept either. It seems to consist of a series of "research acts" that allow each art practice or discourse to again and again contribute to a collective definition and constitution of both the concept and its practice. The term "knowledge production", originally coined in economics in the 1960s and entering arts discourse as a critical term deployed against the rapidly growing global economy of the 1990s, has in the twenty-first century become an increasingly contested term due to its parroting of the discourse of that same global economy.⁸

The aim of this book has been to shed light on PhD research in the Nordic countries and to contribute to discussions on knowledge production in architecture. Having an interest in framing the politics of educational systems and the construction of research cultures in architecture, NAF/NAAR wanted to curate a platform for critical thinking on these matters. Raising a number of epistemological questions regarding the notion of architectural PhD research and its history, research formats, methods, and theoretical positionings, as well as the research skills and competences that the educational systems cultivate, the book presents and discusses what is presently endorsed as architectural research in the Nordic countries. In doing so, it also illuminates past understandings and future perspectives of knowledge production in architecture. Complex, yet making no claim to being complete in its coverage or account of its subject matter, the book wishes to stimulate further thinking on architectural research and the frameworks and mechanisms that govern it.

NOTES

¹ The first doctoral programme in architecture in the USA was established at the University of Pennsylvania in 1964, followed by Cornell University in the late 1960s and later on by Princeton University and the Massachusetts Institute of Technology. Halina Dunin-Woyseth, "The 'Think-able' and the 'Unthinkable' Doctorates: Three Perspectives on Doctoral Scholarship in Architecture", in *The Unthinkable Doctorate* (Ghent: Hogeschool voor Wetenschap & Kunst – School of Architecture Sint-Lucas, 2005), p. 84.

² Jørgen Dehs and Claus Peder Pedersen, "Introduction", in *When Architects and Designers Write/ Draw/Build/? a PhD* (Aarhus: Arkitektskolens Forlag, 2013), p. 8. Although the first formalized doctoral programmes in architecture in the Nordic countries were set up in the 1990s, several theses on architectural research had already been written in the 1970s and 1980s. In Sweden, the PhD education – including special courses and an individual study plan for each PhD student – started in 1970s at the schools of architecture in Stockholm, Gothenburg, and Lund. During the 1970s, altogether fifty-four theses were approved at the three schools of architecture in Sweden. The first "crisis" came in 1980–82 when the government suggested a major cuts in research and PhD education at the schools of architecture in connection to problems in the building sector. See Jan Eriksson and Örjan Wikforss, *Arkitekturforskning* (Stockholm: Statens råd för byggsforskning, G7:1983). The appendix (pp. 77–82) includes an overview of the theses produced at the schools of architecture from 1955 to 1982 – seventy-six theses in total.

³ Already in 1987 this issue was being discussed in *NJAR*, the scientific journal of NAF/NAAR. There are several articles discussing the relations between research, education, and practice in the following issues of the journal: 1 (1987), 2 (1987), 1–2 (1989), 1–2 (1990), and 4 (1991).

⁴ Dunin-Woyseth, "The 'Thinkable' and the 'Unthinkable' Doctorates", p. 84.

⁵ Anne Solberg, "Developing Doctorateness in Art, Design and Architecture", PhD thesis, Faculty of Humanities, Sports and Educational Sciences, University College of Southeast Norway, Kongsberg, 2017, p. 32.

⁶ Merete Wieberg, "Forståelse i forskningsbaseret undervisning – især i relation til human- og samfundsvidenskab", *Dansk Universitetspædagogisk Tidsskrift*, 10 (2011), p. 59.

7 Ibid.

⁸ Sidsel Nelund, "Acts of Research: Knowledge Production in Contemporary Arts between Knowledge Economy and Critical Practice", PhD thesis, Department of Arts and Cultural Studies, Faculty of Humanities, University of Copenhagen, 2015, p. 278.

DEVELOPMENTS TOWARDS FIELD-SPECIFIC RESEARCH IN ARCHITECTURE AND DESIGN: ON DOCTORAL STUDIES IN SCANDINAVIA SINCE THE 1970s Halina Dunin-Woyseth and Fredrik Nilsson

ABSTRACT

Architectural and design research, especially in the context of doctoral studies, has been pursued in Scandinavia for over forty years. This article sketches how the field of architecture and design has developed over several decades with regard to its three constituent components: professional practice, teaching, and research. The components of practice, teaching, and research acted first as separate, then even as opposite, but later on moved closer together in order to, most recently, synergistically permeate each other.

In the decades prior to the mid-1970s, design scholarship relied mostly on mature practitioners who reflected on their life's work. Teachers were practitioners. The period between the mid-1970s and 1990 brought about an uncritical dialogue with academia, while looking for theoretical and methodological frameworks in established academic disciplines. A polarization between practitioners and researchers emerged. In the 1990s and in the beginning of the new century, a stronger intellectual self-confidence developed among design scholars. Practice, teaching, and research came closer to each other.

Most recent years have shown an even stronger movement towards field-specific research. It coincides with a growing awareness of a continuum from creative practice to scientific research, of the potential of research by art and by design, and of inter- and transdisciplinarity which recognize designerly ways of thinking. A kind of "permeability" between various kinds of practices of architecture and design has been observed.

KEYWORDS

Architectural research, design research, field-specific modes of research, permeability of creative practices, doctoral education

INTRODUCTION

Architectural and design research, especially in the context of doctoral studies, has been pursued in Scandinavia for over forty years. On the occasion of the symposium The Production of Knowledge in Architecture by PhD Research in the Nordic Countries, organized by the Nordic Association of Architectural Research (Royal Institute of Technology, Stockholm, 19-20 May 2016), we prepared a presentation that provided the foundation for this article. The main intention of this presentation was to sketch a diachronic review of the main features of the development of doctoral knowledge in Scandinavia. We found it useful to illuminate that development through the contexts of professional practice and teaching, which have both changed over the years, sometimes supporting each other synergistically and other times not. We have built this article on a structuring framework of periodization. We shall attempt to sketch a broad time frame stretching from the mid-1970s to the present time. We are aware that all systems of periodization are more or less arbitrary. Yet, the remarkable can only be comprehended and assessed in light of the historically dominant paradigm.¹ We trust that our periodization will yield such a framework that will help us understand the features of each of the periods of development in architectural practice, education, and research, and also the interplay between them in order to illuminate what kind of doctoral knowledge these periods brought about. We decided to use diagrams that we hope will make the proposed periodization easier to understand. We have presented the reasoning behind the construction of the diagrams elsewhere.²

As a point of departure for this article, we chose to take a quotation by the renowned American architectural scholar Julia Williams Robinson. She maintains that architecture is "an emerging discipline that involves professional practice, research, and teaching". She proceeds,

The character and effects of its products – disciplinary knowledge, the forms of disciplinary practices, architectural artifacts – are the responsibility of those within the field. Academics, researchers, and professional practitioners are thus jointly responsible to society and to each other.³

We have studied the development of such a scholarly culture, but also noted the cohesion of different practices by individual practitioners.⁴ A variety of evidence of this culture can be traced, and recently the evidence is becoming more pronounced and gaining momentum. We have related this emerging development to precedents and prevalent international tendencies in practice and research, and we have also collated them with developments in the Scandinavian countries.

We can see the increasing pace of progress in the field of architectural research today and during the last decade by comparing the first edition of the seminal book Architectural Research Methods by Linda Groat and David Wang from 2002 with the extended second edition from 2013.⁵ In the acknowledgements of the second edition, David Wang makes the reflection that "In writing it, I was struck by just how much has progressed in this arena even since the first issue of this book a decade ago".6 Groat and Wang note that both the nature and the role of architectural research, as conducted in academia and in practice, have gradually shifted over the decade since the first edition was published. They argue that, from their vantage point, the recent evolution of research in academic and professional settings has led to an increasing convergence among the audiences of their book.⁷ They also underline that the developments in Europe for bridging design with research need special attention, and that the European developments suggest that the domains of design and research become more connected and complementary. As an example in their analysis they use a doctoral thesis by a Belgian architect who did her doctoral education and thesis at Chalmers University of Technology.8 Architectural and design research, according to the authors, is in the midst of an exciting time of development, and there have been many attempts in the last decade to bridge the gap between design and research as these have been conventionally understood. Design and research are neither polar opposites nor equivalent domains of activity, Groat and Wang argue; instead, subtle nuances and complementarities exist between the two.9

In the important book *Design Research in Architecture: An Overview*, also from 2013, Murray Fraser gives a working definition of architectural research that bridges the gap between design and research:

As a working definition, architectural design research can be described as the processes and outcomes of inquiries and investigations in which architects use the creation of projects, or broader contributions towards design thinking, as the central constituent in a process which also involves the more generalised research activities of thinking, writing, testing, verifying, debating, disseminating, performing, validating and so on.¹⁰ Fraser also underlines that design research is able to blend into other more established research methodologies in the arts, humanities, and sciences, and that it is vital that the design element and these other research methods operate together in an interactive manner, feeding into each other throughout the entire process. When it comes to how this has developed until today, Fraser states that advances in architectural design research can clearly be grouped geographically in the UK and Australia and a few specific countries in Europe, where he explicitly points out Norway, Sweden, Belgium, and the Netherlands. "Those are certainly the locations where various academic conferences have been held over the last decade or so to discuss design research in architecture, frequently linked to the issue of design doctorates."¹¹

This indicates how important Scandinavian developments in architectural research have been in an international perspective, and that a lot has happened during the last decade in particular. In keeping with the intention for this article, let us now start with the first period in our periodization framework and follow the developments in Scandinavia in particular up to the present day.

UNTIL THE MID-1970s:

INTERNAL CULTURE OF PRACTICE AND TEACHING

Over the years there has been a long tradition of exchange and close bonds between the practice of architecture and design, on the one hand, and education in these fields on the other. At almost all schools of architecture and design, professional practitioners have constituted a significant part of the faculty. That modus operandi has been practiced throughout history and is still prevalent today.¹² In architectural pedagogy, critique is an important teaching model - and also plays an important part in architectural practice - in which learning takes place in an individualized process based on understanding between students and their teachers and critics,¹³ where the critics and teachers often are practicing architects. The teaching of architecture has a long history, but the development of research education at schools of architecture spans only a few decades. As an example, the teaching of architecture at Chalmers University of Technology in Gothenburg, Sweden, has a 160-year-old history starting in 1856, but it was only in the mid-1960s that research education started to become structured, and the first doctoral thesis in architecture at Chalmers was published in 1972.¹⁴ Thus, in many countries in Scandinavia and Europe during the 1970s, academic, discipline-based research was considered only slightly relevant to professional practice, and it



Figure 1. The first phase in the development of doctoral scholarship in architecture and design in Scandinavia (until the mid-1970s). In this and in the following diagrams, the lower part represents the level of professional architectural practices, and the upper part the level of academia with the "clouds" of its disciplines. The arrows show interactions and communications, which are sometimes non-existent or weak and therefore marked with a cross.

therefore met with great scepticism from practitioners. Clearly, field-specific research more closely tied to practice had yet to be developed.¹⁵

The few doctoral projects from the period prior to the mid-seventies were based on the PhD candidates' own professional practice or teaching. The reason to engage in doctoral studies was most often to reflect on and come to a conclusion about one's own professional career. The supervisors of these few PhD students usually had no scholarly background, having been recruited among highly renowned practitioners with no research experience.¹⁶ The reasoning and the language of the doctoral theses reminded mostly of internal professional discussions, without attempts to engage in an academic dialogue with other disciplines in order to contextualize the new architectural knowledge in a broader knowledge landscape.

BETWEEN THE MID-1970s AND 1990: POLARIZATION OF PRACTICE AND THEORY

In the middle of the 1970s, national authorities exerted pressure on the schools of architecture in the Nordic countries in order to develop a more academic – i.e. research-based – conformation in their educational programmes. The schools remained reluctant to this challenge, as there was no strong tradition of academic work in the field. Searching for models for institutionalizing research, many schools looked to various academic disciplines with a more theoretical basis of knowledge, particularly to the social scienc-

es and humanities. These models were often "imported" into architecture programmes. The aim of architectural research was primarily to develop a theoretical foundation rather than to identify what knowledge architects had already developed and what kind of knowledge was needed.¹⁷

Architectural and urban design practice was, collated with established research, mostly considered to be a sort of "applied science". PhD students with an architectural background were expected to essentially abandon their professional backgrounds as designers and architects. In reading their doctoral theses, one finds hardly any attempts at defining the authors' scholarly awareness and epistemological stance. In consequence, architectural research of this period was definitely in want of its own intellectual identity in the dialogue between architecture and various other academic disciplines. At the same time, there were few attempts to apply the newly acquired doctoral knowledge in professional practice.

Architectural research was strongly affected by theories and methods from other academic disciplines, and it adopted many of these, but slowly architectural scholars began debating the idea of developing a field-specific identity and epistemological foundation, one based more on the specific knowledge modes of architecture. The Association of Architectural Research was founded in 1987 in Sweden, and a few years later it had become a pan-Scandinavian endeavour and began to publish the *Nordic Journal of Architectural Research* (NJAR). For many years, the NJAR was the only peer-reviewed journal for architectural research in the Nordic countries, and as such it played a substantial role in these developments.



Figure 2. The second phase in the development of doctoral scholarship in architecture and design in Scandinavia (mid-1970s until 1990).

Until the 1970s, teaching in practice-based fields such as architecture, design, and others had been almost entirely based on a master-apprentice model. Renowned practitioners taught at the vocational schools. Research was a peripheral phenomenon with regard to both practice and academia. Salama and Wilkinson compared this dominance of practice in architecture to a kind of "monadic" position.¹⁸ But since the mid-1970s, mostly because of external, ministerial policies, research began to be established in schools of architecture and design. Teaching began to appear as a new "specialized practice". One could observe a certain polarization among the faculty between those who still pursued the apprentice-master mode of teaching and those who attempted to expand the curriculum to include an introduction to knowledge derived from research. This research was not always regarded as relevant by practitioners, nor sufficiently sophisticated academically by academics.¹⁹ By the 1990s, one could perceive the development of two different profiles among teachers of architecture: the practice-based and the research-based.

THE 1990s: CLOSER DIALOGUE BETWEEN PRACTITIONERS AND RESEARCHERS

This new period in the development was strongly influenced by how doctoral curricula were defined for PhD students, with their background first in architecture and later from other creative practices. The task was to justify such curricula as "academic enough", primarily in terms of the academia from which the established, discipline-founded bodies of decision makers were drawn. There were attempts to formulate frameworks for what practice-based issues were reasonable and justifiable. At several Scandinavian schools of architecture, a concept of the "making disciplines" was developed. This concept was an attempt to define both the academic standards of research educed from creative practices and the practical relevance of the output of this research.²⁰

During the 1990s, the debates on post-modernism and post-structuralism were cogent for the development of architectural practice and theory. The critique of modernism included ideas from many other fields, and the theoretical discussions showed influences from such disciplines as sociology, psychology, history, and especially philosophy, which can be observed in the writings of some prominent scholars of that time.²¹

Several prominent architectural firms began to develop research strategies. Of these firms the most renowned is Rem Koolhaas and OMA, who presented systematic approaches and research that was closely related to architectural design and educational practice. During this period, books began to be published by architects and offices presenting their work as research on working methods towards systematic investigations of contemporary societies and urban situations.²²

Towards the end of the 1990s, architectural scholars became increasingly critical of adopting theoretical frameworks and methodologies from academia, first from the social sciences and later the humanities. The critics also decried the unreflected use of theories and methods from other disciplines without considering their relevance and appropriateness with regard to the specific character of the architectural field.²³

At several Scandinavian schools of architecture, discussions were held about the importance of defining a more field-specific architectural epistemological stance. Providing a direct incentive for these discussions were the new university laws in Scandinavia, which demanded from all institutions of higher education a more academically professional model of scholarship with a special emphasis on doctoral programmes with organized research education.²⁴

In March 1992, a Nordic network for collaboration in research education for design professionals was established during their constitutive meeting at Aarhus School of Architecture. These schools worked on establishing doctoral programmes based on obligatory research education. Many issues needed to be discussed at a broader level than national contexts, including possible contexts and methods of research education in the fields of *making* knowledge. The network organized a series of Nordic courses in research education that, according to feedback from the PhD students who attended them, contributed to the development of doctoral studies focused on establishing the identity of design thinking in architecture.²⁵

Since the beginning of the 1990s, research education at several Scandinavian schools of architecture has continuously moved towards a more field-specific design scholarship. PhD students come mostly from backgrounds in various *making* professions, and their research objects are derived most often from their professional practice. The concept of the *making disciplines* gradually coalesced into one of the epistemological premises for design research ed-

ucation. In the Scandinavian context, this concept is not about a traditional discipline in the strict sense, but rather an attempt to formulate a kind of quality-supportive framework for making discourse.²⁶ This framework addresses the criteria of both professional relevance and research scholarship. This opens the possibility for developing a culture of dialogue with regard to both practice and academia.

In 1996, Delft University of Technology (TU Delft) offered the conference Doctorates in Design and Architecture, which emphasized the scientific status of design research as the basis for doctoral research in architecture. The conference displayed a broad, differentiated, and specialized field of research areas and issues.²⁷ It made it clear that many universities had, at that time, an inadequate research tradition. This collective awareness probably accelerated the emergence of doctoral studies more specific to the field of architecture and design, but it also visualized how the academic and professional worlds were more or less two separate realms. Design approaches and methods were recognized as important "partners" in addressing challenges in the built environment.

Four years later, this conference was followed by another international conference called Research by Design.²⁸ Presentations were made by both researchers and professional practitioners. The architects were represented by, among others, Ben van Berkel and Wiel Arets, who acted confidently and convincingly, while researchers seemed much less confident of their legitimacy both with regard to the profession and to academia. This conference



Figure 3. The third phase in the development of doctoral scholarship in architecture and design in Scandinavia (the 1990s).

can be regarded as a turning point in the development of architectural research, as it presented for the first time a continuum between scientific research and creative practice, identifying *research by design* as a potential path towards more field-specific research.

In 1997, a year after the first conference at TU Delft, a group under the aegis of Christopher Frayling presented the influential report *Practice-Based Doctorates in the Creative and Performing Arts and Design* in the UK. They maintained that the development of research approaches in academic fields such as the social sciences, humanities, and other established disciplines often had lost features of "pure scientific methods", allowing for hybrid modes – a phenomenon the group described as "… a continuum from scientific research to creative practice".²⁹ The second Delft conference seemed to illustrate this phenomenon within the field of architecture.

Throughout the 1990s, a new awareness was growing in architectural milieus of practitioners and educators. There were continuous efforts to recognize designerly ways of thinking as eminent, equal-status contributors both to



Figure 4. Cover of the book for the Research by Design conference in Delft in 2000.
the new developments in contemporary society and to knowledge production. More reflective use of the theoretical and methodological conceptions borrowed from the established academic disciplines in architecture-based research projects at the doctoral level succeeded in generating interdisciplinary research of high quality. The architectural research milieus built a growing intellectual self-confidence during the 1990s. The Nordic schools of architecture encouraged their PhD students to explore new field-specific research approaches.

Internationally, several PhD programmes were initiated that also consciously tried to develop formats for research that take the specific nature of architectural practice and its particular knowledge as a point of departure. In the mid-1990s, the influential new PhD by the Architectural Design programme at The Bartlett, University College London, offered doctoral studies that would "primarily involve design research investigations that are carried out as speculative and theoretical attempts to advance the discourse of architecture as a broad intellectual subject".³⁰ During the same period, the Design Practice Research programme at RMIT in Melbourne, Australia, began to take shape as a PhD research programme,³¹ with the intention to "inculcate an approach to research that was not 'about' design, but that was *research in the medium of design itself*".³²

In this decade, the traditionally distinct lines between practitioners and theoreticians began to blur. The design studio remained at the core of teaching architecture, and the relations between teachers and students usually continued to have the traditional master-apprentice character. Nevertheless, the teachers of design who got involved in research no longer seemed to change their loyalty to practice, but often sought instead to build bridges between practice and theory by developing more field-specific research. Slowly, a broader spectrum of practices emerged that included design practice, teaching, and research.

THE 2000s:

NEW MODES OF DESIGN AND RESEARCH

During the first years of the new millennium, discussions intensified about the specific features of architectural research with regard to professional practice in the field. Much criticism was addressed to advanced architectural research that heavily relied on disciplines outside of architecture. Many doctoral theses borrowed their theoretical and methodological conceptions from philosophy, sociology, literature, and cultural studies. It became clear how challenging it was to competently assess such theses. Alejandro Zaera-Polo maintained that "Often this has resulted in some of the most advanced research in architecture looking like bad movies, bad sociology, or bad literature".³³

Zaera-Polo pleaded the importance of exploring architecture-specific knowledge. He asserted that current research was aimed at fields of knowledge that were either supra-disciplinary (philosophy, sociology, economy) or sub-disciplinary (construction management, engineering). He saw opportunities to produce knowledge by integrating both these levels and held that this would be thinkable through research engaged in using architectural practice and processes of altering the built environment.

Some architectural offices, like MVRDV, Chora, Foreign Office Architects, and UN Studio, decided to use architectural tools, supported by new technology, while analysing the complexity of contemporary society and exploring relations between various phenomena. Examples of new research approaches combining architectural design tools and design projects to investigate knowledge fields and disciplines close to architecture and urbanism are found in the postgraduate programme for architects at the Berlage Institute in Rotterdam,³⁴ and not least in the PhD programmes at The Bartlett and the RMIT that developed further during the first decade of the century.

The Nordic network for collaboration strove to professionalize research education in the last years of the 1990s. One of their initiatives was to arrange a Scandinavian research education programme in the years 1999 and 2001. The group decided that the next phase of this collaboration should prepare young researchers to meet the demands of new types of research and broader expertise.³⁵ In 2003, a new Nordic pilot study course called "Transdisciplinary Research and the Making Professions" was arranged in order to introduce doctoral students to the international debate on new modes of knowledge production.

First and foremost, the course addressed transdisciplinarity as it was formulated in the now-canonical work *The New Production of Knowledge*.³⁷ This work maintains that practice contexts are also sites for knowledge production centred on specific problems close to their application. In transdisciplinary research, both problems and solutions are defined beyond any single discipline. The authors of the book called this mode of knowledge production Mode 2, as opposed to Mode 1, which is the traditional, academic mode of research. Mode 2 and transdisciplinarity have enticed design scholars as a new "in-practice" model of research that has strong similarities with design. Slowly, the awareness that there already existed a "continuum from scientific research to creative practice" grew in various academic milieus, and it was probably one of the reasons that an increasing number of PhD projects with integrated creative practice were accepted by adjudication committees at various schools of architecture and design. The difference from the earlier periods was that the creative practice was used not only for illustrative, but also for explorative and argumentative approaches. Since the 1990s a continuously growing number of research projects in Scandinavia can be regarded as having been carried out "by design". One can trace a longer history of this trend, which started in the discussions of artistic development as early as the 1970s. In the first decade of this century, several PhD theses opened the door to a bolder search for ways of carrying out field-specific research based on creative practice in architecture and design.38

In the same period of time, there has been an increased interest in research among architecture firms. Several Scandinavian firms, including White, 3xN, Arkitema, and Sweco, have intensified the use of research to support innovation and creative design.³⁹ They have developed research strategies for collaborating with academia in both research and teaching.

As mentioned earlier, the development of research education and doctoral scholarship in architecture and design in the Nordic countries was induced



Figure 5. The fourth phase in the development of doctoral scholarship in architecture and design in Scandinavia (after 2000).

by national university laws, thus urging the establishment of organized research education in the region. The Bologna-Berlin guidelines expanded such development to a broader European context. These guidelines appear to induce doctoral research more towards Mode 2 of knowledge production than towards Mode 1, which is in support of interaction between research and practice.

The international conference The Unthinkable Doctorate, organized by the Sint-Lucas School of Architecture and the Network for Theory, History and Criticism of Architecture (NETHCA) in Brussels in 2005,⁴⁰ has played an important role in the debate on new modes of doctoral research. This conference, besides its broader international impact, supported the establishment of Sint-Lucas's own research education programme. The Bologna-Berlin policies acknowledged doctoral studies as the third cycle in European higher education, and for the Sint-Lucas School of Architecture the guidelines of the Bologna-Berlin process made it possible to develop experimental, practice-based concepts for research and doctoral scholarship.⁴¹

In 2009, the Sint-Lucas School of Architecture, in collaboration with Chalmers University of Technology, organized a new conference in Brussels called Communicating (by) Design. The proceedings from the conferences illustrate how the teaching milieu of the institution broadly engaged in experimental and investigative doctoral studies within a very young PhD milieu. The third conference of this series at Sint-Lucas School of Architecture, Knowing (by) Designing, explored research derived from a broader spectrum of creative fields of architecture, design, art, and music, and pursued various field-specific modes. Recently, a fourth conference was arranged in Brussels in April 2017 on the theme of Impact by Designing, which discussed the increasingly important aspect of the impact research has on society in relation to architecture, design, art, and music.

The proceedings of this series of conferences in Delft and Brussels, especially between 1996 and 2013, document the growing awareness among practitioners, teachers, and researchers that their search for field-specific modes of research build bridges between the field's practice and its discourse, and between this discourse and the realm of academia. While the first conference in Delft in 1996 expressed a certain inextricable divergence of the field at the time, the second in 2000 brought up the term and the concept of *research by design*. The first Brussels conference in 2005 went still further by posing the



ference The Unthinkable Doctorate organized by Sint-Lucas and NETHCA in Brussels, 2005...

Figure 6b. Cover of proceedings of the conference Communicating (by) Design organized by Sint-Lucas and Chalmers in Brussels, 2009.

question of whether it would be possible to build doctoral scholarship in a more field-specific mode than what constituted the traditional doctorates in architecture. The second Belgian conference in 2009 reaffirmed this question and debated the issue of disseminating this new scholarship – how and to whom it should be communicated. The Brussels conference of 2013 presented several radical epistemological grounds for design scholarship and for the need to mediate these grounds with practice, education, and research. The questions were also posed whether boundaries between these three notions should not be challenged.

In studying the proceedings of the aforementioned conferences, one could conclude that the profile of vocational studies has developed towards a new phase. There is much evidence to support the conclusion that the spectrum of various practices has become more nuanced: practice-based educators have begun using teaching as practice experiments, closely related to research experiments, and research-based teachers are including practice in their work, which is increasingly field-specific. The various epistemological stances and pedagogical positions have begun to permeate one another. The polarization observed in previous decades has strongly abated, and a more graduated continuum from scientific research to creative practice is definitely observable in various practices in the field of architecture and design.

THE 2010s:

MORE FIELD-SPECIFIC, PRACTICE-BASED RESEARCH

According to the proposed periodization of the development of design as a field of inquiry, the most recent period began around 2010. It corresponds with the start of a research programme under the name of "Architecture in the Making: Architecture as a Making Discipline and Material Practice", which was endowed with a Strong Research Environment grant for 2011–17 from the Swedish Research Council Formas. This research programme was part of an initiative in which the four schools of architecture in Sweden initiated a national collaboration, including research and research education, to strengthen architectural research and create a critical mass of researchers and doctoral students. The aim of the research environment "Architecture in the Making" has been to develop theories and methods from the perspective of, and in collaboration with, architectural practice in order to reinforce ar-



Figure 7a. Cover of the book Reconstructing the Stockholm Exhibition by Atli Magnus Seelow (Arkitektur förlag, 2016).



Figure 7b. Cover of the book The Changing Shape of Practice: Integrating Research and Design in Architecture, edited by Michael Hensel and Fredrik Nilsson (Routledge, 2016).

chitectural research.⁴⁴ A new, important aspect of the programme has been the collective learning, training in, and practice of research in the wider communities of professional practice and academia. Creative practices encounter research collaboration with doctoral, postdoctoral, and senior research, often in educational situations at the four Swedish schools of architecture. Together they form "permeable practices" of design practitioners and research practitioners in the creative fields. Seen from a perspective of several years, these endeavours seem to have contributed to a more field-specific scholarship in the milieus involved. One can perceive a growing intellectual self-confidence, which espouses new, justifiable, field-specific academic autonomy instead of the earlier tradition of "emulated scholarship".

Seminars, symposia, and conferences have been organized around main themes. Researchers with different perspectives on research are invited to develop research projects, as well as to meet, exchange ideas and views, and form frameworks grounded both in traditional academia and in the emerging approaches of research by design and also of other practice-based studies. The results and activities have been published in various forms and include,



Figure 7c. Cover of the doctoral thesis An Inquiry into the Re-Creative Workings of the Unheimliche in Interior Architecture by Karel Deckers (Chalmers, 2015).



Figure 7d. The doctoral thesis The Photographic Absolute: An Architectural Beginning by Pavlina Lucas (AHO, 2014).

for instance, historical studies that integrate teaching and research, and in combination with traditional research methods use the practical methods of building models as well as other tools from architectural practice as means of architectural research.⁴⁵ In parallel, and as another example, studies have been conducted on how contemporary architectural practice is changing and finding new forms as a result of the closer integration of research approaches into design work.⁴⁶ Also, doctoral and licentiate theses have come out of this environment, in which different practices from architectural education and different methods of modelling, material experiments, and production of artefacts are integrated into the research in order to articulate architectural theories and methods.⁴⁷ Some other examples have also emerged out of other Nordic environments, in which a similar integration of research, practice, and education takes new, innovative forms.⁴⁸

One of the projects within the "making research environment" focuses on the need for an adequate assessment of the output of innovative, field-specific design research. The authors pledge that in order to achieve recognition for the results of such innovative research among both practitioners and researchers of architecture (and other knowledge producers), principles for assessing this kind of research should be debated in a broader contention between design practice and (design) academia. Various practices, such as design and research practices, discursive and making practices, hermeneutic and material practice, all of them within a continuum between scientific research and creative practice, are "permeable" and demand specific criticism and assessment better attuned to this "permeability" between modes of practice. The authors maintain that adequate assessment of research results in practice-based, creative fields should build on a double judgement of both practitioners and scholars through negotiations between connoisseurship and criticism.⁴⁹

At the current moment, we perceive "making scholarship" as a broad and inclusive field of inquiry that invites traditional research as well as the most innovative experiments to be carried out as research by design or by art. In this new landscape of making scholarship, we see a place for hybrid modes of research that could take different positions on the continuum between scientific research and creative practice.

CONCLUDING REMARKS

This article was inspired by a statement by the renowned American architecture and design scholar Julia Williams Robinson, written in 2001 – during the third decade of the international debate on building a sustainable field of inquiry in architecture and design. She maintained that architecture was "an emerging discipline that involves professional practice, research and teaching". Further on, she claimed that the responsibility for each of these spheres of activity belongs to separate groups with specialized expertise who are jointly responsible to society and to each other. We examined the validity of Robinson's statement with regard to the developments in the field of architecture and design in Scandinavia, and made some detours to other European countries to contextualize the developments in the Nordic region.

In the decades prior to the mid-1970s, design and architectural research was not considered pertinent to professional practice and thus was seen as marginal. Design scholarship of that period relied mostly on mature practitioners who reflected on their life's work. Teachers were practitioners. There was no need for communicating the practitioner-researchers' reflections to others outside of their professional circles. Doctoral knowledge was largely a more advanced professional debate.

The period between the mid-1970s and 1990 brought about various national policies that demanded developing research also in the vocational fields of academia, including architecture. With no models of their own for field-specific scholarship, the aspiring researchers attempted to build a timid, uncritical dialogue with academia while looking for theoretical and methodological frameworks of established academic disciplines. This period can be characterized by architectural research, primarily PhD research, of weak relevance to the practice, on one hand, and often naive use of intellectual tools borrowed from academia, on the other. A polarization emerged between practitioners and researchers in the field of architecture and design.

In the 1990s and at the beginning of the new century, a stronger intellectual self-confidence developed among design scholars. They strove for research that would be more pertinent to professional practice, and at the same time more reflective and critical with regard to using the theoretical and methodological tools from academically established disciplines. In this period, many attempts by PhD students were made to develop field-specific modes of research, and several innovative PhD programmes were initiated internationally. Teaching was slowly becoming an acknowledged arena of developing scholarship. Practice, teaching, and research came closer to one another.

In the most recent years, an even stronger movement towards field-specific research can be noted. It coincides with the growing awareness of a continuum from creative practice to scientific research, of the potential of research by art and by design, of inter- and transdisciplinarity that recognize designerly ways of thinking. We can observe a kind of "permeability" between various kinds of architecture and design practice. The statement by Julia Williams Robinson can therefore be slightly modified. Architects and designers as individuals have developed joined, synergistic expertise with regard to professional practice, teaching, and research. Even if this phenomenon is still limited in terms of volume, it will continue to grow over time through the complex and advanced contemporary practice and through the education of new generations of architects and designers.

This article followed how PhD knowledge in architecture and design has changed over time. It sketched diachronically how the field of architecture and design has developed over several decades with regard to its three constituent components: professional practice, teaching, and research; and how these components were initially separate, then became oppositional, before recently starting to converge in order to synergistically permeate one another. It is also clear that organized doctoral studies began rather early in Scandinavia compared with many other European countries, and together with the UK and the Netherlands, for example, the Scandinavian countries seem to have been at the forefront of doctoral studies in architecture even internationally. Most European countries began to follow the policies in this respect at the time of the Bologna-Berlin declaration (2003), a decade after the Scandinavian countries adopted their respective university laws. The most recent developments in architectural research and in doctoral studies in Scandinavia, where research has become even more integrated with practice than earlier, have been noticed and reviewed by international scholars (e.g. Linda Groat, David Wang, and Murray Fraser).

One intention of the article has been to give design practitioners and scholars a broader awareness about and stronger confidence in the importance of various forms of practice in their work – both the professionally specialized practices and the "permeable" ones. Another objective has been to encourage present and prospective doctoral students to search for ever more adequate forms of field-specific PhD knowledge in dialogue with a broad audience. This audience is clearly growing today – and is becoming even more multi-faceted and innovative through a broad range of actors – with the increasing interest in and relevance of research in contemporary architectural practice and education.

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HISTORY OF ARCHITECTURE: THINKING BEYOND THE PRESENT Johan Linton

ABSTRACT

This article deals with research in architectural history and takes as a point of departure the author's dissertation on Le Corbusier's concept of Ville radieuse (the Radiant City). It presents some of the ideas behind the thesis, why and how it was written. It also discusses the research situation in architectural history at schools of architecture today. A focus is placed on the paradoxical fact that regardless of the far-reaching presence of architectural history in the built environment – and in the creation of the built environment – it is a subject that is almost excluded from obtaining state research funding (at least in Sweden).

The article has three main sections. The first section discusses the value of architectural history in general and presents examples of references to architectural history in modern and contemporary theory and practice. The second section contains a brief presentation of the dissertation and its content, that is, an overview of the creation of the concept of Ville radieuse. The third section gives a more detailed description of one of the passages in the thesis, the one that deals with Le Corbusier's plan for Stockholm from 1933. The article shows how knowledge about this radical and visionary plan for the Swedish capital helps in gaining a deeper understanding of later urban schemes in Sweden. An important argument is that knowledge in architectural history provides a better possibility for tracing implicit ideas in contemporary architecture.

Finally, the article thematizes the value of architectural history for a "culture of architecture", a culture that does a great deal to promote general quality among professionals in architecture, although this is difficult to measure.

KEYWORDS

Le Corbusier, urban planning, history of architecture, theory of architecture, modernism

INTRODUCTION

This text is an adaption of a keynote lecture presented at KTH in Stockholm at the conference "The Production of Knowledge in Architecture by PhD Research in the Nordic Countries", arranged by The Nordic Association of Architectural Research on 19–20 May 2016. The task was to present and discuss my dissertation and reflect on the knowledge production in architectural history.¹ What is the benefit of such a dissertation project for education in architecture, for the architectural profession, and for society? What kind of knowledge in architecture has been developed through my research and how can this be useful? I would like to begin this text, as I began my lecture, by presenting my warm thanks to The Nordic Association of Architectural Research for the invitation; it has been an honour and a pleasure to give this keynote lecture at the School of Architecture in Stockholm.

My article is structured in three main sections. First, I say something about the view of architectural history behind the article. Secondly, I outline some of the basic content in my dissertation: a study of Le Corbusier's theory for Ville radieuse, the radiant city. Finally, I discuss a concrete application of Ville radieuse: Le Corbusier's plan for Stockholm from 1933. I have structured my article in this way to give an overview of different aspects of architectural history, but also to present an example of why I think that the rather detailed and thorough knowledge presented in my thesis is valuable when it comes to understanding contemporary architecture as well.

ARCHITECTURAL HISTORY: AN OVERVIEW

In a period when research at the schools of architecture is changing, let me first make a general comment about the meaning of research and scientific knowledge in architectural history. To begin with, it is obvious that architectural history as a subject is in decline. This can easily be observed at the traditional architectural schools in Sweden, but there are also indications regarding the situation outside of Scandinavia. Looking at Sweden, it is notable that, at the moment, there are not any professors in architectural history in Göteborg, Stockholm, Lund, or Umeå. Claes Caldenby – the third professor in architectural history at Chalmers – became emeritus in 2013. Johan Mårtelius, at the Royal University of Technology in Stockholm, took leave as of 2015 to become director of the Swedish Research Institute in Istanbul. At Lund University, the last, and still only, professor in architectural history there, Olle Svedberg, became emeritus more than ten years ago and hasn't been replaced so far. At the recently created school of architecture in Umeå, the Estonian Jüri Soolep was professor in architectural history for some years until he left the school around 2016. At the Royal Institute of Art in Stockholm, the emphasis has been on theory rather than history since Fredric Bedoire left as professor in 2012.

Teaching in architectural history exists at Swedish schools, even if maybe not always in a very coherent way. Knowledge is transmitted in more or less traditional courses or through integration in other parts of the program. An awareness of the signification of architectural history exists among many teachers and among the directors of the architectural schools, so the present lack of department leaders might be interpreted as a temporary absence of long term strategy. Still, the lack of academic leaders in the subject indicates a break in continuity.

When it comes to research in architectural history, it is doubtless a difficult situation. For some time now, it has been more or less impossible to get state funding for research projects related to architectural history exclusively. The lack of solid support contributes to the lack of seminars and other events that can transmit tradition, knowledge, and methods from older to younger generations. The state system for research funding hasn't made it easy for schools that want to maintain continuity and development regarding knowledge about the history of architectural thinking and the tradition of building. Nonetheless, architectural history is present in the built environment in an overwhelming way. Man lives, in some respect, in the world of architectural history. Building tradition and history surround everyday life both concretely and ideologically.

The same strong historical presence is to be found in architectural practice. The creation of architecture is in many ways thought with history. Experience and knowledge about the already built environment are fundamental tools for developing and designing new buildings. Architecture is also – just like art and literature – a discipline where historic quality asserts itself today as well. Historical buildings can be, and are not seldom, at least as beautiful, pleasant, and well made as newly built houses. It is possible to compare with art and literature, where works made a very long time ago still remain references and sometimes are regarded as unrivalled. The difference in relation to art and literature is of course that architecture isn't made just to please, to give aesthetic pleasure, or to field questions about man's condition in life, but also to be practically used. Buildings from history stand out even in that

respect and can – at least after technical adjustments – be as functional as modern houses.

The Italian architect Aldo Rossi describes something about this in his now classical book The Architecture of the City (1966), one of the theoretical points of departure for postmodernism. It was easy for Rossi, with his background in the Italian historic building culture, to identify the formula associated with modernism - "form follows function" - as simplistic. A typical example in Rossi's discussion about architecture and the city is the basilica in Padua, a medieval structure still used with a strong and evident presence in the contemporary city. Rossi points out how the buildings' modern functions hardly correspond with the functions it had when created, and he declares that the buildings' functions "are independent of the form".² The example is interesting not only because it demonstrates the qualities of historic architecture, but it also illustrates how knowledge about architectural history is important in analysing contemporary ideas on architecture in a profound way. Architectural knowledge is needed to put the popular architectural ideas of today in a wider perspective and to gain a more precise and balanced understanding of their pros and cons. A historical perspective supports the understanding and critique of building.

It is difficult to discuss Rossi without thinking of Robert Venturi and his book Complexity and Contradiction in Architecture, also published in 1966. That the publication takes an important point of departure in history is obvious. Out of the book's 350 illustrations, 97 show Venturi's own work while over 70 per cent of the rest of the 253 photos show architecture from the time before 1900. Venturi still underlines his fascination with "the present, and with the past in relation to the present" and refers to Henry-Russell Hitchcock when he writes that "there always exists a real need to re-examine the work of the past".³ This historical interest consequently isn't about pastiche or veneration of the past, but about understanding the past for inspiration, stimulation, and knowledge in relation to practical work. That Venturi is neither nostalgic nor pietistic can be exemplified through an expression such as "[o]ur buildings must survive the cigarette machine".4 Even if the book is directed at historical buildings, it is obviously positive towards everyday technology, mass culture, and banality. Nevertheless, architectural history remains a fundamental source of knowledge and inspiration.

Let us continue with a more recent example. One of the latest issues of the internationally leading (Spanish) architectural review *El Croquis* presents two young studios: the American MOS and the Spanish amid.cero9.⁵ Both are small studios founded by couples that are well-integrated at the most respected international architectural schools, and they are dedicated to understanding the architectural practice of today. The issue contains a conversation between the two studios conducted in fragments over the Internet. It has the title "Humboldt or Venturi". Despite the studios' interest in the consequences of new information technology for society and despite the fact that they regard the traditional architectural education as obsolete, it's obvious how history still remains a reference when communicating their thoughts. Both studios remarkably refer to an early renaissance colleague, Filippo Brunelleschi, as an important reference among architects.

In the interview, contemporary architectural culture is regarded as "flat", but for the discussion about that "flatness" they chose a title referring to the history of architecture and science. As Henry-Russell Hitchcock and Robert Venturi, they speak about "the reconsideration of history" and it is said that it is "a source of knowledge" that "can be a radical tool".⁶

A classical author in the history of theory of architecture who is mentioned in the conversation is Auguste Choisy. An engineer and historian, he wrote the famous two-volume opus on architectural history – published in 1899 – that was singled out by Le Corbusier as one of the most important books on architecture ever written. In the *El Croquis* interview, Choisy's work with axonometry is reread in relation to the contemporary virtual worlds created by the film and computer game industry.

The position taken by these two young studios – reading the contemporary with the help of history – is definitely not new. Almost all of the major texts of architecture, from all periods in time, take a point of departure in history. This applies to authors from Marcus Vitruvius Pollio and Leon Battista Alberti to Le Corbusier and Rem Koolhaas.

THE USE OF ARCHITECTURAL HISTORY IN PRACTICE AND EDUCATION

Consequently, the reading of contemporary buildings attains further depth if based on knowledge about history. As another fruitful example, one could mention one of the teachers at Chalmers School of Architecture, and one of the school's most important students ever. Gert Wingårdh is among the most successful Swedish architects of all time and, interestingly enough, he has declared that the only architectural research he finds really relevant is that regarding history. He has also mentioned that he decided to become an architect when he was visiting the Pantheon in Rome. He is likewise an architect who is unusually frank about the inspiration he gets from other architects. It is well known how his projects, during his own studies, often were interpretations of historical architects' way of working.

When he lectured about his work in the 1990s, he sometimes started the lecture by showing a watercolour that he had made of an important interpretation of the Pantheon: the cupola by Francesco Borromini for the small church of San Carlo alle Quattro Fontane in Rome. The strongly personal baroque cupola is characterized by its strong and intricate coffer structure hovering over the flowing baroque space.

Having seen Wingårdh show that photo when he lectures, it is difficult not to recall it twenty-five years later when looking at his work on the shopping centre Emporia in Hyllie, Malmö. A proposal for the exterior shows an expressive volume with bent lines and something typically baroque with lines resembling those of the small church in Rome. The glass facade of Wingårdh's shopping centre has a yellow-gold colour and is supported by a rhombic structure softly curved in a free way, leading one to think of the baroque cupolas of Borromini or Gian Lorenzo Bernini. Of course this doesn't necessarily mean that Wingårdh's conscious intention has been to recreate qualities of the baroque space he once studied, but the knowledge about these studies in relation to his built work later on is definitely a part of a more deep understanding of his architecture. Or, to turn the argument around: lacking knowledge about baroque architecture is to miss tools that to some respect make an understanding of his architecture as deep as possible.

It is consequently possible to demonstrate how knowledge in architectural history is directly useful from a practical point of view in contemporary architecture. At the same time, I don't think it is really useful to evaluate knowledge in architectural history only in relation to practical efficiency or usefulness. Architectural history is the knowledge about the origins of our spatial world and about how it has been formed by, and has interacted with, human culture and society to create the world where we live today. To demand of architectural history that it should be directly useful is to misunderstand its

deeper general meaning and significance for knowledge in architecture, and doing so will always marginalize it in relation to momentarily more "useful" aspects of architectural knowledge, and so the culture of architecture will decline.

LE CORBUSIER: SOME REFLECTIONS

After this introductory remark regarding the essential question for this conference, let me continue with the subject I have been asked to talk about: my dissertation on the theory and history of architecture. My doctoral thesis is a text that examines a crucial passage in the history of modern urban planning and theory development: Le Corbusier's extensive urban concept Ville radieuse as presented in his book of the same name from 1935. As I had been interested in architectural thinking and architectural history for a long time, it was natural for me to chose a subject that made it possible to study important aspects of the origins of contemporary architectural ideas. I had been studying Le Corbusier's work for some time when I started working on my dissertation, so I knew that his most extensive book had not been analysed thoroughly. I thus hoped to contribute with knowledge about Le Corbusier's theoretical work, and also with knowledge about the origins of modern urban planning. To be able to make a thorough presentation and analysis of Ville radieuse, it was necessary to write a monograph, and it became natural for me to adapt to a traditional monographical method of writing in architectural history. The monograph was also one of the forms of writing that had meant most for my own reading and understanding of architecture. I chose to write in Swedish as it is the language I handle best, and I did this even though I planned to publish the dissertation in English later (something that still remains to be done). It was very important for me to write a text that was precise and that could be useful for as long as possible, and I knew that detailed monographs which present new material have a good chance of not being out-of-date immediately.

BREAKTHROUGH PROJECTS

I will now proceed to introduce some of the content from my dissertation. Le Corbusier's Ville radieuse (I use the notation Ville radieuse in referring to the concept and *La ville radieuse* when I reference the publication dealing with the concept) marks the culmination of the Swiss-French architect's urbanism ambitions, even if he would later develop his thoughts about town and country planning even further, towards the concept of the three human environments presented in the book *Les trois établissements humains* from 1945. Le

Corbusier had in fact been writing about urban planning already since 1910, when he embarked on the book project *La construction des villes* (inspired by Camillo Sitte), a project that was never published.

Le Corbusier made his international breakthrough in the 1920s. In Sweden, this occurred in 1925 when Uno Åhrén came back from the World Expo in Paris and wrote about his encounter with Le Corbusier's work in a number of articles. In that period, the Paris-based architect would gain worldwide attention through his writings, buildings, projects, and furniture. However, even though some of his most spectacular ideas were related to urban planning, Le Corbusier worked primarily during this decade on only one major urban development project for an existing city: *Plan Voisin* for Paris. Some of his ideas on urban planning were presented at the *Salon d'Automne* in 1922 as part of a project for a contemporary city of three million inhabitants. A panorama of the *Plan Voisin* was then shown at the World Expo in 1925, the same year that he also published the book *Urbanisme*.

During the first half of the 1920s, Le Corbusier divided his time between theory, painting, small building projects, and some industrial enterprises. From 1925 onwards, following his work on *Urbanisme*, he began to intensify his involvement in building. One could say that during the second half of the twenties he devoted his efforts to the practical realization of architectural ideas consolidated over a long period. Many projects such as villas, rental housing, and institutional buildings were built at that time. However, it was not until the end of the 1920s that Le Corbusier began to work on the application of his urban ideas on a wider scale. This turning point ushered in a long period, which ran throughout the 1930s, where, beside his architectural work, he concentrated on major urban design projects, often of a utopian nature with a program brief written by Le Corbusier himself. These projects, which were based on a profound endeavour to develop and refine his ideas about the modern city, were presented in the mid-1930s in *La ville radieuse* (1935).

Three significant events should be highlighted as significant for the development of the concept of Ville radieuse. Firstly, the formation of CIAM and its first meeting in La Sarraz in 1928. Secondly, Le Corbusier's trip to South America in 1929 and the writing of the subsequent book *Précisions* (1930). Thirdly, Le Corbusier's work with the urban development of Moscow and the exchange with Soviet architects in 1930. A number of additional events would also be fundamental to the creation of Ville radieuse, such as the journals *Plans* and *Prélude* and the fourth CIAM meeting in 1933.

CIAM AS MODEL FOR MODERN ARCHITECTURE

According to Le Corbusier, CIAM was created as a reaction to the treatment of modern architecture in the competition for the League of Nations building (1926-27). It is well known that he thought his own proposal should have won the competition under normal circumstances. However, the jury was under pressure and appointed a chief architect who represented the establishment's conservative values. Le Corbusier and Pierre Jeanneret appealed the decision of the League of Nations in February 1928. At about the same time, in December 1927, the artist and art collector Hélène de Mandrot formed a foundation to organize conferences about art at her medieval castle in La Sarraz. The first congress dealt with modern architecture and she invited the involvement of the Swiss architectural historian Sigfried Giedion, who later became the CIAM Secretary General up until 1956. The Secretariat was led by the French architect Gabriel Guevrékian, who contacted Le Corbusier and asked him to participate. At first, Le Corbusier turned down the invitation on the grounds that there was no program for the conference. Later on, however, he agreed to take part on the condition that a program be provided, which he offered to formulate himself. An initial five-page draft was completed in April, and a more extensive one by the end of May. By that time, Professor Karl Moser, who had been on the jury for the League of Nations headquarters competition, had been nominated as president for the congress. The second program version was printed at the beginning of June, a few weeks before the meeting, which took place between the 26th and 28th of the same month.

Although several participants in the first CIAM meeting reacted to the way the competition for the League of Nations had been handled, and although the competition may reasonably be considered one of the factors which contributed to the formation of CIAM, it appears that Le Corbusier's description of the background of the association's formation is significantly based on the premise of his own participation. The impression is that he emphasized the importance of the competition to support reasons that were linked to his own involvement. CIAM gave him the opportunity, as a member of an international institution, to present the view of architecture and urbanism, which he felt had been overlooked at the event in Geneva.

PRACTICE: LA VILLE RADIEUSE

La ville radieuse was explicitly directed towards the authorities, and it is obvious that Le Corbusier's work at CIAM allowed him to formulate several important ideas that contributed to its development. The preliminary program for the first meeting also came to be one of the first of many texts that would later be included in the book.

Another important step on the road to Ville radieuse was Le Corbusier's visit to South America in autumn 1929. For the first time since the *Plan Voisin* (1925), he began to work with sketches of new master plans for existing cities. He employed new techniques with a stronger relationship to the surrounding nature and with more spectacular bold building volumes.

The first South American city plan that Le Corbusier drew up was for Buenos Aires. It was the city where he had resided for most of his stay in South America and where he gave ten of the eleven lectures that appeared in *Précisions*.

The creation of Le Corbusier's city plan was based on two experiences. Firstly, he highlighted the city's seaside location and fantastic natural surroundings; the presence of the sky, the water, and the "magnificent colours". Secondly, he pointed to the lack of such qualities within the city itself.

Le Corbusier seems to have believed that the Argentine capital, with all its possibilities and shortcomings, constituted good raw material for modern urban construction. His earlier urban plans had been committed to nature in a general way, but now his experience of Buenos Aires' specific natural surroundings became a central starting point for his ideas.

As another starting point for the project, Le Corbusier made a comparison between Buenos Aires and New York. New York, with its tall skyscrapers, was what Le Corbusier called a "poignant paradox" (*paradoxe pathétique*), a city with all the modern facilities for the future but without clear-sightedness. Buenos Aires, as a cosmopolitan city on the Atlantic coast of the South American continent, could conversely become a truly modern city and a South American port to the Atlantic Ocean. Le Corbusier's idea was to open up the city's contact with the sea by building a mighty concrete pier that would stretch out beyond the water's edge. This could be likened to a giant deck which created space for rail, trucking, and loading functions along its artificial surface with office and business space in the towers above. The project would give the city dwellers new and more direct contact with the water. Moreover, because the skyscrapers occupied a very small effective ground area, the building mass closest to the sea could be opened up. A suggestive drawing shows how he envisaged the new Buenos Aires would reveal itself to a traveller approaching from the sea. Five brilliant skyscrapers towering magnificently over the light, shimmering horizon, stretching up against the night stars in the sky, and reflected in the shiny surface of the sea. This drawing became the cover image for *Précisions*.

In the project for Buenos Aires, Le Corbusier had gone further in his urban thinking by dramatically transforming an existing city's relationship to nature. The next step would be to develop a reading based on a study of the city from the air.

Other towns for which Le Corbusier presented plans were Montevideo, São Paolo, and Rio de Janeiro. All of these three proposals were based on studies done from an airplane and included mighty aqueduct- or viaduct-like buildings that combined housing, offices, and roads into one building type. It was here that Le Corbusier, for the first time, used what he would later call "viaduct motorways" (*viaduc autostrade*). He writes that the idea was indirectly created in relation to Montevideo, where the central parts lay on a hill sloping steeply down to the water.

In São Paolo, Le Corbusier applied the same orthogonally arranged building cells as Montevideo to create a *Cité d'Affairs*. However, here the buildings beamed out in all four directions of the city, as thoroughfares. The meeting and crossover of the city centre buildings were used for offices, while further out there was housing. In the same way as in the plan for Montevideo, the buildings were associated with "skyscrapers", but here in São Paolo he called them "landscrapers" (*gratte-terre*). The ground level outside of the building plots could thus be used for sports facilities, parks, and recreation areas. Here, too, Le Corbusier believed that the huge buildings would give the city a new aesthetic quality.

The most important and developed of the three plans was the one for Rio de Janeiro, where Le Corbusier gave the aqueduct-like buildings organic forms. He described how the "majestic motorway" of housing could be a hundred meters above the ground and thus solve the traffic jam of the existing traditional city below.

LE CORBUSIER IN LITERATURE: PRÉCISIONS

When Le Corbusier published his book *Précisions* about his South American trip and city plans, he ended it by stating that his investigation into the architectural revolution was now over and that from then on he would rather be engaged in urbanism in a broader sense. The last two texts in the book are dated 1930 in Moscow. This fact accentuates what Le Corbusier also stated elsewhere, namely that he completed the book *Precisions* when the next step in his thinking had just begun. The visit to Moscow in the spring of 1930 would have a significant impact on his theoretical work and provide a decisive impetus to the work on Ville radieuse.

Le Corbusier had visited Moscow for the first time in October 1928. He went there to participate in a competition for the office building of a consumer cooperative federation. He won the competition that resulted in the Tsentrosoyuz project, which was the first major building he had erected. Le Corbusier returned to Moscow, both in 1929 and 1930, and the radical Soviet architects of the time took a great interest in the Parisian architect's thinking and work. One of the problems that preoccupied the Soviet architects was the expansion of Moscow. Since 1929 they had been discussing the idea of a leisure city for workers, a "green city" (Ville verte), which would be built northeast of the Russian capital. During his visit in March 1930, Le Corbusier was asked to comment on these ideas, and while he was there he wrote a text titled "Commentaries Relative to Moscow and the Green City". After he returned to Paris, he was asked to give more general views about Moscow's urban development. This led to the writing of "Response to Questions from Moscow", a manuscript that was finished in June 1930. It was in connection to his thoughts about Moscow's urban problems that Le Corbusier developed the first theories for his own green city, urban ideas that he would summarize and call Ville radieuse.

This new city concept would follow the ground rules that Le Corbusier had presented previously. The main difference, however, was that he emphasized the principles in other ways together with a more precisely developed structure and detailed design. It is worth noting therefore, that the project grew out of the real urban development issue in Moscow, from which Le Corbusier developed ideal urban design principles. It is easy to see that the Soviet documents which illustrated the Green City contained ideas that were close to Le Corbusier's own. Although the proposal for the Green City was based on socialism, which Le Corbusier's theories were not, the ideas regarding modern technology and public service were very similar to those which the Swiss-French architect had already put forward in his writing. Moreover, the idea to promote the beneficial effects of a town with a large portion of greenery resembled Le Corbusier's own thoughts. The major difference between the two was that Le Corbusier wanted to put greenery into the existing town centres while also making them denser, instead of relocating "recreational" cities to the peripheries. He also believed that collective services should be available in all individual circumstances and that collective life should not replace the individual. Moreover, he stressed the importance of exercise and sport for all people.

At the same time, as Le Corbusier began work on Ville radieuse, he also contrubuted to the foundation of the journal *Plans*. The first article "Invite à l'action" (It Is Time to Act) was published in January 1931, and it presents the Ville radieuse with statements which are reminiscent of the earlier similar passages in Le Corbusier's first texts for *L'Esprit Nouveau*, together with those from 1918 that he and Amédée Ozenfant published in *Après le cubisme*. Already in this text there are passages that can be seen as pointing towards the extensive publication project that followed. He would then frequently repeat that the book *La ville radieuse* was soon to be published. At the same time, his intensive work with applications of his new theoretical ideas to cities around the world would contribute to delaying the publication until 1935.

When the book *La ville radieuse* finally was published, its scope, variety, and rich composition made Le Corbusier's view of the relationship between theory and practice emerge more clearly than in many other books. An example can be found in the introduction to the book and work on a new city plan for Moscow. In principle, this thesis makes it clear how Le Corbusier, right from the beginning, allowed the specific study of Moscow to lead to more general ideas about urban planning. The practical situation is here connected to the development of theory, which also led him to reconsider previous theoretical models. He wrote that "[t]his sketch is superior to my previous urban studies from 1922 and 1925 because it offers complete flexibility to adapt to any future development".⁷

Practice is intimately bound up with theory, and Le Corbusier seemed to strive to allow his practical work to generate theoretical reflections that were then applied to practical work. The Moscow study played a key role here and strengthened Le Corbusier's own conviction of the value of such a theory. He referred to the Soviet views on Moscow as "a vast melting pot of undifferentiated and contradictory ideas" which showed him how arguments about architecture and city planning "should be clarified by theory before any construction work is actually undertaken".⁸

He conveyed the same view of the work by showing the first presentation boards from 1930 for Ville radieuse in the book they led up to. He wrote that the plans are "purely theoretical products" and that they helped him to "express the fundamental principles of this matter in an ideal form". He described how he gained confidence by going into depth with the help of theory. In this way, he reached "fundamental postulate[s]" which could be applied to individual cases, like his own plans for Algiers, Stockholm, Barcelona, and Nemours.⁹

LE CORBUSIER IN STOCKHOLM

Another city to which Le Corbusier applied the concept of Ville radieuse was of course Stockholm. As this lecture was given in Stockholm, and as the plan has a special relevance for the story of Le Corbusier and Scandinavia, I will develop the circumstances behind the Stockholm plan more in detail.

The plan was a proposal made for the so called "Norrmalm Competition" (Norrmalmstävlingen), which was announced in April 1932, with a 1 March deadline the following year. The southern portion of Norrmalm, Nedre Norrmalm (Lower Norrmalm), has a central position in the architectural history of Stockholm. This area, facing the isle of Helgeandsholmen and featuring Riksdagshuset (the Parliament building) and the Old Town district, where the Royal Palace is located, has on numerous occasions significantly affected the development of the capital of Sweden. The competition arose from the significant changes in conditions for the area due to modern traffic. In the late 1920s, the number of automobiles in central Stockholm increased dramatically, and it became necessary to devise a more efficient city plan. A general plan proposal devised by Albert Lilienberg in 1928 generated discussions that a few years later resulted in the competition.

Le Corbusier was interested and probably received details of the competition by way of a Swedish associate who worked at 35 rue de Sèvres in Paris in 1932, Rudolf Cronstedt (a member of the high nobility). In December, upon completing his trainee period and returning to Sweden, Cronstedt was



Figure 1. Le Corbusier and Prince Eugen at Skansen during the former's visit to Stockholm in January 1933. The headline from the edition of Dagens Nyheter, 31 January, reads: "Skansen best according to Le Corbusier." Source: Archive photo by the author.

asked by Le Corbusier to arrange a series of lectures in Stockholm, as early as January 1933. Cronstedt contacted the chairman of the Stockholm Association of Architects, Hakon Ahlberg, who, in turn, arranged for an invitation to be tendered and who scheduled the lectures. Ever since the mid 1920s, Le Corbusier had been the subject of a great deal of interest in Sweden, after his work was presented by the architect and urban planner Uno Åhrén. Modernism – or Functionalism, as it was known in Sweden – had become widely accepted in this country, and the concept was successfully manifested in projects such as the 1930 Stockholm Exhibition. The concept was also officially associated with projects dealing with the modernization of society and public housing.¹³

Le Corbusier arrived in Stockholm on 26 January 1933 and was to give two lectures during his stay in the Swedish capital. On 31 January, he went on to Oslo and Göteborg to give lectures on modern architecture and urban planning there as well. He returned to Paris on 3 February, and that very same day he commenced work on an exhibit of projections for Algiers. The time he had at his disposal to complete his entry for the Norrmalm Competition was thus very limited indeed.¹⁴

Even if Le Corbusier gave evasive answers to the questions regarding his participation in the competition during his visit, it is clear that he began his preparations during the time he spent in the Swedish capital. This can be seen in his travel sketchbook, where he elaborated on various different ways to deal with the specific conditions of Stockholm. In one sketch, he proposed a new city area on the water, and made reference to an earlier project of his for Rio de Janeiro. In another sketch, he applied the huge building volumes of Ville radieuse to the city's topography and outlined a large water sport facility at the waterfront. There are also references to his important ongoing project in North Africa, such as when he wrote: "Pilotis partout // Courbes façon Alger."¹⁵

Even if time was scarce, Le Corbusier elected to go ahead with the competition. Most likely, he was assisted in this battle against the clock by Sven Backström, an accomplished young Swedish architect who worked in his office during the period extending from the autumn of 1932 to the spring of 1933.¹⁶ Le Corbusier undoubtedly also won some time making a departure from the set program with regard to both content and competition area. To this end, he explained that the situation warranted taking the total picture into account, and that his intention was to present a number of general ideas that would promote a modern urban landscape in Stockholm.¹⁷ Relating the Stockholm proposal to other Le Corbusier urban plans from the period, it seems likely that he would have chosen this course of action even if he had had more time at his disposal. Though the final proposal was in many ways schematic, it was also rather rich and detailed, when taking the very short time frame into consideration.

The drawings for Stockholm, kept in the archives of the Fondation Le Corbusier, are fairly fragmented. It is obvious that much of the material presented in Stockholm is missing. One of the drawings that might have been on display in Stockholm, and that could be regarded as the main drawing, features the entire project with the buildings "en redents", following the topography and creating a central public space in the Lower Norrmalm area that opens up on the waterfront, the Royal Palace, the isle of Stadsholmen, and Slussen.¹⁸ Le Corbusier focused mainly on the topographical qualities of Stockholm and its waterfront, declaring that he wanted to create housing that provided a view of the water and the surrounding landscape.¹⁹ Just like in the Algiers plan, the waterfront would be exposed and the long and narrow volumes of buildings would crown the heights surrounding the city. In the Stockholm plan, however, Le Corbusier emphasized the importance of integrating the city with its aquatic environment. He pictured parks that stretched down to the waterfront and boulevards along the coast, as well as centres for water sports. In the Stockholm project, he also stressed the fact that housing issues



Figure 2. Le Corbusier's urban plan for Stockholm from 1933 made as an entry for the international competition for Nedre (Lower) Norrmalm. Source: Fondation Le Corbusier, Paris, FLC 13296.

should have a higher priority than traffic issues. As in the plan projected for Antwerp, railway terminals and track areas would be relocated outside the city limits and stations would merely be buildings to accommodate passengers embarking and disembarking.²⁰

In the Stockholm plan, Le Corbusier developed his vision of modern urban planning as a sculptural design of the location, one that enhanced the existing landscape by way of architecture. He also emphasized that Stockholm was not a suitable location for skyscrapers, that it was preferable to maintain the rolling silhouette of the landscape. As a historical reference for this type of architecture, he mentioned the Vatican Palace, and then particularly as seen from Castel Sant'Angelo.²¹

It is actually in *La ville radieuse* where the most thorough presentation of the Stockholm project is to be found, and so in his most comprehensive publication on urban design, Le Corbusier dedicated eight rather closely written pages to the Swedish project. That makes the Stockholm proposal one of the most salient plans in the book.²²

As was the case with his Plan Voisin for Paris, Le Corbusier was criticized in Sweden for proposing that important parts of Stockholm be torn down, such as areas in the Old Town district built in the Middle Ages on the isle of Stadsholmen. In his presentation of his Stockholm Proposal, Le Corbusier did, however, express his views on preservation, pointing out that the historical features of a city should be preserved, evaluated, and accentuated. With regard to the isle of Stadsholmen, he expressed himself in positive terms on several occasions and wrote that he would like to preserve its unique qualities. He suggested that the district be separated from all thoroughfares, which then would be directed to pass by the district on elevated tracks, or by way of tunnels. At the same time, he wrote that only sites of true historical value should remain, and that central Stockholm should be carefully and gradually "cleaned up".²³

In relation to the Stockholm proposal, he also repeated what he had declared previously: that cities have always been subject to change and remodelling through the ages. More than in many other projects, he also emphasized that the plan was intended as a declaration of principle and that specific decisions would have to be made by individuals who had a more in-depth knowledge of the particulars of Stockholm. At the same time, it is clear that his proposal – should it have been taken into consideration – would require restructuring the existing city in a dramatic manner.



Figure 3. The Rannebergen housing area built in 1974 in the northeastern suburbs of Göteborg. Photograph by Pål-Nils Nilsson, probably from the mid-1970s. Source: Riksantikvarieämbetet (Swedish National Heritage Board).

The international competition dealing with the Lower Normalm district was a huge success, generating 450 proposals from 30 different countries. This complicated the assessment process, and the final decision of the committee was not made public until 20 December 1933.

Le Corbusier was aware from the start that his proposal departed far too much from the programme to be considered. This is evident, for example, in his correspondence. Still it is clear that he nevertheless hoped for the opportunity to contribute to the renewal of the urban layout of Stockholm, and he was disappointed when his proposal didn't lead to any response from the authorities in Stockholm.

Apart from this disappointment, the Norrmalm Competition provided Le Corbusier with the opportunity to apply the principles for Ville radieuse to an urban area that suited one of its most vital concepts: making topography and nature present within the city. In this way, his plan for Stockholm represents a significant application of his ideas on urbanism, and there are several references to it in his writings. Moreover, the Norrmalm Competition was one of the relatively few architectural competitions the famed architect ever took part in. Le Corbusier's project is to remain the only city plan he made



Figure 4. Plan for the Rannebergen housing area from 1974. The project was built by the City of Göteborg and designed by White Arkitekter. Source: Göteborg bygger, 1971, Göteborg.

for the Scandinavian countries, and – as pointed out by Gotthard Johansson as early as 1933 – a rare vision of the City of Stockholm by one of the greatest figures in the history of architecture.

LE CORBUSIER AS EMBEDDED SUBJECT IN CONTEMPORARY ARCHITECTURE

Having given an overview of my dissertation and developed one of its connections to Sweden, I will now return to the discussion of the significance of architectural history in the beginning of my article. Let me present one of the most architecturally special of the late modern suburbs in Göteborg, namely Rannebergen. This interesting residential quarter built in the early 1970s was designed by White Arkitekter, and the responsible architect was



Figure 5. Collage presenting Le Corbusier's Stockholm plan from 1933 together with the Rannebergen area from 1974, at comparable scales. Source: Original illustrations as presented above, collage by the author.

Gunnar Werner. The large building block – or group of buildings – is in fact a suburb of a suburb, as it was planned to be a border residential quarter in the outskirts of the city centre of the suburb Angered. Both suburbs are part of a large area of late modern suburban developments in the northeastern part of Göteborg, including areas such as Hjällbo, Hammarkullen, Gårdsten, and Lövgärdet.

The interesting characteristic of Rannebergen is that it consists of long, tall buildings organized in a rectangle, surrounding a large inner courtyard designed as a natural park accommodating common facilities. The side of the park rectangle is around 400 meters. The concept and scale of this residential quarter is very similar to the city quarters that Le Corbusier had proposed for the centre of Stockholm almost forty years earlier. The organization of long buildings around courtyards with the measure of about 400 meters and the concept of urban space as a large park are almost identical, only that Le Corbusier wanted to realize his quarters in the very centre of the city, not some ten kilometres outside of it.

I think it is most unlikely that the architects of Rannebergen were in any way directly inspired by Le Corbusier's proposal for the Stockholm competition of 1933. They certainly had knowledge about Le Corbusier's work – most of the architects of their generation around the globe had – but that doesn't mean that they were directly inspired by his projects. Maybe they didn't even have his architecture particularly in mind when they designed Rannebergen. Still, it is very clear that their design in the new northeastern parts of Göteborg – incorporated in the city as late as 1967 – is an almost direct application of Le Corbusier's Stockholm scheme from 1933, that is: an application of Ville radieuse. This concept, developed and designed by Le Corbusier, seems embedded in the professional understanding of modern architecture and is put into practice as such.

CONCLUSION

I will conclude this article about knowledge production in architectural history by using (again) the experience from my dissertation and the example mentioned above. In my view, Rannebergen is a good example of the value of knowledge in architectural history. I would say that all architects, even those among the avant-garde and the revolters, relate to implicit and inherited ideas in their designs, ideas that they maybe aren't aware of themselves. It goes without saying that it is relevant and valuable to have historical knowledge about such ideas and about how they have developed and been used through time. It is of value for society - depending fundamentally on the built environment - and also for the architectural profession itself. Nevertheless, such knowledge is only one of the potentially useful results from a dissertation like my own. New knowledge about history makes it possible to critically analyse architectural ideas in new and different ways. On a more general level, it contributes to the culture of architecture in national and international contexts and, not to forget, at the architectural schools where the research is done. This culture of architecture - understanding of tradition, of the relationship between architecture and society, of creative thought in practice, and so forth - is what I see as the most valuable aspect of architectural history. It is a culture that is difficult to fully describe and whose values are impossible to fully measure. If it is nurtured, it might give rise to qualities that we cannot fore-
see, but it is difficult to guarantee positive effects, or to measure them. That makes the subject of architectural history vulnerable in times when academic institutions tend to become more and more influenced by management ideas and strive for concrete economic results. Still, time show us that architectural history is a knowledge that overcomes the present.

NOTES

¹ Johan Linton, *Le Corbusier och Ville radieuse: Att skriva den moderna staden*, PhD diss., 2013; 2nd rev. print, 2014, Göteborg: Chalmers. The dissertation was presented at Chalmers University of Technology on 20 December 2013.

² "[C]ome queste funzioni siano per così dire del tutto indipendenti dalla sua forma." Aldo Rossi, *L'Architettura della città* (1966; repr., Turin: Città Studi Edizioni, 1995), p. 22.

³ Venturi, *Complexity and Contradiction in Architecture* (1966; repr., New York: Museum of Modern Art, 1968), pp. 19 and 21.

⁴ Ibid., p. 48.

⁵ El Croquis, 184 (2016).

⁶ amid.cero9 & MOS, "Humboldt or Venturi: An Improvised Conversation between Peers", *El Croquis*, 184 (2016), p. 11.

⁷ Le Corbusier, "Réponse à un questionnaire de Moscou" (1930–31), dated manuscript cited in Jean-Louis Cohen, *Le Corbusier et la mystique de l'URSS* (Brussels: Pierre Mardaga, 1987), p. 314.

⁸ Le Corbusier, *The Radiant City* (London: Faber and Faber, 1967), p. 145; originally published in 1935, new revised edition in 1964, English translation in 1967.

⁹ Ibid., p. 156.

¹⁰ Gotthard Johansson, "Norrmalmstävlingen", in Gösta Selling (ed.), Samfundet S:t Eriks årsbok 1934 (Stockholm: Wahlström & Widstrand, 1934); Bosse Bergman and Anders Gullberg, "I skönhetens, folklivets och framkomlighetens tjänst, Tage William-Olsson en särling i kampen om Stockholms framtid", in Eva Rudberg (ed.), Tage William-Olsson: stridbar planerare och visionär arkitekt (Stockholm: Stockholmia, 2004), pp. 73–175 and 298–302.

¹¹ Author unknown, "Corbusier med i tävlan om Norrmalms stadsplan, kommer hit för studier på platsen", 26 January 1933, *Svenska Dagbladet*; Rudolf Cronstedt, "Hågkomster av Le Corbusier", *Arkitektur*, 12 (1965), pp. 117–20; Rudolf Cronstedt, *Le Corbusier i Stockholm den 26–31 januari 1933*, manuscript dated 26 February 1983, Paris: Archives Fondations Le Corbusier (FLC), E1 (17), 129.

¹² Uno Åhrén, "Brytningar", in *Svenska slöjdföreningens årsbok* (Stockholm: Svenska Slöjdföreningens Förlag, 1925); Uno Åhrén, "På väg mot en arkitektur", *Byggmästaren*, 11 (1926).

¹³ For a general survey of this period in Swedish architecture, see Claes Caldenby (ed.), 20th-Century Architecture: Sweden (Munich: Prestel, 1998). ¹⁴ Le Corbusier described his trip to Scandinavia and mentioned the work he had done for the competition in a letter to his mother. Le Corbusier to Marie Jeanneret, 12 February 1933, Paris: Archives Fondations Le Corbusier (FLC), R2 (1), 183.

¹⁵ See Carnet C10, pp. 83–89, in Le Corbusier, *Sketchbooks, Volume 1, 1914–1948*, ed. Françoise de Franclieu, 4 vols. (London: Thames and Hudson, 1981), ill. 652–56. A facsimile of the carnet is published in Le Corbusier, *'Espagne': Carnets*, ed. Juan José Lahuerta, 3 vols. (Milan: Electa, 2001).

¹⁶ Cronstedt, "Hågkomster av Le Corbusier", pp. 117–120; a few years later, in 1936, Backström would join with Leif Reinius to form the office – Backström & Reinius – that in the 1940s created the famous "star-houses".

¹⁷ Letter from Le Corbusier to Tage William-Olsson, 1933 (no date), *The William-Olsson Archive*. For Le Corbusier's description of the Stockholm plan, see Le Corbusier, *La Ville Radieuse: Éléments d'une doctrine d'urbanisme pour l'équipement de la civilisation machiniste* (Paris: Éditions de l'Architecture d'Aujourd'hui, 1935), pp. 297–303.

¹⁸ FLC 13302. This drawing is the only one in the AFLC that appears in the presentation in the book *La ville radieuse*, namely on page 207.

¹⁹ The following descriptions of Le Corbusier's ideas are mainly based on the book *La ville radieuse*, pp. 297–303.

²⁰ Suggestions on sketch FLC 13304.

²¹ Le Corbusier, La ville radieuse, p. 298.

²² Ibid., pp. 297–303. This part of the book was translated into Swedish in the catalogue for the Centennial Exhibition on Le Corbusier in Stockholm, a publication that treats Le Corbusier's relationship to Stockholm in other articles as well. The description of the Stockholm project remains one of relatively few texts by Le Corbusier translated into Swedish to date. Karin Winter (ed.), *Le Corbusier och Stockholm* (Stockholm: Arkitekturmuseet, 1987).

²³ "... [N]ettoyé, épuré petit à petit", in Le Corbusier, *La ville radieuse*, p. 301.

EVERYDAY URBAN LIFE AT NEIGHBOURHOOD CENTRES: URBAN DESIGN AND CO-PRESENCE Ann Legeby

ABSTRACT

Urban segregation and increasing polarization in the metropolitan areas in Sweden is considered a major societal problem. Several municipal and national initiatives have been launched to ameliorate residential segregation and to improve the living conditions in socio-economically disfavoured neighbourhoods, but so far they have been only marginally effective. In fact, urban polarization and segregation have been increasing rather then held back. However, urban segregation can also be studied through everyday urban life in public space, where people are brought to interact in different ways with others. Public spaces – streets, squares, and parks – are used in everyday practices and become important social arenas; and public spaces are subject to different uses and meanings.

It has been demonstrated that access to resources varies greatly within the city, influenced to a high extent by urban morphology, and this results in unequal living conditions. As such inequalities are affecting social groups with fewer resources, it becomes especially problematic, thus reproducing and establishing segregation patterns. This research explores and investigates the role of urban design and urban form in relation to urban segregation. It looks beyond residential segregation and seeks to develop descriptions and understandings that acknowledge urban form and configurative properties, with the aim of being relevant from an architectural and urban-design perspective. The objective has been to increase the understanding of how urban form relates to the segregation phenomenon; how urban layouts, through their spatial arrangement and organization, create affordances and limitations; and how urban design can be used to counteract segregation and provide cities with more equal living conditions.

KEYWORDS

Social arena, urban form, urban segregation, inequality

INTRODUCTION

The Swedish history of massive post-war housing expansion has left a legacy of notoriously segregated suburbs.¹ However, the situation is more complex with some suburbs suffering social problems much more than others.² In the first phase of the PhD, methods and approaches studying urban segregation were discussed and partly questioned.³ Alternative methods were tested and argued to increase the understanding of segregation, which has a more direct relevance from an urban design perspective. In the second phase of the PhD, the case of Stockholm was used to illustrate how public spaces, such as streets, parks, and squares, can become an important arena for interplay between incomers and local inhabitants, and how the conditions for such arenas to emerge differs from neighbourhood to neighbourhood in different parts of the city. The research focuses upon the role that spatial configuration plays in shaping the potential for social interaction. In particular, detailed analysis suggests that the design and configurational layout of public spaces holds certain affordances influencing their ability to provide an arena for day-to-day interaction and to potentially prevent social exclusion.⁴ Urban form is found to play a critical role in facilitating such social processes, and increased knowledge about this issue is important when addressing social sustainability within urban design.

In this research, presented in a licentiate thesis and in a doctoral thesis and in other publications, it has been argued that there is a lack of methods for investigating and measuring urban segregation, taking into account aspects more specifically relevant to architecture and urban design: urban form and spatial configuration and how this in turn creates conditions for citizens to use the city in their everyday life. Urban design is argued to strongly influence what living conditions may be found in different parts of the city. Increased knowledge about variations in living conditions, and how this may be identified, analysed, and described, can be related to concepts like "just cities" and to the striving to reach more equal living conditions as a means of counteracting urban segregation.⁵ An important challenge is to decode and increase knowledge of how cities can be designed to facilitate access to various urban resources, both material (i.e. workplaces, public transportation, playgrounds, education, recreation areas, etc.) and immaterial (i.e. other people representing different social categories, etc.).⁶ Here this has been addressed by exploring how spatial form and the organization of space – resulting in connections, relations, and boundaries - will create affordances and limitations of what kind of processes are likely to take place. The approach draws on both social and spatial theories. Identifying how the social relates to the spatial is crucial both for increasing knowledge of what a socially sustainable urban design means, and how it can be practised.

ANALYTICAL METHODS INFLUENCE THE DESCRIPTIONS OF NEIGHBOURHOODS

This research aims to contribute to and nuance the debate on urban segregation by highlighting the role and the impact of the built environment.⁷ The understanding is dominated by descriptions foregrounding residential segregation, a well-established field, especially in Sweden. Residential segregation is defined as differences according to, for example, demographic, ethnical, or economic segregation in different parts of the city based on where people live. There are methodological difficulties in doing this that have to do with defining relevant areas, but also with difficulties in defining relevant categories.8 The result may vary depending on how large the geographical units studied are or as a result of where administrative boarders are found. In the licentiate thesis, a critique is developed discussing the relevance of such descriptions from an urban design perspective; the geographical units do not acknowledge urban form, nor is the context, the surroundings of each geographical unit, allowed to influence the result.9 Depending on the size of the area studied, as well as on how the categories are defined, the understanding of segregation may vary dramatically. Moreover, such an approach does not



Figure 1. An analysis showing residents with foreign background where the results vary depending on what method is chosen; the first (light grey) is a geographical analysis studying the situation within a certain unit, and the second (dark grey) is closer to a perceived situation based on accessibility to people living in the proximity; here, the situation is analysed within three turns from each building through the street network ('floating boundaries' rather than fixed). describe the constitution of people, groups, or categories that are contributing to local urban life by being in the local area, for instance in public space. Also, non-residents are most often taking part in forming local public culture, negotiating societal norms and attitudes,¹⁰ or developing different social solidarities and social ties.¹¹

Hovsjö is a spatially segregated neighbourhood which is partly confirmed by the result showing very little difference between the two methods. In Geneta, the results from the two different methods show larger differences (57 per cent compared with 45 per cent); in this case, it is because Geneta is more spatially integrated with its neighbouring areas that have a different composition of residents, which is allowed to affect the result. From an urban design perspective, this is useful information and it increases the understanding of whether changes in the built environment may have an impact or not.

SEGREGATION BEYOND RESIDENTIAL SEGREGATION

Urban segregation is not limited to housing; rather, there is also a spatial separation of individuals and groups as a result of how we use the city in everyday life. Segregation can also be understood as a separation of people or the separation of different groups or social categories in society as we use the city. Such an aspect is not explored to the same extent, but from an urban design perspective it is highly relevant to develop such an understanding. To what extent do we share urban public space? Which groups or social categories may share streets, neighbourhoods, and public arenas in different parts of the city? How does urban form and the organization of space influence opportunities and limitations regarding what lives can be lived in different parts of the city?

Social processes that create awareness of "the other" and of other people's life conditions, as well as facilitate an inclusive negotiation of norms and attitudes, may affect integration, social cohesion, and sense of belonging.¹² Such processes largely take place outside of peoples' homes; for example, in public space, at workplaces, schools, or at libraries – places often characterized by a mix of locals and strangers, as thoroughly discussed by Jane Jacobs.¹³ Here it is argued that urban space influences to what extent there may be a mix of people and an exchange between neighbourhoods, social groups, et cetera, but this is not studied to the same degree as the residential segregation phenomenon. How this plays out in urban environments and what patterns of co-presence will emerge in different parts of the city is to a large extent a

result of how we structure and form our cities, what spatial relations are created between neighbourhoods, between buildings, all together influencing the relations between people.

This research starts from an understanding that segregation is about separation – a separation of people and groups or a separation of activities and functions. And as Mats Franzén argues:



Figure 2. Streets in a city create relations between different parts of the city and between buildings, which has very direct consequences for the relations between people. Source: The author 2010.

... if people and activities are of different kinds, space can be supposed to be implicated in not only the reproduction, but also and more importantly, in their constitution.¹⁴

Such an understanding of the spatial role makes room for addressing urban segregation from a perspective beyond residential segregation, and it becomes possible to acknowledge the spatial implications for what affordances and limitations are created locally and how urban form influences this in different neighbourhoods.

Urban design establishes an urban landscape of affordances and possibilities with long-term effects. Differences in access to various urban resources tend to reinforce and reproduce segregation, especially if there is a situation of unequal living conditions. Franzén argues that an unequal access to resources is especially problematic as individuals or social groups with fewer resources are not given the same possibilities and opportunities that the city offers as others.¹⁵ This means that cities characterized by unequal living conditions confirm a hierarchal difference between groups; it creates outsiders and insiders. In order to increase the understanding of how urban design may be used to counteract segregation, it is important to establish such inequalities, to identify how urban form influences access to various amenities, and to identify how urban form enables different social groups to share public space in everyday practices. Sharon Zukin argues that public spaces are important sites for negotiating public culture.¹⁶ If social groups are strongly separated, and different norms and attitudes are being practiced, this increases the risk for a development of "parallel societies" or very different social codes and behaviour in different parts of the city. Zukin emphasizes the importance of a public space that various social groups can share:

I also see public culture as socially constructed on the micro-level. It is produced by the many social encounters that make up daily life in the streets, shops, and parks – the spaces in which we experience public life in cities. The right to be in these spaces, to use them in certain ways, to invest them with a sense of ourselves and our communities – to claim them as ours and to be claimed in turn by them – make up a constantly changing public culture.¹⁷

If the configurative properties of space separate different social groups from each other in space, not only from a residential perspective but also from a perspective of how we use the city, it limits the possibilities for different groups to be included in the ongoing negotiation which takes places in our day-to-day practices that form societal norms and attitudes.¹⁸ Zukin points out that this means that being in public space also means "being in society".

AN APPROACH TO FOREGROUNDING URBAN FORM AND URBAN DESIGN

The research develops approaches and methods for analysing and establishing to what extent people are favoured or disfavoured by urban form. It addresses questions like: To what extent are people in segregated areas prevented access to Swedish society through their everyday life experiences? What configurative properties are typically separating different groups? What configurative properties are typically allowing an inflow of non-residents in a neighbourhood? How can the characteristics of urban life at different public spaces be described, and how can correspondences to urban form be established?

There is a shift in focus from a discussion framed in terms of residential segregation to segregation in public space that acknowledges the segregating effect that urban layouts may have on people's chances to share urban space and also to share everyday practices that, on a very fundamental level, are influencing the social processes important for creating and reproducing "society".

Many of the prevailing approaches within the urban segregation field, primarily studies of residential segregation, have proved to be weak in increasing the understanding of the role of urban form as well as weak in developing knowledge that could contribute to the field of architecture and urban design. One reason for this is simply that *urban design* has rarely been the question at hand within segregation research; instead, there has been a strong focus on describing residential segregation phenomena, segregation processes, revealing moving patterns, or contributing to discussion on housing policy. In order to reach beyond such discourse, a shift in focus is proposed, from residential segregation to segregation of urban public space, so as to investigate what consequences segregation and fragmentation in urban space may have. This means that instead of highlighting residential segregation and housing, public space and spatial relations are used as a starting point for studying what this implies for people while using the city. The difference may be illustrated through the following example: residential segregation research is based on an analysis of the constitution of people according to where they

live. Different geographical areas are compared as single entities or units, and compared with the city at large. This approach is instead specifically looking at the constitution of people as we use the city – or the potential constitution – in the public realm, i.e. among those co-present in places where various social networks and solidarities have the potential to emerge and develop.¹⁹ Most importantly, the aim is to identify how urban configuration creates affordances and limitations and how urban configuration influences co-present situations in terms of its intensity and its constitution (e.g. the relation between locals and non-locals).

STRUCTURE OF THE RESEARCH WORK

In the first phase of this research project, the city of Södertälje was the object of empirical analysis. During the second phase, there was a stronger focus upon co-presence. The southern part of Stockholm city was the object of an empirical analysis, since this part of the city is found to have a large variety in terms of urban layout. This phase included a rich empirical study mapping people co-present at squares in the south of Stockholm using a questionnaire. In total, eighteen places were selected for in-depth study in Stockholm. The two main studies included, first, a spatial analysis of the urban system and, second, a social analysis of co-presence in neighbourhood squares and centres. In addition to this, three complementary studies were carried out that looked more specifically at other arenas that are important for the development of social processes, namely those related to work, schools, and culture, which in this study was exemplified by libraries.

SPACE: NOT A NEUTRAL BACKGROUND CO-PRESENCE AND URBAN LIFE

The social performance of different urban layouts becomes legible from their everyday patterns of use and everyday patterns of movement. Within space syntax theory, "co-presence" is seen as an important social resource.²⁰ The potential to develop social networks and different social solidarities is argued to pass through the relationship of spatial configuration and co-presence.²¹ Julienne Hanson even argues that the fundamental relationship between urban space and society is not encounter but co-presence:

We thought at first that we should be looking for and recording encounters between people, but it did not take us long to realise that the fundamental relation between urban space and society was not encounter, but "co-presence". This is important, because co-presence (or its absence) is a "generic" feature of societies.²² Hanson claims that co-presence is a precondition for face-to-face human social interaction without in any way determining what takes place. Hanson points out that an important social function of a city is to structure co-presence among people from different social categories. The effects of urban design are pervasive and insistent and are never absent in their nature; urban space should not be seen as a neutral background. Urban space influences the potential for building different solidarities and influences the potential for building spatial and/or transspatial solidarities.²³ This means that urban design, and the configurative properties of urban space, influences what kind of "arena" urban space might provide:

... cities are not so much mechanisms for generating contact as mechanisms for generating a *potential field of probabilistic co-presence and encounter.*²⁴

Co-presence that appears in streets, squares, and other easily accessible public spaces, where very few people are prevented from using the urban spaces, may be described as a kind of generic co-presence. Co-presence found in more strongly programmed places, such as workplaces, schools, and libraries, may be described as a specific co-presence. The stronger the selection and exclusion of non-invited groups, the more specific the character of co-presence turns out to be.

Hanson has studied social outcomes in different urban layouts that have undergone morphological changes in London and found that different design ideas are related to specific preconditions for sociability.²⁵ The analyses indicate that modernistic urban layouts (typically housing estates) have isolated people from each other, both on the neighbour level and on the neighbourhood level. A paradox according to Hanson is that the conditions for urban life and interaction with neighbours turn out to be considerably poorer in those areas where the social ambitions have governed the design ideas.²⁶

Hillier and Vaughan argue that spatial form needs to be understood as a contributing factor in forming patterns of segregation and integration in cities.²⁷ It is found that the urban street network, in and of itself, is a key determinant for movement flows and hence affects co-presence in space.²⁸ Furthermore, it is emphasized that this is intuitively clear, mathematically necessary, and empirically demonstrable and a key to understanding cities as socially meaningful patterns of relative integration and segregation.²⁹

AFFORDANCES AND EQUAL LIVING CONDITIONS

This study explores how urban layouts differ regarding accessibility both to other people and to amenities. What is made accessible in different neighbourhoods - urban resources in terms of other people, service, transportation, or cultural facilities - could be described as "affordances". The concept of affordances is a term coined by James Gibson.³⁰ Gibson suggests that affordance describes what the environment affords animals or humans in terms of shelter, water, tools, et cetera.³¹ According to Gibson, affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. Affordance in an urban context could be said to describe how the urban form with its structure influences what affordances are created locally; what urban resources are made accessible in different neighbourhoods, for example public transportation, parks, public space, urban life, education, health care, commercial services, or cultural facilities. Such descriptions may be used to increase the understanding of what the built form provides its users, but it is also relevant to discuss who benefits from different types of affordances depending on what resources different people or groups have. The empirical data enables a correspondence analysis between the social outcomes on the one hand, and the spatial properties and characteristics on the other hand. By increasing the understanding of such correspondences, it is possible to address the inequalities in living conditions from a perspective relevant for urban design and architecture. It is often highlighted that all citizens benefit from collective resources, however in general, disfavoured groups benefit more than privileged groups from having access to various amenities. This means that neighbourhoods providing poor living conditions affect people with fewer resources more than others.

METHODS

The empirical study took an experience-oriented spatial approach. The method used involved combining four different analyses: configurative analysis, analysis of social data, observations, and a questionnaire at eighteen different squares in the south of Stockholm. *Configurative analysis* explored centrality and periphery through integration and betweenness analysis, as well as overlapping integration cores and the spatial catchment area. Analysis of *social data* included the respective socio-economic status of residents and visitors (represented by the neighbourhood they live in). The analysis of social data was also combined with the spatial model of greater Stockholm; based on this information, the accessible residents, the working population, and the access to various resources were analysed, information that contributes to identification of living conditions in various neighbourhoods in different parts of the city.³² The method applied enabled the results to be described on a very detailed scale, with many of the analyses made from a specific street or address. *Observations* were carried out at eighteen squares to identify and describe the characteristics at each place. The method for capturing the intensity of co-presence in public spaces was based on direct observations of the everyday practices in the squares and centres. Intensity could be established in several different ways, and here two types of intensity observations were carried out: observations of pedestrian flows and counting co-present people (capturing a kind of momentary intensity).

Questionnaires were used to study eighteen squares (2,224 informants) and five libraries (150 informants). This was carried out within a period of two weeks in May 2011; ten people in total were involved in interviewing people – students and colleagues. Each area was visited at least twice, once during the morning hours (10–13) and once during the afternoon and early evening (15–18). Some of the areas were also visited on a Saturday (11–14). The questionnaire included questions about where people live, how often they visit the place, the purpose of the visit, and whether they came by foot, bike, public transportation, as well as how they perceive public space, et cetera. The information from the questionnaire about where co-present people lived was used to map a kind of social catchment area for each square.

In the final stage, the results from the different analyses were explored in an integrated way with the aim of identifying possible correspondences between spatial and configurative properties: on the one hand, the life at the squares in terms of intensity in public space, and on the other hand, to what degree non-locals were a part of local urban life.

RESULTS

The study of co-presence in public space is argued to reveal patterns of urban segregation as expressed in public space. The analysis will be used to increase the understanding of how urban layouts affect affordances and, more specifically, how spatial configuration of the urban layouts affects the intensity of co-presence on the one hand and the constitution of co-presence on the other. In this article, the constitution of co-present people, the mix of locals and non-locals, and the intensity including the social catchment areas of each square will be highlighted. Moreover, how this is found to relate to the organization of space and configurative properties will be presented. A comparison between the squares in terms of some of the living conditions will be shown in order to illustrate both how affordances may be analysed and described, but also as an illustration of inequalities since neighbourhoods in the south of Stockholm are compared.

CHARACTERISTIC OF CO-PRESENCE AT SQUARES: WHAT KIND OF SOCIAL ARENA?

A central question for this research is to increase the understanding of what kind of social arena the local square may be in different neighbourhoods. The



Figure 3. The home addresses of co-present people (black point) in relation to the square (red point).³⁴ Source: The author 2013.

square or neighbourhood centre is an important place in neighbourhoods for various kinds of social processes, including processes that are about seeing others and being seen, negotiating public culture, learning and forming social codes, norms, and attitudes, developing an awareness of other peoples' living conditions, acknowledging "the other", building social networks (founded on both strong and weak ties), and so forth.³³ The kind of urban life that may potentially emerge is highly dependent on co-presence, its constitution and its intensity, but also on other aspects that this study of urban life tries to capture. Therefore, the method developed in this research is looking



Figure 4. The metric distance (above) and the axial step distance (below) to visitors' home address from each square.³⁵ Source: The author 2013.

at the home address of the visitors, their age and gender, how long visitors tend to stay, how often they visit, and if they recognize other people at the square. From an urban design perspective, it is also of interest to identify what mode of transportation visitors have used to get to the square; and in the questionnaire there are also questions about the general preference for their sojourn: daytime or in the evenings.

SOCIAL CATCHMENT AREA

One of the questions in the questionnaire was about the home address of people who visited the squares. By plotting them on a map, it is possible to define a kind of *social catchment area* of each square. The maps reveal that these catchment areas differ considerably between the squares. The most limited catchment area is found for the square in Östbergahöjden, Östberga torg, but also Hammarby Sjöstad has a rather limited social catchment area. Squares that attract people from a larger geographical area are, for example, Skärholmstorget and Farsta torg. At these two squares, there are large shopping malls.

It is also possible to analyse and compare the distance between the visitors' homes and the squares. In the diagram below, the 25th, 50th, and 75th percentiles are illustrated for each square. It is found that many of the studied squares are dominated by people who live in the proximity. For about half of the squares, the 75th percentile is at 2,000 metres or below, and at 10 turns or below. If looking at the share of co-present people who live within a walking distance of one 1 kilometre from the square, it is found that squares having a large share of non-locals are Skärholmen, Farsta, Nytorget, and Södra station, while squares with a high share of local residents are Östberga and Gamla Östberga. Figure 4 illustrates distances to visitors' home from each square.

LENGTH OF STAY AND VISIT FREQUENCY

Another aspect characterizing urban life is how long people generally stay at the squares. Some squares and places are dominated by people just passing by on their way to other things, while other squares are places for longer stays and perhaps multiple purposes. This is a highly relevant aspect to identify so as to better understand what kind of social arena the public space may be, and it gives an indication of the pace and character at the square. About half of the studied squares have a mix of shorter and longer visits, either those passing by or staying less than half an hour combined with longer visits. Then there is one category characterized by short visits or people just passing by. These people just passing by are only to a limited extent contributing to the urban life at these places. The third category is dominated by visitors that stay one to two hours, for example, Skärholmen and Farsta, which have the large shopping malls. At these squares, it is also found that the intensity and co-presence is very much concentrated on the centre, hence the urban life at these places has very little impact on the rest of the neighbourhood. The squares perform typically as nodes rather than as lines or fields.³⁶

The frequency of visits is an indication of routines and habits; the extent at which everyday practices are routinized and repeated has importance for negotiating public culture. The majority of the squares, as many as fifteen, are dominated by people coming there on a daily basis. This means that those who are there can rather strongly develop habits and norms; it is likely that they will not be questioned by people who only come there more rarely. It is also possible to see that at the squares that are more spatially segregated there is a high degree of familiarity; the informants report that they recognize "most" or "many" of the other co-present people. The three squares that diverge from this are Farsta and Skärholmen, as well as the inner-city square Nytorget. At these squares, it is more likely that there will be higher diversity in this respect; people who come on a daily basis mix with people who visit more rarely.

PURPOSE OF VISIT

Asking why people had come to the square helps to understand the diversity of activities that may take place there, and it partly illustrates what kind of social arena the square potentially could be. It also reveals whether the squares encourage or provide single or multipurpose use. Different characteristics emerged as the informants' answers were studied, here categorized in three main types:

- Squares dominated by residents, and at most of these squares shopping is the main purpose for coming to the square, with other purposes reported but not to the same degree.
- Squares dominated by non-locals who had come primarily to do shopping, who are neither living nor working in the neighbourhood, with other purposes not reported to the same degree.
- Squares with a mix of people living and working in the area, with multiple uses reported (shopping is less dominant than in the other two categories).

CORRESPONDENCE BETWEEN INTENSITY AND NON-LOCALS

What kind of social processes may take place at a local square or centre is also influenced by the intensity at the place. Several of the studied squares are rather quiet, having very few people co-present at the same time, and that is limiting their potential to function as an arena for social interaction, limiting both focused and unfocused interaction.³⁷ Intensity has in this study been



Figure 5. Intensity of urban life corresponds with the share of non-locals.

captured by observations of pedestrian flow and through so-called snapshots, a counting of simultaneously co-present people at these places (momentary intensity). A finding in this study is that intensity and the inflow of non-locals corresponds strongly. In Figure 5, intensity is shown together with the share of non-locals (i.e. those who live more than 1,000 metres from the square) in the same diagram. Places with low intensity and a low inflow of non-locals are found in the lower left part, while places with high intensity and a high share of non-locals are found in the upper right part.

CORRESPONDENCE BETWEEN NON-LOCALS AND SPATIAL CONFIGURATION

The analysis of co-present people was compared with a number of different spatial and configurational properties with the aim to decode how different urban layouts create possibilities or limitations for urban life locally. Two of the squares were found to be outliers in many aspects, namely Farsta and Skärholmen, and these are the ones that have strong attractors, the shopping malls. These shopping malls attracts a lot of non-locals, but these neighbourhoods are weakly spatially integrated with the surroundings, resulting in the high intensity and the high number of non-local visitors clearly being concentrated on the square and mall, while the rest of the neighbourhood as such is only influenced by this inflow of people from other parts of Stockholm and the region to a limited extent. The result of the statistical analyses³⁸ showed a strong correlation between a high inflow of non-locals and integration. Strong correlation is found at all scale levels tested (from the local level, radius 6, to the city level, radius 16), and strongest at the mid-scale level (radius 10). Earlier research has identified integration interfaces between the local and global properties as important for a mix of residents and non-residents,³⁹ which is why this also was tested in this study. For Stockholm, this result can be confirmed, and it is found that integration interface - that is, the extent at which local and global integration values overlap – corresponds to the share of non-locals. The correlation between the share of non-locals and betweenness was much weaker, with only a strong and significant correlation at a radius of 2,000 metres (including all eighteen squares).

CORRESPONDENCE BETWEEN NON-LOCALS AND INTENSITY

It is also possible to see that the share of non-locals correlates strongly with the intensity of co-presence, both when intensity is measured as pedestrian flow and as momentary intensity. In order to understand how population density may affect the character of urban life, the share of non-locals is compared with the number of accessible people within different distances, both residents and working people, with the latter assumed to include non-locals to a large degree but also to attract non-locals. The correlation analysis is stronger between the share of non-locals and access to the number of people who work close to the square (within a walking distance of 500 metres) than is the same analysis including both residents and working population even if this correlation still is strong. If access to residents only is analysed, then the correlation is much weaker. This result indicates that high access to work-places from a certain square has a stronger influence on urban life, both in terms of intensity and the inflow of non-locals, than high access to residents.

Population density (measured as accessible residents and working population within 500 metres) analysed for Stockholm at large reveals large variations between different parts of the city. This kind of analysis is an example of and illustrates distribution *through* space, since both distribution of residents and working population in space are taken into account, as well as the distribution of space in itself.⁴⁰ Hence, this kind of analysis illustrates a combined effect of land use and urban structure and configuration. In Figure 6, population density as accessible population is superimposed with betweenness at a radius of 2,000, two variables indicating that urban life may be characterized



Figure 6. Accessible residential and working population within 1,000 metres from the centre.⁴¹

by both high intensity and inflow of non-residents. Access to urban life with a mix of people has importance for what affordances are created locally in different neighbourhoods, what kind of social exchange may take place, and what kind of social relations and networks may develop.



Figure 7. Access to residential and working population within 500 metres superimposed with high betweenness values at 2,000 metres.⁴²

AFFORDANCES AND UNEQUAL LIVING CONDITIONS

To what extent there is access to a mixed population in public space in a neighbourhood has been argued to be of high importance for what affordances are created locally. In this study, neighbourhoods that are less integrated spatially were found to have a lower inflow of non-locals, resulting in lower diversity – the two squares with large shopping malls being the exception. However, the affordances created locally are also dependent on access to other amenities locally. From a segregation perspective, this is important to identify since people with fewer resources are more dependent on what resources are accessible locally. The way that access to different urban resources is distributed across the city can be linked to the discussion on unequal living conditions and life chances.⁴³ It has been shown that urban form can create closeness and high access within an urban system, but that urban form through its configuration and organization also can create distance to certain resources. In this study, a few key variables that have been analysed



Figure 8. Principle of variables analysed: access to the inner city, configuration, population density, and urban life.

are argued to have high importance for what living conditions are created locally for its residents and users, variables that have great impact on what kind of activities this may establish in a neighbourhood. The spatial properties found to have importance for matters related to urban segregation are included; these properties could be said to give the areas a kind of spatial signature. In addition, population density, distance, and travel time to the inner city are noted, as well as inflow of non-locals and intensity in public space. All together there are nine variables included: four configurative properties, two measures identifying access to the inner city, two variables related to the character of the urban life found locally (intensity and constitution), and a measure for population density. The idea is to propose a method for analysing, comparing, and illustrating living conditions in order to identify inequalities, such as how users may be favoured or underprivileged by the affordances in their neighbourhoods.

The nine variables were analysed for each square. The measurements were then normalized in order to ease a comparison between the neighbourhoods.⁴⁴ The diagrams may be read as follows: the more the different sectors are filled, the higher is the value found in the different neighbourhoods (at the square, the neighbourhood centre, or the main street). Few levels filled means disadvantageous conditions and many levels filled means favourable conditions. What the polar diagram illustrates is that the living conditions vary significantly, and it is revealed that many of the neighbourhoods having a population with fewer resources are also disfavoured in terms of access to urban resources locally.

DISCUSSION AND CONCLUSIONS

By comparing the results from the configurative analyses with the results from social analysis and the questionnaire, it has been possible to increase the understanding of what spatial and configurative properties correspond to different kinds of urban life. The empirical study has demonstrated that spatial configuration is, in different ways, influencing everyday practices and that it influences the patterns of co-presence. The spatial structure and the configurative properties affect not only the intensity of local public life but also the constitution, i.e. the mix of locals and non-locals that in turn correspond to diversity. Squares that are more spatially segregated tend to have a larger share of non-locals, lower intensity, and a limited mix of people who visit the square at different intervals. A conclusion based on these results is that the spatial properties in many neighbourhoods inhibit a mix of people in public space. However, other factors are also found to influence the co-present situation, for example, areas having strong attractors such as a train station or a shopping mall; this kind of land use tends to override the configurational impact. Taken together, the character of the urban life is influencing the social processes: possibilities for seeing and being seen by others, for developing an understanding and an awareness of "the other", for creating strong and weak ties that can build social networks, and it also results in various contextual effects.



Figure 9. A comparison of configurative properties and other conditions that influence urban life in nine neighbourhoods in the south of Stockholm; mapping of affordances.

Considering the way in which access to different urban resources is distributed across the city, it is possible to link to the discussion on unequal living conditions and "just cities". It has been shown that urban form can create closeness and high access within an urban system, but also that urban form can create distance to certain resources and create distance between neighbourhoods and between people. Based on the findings, it is argued that the neighbourhoods and the squares are highly dependent not only on the configurative properties within the neighbourhood but, more importantly, on



Figure 10. A comparison of configurative properties and other conditions that influence urban life in nine neighbourhoods in the south of Stockholm; mapping of affordances.

what is found in the surroundings and to what degree each neighbourhood is *spatially integrated* with other neighbourhoods in the proximity.

The method used – combining configurative and spatial analysis with questionnaires and observations – made it possible to investigate correlations between very specific configurative properties of the different urban layouts with social outcomes. The social catchment area of each square compared with the characteristics of the urban layouts revealed strong correlations between, on the one hand, specific spatial properties and, on the other, intensity in urban life, as well as inflow of non-residents influencing the social catchment area of each square.

Results indicate that segregation of urban space, including restricted access to a range of resources – such as job opportunities and contact with other people – is a tangible feature of segregated neighbourhoods. These are insights that can inform the development of improved urban design practice as well as urban design policies and interventions.

The findings of this study are argued to open theoretical developments that address the social dimension of urban design with greater precision. Increased knowledge of the role of urban form for social processes is argued to increase the understanding of how the spatial relates to the social. The knowledge produced can further be used in urban design practice and in anti-segregation initiatives, identifying whether spatial interventions can contribute or not, and if so, which physical interventions might have an impact on how the city may be used and what affordances may be created. Such knowledge has the ability to support an urban design practice that builds not only cities but societies as well.

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OPEN RESEARCH: SHARING RESEARCH FORMATS AND CHALLENGES

Marie Markman

ABSTRACT

This article describes a new vision of research and methods carried out beginning in 2011 in an architectural research context at the Aarhus School of Architecture, Denmark. It draws on the experiences of the author herself and puts forward a piece of artistic research, focusing on how the research was conducted, the variety of formats involved, its contribution to the wider body of research, how it was challenged by opponents, and how a private developer unexpectedly made it possible for this research to continue.

The article is based on a presentation at the NAF (Nordisk Arkitekturforskning / The Nordic Association of Architectural Research) symposium at KTH Royal Institute of Technology in Stockholm, Sweden, in May 2016. During the symposium it became evident that there is a need for sharing and reflecting more thoroughly on aspects related to research formats. There is a need to open our minds to different research approaches and to the great potential of research within architecture, thereby strengthening the research field and, as a knock-on effect, the self-confidence of its researchers.

The article concludes that within the research context of architecture it would be productive to share research formats in order to reach and explore the potential of research conducted in an architectural context. To do this, established researchers play an important role in putting forward examples of research that show younger researchers how creatively one can actually conduct research and contribute new knowledge. Furthermore, there is a need to address the fact that few PhD fellows will find an academic job position waiting for them after their PhD is completed, and that they have to seek opportunities elsewhere to continue and push their research onward.

KEYWORDS

Architectural PhD fellowship, art, artistic research, activism, city planning, research methods, transdisciplinarity, private developer

INTRODUCTION

While growing up, I was told that there was something suspect about people writing about themselves or their work in the third person. When entering research, I learned that writing in the first person would often be regarded as unserious. Considerable parts of my thesis were written in the first person; I will use this article as an opportunity to explore a third-person perspective and refer to myself as the author.

One of the most notable things I learned during my PhD fellowship was that one should never accept habitual thinking – and one should not reject it either – and that one should continuously experiment. (I remind myself that research is an endeavour, which is a privilege of just a few – being one of them, I feel obliged to take chances.)

"Trust in your explorative drive."¹ Originally uttered in 2013, this quote by Catharina Dyrssen, professor in architecture and design methodology, could potentially enrich research within the architectural field (see the question below this section). "Constantly ask the how and why questions",² her next sentence, could open the field of architectural research beyond this context.

Research offers great freedom and many possibilities – especially if one is a bit "thickheaded" or "naive" and basically believes that research is a creative act. Research equals the artistic process of an artist having to trust her own idea about creating a specific piece of art – the challenge of the researcher is the same; having to trust her own idea about how to create research.

The author's thesis was based on material pertaining to two artistic works created in the years 2011–14. The first work was an edible landscape, *Traffic Island Edible Landscape* (2012), made in collaboration with students of architecture and located between the lanes of a road with heavy traffic.³ The second work was an edible garden, *Edible Estates: Prototype Garden #14: Aarhus; Denmark* (2013), made in a private garden by the American artist Fritz Haeg, who also collaborated with students of architecture. Finally, the research project included a public seminar, *Urban Agriculture: Edible Estates and the Mega Cities of Tomorrow* (2013), discussing whether urban agriculture could play a more pronounced and positive role in urban planning.⁴ Professor Elke Krasny, from the Academy of Fine Arts Vienna, was one of the keynote speakers at the seminar.

Based on these artistic works, a variety of material was produced: logbooks,⁵ stop-motion films, a documentary film, exhibitions, public events, a book, newspaper articles, and a transcription of the seminar. All of these different formats formed the empirical data for the research when handed in.

CONTEXT OF THE ARTICLE

At the symposium called The Production of Knowledge in Architecture by PhD Research in the Nordic Countries, held by The Nordic Association of Architectural Research in May 2016, it became evident that many of the participating PhD fellows felt resistance and difficulties in conducting their research due to lack of support.⁶ It seems that this feeling is a common condition when dealing with research,⁷ and since much research seeks to expand the boundaries of the established and recognized – the well-known – and therefore naturally will meet with scepticism and resistance, one could argue that it would be helpful to just accept that this is a basic condition of such work, and that one simply has to learn to manoeuvre within this insecurity while conducting research.

During the night between 19–20 May 2016 at a two-day symposium, the author reworked her keynote presentation for the following day. The first day of the symposium had made it clear that it would be a good idea to present very concrete examples of how research is conducted in the field of architectural research in a more straightforward manner than planned. Rather than hearing about the great results achieved within architectural research, it seems that there is a hunger for discussing methods and formats. Thus, the author elected to offer a more narrative approach, presenting and describing how her research was constructed in terms of variety of formats, how it was challenged by the opponents at the PhD defence, as well as the opportunities that did or did not open up after the defence.

The presentation given on the second day of the symposium shifted between examples of works of art from the research and the thesis itself. The goal was to take the authority won by having conducted a piece of research that has been accepted in an established research context and use it to give freedom to others. Freedom in terms of daring to be explorative and inventing new research formats, to see the presentation as an encouragement and a plea for this. It is a choice of addressing the working conditions that one is confronted with within research, as well as after the PhD project is complete. Not in terms of giving advice, but as an example to suggest that, since this was accepted as a way of research, why shouldn't a great variety of other ways of research be possible? Last but not least, addressing the freedom in research as a creation of one's responsibility. Maybe one is not warmly embraced by an institution, or maybe the institution doesn't offer the premises required, but if the research needs to be continued, one must find ways of making that possible anyway.

Taking a step backwards, the following text takes its point of departure in the author's PhD defence on 6 February 2015.

DEFENDING "LANDSCAPE SPRAWL:

AN ARTISTIC RESPONSE TO LIVING IN THE ANTHROPOCENE" At the closure of the PhD defence of "Landscape Sprawl: An Artistic Response to Living in the Anthropocene"⁸ at the Aarhus School of Architecture, the chairman of the assessment committee, Professor Niels Albertsen (Aarhus School of Architecture, Denmark), and the two other members of the committee, Professor Catharina Dyrssen (Chalmers University of Technology, Sweden) and Professor Antje Stokman (University of Stuttgart, Germany), stated:

I would like to close with a quote from the artist Olafur Eliasson: "Making art – working creatively – is a way to connect debates about personal and societal values with (physical) forms. To make a sculpture or create a building is to shape reality. It means giving ideas and values a body, giving them space – letting them have space. It is a process of embodiment." What you have been doing is precisely this, connecting personal, subjective feelings and values with societal and even planetary values and challenges in the making of forms that shape reality. And more than that, you have put it into a research form, which documents the work as working in the world, as having an impact in the world, and notably and remarkably, a research form that does not destroy the artistic subjectivity of the making. That is quite an achievement.⁹

The PhD research presented emerged out of wondering about why there is no countermovement to the strategy of urban sprawl,¹⁰ and an acceptance of decreases in biodiversity and increases in climatic catastrophes. The focus

of the PhD is about "making landscape"¹¹ and seeing how it influences the surroundings – animals as well as people – while addressing city planners, politicians, and other stakeholders. The author is striving for change – to make people think and ask new questions. An idea of what the urban space could be is set up against what it is now. The method explores the boundaries between practice and research. The term "landscape sprawl" is introduced as a research strategy and as a countermove to the term "urban sprawl". The method paves the way for new images of how new approaches towards landscape could contribute to a liveable Anthropocene.¹²

Before the statement by Niels Albertsen, a two-and-a-half-hour-long and intense dialogue had taken place. The PhD work was challenged by a number of questions. Some of the questions were posed in a thorough eleven-page preliminary assessment, which the author had received on 16 January 2015. Others were posed for the first time during the defence. One of the general critique points in the preliminary assessment was that the author should have been more precise in the meta-reflection of the thesis. The first challenge of the author was therefore to answer a list of "how" and "why" questions.

The author clarified her research approach by making the following statements:

- In order to displace existing conventions about landscape, I involve myself in discussing with people spanning the full range from laymen to specialists. This generates new perspectives on the field of research.
- The different roles and formats provide new artistic material.
- I find out with whom I need to "discuss" matters (verbally, aesthetically, etc.), I identify the "Landscape Sprawl" format that is suitable and vible for the context, and I realise it in practice.
- Constantly shifting roles and places help to maintain focus on the content rather than on the method.¹³

Also, the author clarified how she understands her own artistic research:

- Describing my artistic practice to make it transparent.
- Contextualizing it in terms of its kinship with other artists and discussions.
- Defining the artworks that can add to the discussions I seek to contribute to.

- Finding ways of documenting the works: stop-motion films, documentary films, pamphlets, etc.
- Involving people in all levels of the research.
- Formulating new concepts to develop understanding and to discuss complex matters.
- Adding perspectives to the discussion about the limitless city / urban sprawl (note). $^{\rm 14}$

In the presentation of the author, all the statements were combined with pictures that showed the content of the statement.

Furthermore, the author spent thirty minutes of individual dialogue with each member of the assessment committee. The committee split up the critical parts into three perspectives which they wanted to discuss: one concerning artistic research, led by Catharina Dyrssen; one concerning landscape architecture, led by Antje Stockman; and one concerning the urban / the city, which Niels Albertsen led. The discussions revolved around topics and questions¹⁵ such as:

Had the author been radical enough in using her methods as an artist? (Catharina Dyrssen)

Had the author been active enough, as leader and the person driving the process forward, when including material from other artists, or had she tended to be thinking more about being polite to collaborators rather than focusing on the material produced / empirical work and positing it in relation to the project she was heading? (Catharina Dyrssen)

How does one go on from the very high conceptual level in the dissertation to implement the ideas and approaches in more policies? How may one activate the term "Landscape Sprawl" that the author invents in the dissertation and really relate it to official urban planning in local authorities? (Antje Stockman)

Does the author think that, as an artist, she has better opportunities for navigating flexibly between disciplines, or did she fall into the trap of looking at art as just another discipline? Does art, and the position as an artist – that I think is permeating everything – also permeate the author as a landscape architect? Is she especially open towards moving between disciplines? (Niels Albertsen)
The author listened carefully and took on board the defects of the dissertation – including the issue of being precise when defining her own position compared to other ways of working. There was critique of content and aesthetics that her professional vanity would have liked to turn differently – even back when the thesis was submitted – but had she not accepted the prospect of being dissatisfied, the thesis would probably never have been handed in. Having said this, she still ventured onto shaky ground in her eagerness to discuss the content with the assessment committee. This approach led to clarifications about some of the topics that are important points in her work: that instead of opening discussions up, academic contexts can sometimes tend to narrow their scope, discussing matters only in familiar contexts.¹⁶

During the defence it became clear that some of the choices made in the thesis that the author thought were radical, because they were perceived as such in the Danish research context, are in fact perceived differently from a Swedish or German perspective, and vice versa. This is an important lesson because it emphasizes how the same piece of research can be judged differently from one context to another, and that every author must be able to make their own valid judgement of the contribution made by their work. And though they were harsh in their critique, the assessment committee members were generous in adding questions that can push the research forward, a virtue that in the most positive sense stimulates research.

The entire defence was documented on video; the questions asked and discussed were captured and can be retrieved. For example, there is a verbal description of the stop-motion film *Traffic Island Edible Landscape*, which the author used as the start of the defence session, and which will be introduced in the following to give an idea of her approach and work.

A BRIEF VIEW INTO THE RESEARCH APPROACH / METHOD

The following offers some insight into the research approach. The stop-motion film described can be accessed on YouTube;¹⁷ the description is an extract from the dissertation.

For three days in April 2012, the atmosphere at Noerreport changes as a small group of people work between the lanes of the road to establish *Traffic Island Edible Landscape / TIEL*. The landscape visually changes Noerreport, and passers-by spontaneously react to it.

During the daytime, the blocked lanes around the traffic island become a lively public space where passers-by (students, colleagues, citizens) stop and comment on the work and share their opinions about planting edible plants in this context. Most people are very sceptical about the idea of eating any-thing from this landscape, but the conversations about actually eating crops from the landscape are introduced by them. During the three days of work at Noerreport, the attitude of people changes to acceptance or at least to recognition of the hard labour and the consistency of the work carried out (*TIEL*, Diary Markman / Thursday, 26 April 2012).

As described in the logbook, the workload is massive (*TIEL*, Diary Markman / Thursday, 26 April 2012). The stop-motion film, as well as other pictures taken during the process, reveals the impact that establishing the landscape has on the physical site and on passers-by.

Watching the stop-motion film and the pictures, the scenario can be perceived as follows: (morning of Wednesday, 25 April 2012). A group of women dressed in recognizable work shirts in vivid yellow (shirts familiar to everyone who has ever seen labour carried out in a road context) block two lanes at Noerreport around the traffic island by manoeuvring two panel wagons and



Figure 1. Traffic Island Edible Landscape / TIEL (2012). The site while being transformed. Photo: Marie Markman

other kinds of road traffic control equipment into place. Then a truck arrives, and small piles of soil are placed in different places within the traffic island.

Shortly afterwards, the women leave the traffic island. After the soil has been deposited, the women return and start digging manually throughout the traffic island, mixing new soil with old. On their shirts is a logo showing a skyline of a city with vegetables and the text "An Edible Landscape". The logo seems handmade. While digging, they leave the traffic island once in a while to take pictures, bringing things back and forth and interacting with passers-by. They shift between different tasks. After noon they are halfway through. They unblock the lanes by manoeuvring the road traffic control equipment away from the lanes into the traffic island, and they leave the site. The following day, the same scenario takes place. The lanes are blocked in the morning, and the women start digging again. Soil is delivered again. Passers-by stop and talk, people take pictures, a group interviews them, and they themselves take pictures. Around noon a Bobcat is driven into the traffic island, and a group of people who have carried out work in a different area of Noerreport help to turn the last soil over. Around noon they leave the landscape, and when they return they bring a lot of small plants that they start planting. All the plants are put on the traffic island and brought back and forth. For a while the plants are put into the ground. Then they unblock the lanes again by manoeuvring the road traffic control equipment away from the lanes into the traffic island, and they leave the site. On the third day (Friday, 25 April 2012), the scenario from the days before is repeated. The lanes are blocked; the women continue planting, move around a bit with the plants, put up stakes for the plants to grow on, and water them. During this process, passers-by approach them, and they stop their work when surrounded. In the afternoon, the panel wagon and the road traffic control equipment are removed from the traffic lanes, and the island and the landscape are left. The traffic island appears as naked soil with a few plants within it.

Planning *TIEL* was done from November 2011 to April 2012. The landscape was established from 25–27 April 2012. The landscape was afterwards maintained from May 2012 to October 2014. And now to the question that lead to *TIEL*.

RESEARCH QUESTION ABOUT THE ROLE OF LANDSCAPE The question leading to the creation of *Traffic Island Edible Landscape* in 2012 was a question posed in 2011 by the Aarhus School of Architecture –

TRAFFIC ISLAND EDIBLE LANDSCAPE						Stop-motion Film Establishing Stop-motion growing season 2012 -2014
Work I						Diary (2012 - 2014) Collection of material from others
			2		Documentary Film Stop-motion Film Stop-motion grow	n Establishing ing season 2013
		Work II	•		Diary (The Peder Diary (2013 - 201 Collection of mate	sen Family 2013) 4) rial from others
	SEMINAR • Work II	EXHIBITION	Curated panel discussion Reseme lectures Question Transcription of panel discussion			
505 •						
Sep. 2011	2012	2013		2014	4	20

Figure 2 Diagram / used time.

the question of "how landscape could have a more prominent and present role in the urban space and connect otherwise fragmented urban areas".¹⁸

Having graduated as a sculptor from an Academy of Fine Arts and holding a degree in landscape architecture from an agricultural university, the author suggested the use of methods from her critical artistic practice of making landscapes. The question would then be answered based on the knowledge that would arise out of this. The author saw it as an opportunity to mediate what she experienced as a common discussion in art and architecture, and to merge methods from the professions in striving for new and durable ways of dealing with the role of landscape in urban development.

Through an open recruiting process, which included a job interview with the dean from the School of Architecture, the head of research, a professor from Cultural Heritage and an associate professor from the Department of Urban Landscapes and Urbanism, the position was offered to the author and her work began in September 2011. Just a few days after her employment started, she was encouraged by her advisers to start collecting empirical data.

IDENTIFYING EMPIRICAL DATA AND CONSTRUCTING RESEARCH BY ORGANIZING, CONTEXTUALIZING, AND REFLECTING Planning for *Traffic Island Edible Landscape* started in September 2011, and work on this piece continued until a few months before the thesis was handed in on 31 October 2014.



Figure 3. Dissertation 1/4.

PART 1/4

- -Structure
- -Acknowledgements
- -Table of contents
- -Summaries (Danish/English)
- -Foreword
- -Introduction

- -Hypothesis / research questions
- -Chapter 1 / context
- -Five different perspectives /Seminar
- -Kinship
- -The Anthropocene
- -Chapter 2 / Research as part of artistic practice



Figure 4. Dissertation 2/4.

-Chapter 3 / Traffic Island Edible Landscape -Intention -Process and impact -Establishment -Art Weekend Aarhus -Research context -Pamphlet -Diary -Articles in public media



Figure 5. Dissertation 3/4.

-Chapter 4 / Edible Estates: Regional Prototype Garden #14: Aarhus, Denmark

- -Intention
- -Process and impact
- -Edible Estate Project (2005–2013)
- -Documentary
- -Diary Markman
- -Establishment
- -Diary Pedersen
 - -Everyday life (2013)
- -Hands-on Urbanism / Exhibition

LANDSCAPE SPRAWL AN ARTISTIC RESPONSE TO LIVING IN THE ANTHROPOCENE

Figure 6. Dissertation 4/4.

PART 4/4

PART 4/4

-Chapter 5 / Reflections on Traffic Island Edible Landscape (2011–2014) -Chapter 6 / Reflections on Edible Estates Prototype Garden #14 (2013)

PhD Dissertation by Marie Markman

-Chapter 7 / Urban Agriculture: Edible Estates and the Mega Cities of Tomorrow -Chapter 8 / Contribution -Conclusion and perspective -Literature Based on *Traffic Island Edible Landscape* (2012), *Edible Estates: Prototype Garden #14: Aarhus; Denmark* (2013), and *Urban Agriculture: Edible Estates and the Mega Cities of Tomorrow* (2013), a variety of material was produced: logbooks, stop-motion films, a documentary film, exhibitions, public events, a book, newspaper articles, and a transcription of the seminar. All of these different formats formed the empirical data of the research.

In the thesis, the empirical data was described from a subject viewpoint, focusing on the making of the art pieces. The artistic research method, where informal use of data is recognized and used, has an impact in shaping form and reality. The research form emulates the scientific method.

The physical format of the thesis was four A4-format booklets, each forty-eight pages long, with all the supplementary material – newspaper articles, films, etc. – provided on a DVD.

A conceptual choice of only using pictures taken during the research was made. A choice of giving the thesis the form of four booklets was made with the intention that, when acquiring the work, one could take in different parts of it simultaneously. Economic and technical printing constraints defined what was possible in terms of space for text and pictures, meaning that all texts simply had to be adjusted to fit into this format.

RESEARCH CONTEXT

In a Danish context, PhD research was conducted at both schools of architecture in 2011: Aarhus School of Architecture and The Royal Danish Academy of Fine Arts' School of Architecture, both institutions attached to the Danish Ministry of Culture. At the time, there was an ongoing discussion about whether research or artistic development work would be the right way to "frame" the research conducted within the schools.¹⁹ Since the author had found freedom for her artistic practice within research and the opportunity to pursue her interests while working within the established academic system, she was quite afraid that it would lead to a redraw from a shared development of research possibility within other professions.

At the launch of the author's PhD studies at Aarhus School of Architecture in 2011, the head of PhD studies was the philosopher and author Jorgen Dehs. Coming from a classical tradition of research, he made it clear from the beginning that he found it laughable when architects and/or artists turned their research into philosophical studies, rather than using the methods that they were skilled within, since they would always be beginners in this venture/ endeavour.²⁰ The challenge then would be using and/or inventing methods from architectural/artistic practices in a way that would contribute to research.

PhD fellows at Aarhus School of Architecture traditionally have two supervisors appointed to them; one might have a third supervisor appointed if this is relevant for the research. Besides individual sessions with one's supervisors, there are seminars where all PhD fellows must present and discuss their work with all PhD supervisors at the school as well as an external opponent; this happens twice a year. At the time, the school aimed to have a practice-based PhD programme as well. Succeeding in this endeavour, the PhD school opened a practice-based PhD programme "ADAPT-r" thanks to major EU funding.²¹ The author further had the good fortune to be invited to a forum of Urbane Landschaften in Bonn once a year (Montag Stiftung Bonn), a forum initiated by the German architect and urban planner Thomas Sieverts, and in this context received critique on her work.

Quite early in the PhD work, it turned out that within the various contexts where the author presented her work, the reactions would always vary. In a Danish context the combination of visual art and urbanism was often questioned. In a German context, people would either see great potential in this research approach or reject it as "just art". Presentations at conferences and seminars also suggested to the author that seeking discussions abroad could be beneficial. After one year, it was decided that the PhD project should be conducted and written in English. This would make it possible to put together an assessment committee to whom the research topic and the transdisciplinary approach would be meaningful. Though challenged by this premise, the author felt it necessary, though questioned by the supervisors. It also became evident that rather than being selective and choosy about collaborators, it was good to be open towards whatever possibilities occurred, saying "yes" even to things that seemed only marginally relevant, since it was most often totally unpredictable who could and would contribute to bringing the PhD work forward.

On the strategic level, in 2012 Claus Peder Pedersen, head of research and associate professor, set up a group to discuss matters concerning artistic development work and research.²² The author was invited to be part of the group. The discussions were summed up in a written note by Claus Peder Pedersen and, combined with the fact that in 2014 the school went from being attached to the Danish Ministry of Culture to the Danish Ministry of Education, discussions found a level where there was no question about insisting on research, but rather on developing one's own methods. In 2013, Johan Verbeke (1962–2017) became MSO professor and head of the PhD school, and thanks to major EU funding the school expanded its PhD programmes in 2014.

No final solutions were offered to the author in terms of what the PhD project should be like. If suggestions were indeed offered, she fortunately somehow managed to overhear it. Also fortunate and inspiring was the fact that there was genuine scope for discussion about the PhD work, and that even researchers who were not supervisors for the author were generous in terms of creating possibilities for her work. One real challenge, however, was the fact that there was no discussion about what would happen after the PhD: no visible research strategy in the institution which could help clarify whether it was worth waiting for a position, or whether one should get out of there as soon as possible and strive for opportunities in other contexts!

A SPACE OF UNCERTAINTY BECOMES A SPACE OF POSSIBILITIES

After the PhD defence things went quiet. No position at the institution where the PhD was conducted appeared. In April 2015, the author decided to continue her work in the context of her own company called Kunstproduktion and combine being a practicing artist with continuing her research and further exploring the results achieved in the PhD. In 2017, the author established her own independent research laboratory called The Exploratory Research Laboratory APS and bought a piece of farmland for the laboratory.

At first, the reflections on the content of future work were mainly theoretical in nature, but in May 2015 an unexpected opportunity opened up: to be part of a quite peculiar urban development project undertaken by the Danish property developer Joern Taekker / Taekker Group.

One of Joern Taekker's great passions is the development of a new city – Nye²³ – and the company has worked with this project for the past ten years. Taekker Group has extensive collaboration with a wide range of architectural offices, various consultancy firms, and the local municipality. Taekker Group has collaborated with a landscape architecture office as well, but since Taekker Group wants the development of Nye's landscape to be discussed and planned at Taekker Group's own office, the collaboration has ended. Joern

Taekker's visions for the city Nye is very much a question of searching for new ways of approaching and thinking landscape within a city, which is perfectly in line with the author's position.

As an independent consultant, but physically located in Taekker Groups's office, Taekker offers the author the opportunity to gather all the thoughts and visions connected to the landscape in Nye and develop the remaining parts in close cooperation with Taekker. This opportunity has arisen due to the author's interdisciplinary approach (artist, landscape architect, researcher), and the proposal from Taekker is that 90 per cent of the "bricks" have been envisioned, but the final 10 per cent of the "bricks" are still missing, including those that will bring it all together.

The author is challenged to her core by the opportunity – in a positive sense. The task will provide a unique opportunity to confront the challenges that were outlined at the PhD defence, but it was quite unexpected that a private developer ended up offering the funding and setting for this research to continue. The usual ideas about where opportunities for breaking through with artistic, critical perspectives can be found to have been turned upside down. In the year that followed, the author's work unfolded in collaboration with Taekker. Denmark's most advanced tractor has replaced hoe and spade, and discussions with real estate agents, engineers, and biologists concerning the landscape of Nye have replaced more theoretical discussions in academic contexts related to research.

The collaboration with Taekker has opened up the author's horizons, prompting her to once again remember that some of the experiences that can open new facets of one's professional work and lead to new perspectives are to be found in places which seem unfamiliar. Sometimes even places that one doesn't consider or think of as a possibility.

The following section discusses the challenges outlined in the PhD defence based on the experiences at Taekker.

TAEKKER GROUP AND CONDUCTING RESEARCH OUTSIDE AN INSTITUTION

Taking up residence at Taekker's office, the author's approach to developing Taekker's landscape plan is in many ways similar to creating works of art. The author works conceptually. The work involves having a clear idea of something to be "disseminated / said" and to "communicate / say" this. To do so, she finds the necessary materials and assembles them so that they form the statement she is striving for. This process can demand that she work with other materials than she is used to; and also acquire other knowledge and maybe collaborate with others on subtasks that help reach the final goal.

The author took a similar approach to the work she was to do at the Taekker office. There is a definite vision of what the "statement" should be – what the "sum / sense" of the city should be when experiencing it, which is connected to "Life / Variation / Balance".²⁴ There are a lot of components that must collectively form the statement – landscape, roads, houses, water, economics, and the people who are going to live there. Most of these components have been identified, but they must be merged, and this should be done through the perspective and vision of the author and attuned with Taekker Group. In this process, the author can work with different places and merge the material in various ways, but she constantly has to keep the relation between the smallest component and the overarching statement in mind.

A very important brick in the development of the landscape plan is the question of which strategies to work with in connection with the "public, the open" spaces. One of the fundamental challenges that the author finds herself facing is how to transform fields that have been cultivated as intensive, conventional agriculture for the past fifteen years into diverse city-nature. Taekker Group has a wish to create a "wild" and "edible" flower landscape in the space between the houses. Visualizations of houses in wild flower meadows are standard among building architects. These visualizations show wild meadows with flowering oligotrophic plants, but the actual soil conditions at Nye consist of intensively farmed fields with many nutrients in the loam – in many ways so far from these visualizations as one can imagine. There are big challenges.

Together with Taekker and other collaborators,²⁵ the author ended up developing a seed mixture comprising twenty-eight different plants.

Based on her conceptual method, the author set up and evaluated which trade-offs should be made. She came up with a proposal, qualified it by mirroring it in criticism, knowledge, and ideas from collaborators, and after having discussed the matter with representatives of all the different professions in the project to form an overview, she made the trade-offs and drew the line.

By the end of March 2016, 325 kilograms of seeds, "Taekker's seed mixture (1601)", arrived at the Taekker office. The seeds were to cover an area of 16.5 hectares in Nye – the total area of phase 1. Due to strategic reasons, 0.2 hectares were sowed / reseeded with the mixture in the spring of 2016. The remaining seed mixture was subsequently sown in the autumn of 2017 and spring of 2018. The artistic approach of "landscape sprawl" had now found a new format and been implemented in a new context.

The work at Taekker's office has lead to the following perspectives on the challenges outlined at the PhD defence:

- 1. The artistic conceptual way of thinking and working used in the PhD enables the author to stand in the middle of a large-scale urban planning project, balancing input from other professions
- 2. By connecting input from all the different professions that the Taekker Group collaborates with, a new form of "Landscape Sprawl" becomes possible. A form which can easily be implemented in official urban planning in the private and public sectors alike.
- 3. The author's artistic practice permeates everything, including her work as a landscape architect, but the conceptual approach makes this artistic practice open towards moving between disciplines.

CONCLUSIONS

"Trust in your explorative drive"²⁶ is the author's inherited mantra and the overall conclusion of this article. Combined with "Constantly ask the how and why questions",²⁷ which the author still needs to do more consistently, this approach would allow PhD students, as well as their supervisors, to strengthen their contributions of new knowledge from the field of architecture.

Share and be generous. If you have a vision, insights, or ambitions of uncovering new knowledge – and your vision might simply be to uncover a fragile poetic moment that nobody else saw the potential in – please put it forward and share, and plea for openness towards experimenting with different formats and content in art and architectural research. Research within the field of architecture is relatively new, and practitioners have the opportunity to ensure that there will be diversity and broadness within the field of architectural research in future. A way of tending this space is to share how the variety of methods found among artists and architects – some of which are so personal that they are linked to individuals only – can be a core feature when conducting research. This means sharing how research is conducted and constructed, demystifying and sharing the critical questions asked of it.

It might be that this attitude will leave you with no job in the academic field – but maybe it is worth the risk, and it might not have been an option anyway. Things may get more complicated, but this can make a positive contribution to the questions asked within research. Few within the field of research will find that a red carpet has been rolled out for them when finishing a research project, and often one must find one's own way of working with matters that are of interest.

In this article a new vision of research and methodology has been described, one in which an artistic approach can be combined with research. To prompt "open research", it has described how the author's PhD work was carried out; the methods that were used; how the different materials were combined; how the assessment committee challenged the work; the questions that were to be answered after the PhD; how the questions were answered and taken back into a research context. Further, it has been described how the author had to rethink her research opportunities.

Different examples of how research can be conducted are absolutely central in opening up discussions about research methods, and different examples are needed to get there. It is certainly worth discussing how those of us who work within the field of architectural research can contribute to new images of the future, whether it is about how we shape landscapes or how we conduct research.

POSTSCRIPT

It took me some time to digest the qualities of my thesis, and the opportunity to present my work at the NAF/NAAR symposium was a generous way of letting me reflect upon it. Whether the choice to apply a third-person perspective on my art and research practice for this article was a wise one will take me some time to properly digest as well. I did it because sometimes ideas just have to be chosen in order to see the field of contribution. I hope, however, that the article adds to the important theme pointed out at the symposium, and that we will open up the field of research more – striving for a research environment where we do not simply focus on individual research results, but foster common discussion about the ambitions and contributions of the research field.

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NOTE

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NOTES

¹ Catharina Dyrssen, "Research Methods Based on Art, Design and Intervention", Centre for Strategic Urban Research, Aalborg University and Aarhus School of Architecture, 2013, private recording, available through: Marie Markman.

² Ibid.

³ Marie Markman, *Et spiseligt landskab* (Traffic Island Edible Landscape), Arkipelaget / Pamflet no. 2 (Aarhus: Edition After Hand, 2013).

⁴ Urban Agriculture: Edible Estates and The Mega Cities of Tomorrow (1) and (2), DVDs, Juliane Brandt, Fritz Haeg, Elke Krasny, Marie Markman, Tom Nielsen, and Svenja Nette, Aarhus School of Architecture, 2013.

⁵ In the thesis, "logbooks" are referred to as diaries.

⁶ During the two-day symposium, many of the PhD presentations ended up in discussions about how experimental a PhD thesis could be, as well as about the support level from supervisors.

⁷ At Aarhus School of Architecture, discussions took place similar to the ones at the NAF/ NAAR symposium about how experimental a PhD thesis could be, as well as about the support level from supervisors.

⁸ Marie Markman, *Landscape Sprawl: An Artistic Response to Living in the Anthropocene (4/4)*, PhD thesis, Aarhus School of Architecture and Centre of Strategic Urban Research, 2014.

⁹ Aarhus School of Architecture, "Marie Markman / Landscape Sprawl: An Artistic Response to Living in the Anthropocene," video recording of the PhD defence, 2015.

¹⁰ "Urban sprawl" in the meaning of the expansion of human populations away from central urban areas into low-density, monofunctional, and usually car-dependent communities.

¹¹ "Making landscape" in the meaning of: physically making landscape and, through this, changing the physical reality and influencing behaviour, values, and the way of living. ¹² The Anthropocene is in accordance with the author's understanding, meaning that human activity since the commencement of industrialization has led to changes on a planetary level. The Anthropocene is not a formally defined geological unit within the geological time scale. A proposal to formalize the Anthropocene is being developed by the Anthropocene Working Group for consideration by the International Commission on Stratigraphy. Available online: http://quaternary.stratigraphy.org/workinggroups/anthropocene/ (all URLs accessed in October 2017).

¹³ Aarhus School of Architecture, "Marie Markman / Landscape Sprawl".

14 Ibid.

¹⁵ Ibid.

¹⁶ Thinking in narrow academic contexts rather than opening up and sharing with other professions.

¹⁷ "Traffic Island Edible Landscape 2012," YouTube video, 1:44, posted by Thorsten, 31 May 2012, https://www.youtube.com/watch?v=qQZEqxy3eY0.

¹⁸ 2011 job ad from the Centre for Strategic Urban Research, Aarhus School of Architecture, available at: Aarhus School of Architecture, Denmark.

¹⁹ PhD research in architecture was also conducted at the University of Copenhagen, Aalborg University, and the University of Southern Denmark, but here the discussion about research and artistic development work never gained foothold.

²⁰ Statement made by head of the PhD School at Aarhus School of Architecture, Joergen Dehs, in a Theories of Science course in 2012.

²¹ EU-funded, practice-based PhD at Aarhus School of Architecture called "ADEPT-r".

²² Working group concerned with "artistic development work / research": associate professor Andriette Ahrenkiel, associate professor Nanna Gro Henningsen, associate professor Hans Feldthusen, associate professor Anders Gammelgaard Nielsen, assistant professor Stefan Darlan Boris, Head of Research Claus Peder Pedersen, Head of Library Lone Bønløkke Stephensen, and PhD fellow Marie Markman.

23 Taekker Group APS, 2016, Nye, http://www.nye.dk.

²⁴ Nye: Liv / Balance / Variation, http://www.nye.dk/vaerdierne/.

²⁵ See COWI: http://www.cowi.com. And DLF – Seeds and Science: https://www.dlf.dk. Farmer Torben Soerensen / Tesgaard, field biologist Torsten Krienke.

²⁶ Dyrssen, "Research Methods Based on Art, Design and Intervention". Ibid.

RELATIONAL ARCHITECTURE: EDUCATION, RESEARCH, TRANSFORMATION Henrik Reeh

ABSTRACT

The present study of PhD education and its impact on architectural research singles out three layers of relational architecture.

A first layer of relationality appears in a graphic model in which an intimate link between PhD education and architectural research is outlined. The model reflects a human and institutional development going on since around 1990 when the present PhD institution was first implemented in Denmark. To be sure, the model is centred around the PhD dissertation (element #1). But it involves four more components: the PhD candidate (element #2), his or her supervisor in a scholarly institution (element #3), as well as the certified PhD scholar (element #4) and the architectural profession, notably its labour market (element #5). This first layer outlines the contemporary context which allows architectural research to take place in a dynamic relationship to doctoral education.

A second layer of relational architecture is revealed when one examines the conception of architecture generated in selected PhD dissertations. Focusing on six dissertations with which the author of the present article was involved as a supervisor, the analysis lays bare a series of dynamic and interrelated fields in which *history*, *place*, and *sound* come to emphasize architecture's relational qualities rather than the apparent three-dimensional solidity of constructed space.

A third layer of relational architecture is at stake in the professional experiences after the defence of the authors' dissertations. Once again, the interrelational features in architecture take the upper hand. Despite having completed a research education (lasting three years in the Danish system), accredited PhDs are not typically employed in full-time research positions. In their professional lives, the six recent doctors explore practices such as (1) film-making on urban architecture, (2) research and administration in architectural heritage, (3) consultancy-related research on public space or theatre culture, as well as (4) teaching and research in higher education. As a result, the relational architecture demonstrated in their dissertations is amplified by the authors' later professional practices, which happen to confirm architecture's relationality in both substance and organization.

In sum, the article shows how three layers of relational architecture coexist; thus it signalizes the degree to which research education, space conceptions, and professional practices are all increasingly pervaded by or even promoting relational features.

KEYWORDS

relational architecture, PhD education, academic supervision, Denmark, architectural history, public space in suburbia, sound and embodiment

INTRODUCTION

The landscape of research and reflection on architecture has been transformed during the past three decades. This transformation runs parallel to the promotion of doctoral programs which enable a systematic academic elaboration of architectural issues, spanning the entire built environment and its cultural repercussions.

For those who started their doctoral studies in the Nordic countries about thirty years ago, there were hardly coherent programs in the field, and supervision was a matter of scholarly discussions among relative equals. In those days, in Denmark at least, one was not considered a student anymore; with no transition one became a member of the academic staff on a nearly equal footing with full-time permanent professors. There was one major difference, of course: the monthly paycheck would stop arriving after a couple of years. In the meantime, the expectations regarding the dissertation to be written were both vague and ambitious. This ambitious vagueness may, in part, explain the fact that quite a few scholars never handed in their dissertation for the so-called "Licentiatgrad" *(lic. phil.)*. Nonetheless, they continued their careers as if nothing had happened. A good master's thesis in those days was sometimes as elaborate and dense as a PhD dissertation in present-day terms.¹

All of a sudden, however, the PhD title was considered a useful or even necessary component in an academic career in Denmark. In order to promote this new step on the academic ladder, all sorts of generous travel grants were awarded for studies abroad by the so-called Forskerakademiet (Researchers' Academy, 1986–99). In reality, the Danish government had decided that a third level, beyond the master's level but below the traditional dr. phil. (the equivalent of a *Habilitation* in Germany and a *Thèse d'État or Thèse d'Habilitation à Diriger des Recherches* in France), be established in order to make the national educational system comparable to international standards, in which a master's thesis didn't count as much. In France, for instance, students were often but twenty-two-years-old when they graduated, while Danish *cand. mag.* or *mag. art.* candidates were frequently approaching their thirtieth birthday – not unlike many serious *Magister* graduates in the Germany of those days.

Since its introduction in 1989, the PhD system has proliferated according to what later became the Bologna model for European education (3+2+3 years).² Even fully financed PhD candidates are now called "students", whereas they used to be termed kandidatstipendiater, i.e. scholars carrying a stipend after having become "candidates" (cand. mag. or cand. arch.). Along with the status as a student anew (yet at a higher level), doctoral courses (calculated in ECTS points representing the estimated workload) and systematic supervision have been implemented, so that, today, there is a coherent institutional framework of doctoral education. Essentially, it is - or should be - absolutely realistic to finish in time, after three years. Or the project ought to be downscaled, since there is no funding available for finishing the thesis after the expiry of the stipend period.3 Just fifteen years ago, many academically serious PhD candidates didn't dare to finish their dissertation as scheduled but would carry on until a fully convincing scholarly level had been reached. Today, issues of delivery come first, while excessively time-consuming criteria of quality are considered a superfluous luxury.

PART I. EDUCATION AND MORE: A MODEL

In the present system of research education, which also entails courses (half a year – 30 ECTS) and job training (another half a year – 840 hours as part of a work contract), the doctoral dissertation (Danish: *ph.d.-afhandlingen*) overshadows all other elements. The dissertation, occupying two of a total of three years' study time, remains central, firstly, when applicants are selected, secondly, when the title is being conferred (after a successful defence of the dissertation), and thirdly, afterwards, when doctors, younger or more experienced ones, are discussing their occupations during the three years spent as a PhD candidate, a period which is remarkably privileged and demanding at the same time.

Since the late 1980s, doctoral education has become a complex institution in its own right, and it increasingly imposes itself as a *system* which involves a number of well-defined factors. While all factors are meant to facilitate the academic result, i.e. the dissertation, they themselves are affected by the recent cohesion of a doctoral education environment in which the academic institutions (supervisor, doctoral schools, etc.) come to play new roles.

In short, if we are to understand the development of research within and thanks to PhD programs (*forskeruddannelse* – "education of researchers" as the field was originally termed), it is necessary to address the system in *relational terms*. Hence, *a synoptic view of the total system* is required in order to single out those relationships within research education which promote a new language reflecting a commonly shared framework for a self-reflexive and conceptual approach in architecture. Thanks to this self-reflection, architecture is taken beyond levels of technical mastery and, instead, becomes an object of meta-scholarly thinking, too.

I shall limit the number of elements in the synoptic model of contemporary PhD education to five only.



Figure 1. The relational architecture of the doctoral research environment.

The above model provides a first example of a *relational architecture*; this is a map of the factors which should be taken into consideration in order to understand the precise conditions of research evolving within the framework of PhD education. A few comments about each of the elements will reveal this model as a map representing a dynamic process.

1. Now, as before, the symbolic centre remains the DISSERTATION. The dissertation – the doctoral thesis – is the test and the challenge, the medium and the result, testifying to the successful completion of doctoral studies. At least in a university tradition, the written thesis is pivotal, while architectural projects and other media are not frequently accepted.⁴ In the humanities, the monograph remains the dominant genre, while a collection of articles and independent chapters is also possible, provided that a so-called "cape", a reasoned introduction, establishes and justifies a certain degree of cohesion between the individual elements.⁵

2. One cannot conceive of the dissertation without addressing the PhD CAN-DIDATE, i.e. the doctoral student who, during a three-year period, is expected to move – academically and mentally – from a master's level to a PhD level – a transformation during which he or she is writing a scholarly text of no more than 100,000 words (by Copenhagen humanities standards).

3. The author and the text don't exist in a vacuum. A certain institutional framing has always been effective, also before the age of PhD programs or doctoral schools, but the role of SUPERVISORS has been significantly strengthened, quantified even, since a number of hours per semester - from thirty to fifty, depending on the faculty and the university - is now allocated to the individual professor's work account. Being the supervisor of a PhD candidate is generally considered a professional privilege rather than a time-consuming obligation.⁶ Without having written one single line of the individual dissertations, the supervisors may hope to recognize elements of their personal research agendas in the work of PhD candidates who, in a certain way, help to transform some of the sketchy ideas, rumbling in the minds of supervisors, into pieces of completed research - research that the supervisor, being limited in time and intellect, would never have been capable of finishing. Or is this interpretation an effect of narcissism, an illusion? To be sure, the PhD candidate is recognized as the sole author of the dissertation which often represents the biggest and most intensive research project ever to be completed by him or her during an entire lifetime.

4. In order to introduce a *temporal dimension* into the model, the dissertation, the candidate, and the supervisor are supplemented by more factors. The PhD candidate doesn't remain a candidate forever; after a successful defence of the dissertation (ritualized as a smaller version of the public habilitation defence, *dr. phil.*),⁷ he or she is allowed to employ the title "PhD". Being labelled "PhD" is a significant professional distinction compared to the previous status as an MA or *cand. mag. / cand. arch.* It is as if the researcher were professionally reborn at a higher level – reincarnated with a substantially increased degree of intellectual legitimacy. Given the growing number of *Philosophiae Doctors*, a whole NEW PROFESSIONAL CLASS is coming about. Little by little, the members of this "caste" are forming a collective – a group whose members have been trained to employ a discursive idiom which expresses not only a higher degree of specialization, but also more general epistemological reflection.

5. Finally, one shouldn't underestimate the role of THE PROFESSION AND THE LABOUR MARKET. Progressively, the architectural discourse and the organization of knowledge, as well as the division and hierarchy of labour, are all affected by the existence of colleagues titled "PhD".

Within private companies or public institutions, it might still look superfluous to have been trained as a PhD. Certain colleagues associate this title with overly intellectual habits that run counter to the pragmatic organization of many everyday work processes. In the long run, however, the stereotypes of "useless" and excessively academic PhD's will probably fade away.

Considered both independently and as ingredients of a totality, the growth of the five factors informs *a new way of talking and thinking about scholarly and professional matters*. In the future, such ways of speaking and acting will be accepted; they might even be demanded by the authorities, notably employers in a labour market with ambitions of innovation.⁸

The above presentation of the five elements in the PhD education portrays a research framework in both structural and processual terms. In the following, I shall explore two selected *subensembles* with empirical reference to a distinct group of former PhD candidates with whom I happened to be involved. In Part II, I shall outline the production of knowledge that results from a triangular relationship between the PhD candidate, the dissertation, and the supervisor.

In a subsequent Part III, I shall single out another triangular relationship, engaging the researcher who has obtained the PhD title, the dissertation, and, finally, has entered the labour market and the profession. How are certified researchers and their qualifications employed in the contemporary world? And to which extent do new patterns of employment promote a relational conception of architecture?

PART II. RESEARCH: A SCHOLARLY LANDSCAPE

In this second part, the *supervisor* provides the viewpoint from which research results will be commented on.

Limiting the enquiry to a subensemble of three factors, we can single out various relational qualities within architecture – qualities that appear when a number of PhD dissertations are considered as part of a larger scholarly effort.



Figure 2. Subensemble I (red) within the relational architecture of doctoral research.

In fact, I shall address the intellectual landscape that appears in the dissertations by six PhD candidates, whose research education I have been supervising (sometimes in collaboration). In this way, a second example of "relational architecture" (this time in a more immediate sense of the term "architecture" than in the first part) will stand out; six dissertations suggest a conception of architecture in which relational features invade a field that, traditionally, was understood in much more static, physical, and three-dimensional terms.

The six different PhD dissertations situate themselves along three *axes*. One may thus distinguish three *couples* of dissertations.⁹ In fact, the dissertations form three dialectical images which document how a few PhD candidates may, after all, contribute to an essential understanding of the architectural realm.

Axis I: History - Architecture - Politics

A first axis stages an intimate relationship between architecture and history. Positioning themselves in relation to past and present, modern architects often refer to architecture-historical features in their local or national environment. Moreover, architectural projects may engage in an interpretation of historical trends and thus articulate particular layers in actual society.

Axis I, point A:

Enkelhed, mådehold og funktionalitet – en analyse af fremtrædende danske arkitekters udlægning af dansk arkitektur (Simplicity, Modesty and Functionality: An Analysis of Danish Architecture according to Major Danish Architects [= Rectors and Historiographers]). Author: Jannie Rosenberg Bendsen.¹⁰

This dissertation addresses the often implicit normative positions in Danish architectural education. Reinforced by the fact that architecture is taught at schools of architecture and not, as in many international environments, within a university, the issues of professional self-consciousness and historical legitimacy are rarely discussed. Yet the aesthetic, ethical, and spatial positions governing the shared language and traditions of Danish architecture have obtained prominent spokesmen in two long-term rectors of the Copenhagen and the Aarhus schools of architecture, namely Tobias Faber and Nils-Ole Lund. Both of them are well versed in architectural history and have written substantial presentations of Danish and Nordic architecture, respectively. May these historical accounts be considered as representations of decisive architectural values in the era of the Danish Modern and Postmodern? This

is the idea underlying a dissertation which aims at detecting basic yet tacit principles that continue to animate the pedagogical structures (workshop training rather than reading) in Copenhagen, and in Aarhus, where social commitment and intellectual ambitions also profited from the presence of critical thinkers, originally trained in Literature and History of Ideas at the University of Aarhus in the late 1960s and early 1970s. Despite such differences, a national tradition - that may in part be shared with other Nordic countries - seems to survive and to inform contemporary Danish architecture studios, some of which successfully export their designs on the international market. According to the Copenhagen rector Tobias Faber, modesty, craftsmanship, and honest use of materials are fundamental, whereas the Aarhus view of Nils-Ole Lund also points to social, historical, and political values of the welfare state as key to Nordic architecture. A major reinterpretation of history and ideals has been underway in recent decades, during which architecture has become the object of cultural policies and projects destined for a global market. Nonetheless, tradition still tacitly pervades the normative aesthetic and pedagogical institution of architecture.

Axis I, point B:

Berlins Alexanderplatz mellem opbrud og erindring (book version), originally Tilbage til fremtiden, men hvilken? (dissertation). Subtitle in both cases: Den byarkitektoniske idékonkurrence for Berlins Alexanderplatz i 1993 (Berlin's Alexanderplatz between Rupture and Memory), originally: Back to the Future, but which one? Subtitle in both cases: The Urban-Architectonic Design Competition for Berlin's Alexanderplatz, 1993. Author: Hans Christian Post.¹¹

Architecture also actively participates in history, and this participation is a possible object of research, too. The second dissertation – on history, architecture, and politics – explores an international source material, defined by the prizewinning projects for an urban design competition in Berlin, 1993. Here, Alexanderplatz, a most emblematic Berlin square in former East Germany but also in interwar Germany, is at stake. The dissertation particularly discusses two prizewinners and points out the quasi-impossibility of a dialogue between them.

Indeed, Hans Kollhoff, laureate of the first prize, cultivates the "golden age" of Berlin in the 1920s: *die goldenen Zwanziger*. Still, the urban-architectural idiom of Kolhoff's thirteen skyscrapers for the future Alexanderplatz area is largely influenced by the aesthetics of the New York City's Rockefeller Center architecture from the mid-1930s.

On the other hand, Daniel Libeskind's second-prize project for the Berlin square might refer to the aesthetics of Russian Constructivism that he submits to a deconstructivist rereading of the 1990s. Basically, however, Libeskind's polysemic and multilayered project points to the cultural and political history of Berlin (East and West) and of both Germanys, as a realm to be taken seriously. In a situation after the fall of the Berlin Wall, two sociocultural traditions – those of East and West – were, ideally, to meet and engage in dialogue within one city, Berlin, which was about to become the capital of a reunified nation. Could such a dialogue be articulated by means of urban architectures and spaces?

None of the prizewinning proposals have been fully applied. First of all, Kollhoff's skyscrapers have remained unbuilt. Should some of them become physical reality one day, the context of the Alexanderplatz area will affect their



Figure 3. Axis I of scholarly landscape as suggested by six PhD dissertations.

architectural and urban meaning. Influenced by the popular culture which, for ages, has been associated with Alexanderplatz, this site just outside of the former city border is no *tabula rasa*. As suggested by Libeskind's attention to the many layers of collective habits and memory, counteracting forces unfold in this area – socially, economically, politically, or even physically. After all, the composite urban context of Alexanderplatz is a powerfully modifying factor and may become a long-term winner of the urban-architectural battle that continues in twenty-first-century Berlin.

Altogether, the dissertations positioned on the first axis, "History – Architecture – Politics", both address relations between architectural culture and history. In either case, aesthetic and ethical issues are touched upon, while national and urban levels act differently. However distant the architectural values in the education of Danish architects and the urban-architectural typologies in post-Wall Berlin may appear – the two realms of professional consciousness and historicopolitical battles *converge* in documenting contemporary uses of architecture and their debt to history.

Axis II: Public Space - Suburbia & Harbours - Postindustrial Realities

Public space is frequently associated with a city rejecting the values of suburbia and domesticity. However, one should not underestimate those public spaces which arise in postindustrial or postmodern contexts. Such spaces occur not only in the city centres, at present dominated by retail, consumption, and cultural institutions, but also in areas which have long been considered alien or even hostile to the European urban tradition. After all, public space is also possible in suburbia, just as it is a main ingredient in the conversion of former industrial areas along harbour fronts.

Axis II, point A:

Det urbane suburbane – forstadsbyrum i Vangede og Silicon Valley (Urban Suburbia: Suburban Urban Spaces in Vangede and Silicon Valley). Author: Birgitte Bundesen Svarre.¹²

Many urban discourses stage public space and suburbia as enemies. Since traditional and modern city centres are considered places of *Öffentlichkeit*, of publicness, excentred suburbia is depicted as an array of lifeless spaces where residents are primarily cultivating *private* life, at the expense of shared places and activities. Life goes on behind the hedge, while movements outside are dominated by cars and consumption.

But is this a true picture of reality? One sometimes gets the impression that such discourses rely on a radical repression (*Verdrängung*) in the minds of the speakers, many of whom originally grew up in suburbs before migrating to cities for educational and other purposes. Now, however, they tend to underestimate those *urban* aspects of life which were present in their suburban childhoods. In reality, many suburbs are built upon the structures of premodern villages which orient constructive and infrastructural patterns and allow for human encounters in everyday life. Places in suburbia such as libraries, schools, recreative areas, sports facilities, but also shops and supermarkets, are sedimented in the experience of humans; they inform the history of children growing up in suburban towns and quarters to an extent that may, sooner or later, find literary and other symbolizations in genuine works of art.

Occasionally, public space in suburbia receives fame and collective recognition thanks to literature. This is what happens in Danish author Dan Turèll's *Vangede Billeder* (Vangede Images) from 1976, in which Vangede, an underprivileged sector within the wealthy suburban municipality of Gentofte, north of Copenhagen, is depicted as an adventure zone for the children growing up and the people living there. All sorts of secret places and colourful local personalities are given shape in a poetic prose, the dynamic rhythm of which echoes the fact that this book was first written as a kind of beat poem with lines of varying lengths. In the prose version finally published, the literary ambition contributes to dramatizing various spaces which become elements of a local mythology. In literature, Vangede stands out – in remarkable contrast to the more boring physical and social reality usually associated with the petty bourgeois building typology and lifestyles of Vangede.

Vangede is "Gentofte's Harlem", as Turèll's puts it. Local patriotism and underground literature unite in this book. Here, the "infra-ordinary" (a term coined by French writer Georges Perec)¹³ is turned into literature as a recognition of a particular suburban location in which, thanks to the minds of children and youngsters, public places are generated everywhere as a result of everyday human inventiveness and poetic improvisation by misfits and ordinary people alike. The quasi-baroque aspects of Vangede have been perpetuated by Turèll's literature, despite the fact that, later on, valuable architectural monuments and well-designed shopping centres were added, physically eradicating the adventure playgrounds of the writer and his generation. Yet the myths and connotations persist, conveying a heroic cultural relief to a previously unknown suburb. Similar features and urban places of encounter appear in suburban zones worldwide, such as in California's Silicon Valley where dominant IT companies were founded and are building their own mega-villages.¹⁴ To visitors or collaborators, such headquarters may appear as urban monuments, although they are indeed private and mostly inaccessible. There as well, a local mythology with a global readership unfolds when Douglas Coupland maps the territories of the IT economy in his 1995 novel *Microserfs*. In built reality, the library, the cultural centre, the private garage, and other places stand forth as potential elements of public space in a suburban reality that cannot be reduced to anti- or simply an-urbanity. Paradoxically perhaps, urban elements are generated under new suburban conditions. Suburbia is more than a void.

Axis II, point B:

Translating Harbourscapes: Site-specific Design Approaches in Contemporary European Harbour Transformation. Author: Lisa Diedrich.¹⁵

For more than a century, urban coastal or riverbank areas were conquered by industry and made inaccessible to the public. Turning their back on the city, they generated a borderland between the city itself and the waterfront that once defined not only the location and the attractiveness of a city on the map, but also huge portions of the everyday movements and activities among citizens. The subsequent decline of industrial production in the Western world brought an end to this anti-public occupation of city space and made new civic uses of the harbourfront possible, be it for residential, corporate, cultural, leisure, or landscape purposes. This is why recent decades have promoted a kind of urban regeneration which, however, tends to look very much the same in profoundly different locations. Generic building patterns in apartments or offices are applied, stressing a repetitive trend which doesn't reflect the morphological and sociocultural heterogeneity of the individual cityscapes, but exacerbates the similarities already promoted by industrialist architecture and landscapes.

While standard solutions get the upper hand, site-specific strategies should remain possible. But how is site-specificity to be articulated in the individual locations? How is site-specificity translated into particular planning solutions and processes?

Many conceptions of site and site-specificity circulate. Some authors refer to the immediately visible particularities of a place and its topography, while others claim that structural features, visible or not (sometimes underground), are capable of defining a particular setting as part of a functional totality. In this way, the falsely evident term of site-specificity is subject to variation and cannot be claimed as an unambiguous normative value. A dialectic between generic and specific traits occurs, in which topography (immediately visible landscape features) as well as social, cultural, and functional variables are at play.

Many planning processes favour a *tabula rasa* strategy and eliminate visible as well as tactile, auditory, and olfactory traces of the original harbour topography in the new and refurbished environment. There are indeed examples of long-term transformation processes in which the emphasis on *topographic heterogeneity and multilayered spatialities* informs a new cityscape. One such example is provided by the Île de Nantes (Nantes Island) in the Loire River, France, where Alexandre Chemetoff, landscape architect, was in charge of



Figure 4. Axis I and II of scholarly landscape as suggested by six PhD dissertations.

the transformation process for a decade. In Nantes, a new representational tool, Chemetoff's so-called *plan-guide*, has helped to maintain remarkable differences – temporal, structural, architectural, functional – within an urban zone which otherwise would have been treated in more generically and homogenizing ways. Allowing time to last, and inviting things to develop, this project tries to take advantage of the many leftovers from the previous industrial and maritime functions on the spot.

In sum, elements of site-specificity may be developed, if one privileges a place-sensitive representation of space as well as a composite process of transformation. Time, quality, and heterogeneity are key in this context. Linking traditional suburbia and harbour zones with city centres, the dissertations composing the *second axis* foster dialogue between urban space and postindustrial realities; here, attention and inventiveness counter those homogeneous trends which, quite often, seem inevitable. But they are not.

Axis III: Sound - Territoriality - Embodiment

Two dissertations in which hearing and auditory perception of space are introduced as components in contemporary territoriality add a third axis to the ongoing rethinking of architecture. The familiarity of sound, music, and architectural space is no recent discovery. Since antiquity, music and architecture have been closely related in built space and also in discourses on architecture. Just read your *Vitruvius*.¹⁶ Or go to "Hearing Architecture", the final chapter in Steen Eiler Rasmussen's *Experiencing Architecture* (orig. 1957).¹⁷ On the other hand, contemporary metropolitan life takes this acoustic dimension in space and life to a whole new level.

Axis III, point A:

Akustisk territorialitet: Rumlige perspektiver i analysen af urbane lydmiljøer: R. Murray Schafer, J.-F. Augoyard, G. Deleuze & F. Guattari (Acoustic Territoriality: Spatial Perspectives in the Analysis of Urban Sound Environments: R. Murray Schafer, J.-F. Augoyard, G. Deleuze & F. Guattari). Author: Jacob Kreutzfeldt.¹⁸

Since the emergence of the concept "soundscape", a neologism due to R. Murray Schafer in the mid-1970s, sound has increasingly been recognized as a component in the human exchange with spatial environments. Sound cannot be photographed, but it may be recorded and transformed into a material archive which documents it as a possible object of study and speculation.

Murray Schafer's normative naturalism implies an anti-urban stance and prevents a nuanced mapping of metropolitan soundscapes. However, other authors have taken urban sound seriously in an attempt at conceptualizing the auditory dimension in modern life. While composers of the post-World War II period introduced so-called *musique concrète* and conceived of sound objects, French philosopher and musicologist Jean-François Augoyard and his research team focused on the so-called *effets sonores*,¹⁹ or "sound effects", by means of which the differentiated presence of sound in contemporary space may be described. After all, sonic presence pervades space and affects human beings who try to appropriate their spatial surroundings.

As we know from shopping environments, music technologies are used to stage quotidian spaces and promote certain activities (often commercial). On the other hand, human beings actively accompany their daily practices with little pieces of music or singing. Contemporary French philosophers Gilles Deleuze and Félix Guattari conceptualized this type of sound practice with a reference to the so-called *ritournelle*, a refrain or a repetitive musical figure thanks to which an interpretive *territorialization* of space becomes possible. In addition, de-territorialization and re-territorialization also take place when human beings move through space and make it their territory by way of tone and rhythm.

Mapping such acoustic territorial efforts in metropolitan environments provides insight into the cocktail of sounds pervading present-day urbanity. Intentional or not, sound affects architecture and its perception by humans.

Axis III, point B:

Når musikken virker – en undersøgelse af lydens mobilisering og mediering i det urbane rum (Music in Action: An Enquiry into the Mobilization and Mediation of Sound in Urban Space). Author: Nina Gram.²⁰

Increasingly, human movements in public space, not least in cities or on the way to and fro, are accompanied by sound prostheses which add an extra layer to the visual and tactile perception of contemporary landscapes. Historically, the post-World War II car radio, later augmented with a cassette or a CD player, is but a first technology which allows for a dynamic combination of seeing and listening while moving through space. The car radio was followed by the mobile transistor radio (powered by batteries), sometimes becoming a "ghetto blaster", and, later, by individual listening devices such

as the Sony Walkman (playing compact cassettes), the iPod (storing music as digital files), and, since 2007, the smartphone. In the mid-2000s, the metaphor of "iPodification" in urban space referred to a specific sound technology (MP3 players, notably Apple's iPods). Since then, the practices of mute listening (and occasional talking) through headsets have become a general phenomenon in public transportation, on sidewalks, or on bicycle lanes. The multimedia smartphone – a personal computer combined with sound and image technologies – accompanies people everywhere, and loudspeakers with built-in microphones (for telephone conversations) are positioned over, on, or in people's ears.

The smartphone and its more or less visible sound accessories even affect the urban experience of non-listeners who are visually confronted with co-citizens wearing ear- or headphones. One cannot help wondering whether these persons are actually listening – through their earphones – to some kind of music or other soundtrack which may heighten or lower the appearances of the immediate location. They might also be deeply involved in a conversation with somebody else who is not physically present. Or are they still hearing their surroundings from behind their technical protection (ear- or headphones)? One imagines an entire array of possibilities which determine one's own imaginary position in the reciprocity taking place. A general question remains: How do head- or earphones tune and affect a citizen's perception of the world: of him- or herself, of other people, of *me*, of *us*? In principle, all of us are present in space, but the modes of presence are subject to variation.

Quite a few researchers interpret the extra soundtrack or mobile telephone conversations as a contribution to narcissism and placelessness. The listener is supposedly not taking his or her surroundings, be they physical, social, or human, into consideration. Yet this neutralization of the environment is but one interpretation of the subjectivity at play in the other person facing us. In reality, he or she might also be perceiving the urban or suburban environment in an intensified way. A soundtrack or conversation will sometimes blend with it and thus generate new constellations of visual appearances and mental interpretations. Thanks to the sound montage evolving in the headset, a new and productive kind of interpretation and self-reflection may unfold – just as listening to music or radio programmes from a car radio sometimes intensifies the experience of both music and landscape in the mobile human being on the road. Subjective experiences take place in the mind of a person who invites a soundtrack to become part of his or her trajectory, as well as of a bodily practice.

Things and humans, speed and technology, combine and make space sound differently, thus emphasizing the fleeting and temporal quality of life in contemporary cities.

Inspired by the six PhD space-related dissertations I once supervised, the above comments on their constellation in *three dialectical images* suggest how a limited body of doctoral research may articulate overlooked dimensions in architecture.²¹ Embedded in history and humans, city and suburb, harbours and hearing, architectural space transgresses its apparent three-dimensional objectivity. Instead, architecture becomes a *relational field* of potentials to which architects and citizens, beholders and researchers, all have contributions to make.

PART III. TRANSFORMATION: POSITIONS AND RELATIONS

In the third and final part of the present article, I shall briefly outline the professional situation faced by the authors of the dissertations commented on



Figure 5. Axis I, II, and III of scholarly landscape as suggested by six PhD dissertations.
above. Once again, *relational features* appear. Among the basic five elements in the model of knowledge production related to PhD education, we are now focusing on the triangle encompassing the certified PhD scholar, his or her dissertation, and the profession, including its labour market.

To be sure, the dissertation authors operated successfully in the academic system and, moreover, contributed to the intellectual realm of architecture. Nonetheless, one might wonder whether innovative academic approaches to an object with strong traditions are welcomed by the professional field. In short, is the labour market ready to integrate the authors of such dissertations, and if yes, in which ways?

The postdoctoral situation is a strange mixture of individual fatality and general tendencies. The period immediately after having been awarded the PhD title is both exciting and demanding, promising and tough. Although the former PhD candidates belong to a relative elite, no safe job situation is awaiting them. In particular, no professional itinerary is guaranteed within research – the realm for which they were educated. Even though one transforms one's dissertation into a scholarly book and publishes it with a recognized academic publisher, as did Hans Christian Post with his research on



Figure 6. Subensemble II (red) within the relational architecture of doctoral research.

Berlin's Alexanderplatz,²² many variables and coincidences decide whether a university track or other professional itineraries will become effective. This may be experienced as a problem, but also as an opportunity insofar as new tasks and practices prove desirable, too.²³

Basically, a large professional field has proven relevant to the authors of the six dissertations referred to in Part II. Each life story is certainly an individual one, but general positions and patterns in the current academic labour market appear when summarized by four keywords: "Representation", "Patrimonialization", "Consultancy", and "University". Indeed, these positions are interdependent and reversible; in the long run, shifts and reorientations are possible and sometimes necessary.

1. Representation and Communication of Architecture and Urban Culture As philosopher Walter Benjamin observed in his seminal essay, *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit* (The Work of Art in the Era of Its Technical Reproducibility, 1936),²⁴ the reception of architecture is twofold. Divided between optics and tactics, architectural reception is united in everyday life, where vision and bodily practices supplement each other.²⁵



Figure 7. Elements in the professional landscape encountered by former PhD candidates.

On the other hand, the sense of sight is dominating contemporary culture. Just observe how photography and film are continuously mobilized, not least in spectacular representations of architects and projects. Despite the intimate link between architecture and visibility, questioning architectural and urban matters remains possible. In cinematographic representation of space and time, critical opportunities may occur.

More than a by-product of scholarly research, the project for a documentary film gives a doctoral student access to key players in the field who otherwise would have less time for interviews. Later on, the representation of such research by way of cinema may take on a life of its own, thanks to various festivals of architecture, cities, or cinema. "Festivalization" is a phenomenon in which issues of architecture have a role to play, sometimes even a challenging one.²⁶

The realm of sound is equally evolving. Instead of being subsumed by the moving images (video included), sound may seize a distinct and privileged role, either as montages or by way of narratives inviting us to reflect. Thanks to the miniaturization of recording and listening technologies, a new sphere of auditory experiments is there to be explored – to the benefit of critical space, urban culture, and self-discovery.²⁷

2. Patrimonialization: Cultural Heritage, Conservation, and Collective Memory

"Patrimonialization" is seemingly here to stay. At national and international levels, the preservation of built environments has become part of cultural policies and an object of public administration. More than an instrumental and technical practice, however, preservation is also a field of knowledge. Knowledge production is necessary in order to single out those areas which will be taken care of in policies of exhibition and maintenance. With the expanded role of "cultural heritage", the development of criteria and typologies, of histories and techniques, is on the agenda. This is why a scholarly informed approach to this domain is necessary as a response to the growing public or even political interest in the built environment – possible sources in community building, local economy, and city branding. Along with administrative and pragmatic agendas, a collective work of memory might thus become possible.²⁸

3. Consultancy: Urban Space and Cultural Policies

Fuelled by neoliberal discourses on the creative city, the cause of public spaces has become a privileged object of attention and investment in urban development. While "Life between Buildings" (a realm pointed out by Jan Gehl in the title of his book classic from 1971 on architectural space and human life) originally had a limited impact in a world of unbound automobilization, the decay of industry and, conversely, the growth of other economic sectors recently turned critical positions vis-à-vis functionalist rationalization into widely shared guidelines for urban design. This conversion also promotes research and experimentation in the field of urban space, which proves to be more than an issue of pleasant design. The cultural and social dimensions of urban spaces are essential in architecture and must eventually be addressed by the consultancy studios which are popping up as supplements to traditional offices of architecture and urban planning. A situation in which genuine research has a word to say may be underway as a field for scholars of urban architectures and cultures.²⁹

4. University: Teaching and Research

A certain imbalance is striking between the increasing number of PhD candidates and the reduced budgets for institutions of research and higher education which are not directly linked to sectors of economic growth. Even the academic elite – students funded for education beyond the MA or MSc levels – is facing a future that can take them to many other institutions than those of teaching and research in university and schools of architecture. Yet positions in higher education exist, and universities and schools of architecture occasionally renew their teaching and research profiles. As a consequence, some PhD candidates will make their way into the university context, insofar as universities now exclusively recruit their permanent faculty members among applicants who have completed a PhD curriculum.

CONCLUSION: RELATIONAL ARCHITECTURE

- INSTITUTIONAL, SUBJECTIVE, AND MATERIAL DIMENSIONS

Since times immemorial, architecture has been profoundly relational. Built space hardly exists in its own right but depends on reception by human beings, who not only see but also hear, touch, and smell as part of their lifeworld. Individually and collectively, people perceive, use, and appropriate the space surrounding them thanks to a multiplicity of practices spanning the quotidian and the ritual, the habitual and the exceptional. More than a delimited object, architecture constitutes an environment – a *milieu* – in which

human beings relate to each other and to space – material, imaginary, and sociocultural. Taking architecture as an object in research education may after all contribute to transforming the *relationality of space* from a tacit and overlooked condition into an explicit and essential cause.

NOTES

¹ A present-day PhD curriculum also includes half a year of course attendance and half a year of pedagogical experience, both of which are compulsory ingredients in the Danish education of a researcher at doctoral level.

² Still, professors barely teach continuous courses to doctoral students only. Unlike in France or Germany, there is no weekly or fortnightly teaching at this level – although such an institution would significantly raise the academic ambitions of the professors involved.

³ A few words about my individual experience related to teaching at a PhD level. Apart from organizing a series of doctoral courses and seminars, I have been a supervisor and co-supervisor of some ten PhD students since 1998, and I have also been a member of the PhD committee of the Faculty of Humanities, University of Copenhagen, since January 2008. From spring 2013, I have been co-chairman of the committee, conducting job interviews, et cetera, which gives me insight into the broad spectrum of doctoral education in the humanities. On top of being a visiting professor (2005) in Jan Gehl's Center for Public Space Research at Copenhagen's Royal Academy of Fine Arts – School of Architecture, I have been supervising a doctoral student (and a half) at that school (2002–11). In this way, I have looked into non-humanities traditions and I have also co-supervised theses in landscape architecture at the former University of Agricultural Sciences in Copenhagen (2012–13) and in musicology at the University of Aarhus (2009–13). In addition, I have supervised a so-called Industrial PhD student, who – employed at the Danish Architecture Center – was academically enrolled in the Faculty of Humanities, University of Copenhagen, during the years 2005–09. Finally, I have supervised four PhD candidates at the Faculty of Humanities in Copenhagen.

⁴ Practice-based projects are germinating, here and there, among visual artists, who are enrolled at universities, since the Academy of Fine Arts in Copenhagen, for instance, is not entitled to award the title of PhD. Such PhD candidates are allowed to adopt other formats than that of the traditional academic dissertation.

⁵ "Regelhåndbog for ph.d.-uddannelsen på Det Humanistiske Fakultet", http://phd.hum.ku.dk/ blivph.d./nyphd/opbygning/regler/HUM_regelh_ndbog_2015.pdf (all URLs accessed in February 2018).

⁶ Although it is still rare that PhD candidates and supervisors co-sign articles, let alone that the PhD student carries out research projects defined and detailed by the supervisor, certain externally funded research projects do indeed depend on the doctoral dissertations in order to reach their defined goals; and the funding of individual PhD candidates (scholarships, travel expenses, etc.) is increasingly generated by research budgets provided by external sources.

⁷ A Danish *dr. phil.* is in reality a *Dr. Habil.* according to the Germanic tradition, in which the denomination *Dr. Phil.* is but the equivalent of a *PhD* in the Anglo-American world.

⁸ In reality, the qualifications of contemporary doctors in architecture or other disciplines are not that different from those of some previous master's students who, generally, were graduating at a significantly older age after having ruminated their master's thesis project for a long time. In certain cases, limited changes would have sufficed for a former master's theses to look like a contemporary PhD dissertation. Only in those days, until the late 1980s, the PhD title was not a realistic or necessary endeavour for students in their late twenties or early thirties. Being awarded a PhD degree wasn't institutionally favoured in the way it has become, thanks, not least, to a heavy injection of financial means which generates a new and distinct population of academics who develop their own codes and reflexivity, but also, sometimes, their own privileges and system of self-esteem.

⁹ See Henrik Reeh et al. (eds.), *Rumlig kultur / Spatial Culture: Studier i Urbanitet & Æstetik / Studies in Urbanity and Aesthetics* (Copenhagen: Museum Tusculanum, University of Copenhagen, 2012) for a constellation of some twenty master's theses, written under my supervision. These master's theses also situated themselves in subensembles, constituting five essential fields within a humanities approach to urban studies.

¹⁰ Jannie Rosenberg Bendsen, *Enkelhed, mådehold og funktionalitet – en analyse af fremtrædende danske arkitekters udlægning af dansk arkitektur (Copenhagen: University of Copenhagen, 2009). The public defence took place on 7 December 2009. Article in English derived from this dissertation: Jannie Rosenberg Bendsen, "A Tale of Danish Architecture: Nils-Ole Lund's Interpretation of Danish Architecture", in <i>Forming Welfare*, ed. Jannie Rosenberg Bendsen et al. (Copenhagen: Architectural Press / Arkitektens Forlag, 2017), pp. 322–39.

¹¹ Hans Christian Post, *Berlins Alexanderplatz mellem opbrud og erindring* (book version), originally *Tilbage til fremtiden, men hvilken?* (Copenhagen: University of Copenhagen, 2011). The dissertation was publically defended on 25 November 2011.

¹² Birgitte Bundesen Svarre, Det urbane suburbane – forstadsbyrum i Vangede og Silicon Valley (Copenhagen: Kunstakademiets Arkitektskole, 2011). The public defence took place on 24 May 2011. English translation of title: "Urban Suburbia: Suburban Urban Spaces in Vangede and Silicon Valley."

¹³ Georges Perec, *L'infra-ordinaire* (1989; repr., Paris: Editions du Seuil, 1994), essay from 1973.

¹⁴ Aureliano Tonet on Apple's new headquarters, designed by Norman Foster: "Apple pose sa soucoupe à Cupertino", *Le Monde*, 21–24 August 2017. Article 1 of 6 in a series on "Temples high-tech".

¹⁵ Lisa Diedrich, *Translating Harbourscapes: Site-specific Design Approaches in Contemporary European Harbour Transformation* (Copenhagen: University of Copenhagen, 2013). The dissertation was publically defended on 9 December 2013.

¹⁶ Vitruvius, *The Ten Books of Architecture*, trans. Morris Hicky Morgan (New York: Dover, 1960), pp. 8 and 153. This translation was originally published in 1914.

¹⁷ Steen Eiler Rasmussen, *Experiencing Architecture* (1959; repr., Cambridge, MA, and London: MIT Press, 1964), pp. 224–37.

¹⁸ Jacob Kreutzfeldt, *Akustisk territorialitet: Rumlige perspektiver i analysen af urbane lydmiljøer: R. Murray Schafer, J.-F. Augoyard, G. Deleuze & F. Guattari* (Copenhagen: University of Copenhagen, 2009). The dissertation was defended in public on 8 December 2009.

¹⁹ Jean-François Augoyard and Henry Torgue, *A l'écoute de l'environnement: Répertoire des effets sonores* (Marseille: Ed. Parenthèses, 1995).

²⁰ Nina Gram, Når musikken virker – en undersøgelse af lydens mobilisering og mediering i det urbane rum (Aarhus: University of Aarhus, 2013). The public defence of this dissertation took place on 15 April 2013.

²¹ On four distinct meanings of "overlooking", see Henrik Reeh, "Four Ways of Overlooking Copenhagen in Steen Eiler Rasmussen", in *The Urban Lifeworld: Formation, Perception, Representation*, ed. Peter Madsen and Richard Plunz (London and New York: Routledge, 2002), pp. 252–76.

²² Hans Christian Post, *Berlin's Alexanderplatz mellem opbrud og erindring* (Odense: University Press of Southern Denmark, 2014).

²³ This observation of professional openness also applies to master's students in urban-cultural and architectural studies. While certain curriculum managers prescribe a specialization for the sake of promoting expertise, I myself recommend a more flexible model. Just as there are limits to the degree of expertise you obtain in a two-year master's program, professional reality requires flexibility. In principle, masters of humanistic urban studies (the realm of my position at the University of Copenhagen) should be prepared for three kinds of professional employment, all of which start by an "F" in the Scandinavian languages: *Forskning* (research), *Formidling* (communication, dissemination, public outreach), and *Forvaltning* (administration). Many a former master's student has coped with changeable situations, which took them from, say, teaching to administration and further on to research – and sometimes back again. While unemployment is a more or less unknown phenomenon among the twenty contributors to the book *Rumlig kultur – Spatial Culture*, their versatile experiences confirm the relevance of a "3F" strategy for an academic curriculum in urban and architectural studies. See Reeh et al., *Rumlig Kultur / Spatial Culture*.

²⁴ Walter Benjamin, "Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit" (1936), in Walter Benjamin, *Gesammelte Schriften*, vol. I, 2 (Frankfurt am Main: Suhrkamp Verlag, 1980), pp. 471–505. A US translation of this version appeared under the title "The Work of Art in the Age of Its Technological Reproducibility" in Walter Benjamin, *Selected Writings*, vol. 4: 1938–1940, ed. Howard Eiland and Michael W. Jennings (Cambridge, MA, and London: Belknap Press, 2003), pp. 251–83.

²⁵ Henrik Reeh, "Blik i brug – Walter Benjamin og erfaringens arkitektur", in *Filosofi & arkitektur i det 20. århundrede*, ed. Carsten Thau (Copenhagen: Kunstakademiets Arkitektskole, 2006), pp. 83–124.

²⁶ Hans Christian Post, *Last Exit Alexanderplatz*, Denmark and Germany. Director, script, and research: Hans Christian Post. World sales: Michael Truckenbrodt (trucken@timeprints.de). Production: Hans Christian Post, Michael Truckenbrodt. Production company: Time PrintsKg. Editing: Karoline Schulz. Cinematography: Uwe Bohrer, Erik Krambeck, Hans Christian Post. Soundtrack: Hans Christian Post, Kristian Due Marstal, Mikkel Benn, Mitch & Mitch With Their Incredible Combo. *Whose City* (2017), another documentary film by H. C. Post, is also derived from the many substantial interviews he did for his PhD dissertation on post-1989 Berlin.

²⁷ In 2017, Jacob Kreutzfeldt is the festival director of *Struer Tracks*, a sound festival hosted by the City of Struer (Jutland, Denmark), where the headquarters of the Bang & Olufsen hi-fi manufacturer are located.

²⁸ Jannie Rosenberg Bendsen, Birgitte Kleis, and Mogens Morgen, Bellahøj – Fortællinger om en bebyggelse (Copenhagen: Strandberg Publishing, 2015). Jannie Rosenberg Bendsen et al. (eds.), Form til velfærd (Copenhagen: Arkitektens Forlag, 2017).

²⁹ Jan Gehl and Birgitte Svarre, *How To Study Public Life* (Washington, DC: Island Press, 2013).

ARCHITECTURE EDUCATION IN NORWAY IN THE NINETEENTH CENTURY: FROM FRANCE WITH LOVE Mathilde Sprovin

ABSTRACT

Founded in 1818, The Royal Drawing School in Christiania (Oslo) became the first school responsible for the education of architects in Norway. In Europe, this education traditionally took place at the art academies. In the late eighteenth and early nineteenth centuries, polytechnic schools emerging in France and Germany provided an alternative path. In light of this background, this article discusses the conditions for the emergence of a national architecture education at The Royal Drawing School in Christiania.

KEYWORDS

The Royal Drawing School in Christiania, architecture education, architecture history, academy of art, polytechnic school

INTRODUCTION

Until 1814, Norway was subjected to Danish rule. This changed when the country gained its own constitution that year, with Christiania chosen as the capital. Up to this point, the profession of architecture in Norway was almost non-existent, with the exception of small civil construction tasks, along with the development of defence facilities, that were undertaken by engineer-of-ficers.¹ The establishment of a governmental constitution cleared the ground for the emergence of a class of practicing architects in Norway, as there were many building tasks to be solved in the re-creation of the nation.

At this point, however, Norway lacked buildings for public administration and educational institutions, such as universities and art academies. As Christiania evolved rapidly, the city fortified itself as the country's capital all along with the physical facilities for public administration, schools, hospitals, residential buildings, and housing areas. The growing city with its need for public institutions resulted in assignments, which led to the emergence of the Norwegian profession of architecture. As this article will argue, The Drawing School in Christiania played a significant role in this development. This argument contrasts the general assumption that the German influence was paramount in the early days of the profession, in both training and practice. The reason for this belief can be explained by the fact that the majority of architects of the day received their training in German schools. However, it does not provide the full picture and thus diminishes the role of the architecture education at The Drawing School in Christiania, which is the subject of my PhD thesis and this article.

One of the main research questions has been to shed light upon the fact that a substantial number of architects were trained at the school, thereby acknowledging the significant role of the school in the history of Norwegian architecture education. Based on the literature on Norwegian architectural history and student protocols from The Drawing School, I have prepared an overview that includes all Norwegian architects educated in Norway and abroad before 1910 (Norway's Technical College in Trondheim established its education in architecture in 1910, and here the dissertation's time limit ends). The overview is included as an attachment to my PhD thesis.

Another research question addresses the form and content of architecture education at the school. In this research, school regulations and annual reports written by the board of the school have been central, along with more private archive material like written posts for school operations, letters, and autobiographical texts for some of the school's teachers. An extensive collection of preserved teaching material, used in the training of architecture students at the school, has also served as source material.

THE ESTABLISHMENT OF THE DRAWING SCHOOL: A SCHOOL FOR ARCHITECTURE

The ambition of The Drawing School was to operate in the line of a traditional art academy, similar to other national art academies established in Europe during the eighteenth century. As early as April 1818, the founders of the school delivered a draft for the school's regulations to the ministry. There it stated that the school aimed at educating craftsmen, artists, and architects. However, being a poor country, due to weak economic conditions, money was put aside to establish a school that was merely confined to teach basic knowledge in drawing.

As the aforementioned overview shows, 344 Norwegian architects were educated, either at home or abroad, before 1910 (and 8 of these architects were educated before 1818). Of these students, 75 were educated solely at The Drawing School, before becoming assistants at offices, a practice that must be perceived as a continuation of their architecture education. These empirical findings uncover that, despite the ministry's decision to provide training in basic drawing, The Drawing School must be considered as a considerable factor in the training of Norwegian architects. Concerned with the relationship between the academic training of architects and the emergence of the polytechnic schools, this article intends to place the architecture education at The Drawing School within the European tradition.

THE ACADEMIC TRADITION

The traditional training of architects took place at art academies. Here the art of architecture was learned by studying masterpieces from the past and taking lessons in drawing. This form of training could be traced back to the early art academies, like the Accademia del Disegno in Florence, founded in 1563, and the Accademia di San Luca in Rome in 1577.² In 1648, the Académie Royal de Peinture et de Sculpture was founded in Paris. The French academy was crucial in establishing a modern academy tradition.³

The Académie Royale established a form for academic training organized in three stages. The students started their training by copying patterns and also motifs from the human body, like the head, foot, and hands. At the next level, the students observed and drew after plaster casts. At the highest level, they produced drawings based on observations of living models.⁴ Drawing lessons were mandatory for the architecture students as well, but the subject of copying was different. While the students of art draw the human body, the aspiring architects replaced this with architectural components like entablatures, pediments, columns, and not to forget: studies of the classical orders.

France, and Paris in particular, was important for the development of architecture education. In 1671, the Académie Royale d'Architecture was founded, as the first school for educating architects. Soon this school became a milieu for developing theories in architecture, theories that also included new scientific discoveries.⁵ The architect and engineer François Blondel (1618–1686) was the first official professor at the Académie d'Architecture. He published his theories in two volumes, *Cours d'Architecture* (Course of Architecture), in 1675 and 1683. His theories were a continuation of the classical architecture from Antiquity and the Renaissance, with a special focus on the classical orders. But he also pointed out that architecture was part of the mathematical science that had arisen in the seventeenth century. These principles, when applied to architecture, envisioned how geometry and new mathematics studies could be transferred to the art of building. As a result, Blondel also taught geometry, arithmetic, mechanics, hydraulics, fortifications, perspective, and stereotomy.⁶

The Académie d'Architecture continued to be an important school in the education of French architects. In 1762, the architect Jacques-François Blondel (1705–1774) was appointed as professor at the school. (In spite of the similarity in name, there is no evident kinship with the older Blondel). Jacques-François Blondel was an important figure in France during the Enlightenment period, and he had big ambitions for the profession of architecture. Blondel wrote the capture about French architecture in the Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers ("The French encyclopèdie"), a work which was a prerequisite for architectural ideas in the Enlightenment era and important in the final years before the revolution in 1789. Blondel also wrote Architecture françoise (About French Architecture, 1752-56), and he published his lectures in two additional books with the title: Cours d'architecture (1771 and 1774). In his book about French architecture, Blondel explains how he incorporated elements from Vitruvius, the Renaissance theorists like Alberti, Vignola, and Serlio, and the older Blondel into his own theories.⁷

The theories of Blondel and Blondel are considered important in architecture and the French Enlightenment.⁸ After the Baroque and Rococo eras in art and architectural history, the revival of classical language in architecture was a desirable development. Antiquity was a basic component in architecture and its education, along with studies of the classical orders. This was, however, not new. The problem had also preoccupied theorists of the Renaissance like Vignola and Palladio. But where Vignola established rules of the classical orders based on the internal relationship between the column and capital, together with theories of the optical perspective, "The Blondels" benefited from theories in mathematics and empirical methods influenced by Newtonian natural philosophy to solve the problem with architectural proportions once and for all.⁹

EDUCATION OF ARCHITECTS: TEACHING MATERIAL

In the fifteenth century, the discovery of the printing technique had emerged, and the Renaissance architects and theoreticians were then able to publish their work. This took the form of illustrated books, with drawings (like Vignola and Palladio). These illustrated books marked the beginning of a significant tradition with architectural drawings being utilized in the education of architects.

In 1650, the work named Paralléle de l'architecture antique et de la modern (A Parallel of the Ancient Architecture with the Modern) was published, comprising a collection of large-format architectural drawings with motifs from Antiquity. The author was the French artist and architect Charles Errard, one of the initiators of the Académie Royale in Paris. The work is considered to be the first publication of architectural drawings after the Renaissance, and several works with drawings collected in large-format hardcover books appeared after this.¹⁰ Another important early work is Ruins des plus beaux monuments de la Grèce (Ruins of the Most Beautiful Monuments of Greece) by Julien-David Leroy (1724-1803), published in 1758. The work contains several etchings of classical architecture, including perspectives and a close study of building elements. Leroy was an architect and a professor at the Académie Royale. His work is considered to be important, both in the rich material of drawings and in his way of treating the material, emphasizing the need to study the ruins and their dimensions, without relating it to abstract theories about proportions and harmony.11

ANTIQUITY IN THE TRAINING OF ARCHITECTS: FROM FRANCE TO NORWAY

The Académie d'Architecture was, in 1816, part of the Académie Royale. As part of this process, the academy changed its name to Académie des beauxarts. The architecture education at The Beaux-Arts continued the academic tradition, strongly influenced by the classical style. The training was still based on the traditional model established at the early Italian art academies and at the Académie Royal in Paris, where the training of architecture students was based on lessons in drawing and studies of architectural masterpieces from the past.

If we go back to the Norwegian conditions and The Drawing School, the archives provide information about the training of the architecture students at the school. The earliest source is a letter written by the board of the school and sent to the department of education in 1819:

The Class in Architecture needs a significant portion of patterns, and works of Architecture, as teaching without these, will be limited.¹²

The letter tells us that the training of architecture students needs drawings used as patterns, similar to the academic tradition. The regulations for The Drawing School also referred to the use of patterns, when they stipulated that the teaching in architecture should concentrate on the classical orders drawn



Figure 1. Drawing of a Corinthian capital, by Johannes Flintoe, teacher at The Drawing School, 1819–50. Photo: Sprovin, 2015.

after patterns.¹³ Further confirmation is the collection of preserved teaching material. Two of the earliest books purchased for the school was a book on the five orders, *De fem Söileordner* (The Five Orders, 1814), published by Jørgen Henrik Rawert (1751–1823), who was professor at the Academy of Art in Copenhagen, and *Aphoristische Bemerkungen gesammelt auf seiner Reise nach Griechenland* (Notes from His Journey to Greece) by the German architect Leo von Klenze (1784–1864). Both of these books had classical architecture as their topic, and they were well illustrated.

The first decades of The Drawing School were, however, characterized by limited funding. This could be the reason for a recommendation reclaimed in a letter from the board to the school's teachers. The letter is dated "Christiania 28. October 1829", and here the teachers are asked to "produce some patterns for the students' drawings", and furthermore, these drawings should stay at the school for "further beneficial use". The letter asks specifically for architectural solutions in a classical style such as "Doric portal with column", "Ionic cornice with ornaments", and "Ionic capital".¹⁴ The archive also contains a drawing signed *Flintoe*, who was teacher in the Architecture class from 1819 to 1822, and in the Ornament class from 1822 to 1850.¹⁵ Probably is this drawn answer to the inquiry from the board, and the drawing was used in the teaching of the architecture students.

NEW SCIENCES AND THE POLYTECHNIC MODEL

Important as they were for the profession of architecture in the eighteenth century, the Académie d'Architecture and the later Beaux-Art were not the schools that met the requirements of the emerging modern society, in the era of industrialization and the French Revolution. As result, after 1789, new institutions for architecture education emerged – the polytechnic school.

Founded in Paris in 1794, the École Polytechnique represents new forms of teaching architecture in both content and pedagogical principles. While the art academies emphasized architectural history and its key monuments, the École Polytechnique took advantage of mathematical science. The school's main task was to educate engineers for French society after the revolution, where technical expertise was needed in order to solve public tasks related to infrastructure such as roads and the railway. In addition to this, there were also building projects like roofed halls for markets, railway buildings, factories, modern house construction, schools, hospitals, and prisons.¹⁶The study program for the École Polytechnique in 1794 contained lessons in mathe-

matics, physics, geometry, drawing, chemistry, mechanics, and architecture. In addition, the organization of the teaching marked a change from previous schools for architecture education. The training was given in studios, and the students here were directed towards practical problem solving. The school marked the progress towards a new form of education of architects, closely related to engineering science.

Gaspard Monge (1746–1818) was one of the founders of the École Polytechnique, but he refused to be the school's director, as he would rather teach. Monge was employed as a professor in *descriptive geometry*. This was a way of drawing, developed by Monge himself, for precise renderings of three-dimensional shapes. For architects, this became an important aid for the drawing of plans, sections, and elevation.¹⁷ Based on his lectures at the École Polytechnique, Monge published his work *Géométrie descriptive: Leçons données aux écoles normales* (Descriptive Geometry) in 1799, a work that referred to descriptive geometry and technical drawing.



Figure 2. Durand, Recueil et parallèle des edifices de tout genre, anciens et modernes (1799). Part of the preserved teaching material after The Drawing School. Photo: Sprovin, 2016.

Jean-Nicolas-Louis Durand (1760-1834) was also one of the leading professors at the École Polytechnique, employed in 1795. In 1799, he published the book Recueil et parallèle des edifices de tout genre, anciens et modernes (Compendium and Parallel of Buildings of all Kinds) and further on, in 1802 and 1805, he published two volumes of the work Précis des leçons d'architecture données à l'école polytechnique (Summary of Lectures on Architecture Given at the École Polytechnique) In his lectures and books, Durand explored and presented architectural components like walls, vaults, and columns. He was concerned with a building's material and details, and above all with architectural principles for organizing the volumes, based on the doctrine of proportions and symmetry.¹⁸ Durand claimed that buildings should be convenient and economical. For a building to be convenient, it had to be solid, healthy, and comfortable, built with materials of high quality and placed on a well-chosen site. And, Durand claimed, by using simple and symmetrical forms in the architecture, the result will be an economical building. An important component in Durand's teaching was Monge's method for descriptive geometry, which Durand used as an instrument for precise representation of buildings in his publications.19

THE CONDITIONS IN NORWAY:

THE ACADEMIC TRADITION AND THE POLYTECHNIC MODEL

If we follow The Drawing School's history throughout the nineteenth century, it transpires that the regulations were geared towards technical education when the Industrial Revolution came to Norway, and the first factories were established in Christiania around 1850.²⁰ In the 1850s, The Drawing School started acquiring publications prepared by Julien-David Leroy and Jean-Nicolas-Louis Durand. Beside these two French authors, a large quantity of teaching material was shipped in from The Academy of Art in Copenhagen. This included textbooks on descriptive geometry and linear perspective, compiled by professors at the Danish academy like Gustav Friedrich Hetsch (1788–1864), Georg Frederik Ursin (1797–1849), and Christian Vilhelm Nielsen (1833–1910).

The fact that Leroy and Durand were acquired, in addition to several books on perspective, technical drawing, and descriptive geometry, tells us that the school followed the European development, but it also problematizes the questions about the aim of the school, and where it could be placed in the European tradition for architecture education. My study of the preserved teaching material uncovered that the earliest procurement were publications on classical architecture. The teachers' own architectural drawings, like Flintoe's capital, also introduced the students to the classical vocabulary. In this way, architecture education was in the academic tradition. But when the school bought teaching material that increasingly led the architecture towards more technical aspects – must this be considered as a deliberate progress away from the academic ideals and towards the polytechnic model?

THEN WE TAKE BERLIN

The foundation of the polytechnic schools lay in France, and the collaboration within the classical architecture theory and the new science also appeared in France. Despite this, Germany became the leading country for the polytechnic model, and during the nineteenth century several polytechnic schools were established there. Germany is particularly important for Norway and the Norwegian architects for two reasons:

- 1. Teaching material used in the training of the architecture students at The Drawing School in Christiania was imported from Germany.
- 2. Many of the Norwegian architects were trained at the German polytechnic schools.

The overview of the Norwegian architects shows that out of 344 architects, 169 were educated in Germany. The German impulses in Norwegian architecture should therefore not be questioned. However, the preserved teaching material shows that The Drawing School purchased a large number of German publications and used them in the training of architecture students. There is therefore reason to assume that the school was a mediator of the German ideals. The early German publications were exclusively on classical architecture. This could be derived from Antiquity, the Italian Renaissance, or it consisted of contemporary German architecture like the books of Karl Friedrich Schinkel (1781–1841) and Leo von Klenze. Important publications to mention here are Schinkel's *Sammlung architektonischer Entwürfe* (Collection of Architectural Designs, first edition published in 1828), and Leo von Klenze's *Glyptothek* (1816-34) and *Pinakothek* (1826-36).

There was, however, little construction activity in Norway before 1870, except those major building tasks which were part of re-creating the nation after independence from Denmark in 1814. These were buildings like the Royal Castle (1823–48), designed by architect Hans Ditlev Frantz Linstow (1787–1851), and the Bank Building (1826–30) and the University (1838–56), both

designed by architect Christian Heinrich Grosch (1801–1865). Grosch took the first part of his architecture education at The Drawing School in Christiania, 1819–21. After that, he went to The Academy of Art in Copenhagen. Linstow was also educated in Copenhagen, at the University where he took lessons in law. At the same time he was a student at the Academy of Art. The early publications on classical architecture purchased for The Drawing School in Christiania therefore had little direct influence on the architecture raised before 1870.

In the 1870s, the cities in Norway started to expand at a great pace. This was the result of large immigration from the countryside into the cities. The population increase created a big market for housing speculation, and the city needed architects and builders. This had consequences for The Drawing School as well, and the student records show a significant increase in architecture students around 1870. The increase in building tasks coincided with a change in the architecture style towards the end of the century, from classicism based on Antiquity to historian styles such as neo-Renaissance and neo-Gothicism.



Figure 3. Grünerløkka, Markveien, street with residential buildings built in 1870–99. Photo: Wilse, 1904, www.oslobilder.no.

The German teaching material reflects the development in the architectural style, but it also reflects a change in the training of architecture students – from overview perspectives of architecture (classical ruins) to more detailed drawings showing solutions of building-engineering character, such as the construction of facades in bricks, roof constructions, windows, and doorways. An example is *Die Bauformenlehre Mit Besonderer Berücksichtigung Des Wohnhausbaues Und Der Bürgerlichen Baukunst. Der Ziegelsteinbau* (The building theory with special consideration of residential construction and civil architecture. The brick building, 1887). There is reason to believe that this was a form of teaching material easily applicable to the building tasks the architects were confronted with as graduated architects, and therefore that the education had consequences for Norwegian architecture as it evolved towards the end of the century.



Figure 4. Die Bauformenlehre Mit Besonderer Berücksichtigung Des Wohnhausbaues Und Der Bürgerlichen Baukunst. Der Ziegelsteinbau (1887). Part of the preserved teaching material after The Drawing School. Photo: Sprovin, 2016.

CONCLUSION

The Royal Drawing School in Christiania did not, according to school regulations, intend to educate architects, and in the writing of Norwegian architectural history the school is given little significance. However, my research on the school's history and its archives shows that The Drawing School educated a large number of Norwegian architects. The school could therefore be considered as the first school for education of architects in Norway.

Based on the study and investigation of the school's regulations and teaching material, it could be concluded that the training of architecture students followed the leading principles for architecture education as developed in Europe, with France and Germany as the dominant countries. This included a gradual development from studies of Antiquity, learned by copying after patterns, to more detailed drawings that focus on technical building solutions. However, the training of the architecture students at The Drawing School retained the drawing instructions as the leading pedagogical principle; and as opposed to the study program that developed at the polytechnic schools, the education at The Drawing School continued in the academic tradition.

NOTES

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⁵ Spiro Kostof, *The Architect: Chapters in the History of the Profession* (Berkeley: University of California Press, 1977/2000, p. 173.

⁶ Alberto Pérez-Gómez, *Architecture and the Crisis of Modern Science* (1983; repr., Cambridge, MA: MIT Press, 1990), pp. 41–42.

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9 Ibid., pp. 35-36.

¹⁰ Gil R. Smith, Architectural Diplomacy: Rome and Paris in the late Baroque (Cambridge, MA: MIT Press, 1993).

¹¹ Sergio Villari, "Neoclassicism and Architecture in France in the Second Half of the Eighteenth Century", in *J. N. L. Durand (1760–1834): Art and Science of Architecture* (New York: Rizzoli, 1990).

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¹³ Kongeligt Reglement, 1822 § 26 / Reglement, 1834, § 46a. See *Kongeligt Reglement af 7de October 1822 for Den Kongelige Tegne- og Kunstskole i Christiania*, printed by Wulfsbergste Bogtrykkerie, Christiania, 1822; *Reglement for den Kongelige Norske Kunstskole, Stockholms Slot den 16de Januar 1834*, printed by Chr. Grøndahl, Christiania, 1834.

¹⁴ H. Grosch and T. Broch, *Bilag No 1, Christiania den 28de October 1829*, SHKS arkiv, A-10583, serie: Q- Eiendomsforvaltning, inventar /Qa- Inventarfortegnelser, eske: 01/Qa – 0001.

¹⁵ Johannes Flintoe, *"Eringdringer fra mine yngre Dager" og andre nedtegnelser, Brevs. 15*, transcribed by Ingebjørg Ydstie, http://urn.nb.no/URN:NBN:NO.NB_DIGIMANUS_136346, downloaded on 5 August 2015.

¹⁶ Ulrich Pfammatter, *The Making of the Modern Architect and Engineer* (Basel: Birkhäuser, 2000), p. 51.

¹⁷ Pérez-Gómez, Architecture and the Crisis of Modern Science, pp. 279-82.

¹⁸ Villari, "Neoclassicism and Architecture in France".

¹⁹ Pérez-Gómez, Architecture and the Crisis of Modern Science, pp. 297–311.

²⁰ Plan for den Kongelige Tegneskole i Christiania (Approbert ved kgl. Res. af 6te Marts 1869), Riksarkivet, Kirke- og undervisningsdepartementet, 2. skolekontor E, serie: Eka Kunst- og håndverksskoler, eske: L0011 Statens kunst- og håndverksskole.

LOST GROUNDS: ARCHITECTURAL KNOWLEDGE PRODUCTION AS CRISIS MANAGEMENT Ola Svenle

ABSTRACT

This essay will address the effects of the introduction of industrialization and mass society, starting around 150 years ago, onto Swedish architecture, and elaborated in historiographical accounts of that period. More specifically, it will focus on the notion of a subsequent architectural crisis proclaimed by several architectural historians and theorists of the late twentieth century. In particular, texts by Björn Linn and Finn Werne, Swedish architectural historians of the late twentieth century, will be used as primary material for a critical historiography. The crisis identified refers to the architectural knowledge base, as well as to the resulting built environments of the modernist era, and is crucial for understanding late-twentieth-century interpretations of modern architectural history in Sweden.

KEYWORDS

Architecture, architectural history, architectural knowledge, crisis

INTRODUCTION

My research project, which concerns the restructuring of Swedish architectural training of the late nineteenth century, has led me to consider certain notions of crisis regarding the state of architecture at the time as well as that of later date. In relation to earlier research in this field, I would argue that some grounds lost around a hundred years ago seem to have never been recovered, and that architectural research and education, at schools as well as research institutes, has been perceived as trying to regain such grounds, especially the hands-on sensual knowledge of the crafts and the artistic mastery of complex structures.¹

Since my area of study is the late-nineteenth-century shift in the direction of Swedish architectural education, I have come to dwell upon the interim period between the old and the new, the artistic paradigm and the rational-scientific-technological one. This period, spanning approximately the last quarter of the century, was when new artistic considerations and motives started to show in architecture. They were nurtured by the Romantic movement's resistance to the idealism and absolutism of the Enlightenment. The emphasis on the particular, the local, and the unique was influential to the new.²

The architectural profession was formed up in Sweden at the end of the nineteenth century, and professionalization of the building practice took place during the same period. Building for one's own needs went from being the norm in agrarian society to the exception once the division of labour started.³ New sets of knowledge had to be produced to pull off the new task of building without knowing the user, and complex problems had to be broken down to manageable parts. The quantification of patterns of social behaviour in dwelling investigations was the first instance of modern architectural research. Succesive efforts along that line could seemingly cover up passably for the loss of a professional knowledge base until the backlash in the 1960s and 1970s.⁴

In this article, some texts by Björn Linn and Finn Werne, Swedish architectural historians of the late twentieth century, will be used as primary material for a critical historiography. Starting with establishing the notion of crisis, the main aspect is lost grounds acknowledged in relation to the development of architectural knowledge in an industrial society.

CRISIS MANAGEMENT

First, the notion of "crisis" should be dealt with. As Mari Hvattum has pointed out, the modern meaning of the concept of crisis is derived from the historical philosophy of Henri de Saint-Simon (1760–1825). His use of the concept was introduced in a collection of essays in 1821, where history is perceived as a circular movement shifting between organic and critical periods. According to Saint-Simon, history was characterized by either organic situations or crisis, with discrepancies between societies and their cultures and systems of belief. This concept of crisis was widely understood as being applicable to the nineteenth-century situation.⁵

On the notion of crisis in architecture, one could also point to Alberto Pérez-Gómez's *Architecture and the Crisis of Modern Science*. He stresses the inability of positivist science to account for any aspects outside the strictly syntactic and disciplinary. As architectural theory was absorbed by technologism and functionalized, its transcendental dimension, its ability to refer semantically (as opposed to syntactically), was lost.⁶ Furthermore, Manfredo Tafuri, in *Architecture and Utopia*, and elsewhere, addresses the crisis of architectural and urban ideology. He seeks the roots in social and political conditions, in commercialization and capitalism, rendering modern utopian architecture obsolete.⁷

The introduction of industrialization had radical effects on the lives of the population. Few constant categories remained. Lewis Mumford, following Patrick Geddes, characterized this phase as *paleotechnical*. The introduction of the coal-fuelled steam engine as the new power source and the new methods of smelting and processing iron resulted in massive societal migration and reorganization. A new culture emerged from this complex of coal and iron.⁸

Architectural debate in the nineteenth century was preoccupied with the issue of correspondence between the times and their formal expressions. Engineering was singled out from the architectural sphere of interest to form its own knowledge base. The nineteenth century was obsessed with history; facilitated travelling and printing technologies improved the historical architectural awareness. Windows to the world were opened. The number of building types being commissioned increased as architectural training was formalized in the guise of an artistic branch.

However, as Peter Collins has pointed out, the sense of crisis preoccupied mainly architectural theorists during the nineteenth century, an elusive example being the architectural historian James Fergusson, mocking the "monkey styles of modern Europe", starting already in the Renaissance, when the senseless copying supposedly began, and steadily ongoing into the nineteenth century.⁹ The commissioners, the rising bourgeoisies of Europe, generally found the formal expressions suitable for their new claims to economic and political power.

The crisis of the twentieth century mass society has had different implications and other critics. Taylorism had a significant impact, guiding the way for industrial production in all areas, even that of building production. It was characterized by the collection of knowledge and analysis aiming at the elimination of all unnecessary knowledge in the specialized work force. The goal was an advanced specialization where simple occupations were singled out and carried out by the cheapest work force, a sophisticated division of labour between thought and execution. The traditional skilled worker was degraded or done away with in favour of workers in general.¹⁰

In Sweden, the problems acknowledged during the twentieth century are particularly mirrored in the work of Björn Linn and Finn Werne. For instance, Linn singles out the same period in the mid-eighteenth century, as does Pérez-Gómez, as a crucial point of summing up the knowledge gathered so far and placing it into defining categories as scientific disciplines. He points to the start of crisis in architecture in the 1880s, when old knowledge bases began to prove inadequate. Werne, on the other hand, focuses on the building practice of agrarian pre-industrial Sweden. He makes a sharp qualitative distinction between pre-industrial building practice comprising the livelihoods and the local material conditions of the users and the industrial "ready-to-wear" building production, reflecting essentially the material and economic conditions of the building industry.

ARCHITECTURAL KNOWLEDGE IN SWEDEN

The disquiet caused by the division of labour, mass production, and freedom of trade with the resulting emergence of numerous fortune-seeking builders, et cetera, in the late 1800s, resulted in a new interest in the material properties of architecture. The desire to establish a new relation between humans and their surroundings led to the reappraisal of handicraft and "true materials". The Swedish architectural historian Björn Linn has defined this as a proper cultural revolution, affecting all artistic branches and doing away with much of the French academic idealism.¹¹ Tangled up with the regionalist endeavours of the emerging nation state, Swedish architects discovered for the first time a local building tradition worth considering and they became acquainted with its buildings in their own right, and not just their formal expressions. The coupling of that historic consciousness with adequate technological skills was demanded from the new polytechnic education.

According to Linn, the origin of the architect is the representative of the sovereign. Following Spiro Kostof's history of the architectural profession, Linn describes the first known architect as Imhotep, first minister of King Zoser, associated with the construction of the pyramid of Saqqara, ca. 2600 BC. The birth of the profession required a social layering, producing powers with the means and resources to obtain the specialist knowledge required to build their monuments. The origin is certainly not the liberal artist, but the royal official.¹² The required knowledge in Linn's view revolves around knowing the needs and desires of the ruling class. As the institutions of civil society were created and industrial entrepreneurs, et cetera, rose to power, needing to manifest their new positions, commissions increased. At the end of the nineteenth century, the professions of modern society took shape. In such a process of professionalization it is necessary to draw lines around one's own sphere of competence.

As the Swedish architectural historian Finn Werne pointed out during the same period of crisis, the architectural profession is a particularly weak one. The reason is the bond to the client, making the architect unable to work in the best interest of the public.¹³ Up until the Industrial Revolution, in Sweden the vast majority of structures nationwide had been erected without any architect involved. The dwellings of agrarian society were not considered architecture at that time; they lacked the notion of order imposed on all monumental works, and they required no compositional training of many years. Instead, tradition was the beacon of the peasantry. The materials were local, their manipulation thoroughly known. The rural buildings showed a close affinity with the livelihood of the people. Werne states that these requirements are to be met in order for buildings to appear meaningful for their users.¹⁴

Tradition (from the Latin word *tradere*, meaning "to hand over") means *that*, which is considered "natural" at a given time. Working in a tradition, in the sense established by Werne and Linn, means resting in the knowledge acquired so far, and it means that one can be fairly certain about the outcome. The type of knowledge is hands-on, sensual, and concrete. It is closely related to the materials and tools in use. When the concept of tradition is countered by renewal, as the opposite approach to solving a problem, it often points to the rationality of the latter. Upon closer examination, both may be equally rational, depending on the situation. Tradition uses acquired human knowledge to move swiftly to the phase of execution, typecasting the problem. Renewal, on the other hand, focuses on the specificity of the problem at hand, rejects known solutions, and instead aims at efficiency in the long run.¹⁵

Renewal of course eventually turns into tradition, and as technologies become outdated they can turn into the realm of art or handicraft. The singularity of architecture is that it deals with the interface between humans and their surroundings. As much as it is about humans and buildings, it is also about the relations between them. Its insights have been layered over centuries, and the understanding of its nature needs to be historical. Furthermore, it is not just the present surroundings that affect us humans. Every built reality holds simultaneously the dimensions of history and, perhaps to a lesser extent, the possible future ones. Beside their extension in space and time, they exist intentionally in human beings.

When considering architectural knowledge, Linn and Werne find the ancient division into *knowing* something and *knowing how to do* something useful. Both are equally essential to the subject matter. With the evolution from a building practice based on craft into that of specification, and division of labour in the highly industrialized countries, a significant and radical change took place. The shaping and creative moments of the work, which had been integrated with the execution in earlier craft-based building practices, were separated from it. Along the same line, theory and technology were separated from practice, and the result is that experts now decide how something should be done, while others execute it without reflection.¹⁶

As a contrast, according to the nineteenth-century beaux arts view, architectural education was considered the more professional the more distance it kept from the hands-on building practice. Since building practice was seen as a commercial activity, architectural professionalism meant a combination of distance from, and regulation of, the commercial practice. Control over the design was the key issue for both of these goals.¹⁷

LOST GROUNDS

My understanding of the distinction between research and knowledge in relation to the texts discussed here considers knowledge as the foundation to which research results can be attached. Research aims at a systematic production of new knowledge through the application of methods upon a material. The Enlightenment did away with transcendental ontologies but kept the belief in universally valid truths, with natural laws waiting to be uncovered. The existence of timeless truths, identical in all spheres of human activity – artistic and scientific alike – implied that the only way to detect them is by the work of reason alone. With the progress of time, scientifically produced knowledge would increase. Observation was the main method, and the object was thought of as completely separable from the impersonal subject.

Björn Linn points to the housing issue and the resulting problem solving of "ready-to-wear building"¹⁸ as the driving force in the introduction of analyt-

ical and quantitative research in architecture in the early twentieth century. The analytical method applied by the architects and given the status of a scientific approach was the Cartesian method of dividing the whole into parts, and handling them one after the other, working one's way from the easiest to the most complicated. In the 1940s, the research perspective was expanded to house sociological aspects in studies on the uses of dwellings. In the 1950s, the building industry took decisive steps towards the commodification of dwellings. Standardization and large quantities had their breakthroughs. During the same period, a PhD program was implemented at the Royal Institute of Technology (KTH) in Stockholm, although the first dissertation took place already in 1934. Following the crisis of the architectural profession in the late 1960s and early 1970s, the various research attempts were still trying to come to terms with the loss of legitimacy on the one hand, and of aesthetic design principles on the other.¹⁹

According to Finn Werne, ever since the rise of specialist society, division of labour, and the "ready-to-wear building" policy, the dwellings of the people have been separated from their livelihoods, denying the creation of meaningfulness. When, in the first half of the twentieth century, building culture was entrusted to specialists instead of the entire population, the common man was removed from taking part in the construction of society proper. The specialization of the building activity brought about the singling out of both theory and technology from the concrete craft and practice.²⁰

Björn Linn, on the other hand, puts emphasis on the Cartesian method of reduction of factors as the cause of the most serious architectural shortcomings of the modern age. He points to the desire to reduce the number of unknowns when facing a problem of unprecedented nature. In architecture, though, what is needed is keeping many levels present at the same time, i.e. the artefact, the building, and the city, and not treating them all as things, or commodities even. Furthermore, Linn stresses the necessity to recognize the complexity embedded in all architectural problems. According to Linn, partial knowledge has characterized the modern age, and while individual building elements have been determined meticulously, the buildings treated as complexes have not been manageable. Instead design has meant a multiplying of parts up to an arbitrary point selected as the endpoint. What he perceives in the modern age is a lack of understanding of the nature of the problems regarding hierarchy, i.e. what is actually frame and what is content. The result is that all design tasks are treated as objects, while the city demands another kind of problem treatment in its complexity than the single building.²¹

Central to Björn Linn is always the relation between man and artefact. Finn Werne, on his part, points to the abstraction and fragmentation that technology entails. By contrast the knowledge of the crafts was theoretical and practical, hands-on and sensual. The architectural crisis of Sweden and other Western countries of the 1970s brought to the fore the larger crisis, the one of the turn-of-the-century societal transformation. Even though the texts I have used as source material date from the 1980s and 1990s, they are unquestionably provoked by the 1970s crisis.

Interestingly, despite the common observations made by Werne and Linn, their conclusions vary considerably. You can almost speak of opposing poles in their problem descriptions. Werne appears to appeal to a revolutionary shift in the engagement of citizenry. Therein lie the ideas of user-producer cooperation and participatory design. He is highly sceptical about the notion of expert society and specialized building culture. Linn, on the other hand, doesn't seem to care a great deal for popular engagement. His primary focus is solving the question of adequate expert knowledge and regaining professional legitimacy.

The two historians address the notion of quality from different perspectives. Werne's concept is closely related to that of "conveying meaning" or "making sense", and in architecture it is achievable only as long as it manages to form a connection between man and his livelihood. Linn is rather satisfied with *Bildung* (meaning roughly personal and cultural maturation) as the foundation for the expert architect to be able to distinguish between better or worse solutions to the problems posed. He does however include in that concept large amounts of knowledge and the necessity to broaden the perspectives considerably, but in principle it should be attainable for the gifted and properly trained architectural specialist.

Mass society and mass production, urbanization and overcrowding, division of labour and expert society; all these aspects were characteristics of the rise of modernity and seemed to call for the production of a new architectural knowledge base. Just the same, they entailed the loss of other knowledge bases. In a way, as interpreted by Swedish architectural historians in the late twentieth century, architectural research and education represent a permanently ongoing crisis for architecture ever since the nineteenth century.

NOTES

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⁴ Finn Werne, "Allmogens byggnadskultur", PhD thesis, Chalmers University of Technology, Göteborg, 1980; Björn Linn, Arkitektur som kunskap (Stockholm: Byggforskningsrådet, 1998).

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⁹ Peter Collins, Changing Ideals in Modern Architecture (Montreal: McGill University, 1963).

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¹¹ Björn Linn, "Arkitektutbildning och arkitektkunskap i Sverige", *Tidskrift för arkitekturforskning*, 1–2 (1990).

¹² Linn, Arkitektur som kunskap, p. 23; Spiro Kostof (ed.), The Architect: Chapters in the History of the Profession (Oxford: Oxford University Press, 1977).

¹³ Finn Werne, "Professionen, grundutbildningen och arkitekturforskningen", *Tidskrift för Arkitekturforskning*, 3/1–2 (1990), pp. 134–58.

¹⁴ Werne, Allmogens byggnadskultur.

¹⁵ Linn, Arkitektur som kunskap, p. 53.

¹⁶ Finn Werne, Böndernas bygge: traditionellt byggnadsskick på landsbygden i Sverige (Höganäs: Wiken, 1993); Linn, Arkitektur som kunskap.

¹⁷ Mark Crinson and Jules Lubbock, *Architecture – Art or Profession?* (Manchester: Manchester University Press, 1994), p. 81.

¹⁸ I have adopted Björn Linn's felicitous expression in analogy to clothing production. Its three principles are home sewing, tailoring and ready-to-wear (in Swedish hemsömnad, måttsömnad and konfektion). A brief elaboration on the analogy is found in: Björn Linn, "Att öppna historien", *Konsthistorisk tidskrift/Journal of Art History*, volume 77 (2008), pp. 146-50.

¹⁹ Linn, "Arkitektutbildning och arkitektkunskap i Sverige"; Linn, Arkitektur som kunskap.

²⁰ Werne, Allmogens byggnadskultur; Werne, Böndernas bygge.

²¹ Linn, Arkitektur som kunskap.

CLOUD MACHINERY AND MEMORY THEATRES: A SPATIAL APPROXIMATION OF THE DIGITAL CLOUD Natalie Koerner

ABSTRACT

This article attempts to elucidate the spatiality of the digital cloud. The prevailing meteorological analogies and the emphasis on the cloud's network character lack in spatiality. The article draws on two historical, theatre-related occurrences that deal with ephemeral data structuring: the so-called cloud machinery used in religious theatre since the fourteenth century and Giulio Camillo's sixteenth-century Memory Theatre.

A closer look at the spatiality of the cloud stage prop reveals how today's concept of the digital cloud as a data-transfer medium can be linked to the theatricality of the Middle Ages and the Renaissance, which dealt with equally invisible and inaccessible space. In this reading, the cloud stands for a tool that enables mobility and communication, while partly blurring the hardware that enables the exchange.

The second topic of study, Camillo's Memory Theatre, makes use of the same concept of revealing knowledge while veiling it. His project draws parallels between today's archival practices and Camillo's own borderline-occult mnemonic endeavours. The project exerts fascination on practising architects and theoreticians, but it has yet to be related to today's memory culture. Despite striking ontological, theatrical, and spatial similarities, no parallels have yet been drawn between the cloud machinery, Memory Theatre, and today's digital archive cloud, in order to explore the spatial imaginability of the present-day digital cloud. I will connect these two occurrences with the spatiality of the digital cloud, drawing from a number of contemporary authors from art history, theatre studies, media theory, media and political geology, and architecture theory.

KEYWORDS

Digital cloud, inaccessibility, cloud machinery, Memory Theatre, Giulio Camillo, religious theatre

INTRODUCTION

Contemporary knowledge production is closely linked to the gathering and analysis of big data, which is entwined with data production and archiving. Today's prevalent digital archive is nebulously known as the *cloud*. The cloud is anchored in data centres, which are located at strategic locations that maximize political and environmental security, legislative benefits, resource proximity, bandwidth availability, and financial advantages.¹ Unlike the digital archive cloud, data centres retain a certain spatial imaginability despite their often vague or undisclosed locations. Most users are able to spatially associate data centres with thoroughly sealed and protected high-tech, shed-like buildings or reclaimed sites, such as bunkers.² Their interiors conjure long, unpeopled rows of computing equipment racks with blinking LED lights that indicate the flow of data.

The actual cloud – literally made up of invisible Wi-Fi radio waves – remains a spatial mystery to most users, despite being talked about in spatial terms: *Data is archived in the cloud*. This article attempts to elucidate the spatiality of the digital cloud – or rather, it aims to make the digital cloud spatially imaginable. Usually, meteorological analogies³ or the network character⁴ of the digital cloud are emphasized in attempts to approximate a cloud spatiality. Instead, this article draws on two historical, theatre-related occurrences that deal with ephemeral data structuring: the so-called cloud machinery used in religious theatre since the fourteenth century and Giulio Camillo's sixteenth-century Memory Theatre.

A closer look at the spatiality of the cloud stage prop, which influenced painters and the general public's imagination of immanence, will reveal how today's concept of the digital cloud as a data transfer medium can be linked to the theatricality of the Middle Ages and the Renaissance, which dealt with equally invisible and inaccessible space. In this reading, the cloud stands for a tool that enables mobility and communication, while partly blurring the hardware that enables the exchange. The cloud was chosen as mediating device, because it is locationless and borderless; it is a body "without surface".⁵ The cloud is here understood as a veil, a blur that reveals information in the very act of obscuring it.

The second topic of study, Camillo's Memory Theatre, makes use of the same concept of revealing knowledge while veiling it. His borderline-occult mnemonic exerts fascination on practising architects (Libeskind, Diller and

Scofidio, etc.) and theoreticians, but it has yet to be related to today's digital memory culture.

Despite striking ontological and spatial similarities, so far no parallels have been drawn between the cloud machinery, Memory Theatre, and today's digital archive cloud. This study reveals these analogies, in order to explore the spatial imaginability of today's digital cloud. I will rely heavily on Hubert Damisch, who has comprehensively investigated the cloud in an alternative narrative to the general understanding of the dominating role of linear perspective in the history of Western painting, and on Alessandra Buccheri, who has extensively researched the cloud machinery. For Camillo, I will refer to Frances Yates and her broad knowledge of *The Art of Memory*, to Lu Beery Wenneker's 1970 thesis, and to Camillo's own *L'Idea del Teatro*. I will connect these two occurrences with the spatiality of the digital cloud, drawing from a number of contemporary authors from media theory, media and political geology, and architecture theory.

CLOUD MACHINERY

From a computing perspective, cloud machinery is the early Renaissance theatrical equivalent of early twenty-first century virtual machines that depend on cloud computing. Virtual machines are installed on software to simulate hardware. Whereas hardware and software used to be relatively clearly distinguished into the physical and the intangible, innovations such as cloud computing and virtualization have increasingly blurred the distinction.⁶ This blurring has an important spatial component. Cloud computing and virtualization remove the physical hardware that enables the computing not just from the visible realm of the user, but even from an identifiable location. The location of the clustered hardware - of data centres - is mostly undisclosed for reasons of security, simplicity, and user convenience. The conceptual cloud is thus used to veil the location, spatiality, and materiality of the machinery that is necessary to sustain cloud computing and data storage. The notion of veiling the "hardware" via the meteorological phenomenon of a cloud can be seen as part of a larger tradition that has its roots as much in data mediation and mobility as in theatricality.

Cloud machinery denotes a theatre prop that played a role in Late Medieval and Renaissance religious theatre. It was used in the religious enactment of biblical scenes to facilitate an exchange between the earthly realm and the otherwise physically inaccessible heavens. In Florence, the initially simple stage device was especially popular. Throughout the fifteenth and sixteenth centuries, it gradually evolved into a sophisticated theatrical device, known as "heaven machinery". By the mid-sixteenth century, it was used in the Medicean court theatre.⁷ It was so influential that painters incorporated it into their depictions of religious events and clearly distinguished it from the meteorological clouds of the painted skies.⁸

Developed simultaneously to Filippo Brunelleschi's geometrical explorations of linear perspective, which he first applied in 1413 in Florence in a painting of the Florence Baptistery, the cloud machinery had vastly different ambitions. Whereas perspectival drawing required the represented object to have a fixed position in the world or in the represented scene, the cloud in theatre and in painting denotes the spatially ambiguous, the sites that were not tied to location, the concepts that had no fixed outline – literally as much as ontologically.⁹

The cloud machinery developed out of a simple plinth – "a flat pedestal, camouflaged as a cloud"¹⁰ – into a complex, technologically ingenious illusionary system that could be lifted and suspended and thus create the illusion of flight or ascension from ground to sky. The cloud props were common in European theatre and known generally as "cloud" or *nughola/nuvola* (Italian), *nuée* (French), *nube* (Spanish).¹¹ It described a sturdy iron or wood structure and pulley system which was hidden by wadding, feathers, and painted fabric to create the imitation of a cloud. The props would range in size from larger heaven floats to single clouds or mandorla.¹²

Religious theatre productions were initially staged in churches and made strategic use of the narrative potential of their architectural features. Cloud props were used to transport actors playing holy characters into the more elevated regions of the church space, which represented heaven. Often, the "clouds" would be raised in the choir area, close to the altar, to emphasize the proximity of the divine. The rood screen also played an important role until the sixteenth century, when it became less common in Western European churches. It established a tangible, emblematic, and impenetrable interface between the worldly and the heavenly realms – an elusive border of two realms that meet but do not mix. Actors who represented the saints, Virgin Mary, Jesus, or even God, were able to navigate this interface with the help of the cloud machinery: it quite literally lifted them from one realm into the other.
Cloud machinery evolved throughout the centuries, and the props advanced in complexity and craftsmanship. The Roman Church continuously advocated the use of elaborate cloud machinery and theatrical re-enactments, because chanting, music, light effects, and actors contributed to a representation of heaven that was more emotive, impressive, and memorable than any two-dimensional depiction could ever be. These theatre productions with their illuminated and kinetic cloud machinery were thus valued for creating a more *real* representation of heaven.

The early, simple cloud pedestal does, however, have important links to painting, where the feet of angels were often supported by small, sometimes barely visible clouds. These practical clouds have a supportive function as illustrative cantilevers that situate the angel in the otherwise infinite and placeless sky-space. These little aid-clouds can be read as cognitive supports for the observer to comprehend the flight of the angel, suggesting that the cloud relieves the angel of the earth's earth-bound pull. A good example is the 1428 Assumption by Masolino da Panicale (ca. 1383-1435) (Figure 1). The 144 x 76 cm panel shows the Virgin Mary's ascent to heaven against an abstract golden realm. The seated Virgin is framed by a mandorla-cloud that is densely patterned with putti and flanked by angels, which are in turn supported by small individual cloud fields. The panel was produced in 1425 for the Compagnia di Sant'Agnese, a group that was famous for the magnificent Ascension play it performed in Florence every year. Alessandra Buccheri shows that the depiction of the Virgin Mary's ascent is itself inspired by the shape of the cloud machinery that would have accompanied the celebrations. In fact, Mary takes the position of the actors that would usually mount the three-dimensional props.13

From 1460 to 1464, Andrea Mantegna (1431–1506) painted a triptych with *The Ascension of Christ, The Adoration of the Magi, and The Circumcision.* Both the Ascension and *The Adoration of the Magi* feature cloud machinery that supports Jesus in the first and Mary with the Christ Child in the latter. In both paintings, the cloud machinery is mandorla-shaped and covered with alternating fields of blue and dense, wadding-like cloud patches and orange and yellow, winged cherub busts. In the *Ascension*, Christ is standing in the cloud machinery, suspended above a group of astounded admirers. He is holding a thin pole that ends in a cross and hoists a flag. The ascension-cloud differs starkly from the meteorological clouds in the distance: these are white, their consistency is less dense, and their sizes and shapes are more irregular than the machinery's wadding patches.



Figure 1. Assumption by Masolino da Panicale (1383–1435) from 1428. Source: Public Domain

The Adoration at the centre of the triptych also clearly references Quattrocento theatre. Mary's cloud machinery is parked on the ground, so that the Magi can approach her and the Holy Child. It resembles the Ascension cloud but is connected to a second cloud machinery - suspended mid-air above Mary's - via a thin, straight rod. The hoisted cloud is occupied by four angels. Damisch draws attention to the close connection between these painted "ascension tools" and religious theatre: "With all the precision of an ethnographer, Mantegna carefully represented the vertical metal rod, the tip of which upheld a star and a foursome of angels in a cloud of wadding."14 The painted representation of the gravity-defying action potential of the divine here stimulates "the juncture of reality and the imaginary" and refers "to a theatrical representation rather than to a natural reality of an intellectual notion."¹⁵ It is intriguing that Mantegna depicts the prop rather than a real cloud, suggesting that divine travel is really facilitated by cloud machinery and its comprehensible mechanisms - as in theatres - rather than meteorological or other more mysterious clouds.

The cloud prop thus came to signify and explain the truth of physical mediation between the earthly and the heavenly realm. There was an exchange of bodies and of information mediated by the cloud *machinery*, not by a meteorological cloud. Clouds in religious theatre were thus a tool to conceal as much as explain and enable the transition from earth to heaven, from secular to divine. Cloud machinery became, in some instances, *more real* than what the painter could imagine.¹⁶ The Quattrocento thus invented a cloud device that was inspired by the meteorological phenomenon – outline-less, borderless, locationless, concealing and revealing, transcendentally mobile – yet entirely different: the cloud prop and its pulley system formed part of a greater context that structured the heavenly and earthly realms. It was crafted and its shape was fixed to resemble a mandorla.

In the sophisticated, late fourteenth-century Christian treatise *The Cloud of Unknowing*, its anonymous author advises those who wish to truly be close to God to approach God through non-intellectual contemplation. The best strategy is to focus on the "cloud of unknowing, that is betwixt thee and thy God"¹⁷ and to attempt to truly occupy this darkness. By darkness the author means "a lacking of knowing: as all that thing that thou knowest not, or else that thou hast forgotten, it is dark to thee; for thou seest it not with thy ghost-ly eye. And for this reason it is not called a cloud of the air, but a cloud of unknowing."¹⁸ The cloud prop, like the imaginary "cloud of unknowing" as

mediating tool between the devoted Christian and her God, creates an intermediate space with blurred outlines and a flexible location.

Acting as a mediator between earth and heaven, the cloud apparatus pre-empted any inquiries into the how of the ascension. In Buccheri's words, these props "were used mainly for the representation of the episodes which involved some communication between heaven and earth".¹⁹ While a full unpacking of the relationship is beyond the scope of this article, I hope to show that the metaphorical, pseudo-meteorological cloud, which so omnisciently guides today's daily practice of cloud computing, communication, and archiving, has a long tradition of enabling communication between two bordering but ultimately distinct realms. Much like today's digital storage cloud, the cloud machinery bridged and blurred the (hardware) gap between earthly ground and divine heaven. The cloud prop can be read as a data transfer tool, thus closely relating to today's digital cloud of cloud archiving and cloud computing. Like the cloud prop in religious theatre, the digital cloud accesses an elusive realm - of digital, physically intangible data. The cloud is thus a connective device or rather a mediating environment, as its responsive nature defies clearly defined boundaries. The cloud acts as an interface: between heaven and earth, between user and data.

GIULIO CAMILLO'S MEMORY THEATRE

The theatricality of the cloud that veils and unveils – much like a theatre curtain – was not confined to religious theatre. Giulio Camillo's Memory Theatre also embodied the notion of concealing for enhanced truth. The practice of disguising knowledge to make it accessible for only those who are worthy – believers or those initiated in particular knowledge practices – was a common concept throughout the late Middle Ages and the Renaissance. Giulio Camillo's Memory Theatre never quite materialized and hovers like a cloud of blurred information between the pages of his posthumously published *L'Idea del Teatro* (1550) and the imagination of its readers. In the study of the ontological and spatial origins of today's digital cloud, the Memory Theatre offers further architectural and theatrical analogies.

In line with the rhetoricians of Ancient Greece, who conceived so-called memory palaces as mental memory aids, Camillo devised a spatial memory system. He dedicated most of his life to creating the structure, plans, and prototype for a physically accessible memory pavilion, which would be used less for practical purposes, than for the transcendental access of all the world's wisdom. His Memory Theatre was an attempt to gather and organize all knowledge in one place – accessible to anyone who wished to be infused with the memories of all insight.

The Memory Theatre uses architecture to support and order processes of the mental faculty of memory. The structure is modelled on classical theatre, with semicircular ranks arranged around the stage. On the ranks Camillo placed a rich array of memory "trigger images" which would be viewed from the stage, inverting the positions of spectator and image-actors. He described the workings of the project in *L'Idea del Teatro*. In the following analysis, the project will be situated in the context of the art of memory, architecture and theatre, and archiving, in order to gain insight into the spatiality of memory.

L'IDEA DEL TEATRO

Giulio Camillo Delminio lived from ca. 1480 until 1544. During his lifetime, he acquired much fame, manifest in his nickname "Santo Camillo", the patronage of the French King Francis I, and a legend around his dangerously close encounter with a submissive lion. Much of the enchantment of the theatre project rests on the fact that it always remained largely invisible: for most of his life, Camillo was developing the project and remained hesitant to show it in its uncompleted state. *L'Idea* evokes vivid imagery but contains no illustrations. By the time of its publication, rare built evidence of the theatre had already disappeared.²⁰

The fascination engendered by the work thus lies in conjuring evocative images in the reader's mind, and puzzlement at the notion of "all the world's knowledge" assembled coherently in one place – accessible and absorbable. The conjured sense of mystery forms part of Camillo's stated ambitions. He aligned himself with the approach of Giovanni Pico della Mirandola (1463– 1494),²¹ and emphasized that truly enlightened writers shield "the secrets of God with dark veils, so that they are understood only by those, who, as Christ says, "have ears to hear", that is, those who are chosen by God to understand His most holy mysteries".²² Camillo stressed the importance of presenting (divine) truths in a round-about manner that demands a certain degree of interpretation skills from the reader. To substantiate his method, he referred to the ancient custom of placing sphinxes at temple entrances to remind the believer that "one should never speak publicly of the mysteries of God, except in riddles".²³ He also evoked the Christian tradition, as Jesus spoke to his Apostles in parables, which only they understood, because to them it was "given to know the mysteries of the Kingdom of Heaven".²⁴ Camillo thus positioned his theatre in a lineage that veils holy truths in shrouds of riddle, so that only those who have the required openness and learnedness can access his mysterious knowledge-transfer realm. It could be argued that Camillo artificially created a kind of inaccessible information realm, to which his theatre establishes an interface. The rood screen of the religious plays is analogous with Camillo's rack of images. Rather than a "cloud" to navigate the interface between the realm of truth and the realm of ignorance, it requires an inquisitive state of mind.

L'Idea describes a complex hierarchical order of wisdom that draws its structure from a variety of sources - the classical texts revived during the Renaissance, Christian, Cabalist, and the Hermetic works of the alchemist pseudoscientific world. Camillo's ultimate goal seems to have been to tie the different strands and traditions of knowledge together into a mnemonic knot. Like a labyrinth that only becomes comprehensible when seen from above, he suggests using the theatre as a metaphorical medium for "climbing" into the higher realms of knowledge for better insight. He compares the search for knowledge to being "in a great wood".²⁵ Wishing to see the whole forest, he must climb a hill. The incline mediates between the top of the hill that offers an overview (truth) and the forest (earthly confusion). Empowered by the complex interplay of the wisdom of Christianity, Cabalism, and Hermeticism, he and his fellow scholars must aim to ascend to the metaphysical heights of origin and superior wisdom in order to access true comprehension of the world. This picks up on themes of elevation, transcendence into otherwise inaccessible realms, and information transfer expressed more directly with the cloud machinery.

THE STRUCTURE OF THE THEATRE

To articulate the notion of an allegorical elevation, Camillo does not make use of cloud symbolism, but rather organizes the theatre around seven astral figures. These reference Salomon's observation that "wisdom hath built herself a house"²⁶ and supported it on seven columns. To Camillo, using the seven planets – Saturn, Jupiter, Mars, Sol, Venus, Mercury, and "Luna" – as starting points for a mnemonic system is advantageous because they are well known. Camillo arranges the planets in a half circle around the stage. The sun is placed centrally, at the quadrant of the semicircular plan, the "most noble place of all the theatre".²⁷ The sun is Camillo's favourite celestial body because of its "germinative" powers. The overall structure is divided into seven columns, marked by the planets, and seven tiers.²⁸ On each rank, there are seven doors that align with the planet columns. A thematic image is assigned to each row and adorns each of the seven doors. Its meaning changes according to which planet it engages with. The theatre's first rank, the lowest and closest one to the stage, is occupied by "the most natural [noblest] things".²⁹ On the seventh level "shall sit all the arts and properties that fall under these canons, ... by reason of chronology, since these were the last to have been found by men"..³⁰ The hierarchy thus values matter that has been the least manipulated by humans and that retains a pure, "original" quality.

The seven doors on the lowest rank each show their corresponding planet painted in human form.³¹ Below each of these seven doors, there are three related images of the "supercelestial, celestial and the mythical worlds", to situate and illustrate the planet. On the second tier a banquet scene decorates each door. The banquet is a symbol for beginnings and alludes to the fictional banquet in Homer's Iliad, which Oceanus hosts for all the other Gods. Oceanus here represents "the waters of wisdom which were in existence before the materia prima,"32 and the other Gods, represent "the Ideas, forms and exemplars of essential things in the eternal mind ... whence all things created drew their being"..3 This Neoplatonic concept refers to elements in their pure, unmixed form.³⁴ On the third rank, the doors show the Homeric Cave from Plato's Republic, close to the harbour of Ithaca, where nymphs were weaving purple linen and bees were producing honey. In Camillo's understanding, "God created new matter ... from the primary [matter]. He formed everything which we call mixed and simple ... except for man, who, [was] formed separately".35 The creation of "interior man" - the souls - is depicted on the fourth rank, through the Gorgon Sisters. The fifth step then deals with man's body - "exterior man". The individual planets' influence determines the focus on particular body parts. Interestingly, this topic is visualized with Pasiphaë's attraction to the Bull, which culminated in the conception of the Minotaur – half human, half bull. The sixth level portrays Mercury's Sandals. To Camillo, they refer to natural (excluding artistic and technological) human activity. On the final, seventh grade, Prometheus and his torch stand for the fire that he stole for the humans. In Camillo's cosmology, it symbolizes the arts.³⁶

The spatial arrangement of the images in Camillo's theatre is the result of much consideration, yet it still remains somewhat intangible. Frances Yates's



Figure 2. Frances Yates's plan view reconstruction of the theatre, based on L'Idea del Teatro. Source: Appendix in Yates, A. F., 2007. The Art of Memory. London: Pimlico.

reconstruction of the theatre, based on *L'Idea del Teatro*, is a plan view of the design, with the ranks and imagery written down at their appropriate positions (Figure 2). However, there is no sense of the rich and evocative imagery usually employed in mnemotechnics, nor of the spatial implications of a construct that consists of ranks, gates, gangways, and a stage. Lu Beery Wenneker, who completed his dissertation at the University of Pittsburgh on this project in 1970, has included an abstract, relatively flat elevation. It more closely resembles an information board than a richly adorned theatre (Figure 3).

It is in fact not clear whether the wooden pavilion that Camillo built had actual stepped ranks, or whether, as in the depiction in Wenneker's thesis, they were merely suggested as reliefs to allude to theatre architecture. Since the images and gates were two-dimensional representations on the wall, it is as such not necessary to imagine the "amphitheatre" that some of Camillo's contemporaries – and eyewitnesses of the theatre – refer to. One of these was Viglius Zuichemus. He explained the construct to Erasmus, in a letter dating from 1532,³⁷ after meeting Camillo in the wooden "Amphitheatre", which was "marked with many images, and full of little boxes".³⁸ Zuichemus further reports:

He calls this theatre of his by many names, saying now that it is a built or constructed mind and soul, and now that it is a windowed one. He



Figure 3. Lu Beery Wenneker's abstract, relatively flat elevation.

Source; Wenneker, L. B., 1970. PhD Thesis: An examination of L'idea del theatro of Giulio Camillo, including an annotated translation, with special attention to his influence on emblem literature and iconography. Michigan: University of Pittsburgh.

pretends that all things that the human mind can conceive and which we cannot see with the corporeal eye, after being collected together by diligent meditation may be expressed by certain corporeal signs in such a way that the beholder may at once perceive with his eyes everything that is otherwise hidden in the depths of the human mind. And it is because of this corporeal looking that he calls it a theatre.³⁹

It seems that Camillo aimed to mediate the knowledge transfer between the viewer and physically imperceptible knowledge – between physical organs of perception and intellectual, immaterial signals – via specially conceived "corporeal signs". These physical markers render the otherwise inaccessible information discernible. As such, the memory theatre operates on a similar level as today's digital cloud archives. The physical user accesses information "which we cannot see with the corporeal eye" and that pulsates in the electronically and radio-wave transmitted space of the digital cloud, via the mediating two-dimensional interface of a tangible hardware screen. Thus, the theatre attempts what the digital cloud achieves.

Architecturally, the main structure draws on the Vitruvian instructions for theatre design that were known through Alberti: semicircular in shape, the



Figure 4. Theatre of Austrian Peace that had been erected to welcome Archduke Ernest, an Austrian Habsburg prince, to Antwerp in 1594. Source: Public Domain: https://warwick.ac.uk/fac/arts/theatre_s/research/current/festivals/mcgowan/list_of_illustrations/

auditorium ranks are divided by seven gangways, and the noblest "spectators" sit on the lowest ranks and the humblest – the artisans – sit on the highest, furthest seats.

Wenneker suggests that the theatre would have resembled the semicircular, three-storey-tall Theatre of Austrian Peace of 1594, which had been erected to welcome Archduke Ernest, an Austrian Habsburg prince, in Antwerp. Like in Camillo's theatre, both the audience and the stage are exchanged. Figures of peace – Apollo, a female personification, and other peace "players" – are sitting on the ranks of the construct. The seats at the centre of each storey are also occupied by the most important figures, comparable to Camillo's sun column (Figure 4).⁴⁰

THE ART OF MEMORY

There are a number of ways of reading the theatre in the context of the tradition of the art of memory. Memory, originally one of the five canons of rhetoric, and its artificial⁴¹ enhancement via mnemotechnics, was still commonly

practised during Camillo's lifetime. Because of the close relationship between architecture and memory in the Teatro, this article focuses on the more spatial mnemotechnics. The architectural art of memory had been adapted considerably since its beginnings in Greek antiquity, where it can be traced back to the myth of its invention: Simonides of Ceos (556-468 BC) was commissioned by a greedy patron, Scopas of Thessaly, to present a lyric poem at a banquet. Irritated that Simonides generously praised the gods Castor and Pollux, Scopas decided to pay the poet only half of the agreed remuneration and suggested that Simonides collect the rest from the praised twin gods. Sometime later that evening, Simonides learned that two men were waiting to talk to him outside about a pressing matter. As he was searching for them - conceivably Castor and Pollux - the roof of the banqueting hall collapsed and mangled all the guests to such an awful degree that their crushed corpses could not be recognized by their families. Fortunately, Simonides remembered the order in which the guests had been placed around the table and could thereby identify the bodies according to their positions. Simonides interconnected information images (the faces) with specific places (at the table), in a given sequence. And so, in Cicero's words,

He inferred that persons desiring to train this faculty [of memory] must select places and form mental images of the things they wish to remember and store those images in the places, so that the order of the places will preserve the order of the things, and the images of the things will denote the things themselves, and we shall employ the places and images respectively as a wax writing-tablet and the letters written on it.⁴²

Also known as the "method of loci", this branch of rhetoric's art of memory thus creates places in the imagination or uses familiar places from memory. Note how the legend of the invention of the architectural arts of memory is also bound to a specific house – that of Scopas. Preferably, these *buildings* offer varied architectural features, such as niches, arches, or courtyards. The memorizer then defines a route through the building: for example, "up the entrance stairs", "into the entrance hall", "through the corridor", "past a niche", "around the corner", et cetera. Along this route, which establishes a spatial and temporal sequence, she places striking images that trigger certain topics. When the memorizer needs to access the stored memories, she can do so by walking through her "memory palace" and collecting them along the route. This exercise can be repeated by erasing the deposited images, as from a wax tablet, and repopulating the house of memory with new images. The unknown author of *Rhetorica ad Herennium*, ca. 86–82 BC, advises that the images employed to trigger the associated memories should have features that are "exceptionally base, dishonourable, unusual, great, unbelievable, or ridiculous"⁴³ because these out-of-the-ordinary assets are likely to be more easily remembered. A striking memory image to recall the account of Simonides's discovery of the art of memory would depict the poet amongst the mangled mass of crushed guests, deciphering their identities, one after the other, around the destroyed banqueting table.

Naturally, Camillo's Memory Theatre is part of this mnemotechnical tradition. He creates a space that is populated by memory images that trigger certain associations. However, his construct does differ somewhat from the original memory palaces. Firstly, there is no route that the practitioner follows – he remains at the centre of the circular "stage" and looks onto the ranks. The spatial sequence comes less from the onlooker's movement, but is instead established by the hierarchy and order of the ranks and columns, which suggest a sequence of observation. Neither does Camillo adhere to the practice of creating varied and characteristic spaces within memory buildings. His theatre is repetitive: much space is taken up by the sevenfold repetition of an image on each row; the smaller, particularly telling images are crowed underneath each of the forty-nine doors, along with drawers for relevant text documents. It seems that Camillo attempts to encourage "knowledge absorption" by reiteration. He combines striking images with repetition, thus bringing together two mnemonic strategies.

In medieval times, memory was understood as a gathering activity, which accumulates a texture of associations related to a certain topic.⁴⁴ Quintilian compared the orator, who gathers knowledge fragments and composes them to generate ideas and arguments, to bees, which "turn various kinds of flowers and juices into that flavour of honey". At the time, memorizing was closely related to internalizing the content in a process named "textualization". Mary Carruthers writes, "The Latin word *textus* comes from the verb meaning 'to weave' ... *Textus* also means 'texture."⁴⁵ Memory was understood as an exercise of gathering, layering, and weaving together in order to (re)compose new, in-depth knowledge. The memory theatre embodies this gathering and composition practice. Its image doors serve as gathering points for thoughts and concepts that texture individual aspects of Camillo's knowledge hierarchy. For example, the symbol for fire in Mars's column gathers a "texture of meaning" when seen in relation to the other doors and their fields of meaning:

Under the Cave, it represents the ether, the elemental fire, the universal blaze, our fire, the personal blaze, a spark, flame, coal and ashes. Under the Sandals it will stand for striking a fire, catching fire from a tinder, to kindle it, to put it to a blaze, and extinguish it. Under Prometheus it will include all the arts of the smithy which are effected with fire.⁴⁶

Camillo's memory theatre can thus be understood as an archive for memory images. He establishes a flexible - if somewhat personal - and open system, a microcosmic representation of the universe. His rich and suggestive images trigger a number of associations, and depending on which theme and planet they are related to, they take on different meanings. The variability of the images is underlined by Camillo in L'Idea when he walks the reader through an image adaptation across the ranks, as with the fire example in the Mars column. Depending on the degree of learnedness and imaginative faculties, each hypothetical spectator soaks up more or less knowledge, generates connections, and makes deductions. The "readers" can select and duplicate the images in their own memory archives, be they palaces, cabinets, or theatres. The images function as "players", as they take on a life of their own in the imagination of the particular viewer. Depending on the associations that the spectator on the stage makes and which images he pairs or groups, the "play" will unfold. The accessible knowledge comes to life as actors in a theatre - taking on a variety of roles and telling a diverse number of stories, according to who reads them and in vicinity to which other "players" they are perceived. His theatre is an animated moment in a fruitful thought process: connections are made, fields of meaning are texturized, new compositions are formed. Camillo had at one point considered using the human body as memory analogy but ultimately decided on the theatre. One can assume that he chose this typology because its spatial organization allows the active and interactive information "players" to engage fully. L'Idea shows that the forty-nine fields are not isolated and complete in themselves - they benefit from their connection with the other positions: "Camillo's 'corporeal looking' is activated in his memory space, and depends on a historical subject viewing and thus 'remembering' the knowledge incorporated in the images."47

Jacques Derrida's *Archive Fever: A Freudian Impression* (1995) explains the archive in a way that is applicable to the Memory Theatre in its archival capacity. He traces the origins of the word "archive" to the Greek *arkheion*: "initially a house, a domicile, an address, the residence of the superior magistrates, the archons, those who commanded."⁴⁸ The archived documents re-

quire "at once a guardian and a localisation". In Camillo's theatre, the stored knowledge is localized in the theatre. It is guarded by Camillo and by the insight-seeking "spectators", who like Derrida's archons "have the power to interpret the archives". Gathering a representation of the world - be it as microcosm, as talismanic or emblematic collection - is driven by the archontic principle that is "also a principle of consignation, that is, of gathering together".49 The "obscuring veils" that Camillo spreads over the embedded information align with Derrida's understanding of the essence of the archive "To shelter itself and sheltered, to conceal itself".⁵⁰ Along with the gathering, preserving, and repeating activity intrinsic to archives is, in Derrida's Freudian interpretation, the will to destroy: the archive's *death drive or archival fever*. Camillo was consumed and to some extent defeated by the wish to gather the knowledge of the universe - the universe and its workings - in one place, in a mnemonic nutshell. The veils of secrecy, the elitism, the obscurity of the hermetic tradition imploded in the memory theatre, so that it could never truly function in its archival and revelatory capacity.

CONCLUSION

While a closer investigation of the theatrical qualities of the digital cloud are beyond the scope of this article, it can be argued that, like the theatre, the cloud is a site of information interaction. The digital cloud is also closely related to a kind of *fever*: the "database complex", which is characterized by media theorist Lev Manovich as "the irrational desire to preserve and store everything".⁵¹ Its veil of secrecy is one of fear. Fear of information loss⁵² and fear of infiltration. The cloud has come to be seen as a new site of sovereign power.⁵³

In regard to the imaginability of the spatial qualities of the digital cloud, the discussed material identifies several of these attributes. The cloud creates its own spatiality. The discussed theatre props and paintings show that clouds generate their own infinite, timeless space. A cloud's surfacelessness and inherent mobility allow it to navigate otherwise inaccessible spaces. The spatiality of the cloud is like the information it reveals: it is never quite tangible and graspable, but remains veiled and blurred. As long as the digital cloud remains shrouded in an elusive and barely imaginable spatial ephemerality, it can constitute a site of sovereign exclusivity. The disembodiment that occurs in the "reduction of other to data,"⁵⁴ and the impenetrable intangibility of the digital cloud, can be counteracted with historical spatial references that point to the characteristics inherent to the digital cloud. The less ephemeral and

the more spatially unpacked this construct is, the less evasive and potentially exclusive today's data archives can become. The memory theatre as evocative – rather than complete – archive thus raises overlaps as regards uncertainty, subtraction, and expansion that are especially relevant in relation to today's big data archives.

NOTES

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¹⁰ Buccheri, *The Spectacle of Clouds*, p. 2.

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¹² Elie Konigson, La représentation d'un mystère de la passion à Valenciennes en 1547 (Paris: Centre national de la recherche scientifique, 1969).

¹³ Buccheri, *The Spectacle of Clouds*.

¹⁴ Damisch, A Theory of /Cloud/, p. 71.

¹⁵ Ibid.

¹⁶ It is beyond the scope of this article to go into more depth on the notion of truth in painting. However, Alberti's treatise *On Painting* offers insight into the relationship between "what the painter sees" (the theatrical performance) and truth – which he must then represent in his work. ¹⁷ Anonymous, *The Cloud of Unknowing*, Kindle edition, Kindle location 410–12.

¹⁸ Ibid.

¹⁹ Buccheri, *The Spectacle of Clouds*, p. 14.

²⁰ By 1550 the prototype could no longer be found. See Frances A. Yates, *The Art of Memory* (1966; repr., London: Pimlico, 2008), p. 140.

²¹ Douglas Radcliff-Umstead, "Guilio Camillo's Emblems of Memory", Yale French Studies, Image and Symbol in the Renaissance, 47 (1972), p. 49.

²² Lu Beery Wenneker, "An Examination of L'Idea Del Theatro of Giulio Camillo", PhD thesis, University of Pittsburgh, 1970, p. 197.

²³ Ibid.

²⁴ Ibid., p. 199.

²⁵ Ibid., pp. 206–07.

²⁶ Ibid., p. 201.

²⁷ Camillo, in ibid., p. 211.

²⁸ In Cabalist symbolism, the number seven is especially powerful.

²⁹ Camillo, in Wenneker, An Examination of L'Idea Del Theatro of Giulio Camillo, p. 211.

³⁰ Ibid.

³¹ To emphasize the importance of the sun, there was to be an interruption of the schema in the section of the sun, where Apollo would be sitting at "the banquet of the Breadth of Being, which is the image of the Divinity" (ibid., p. 211) conjuring the first day of creation.

³² Yates, The Art of Memory, p. 144.

³³ Wenneker, An Examination of L'Idea Del Theatro of Giulio Camillo, pp. 231–32.

³⁴ Yates, The Art of Memory.

³⁵ Wenneker, An Examination of L'Idea Del Theatro of Giulio Camillo, p. 123.

³⁶ Yates, The Art of Memory.

37 Ibid.

³⁸ Ibid., p. 145.

³⁹ Ibid., p. 137.

⁴⁰ Monica Stensland, *Habsburg Communication in the Dutch Revolt* (Amsterdam: Amsterdam University Press, 2012).

⁴¹ Memory was divided into natural and artificial. Artificial memory was trained and improved, and stirred some controversy.

⁴² Cicero quoted in Yates, *The Art of Memory*, p. 2.

⁴³ Rhetorica ad Herennium, quoted in Yates, *The Art of Memory*, p. 25.

⁴⁴ Mary Carruthers, *The Book of Memory: A Study of Memory in Medieval Culture* (Cambridge: Cambridge University Press, 2008).

⁴⁵ Ibid., pp. 11 and 14.

⁴⁶ Camillo, in Wenneker, An Examination of L'Idea Del Theatro of Giulio Camillo.

⁴⁷ Michaela Grobbel, *Enacting Past and Present: The Memory Theatres of Djuna Barnes, Ingeborg Bachmann, and Marguerite Duras* (Oxford: Lexington Books, 2004), p. 12.

⁴⁸ Jacques Derrida and Eric Prenowitz, "Archive Fever: A Freudian Impression", *Diacritics*, 25/2 (1995), p. 9.

⁴⁹ Ibid., p. 10.

⁵⁰ Ibid.

⁵¹ Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001), p. 235.

⁵³ Wendy Hui Kyong Chun, *Control and Freedom: Power and Paranoia in the Age of Fiber Optics* (Cambridge, MA: MIT Press, 2006); Hu, *A Prehistory of the Cloud*; Amoore, L. (2016) 'Cloud geographies: computing, data, sovereignty', *Progress in human geography.*

⁵⁴ Chun, Control and Freedom, p. 29.

⁵² Hu, A Prehistory of the Cloud.

CHANGING PERSPECTIVES ON STORMWEATHER MANAGEMENT IN NORWAY Elisabeth Sjödahl

ABSTRACT

Climate change in Scandinavia leads to more rain over shorter periods of time, giving water management a central role in future urban planning. The aging sewage systems and urban growth in the Oslo region, as well as water supply safety and the lowering of groundwater levels, are factors that are forcing planners to rethink stormwater management (SWM). This article reviews literature that reveals how SWM thinking has changed over the last decades in Norway. The review provides insight into what is specific for the Norwegian context and gives perspectives on the development of trends within SWM.

KEYWORDS

Stormwater management, landscape architecture, infiltration, climate change, groundwater.

STORMWATER MANAGEMENT IN A NORWEGIAN CONTEXT

Climate change creates new precipitation patterns with more intense rain, which together with urban growth results in more intense run-off water. The risk factors in relation to human settlements depend on how SWM is handled, and on how infrastructure is implemented in the territory. A paradox of the northern latitudes with heavy precipitation is the decreased amount of groundwater. The melting snow that previously filled up the groundwater levels has now gradually been replaced by warmer winters with rain and quick run-off water that does not fill up the aquifers to the same extent, and the snow that falls in the seasons when the plants have started to grow is taken up by the vegetation before it reaches the deeper ground. In addition, the long periods with temperatures around zero degrees create frozen ground surfaces with ice cover that results in a high run-off coefficient and clogged stormwater infrastructure. The prolonged periods of shifting between snow and rain, or snow that melts during the day and freezes again during the night, also creates demanding circumstances for pedestrians and traffic safety.¹

While this study deals with Oslo, the conditions vary across the country:

Norway's climatic change challenges are represented in three main regions by the European Environment Agency (EEA):

- The Boreal region around Greater Oslo has a prediction of raised precipitation and an increased frequency of heavy rains and less snow and ice on lakes and rivers.
- In the mountain regions in the central part of Norway, the effects of raised temperature are stronger than in the rest of Europe and imply a decrease in glacier size and snow cover.
- In the Atlantic region at the west coast, the main effects are sea-level rise and increase in heavy precipitation and river flows as well as winter storms.² This means that the SWM has specific local conditions to account for.



Figure 1. The superposition of the park system from 1950 with the actual urban situation of 2016 that erases some of the former planed park structure. From the Oslo general plan of 1950 elaborated in the period of planning director Eirik Rolfsen and today's situation based on GIS maps from GeoNorge 2016; illustration elaborated by the author in 2016.

A HISTORICAL BLUE-GREEN BACKGROUND TO OSLO

The Norwegian landscape architect Marius Røhne³ started at the planning office of Oslo in 1916 and established a park plan for Oslo in 1916–17,⁴ which provided the base for future planning of a green structure for the city of Oslo, developing an integrated park system that connected the Marka natural reserve with its mountains and woodlands with the sea.



Figure 2. Illustration of Oslo's watersheds to the north, with its waterways that lead down to the urban areas and the fjord (in grey the urbanized area of the Oslo municipality delimited by the line of the Marka natural reserve to the north and south-east). Map elaborated by the Master Course "Sp(C)lash – Let's go swimming" in 2017 at the Oslo School of Architecture and Design.

Harald Hals, the city's urban planning director during the period 1926–47, saw the value of Oslo's green structures. In the years after his education as an architect, he had been working in the United States in Seattle and Chicago until 1911. From this time Harald Hals could have been inspired by the Boston "Emerald Necklace" (1878-1896), by Frederick Law Olmsted where one third of the park was established as a flood control and water quality project. This is shown in Olmsted's map of 1881, "General Plan for the Sanitary Improvement of the Muddy River", which indicates the water management aspect of the project.⁵ However, over the decades, the clear green-structure of Oslo that guides the water from the higher levels of the natural areas of Marka has been gradually erased by urban development. In addition, Oslo has recently been one of Europe's fastest growing cities, where the main urban pressure is now found not in the municipality of Oslo, but in the surrounding regions, where clear green structures and floodways are to be defined.

REVIEW OF LITERATURE

The review of literature on stormwater management aims to reveal the change in thinking in Norway during the last decades. The review is mainly based on the journal *Vann* (Water), which is the Norwegian Water Association's publication.⁶ This is a central publication for Norwegian professions related to water management. It contains scientific articles, as well as descriptions of technical facilities and investigations carried out, and offers practical advice and guidance. It has provided regular information about the activities of pivotal water-based environments in Norway and important academic events in Norway and abroad. The journal started one year after the inauguration of the Water Association in 1964. The review also utilizes the recent report published by the Norwegian Ministry of Climate and Environment, "Stormwater management in Cities and Villages: A Problem and a Resource",⁷ which provides an additional overview of the Norwegian literature in relation to stormwater management.

The research is carried out through literature reviews asking: What have the main tendencies been in the discourse on stormwater management in recent decades in the Norwegian context, as reflected by central publications? In addition, a supporting question is: Which are the transferable thoughts in international readings and approaches to Norwegian SWM with relevance today? Based on the review, a set of perspectives on SWM over recent decades were identified that can be seen as phases of a development leading to the rapidly changing situation today.

STORMWATER MANAGEMENT IN RECENT DECADES WATER QUANTITY AND QUALITY

In the 1970s, a research program for the purification of waste water was developed in Norway (prosjektkomiteen for rensing av avløpsvann, PRA). The main purpose of the program was to provide a better basis for the significant investments that were made in the waste water sector and to reduce water pollution problems that had been discovered in the lakes, fjords, and sea. In relation to this program, the Norwegian Water Resources and Energy Directorate (NVE) initiated a project where urban hydrological stations were installed to measure urban run-off.⁸

Heavy rains are only corresponding to a small part of the yearly rain. The sewage system that leads rainwater is therefore not designed for the peak volumes that the heavy rain gives.⁹

The project revealed that the combined sewage (CS) system, which was the norm at the time, resulted in pollution, as the sewage system and treatment plants could not take the overload at heavy rains and thus let the rain and sewage go directly to the sea without cleaning. In Oslo, the CS overflow is still a problem, while some parts of the sewage system have the old combined system.

The concern in the discourse at that moment was mainly focused on the quantity and quality of the water, as well as the industrial sewage problems.¹⁰ There are publications that suggest retention ponds, such as civil engineer Gunnar Mosevoll's PRA 2 report "Rainwater Overflow and Retention Ponds".¹¹ Here the suggestion is that the overflow system should be put into operation once the net is saturated as a reserve volume parallel to the general system. In this first phase, Stormwater management was viewed as a technical hydrological question.

THE IDEA OF INFILTRATION

The next phase revealed in the literature study was also a part of the PRA research project, where engineer Oddvar Lindholm suggested in 1975 to infiltrate more rainwater into the ground.¹² He later estimated that there are around twenty housing districts in Norway with an open SWM, and that there were approximately sixty at the end of the 1970s in Sweden.¹³ He refers here to Westinand and to Malmquist and Hard.¹⁴ The article shows that there is an international exchange of knowledge between researchers, but that the implementation of research into practice is taking its time.



Figure 3. Source: stormwater overflow system from Mosevoll, 1975, PRA 2 "Regnvannsoverløp og fordrøyningsbasseng". Illustration based on diagram, p. 12, translated by the author in 2017.

In 2008, Lindholm published a three-step guideline for SWM, introducing the logic of trying to infiltrate as much water as possible close up to the source where it falls.

The principle is based on an open solution where the first step is to catch and infiltrate, then delay and retain, and, finally, to create secure floodways. This system has become the guideline for the stormwater management policies in many municipalities. The quantity of rain, of 20 millimetres of precipitation, is to be caught and infiltrated where it falls, on rooftops, permeable ground, et cetera, and up to 40 millimetres is to be delayed within retention ponds and areas that can be temporarily flooded. When this capacity is exceeded, the rain is to be guided into safe floodways. The exact quantity and time frame are to be determined in each area of intervention. The guideline thus exposes a key question of responsibility for Stormwater management: while each municipality in Norway (426 municipalities for a population of 5.3 million people) is charged with evaluating the water quantity within its borders, the actual stormwater management systems often transgress municipal boundaries, leaving individual municipalities with responsibilities



Figure 4. Illustration based on Oddvar Lindholm's SWM strategy of "The Three Step Principle", Norsk Vann Rapport R-162, p. 8. Further elaborated by Oslo Municipality SWM 2013–30, "Tre trinns princippen". Traced and translated by the author in 2017.

for only parts of the overall system. In addition, the fragmented government system means that few municipalities have full competence within the field.

The articles in *Vann* demonstrate that the question of water quality was the most central from the 1970s to the mid-1990s. In the 1990s, Norway's biggest LOD (Local SWM) project, the Gardermoen Airport, and its consequences for the groundwater became vital to the discourse.¹⁵ The SWM was to be

handled on the surface, but the airport activity with de-icing chemical treatment for the planes, fuel, and oil, et cetera, implied a risk for drainage of toxic contaminants' down to the groundwater.

NATURAL DISASTERS AS ENGINES FOR CHANGE

In recent years, there has been an increase in articles dealing with stormwater management from the year 2000 up until today. At the beginning of the 2000s, the focus in the *Vann* journal increasingly dealt with the question of flooding. Climate change is becoming a more central theme, and in 2010 the Norwegian Ministry of the Environment presented a report on "Adaptation to a Climate in Change".¹⁶ The question of flooding became accentuated in 2011 when Copenhagen had its extreme rain event, resulting in extensive flooding. This promoted articles like "What If the Monster Rain from Copenhagen on the 2nd of July 2011 Had Fallen in Norway?"¹⁷

This article summarizes the societal effects of the flooding and refers to an evaluation report from the Copenhagen Fire Department¹⁸ that revealed that several critical infrastructures were hit hard by water damage, including emergency centres, the main hospital, the police, and the railway service.¹⁹ In Norway, a comparable rain event, "Frida", fell over the smaller town of Nedre Eiker in 2012 and dropped 70 millimetres in forty minutes. The overall consensus in the debate was that secure floodways had to be provided in the urbanized areas of Norway.²⁰ As a result, and as an example, Nedre Eiker started to use GIS as a relatively simple way to show the floodways at the property level.²¹



Figure 5. Overview of articles in Vann which deal with SWM. Illustration by the author made with Zotero and Photoshop in 2017.

STORMWATER MANAGEMENT TODAY STORMWATER MANAGEMENT AS PART OF LANDSCAPE ENGINEERING

The current literature converges on a set of themes. First, the landscape is increasingly seen to have a capacity to deal with stormwater, which can also introduce new qualities within the urban setting. Leading proponents within the landscape architectural field of "water urbanism" Bruno De Meulder and Kelly Shannon argue that "visions for territories can be designed for resilience, remoulding landscapes and reconstructing settlements to bend from hazards but not break".²² Aligning with the development on Stormwater management in Norway, they criticize a hard engineering approach and argue for a "softer" engineering method that reads the territory and its existing logics, and one in which interventions adjust to the natural logics of water. This, they state, is a realistic landscape engineering form where future challenges can be dealt with, and adapted to: nature's own forces.

The Societal and Economic Question of Stormwater Management

Second, a focus on the wider societal consequences of stormwater management events has emerged. In Norway, a major flood in south-eastern Norway in 1995 resulted in damages that amounted to about 1.8 billion NOK (200 million US dollars).²³ The consequences of flooding were also seen in August 2016, when heavy rains stopped traffic on one of the nation's most important roads in Oslo for several hours. The temporary collapse of mobility caused delays in the flow within the city, including transportation of goods, shutting down evacuation routes and access to hospitals, et cetera. The greater flooding events make the importance of SWM clear for all inhabitants, planners, and politicians, as it transforms from being a technical hydrological issue to a real conditioning event for everyday life. In a neoliberal planning regime such as the Norwegian one, this indicates that there is a need for a stronger juridical framework that strengthens the status of the cities' flood structures, in order to secure values.

The greater flood events are often exposed in the daily media, but in terms of costs it is rather the sum of the small stormwater damages to a wider range of households that represents the greater expenses, such as sewage overflow that is drawn back in the sewage system at moments of heavy rains and floods the cellars.

The city of Malmö can serve as an example of how such events lead to real change. Professor Peter Stahre commented that in some projects at the Municipality of Malmö, it might have helped to move towards a landscape-based stormwater management, because it was very difficult and costly to solve the stormwater management in a traditional way. Here, the open solution was the only economically reasonable way to solve the stormwater issues.²⁴ The question of economy could be developed further through a comparative cost calculation of traditional versus landscape-integrated stormwater management: its maintenance and its long-term economic effects.

There are a broad scope of ecosystem services based on water. As water is one of the fundamentals for life, it therefore has an outstanding position in terms of value. On the other hand, the economic effects of stormwater management can be relatively easily valued in the implementation of SWMwithin the landscape structures, versus traditional tube systems. In Oslo, this investigation is started with the work of evaluation of the ecosystem services "Values of Urban Ecosystem Services: Four Examples from Oslo".²⁵ As an example, this project compares the cost of implementing SWM in a traditional and a landscape-integrated solution, in the newly built area of Ensjø in Oslo. This can give clear argumentative tools for practitioners that promote landscape-based SWM solutions in their daily work.

SWM Can Become a Part of Cities' Drinking Water Security as Decentralized Systems

Third, the fresh water supply of a city can depend on one single system or be divided into a multisource system, which is a fundamental question for the cities' drinking water security.²⁶ Recent years of threat in cities has raised the issue of water security higher up on the agenda. This is especially the case in municipalities that receive their major intake from one fresh water source.

In the case of Norway with its rapid urban growth, this may lead to a more direct interaction between buildings and the landscapes of water that surround them. Here, increased run-off because of urbanization can be turned into an advantage in terms of water supply for an urban region that is in need of it. The idea of a "linear stormwater management" can be summarized in three steps: 1. catch and infiltrate, 2. delay and retain, and 3. create secure

floodways.²⁷ Using stormwater for drinking water in the Norwegian context can seem absurd at first as there is an abundance of water. But taking into consideration that Oslo has been close to water shortage in recent summers, and that an alternative water supply is being evaluated as the water tunnel project that opens up to the next water reserve Holsfjorden 2.5 kilometres to the north-west of Oslo, a circular use of stormwater presents itself as a viable solution. A circular use of water would permit the stormwater management to become an integrated part of the built-up environment, which is to be further investigated within the Norwegian context.



Figure 6. Illustration of the urban underground with its groundwater, made by the author in 2017.

"Underground Urbanism":

More Active Consideration of Groundwater in Planning Fourth, while research has found that groundwater was addressed in various articles as part of a bigger picture, in 2016 a reading of the territory from the perspective of the groundwater appeared in the article "Surface and Ground-



Figure 7. Older houses in Oslo, lower part constructed on fundaments of wood called treflåter; illustration by the author in 2017.

water: Interaction and How to Better Exploit the Interaction" by Hans de Beer. He suggests that the city's underground is important for an adaptable and sustainable urban development, not least in relation to how we handle stormwater. He argues that in contrast to the visual expressions in the cities, we see a significantly lower valuation of the importance of the subsoil among those who plan, develop, and manage our cities. "Stormwater management has traditionally focused a lot on the water's movement on the surface. Fortunately, today we see a turn towards a more holistic approach, where the potential of the subsoil is given more importance."²⁸

Knowledge about the characteristics of the subsoil is of great importance in understanding the absorption capacity and the sub-water flows. This is especially true in Norway with areas of quick clay that can be destabilized by water, and where solid soil can become liquid and start to move. The ground component of alum shale, as in the Oslo region, can also be affected if in contact with water, where it swells and releases heavy metals.²⁹ As illustrated by Beer's article, the general principle in the municipalities' use of the three-step principle of linear stormwater management is to first have a clear overview of the site- and soil-specific characteristics. Beer concludes, "today's knowledge and data about the underground are unfortunately, limited and fragmented. This prevents cost-effective and sustainable urban development, not least implementation of nature-based solutions for stormwater management".³⁰

One of the important effects of groundwater decline in the Oslo area is that the ground loses volume, and oxygen enters the ground and changes its properties.³¹ When the water does not cover the building foundations, oxygen reaches the wooden foundations causing them to rot, which destabilizes the buildings.

The groundwater affects various other factors in the Oslo region beyond the lowering of the groundwater table and its effect on older building foundations. For instance, the movement of pollutions from one site to the general water system, such as older waste dumps that, with the progression of urban growth, are being integrated into the urban fabric. In addition, the urban expansion that is taking place underground, with garages, storage, et cetera, increases the risk of modifying and cutting off the underground water system flows. Further, the lowering of the groundwater table affects local wells and the possibility for thermo-well installations. Based on these issues, there is actually a need for an "underground urbanism" that puts into context the already built and the planned future installations in relation to the natural underground systems. SWM as a Widening Field of Concern:

From a Technical Question to a Central Societal Question Involving Many Professions

Finally, the review of the literature reveals that a major challenge in the relationship between water and city is that water crosses not only administrative borders, but also – increasingly – disciplinary ones. Solving the stormwater problem within the landscape rather than in separate pipes requires an opening of the disciplines, which includes hydrology, civil engineering, environmental engineering, and economics, as well as urban planning, landscape architecture, and architecture.

The integration of stormwater management in the landscape means that several disciplines have to collaborate closely.³² The fact that the work implies a multidisciplinary approach means that there is also a need for structural changes within the planning administration system, and a clarification of each entity's responsibility in terms of SWM.



Figure 8. Illustration of the evaluation of storm water-related issues by Fleicher et al p. 534, based on an adoption from Whelans et al 1994.

The scarcity of space in urban areas, and the recognition of broad use of the blue-green structures in planning, requires even more functions to be integrated along with the management of stormwater.

The situation in Norway illustrates how stormwater management is becoming a widening field of concern. SWM has undergone important changes in recent decades: from a focus on flood mitigation, to the integration of a variety of conditions, such as recreational, environmental, and health aspects.³³ At each stage, new terms have been coined to describe the evolving set of parameters, such as best management practice (BPM), sustainable urban drainage systems (SUDS), water-sensitive urban design (WSUD), integrated urban water management, and so forth. In relation to the literature review, even more aspects can be added, such as social, economical, fresh water security, and rehydration of the ground.

DISCUSSION

As the literature study has shown, there are different phases in stormwater management, not clearly chronological, but partly overlapping and interwoven. The literature has mainly been restricted to central Norwegian sources in order to reflect the tendencies on SWM within the Norwegian setting. This might have excluded international publications that could have provided other contrasting insights and approaches.

The study has revealed that the number of experts on SWM has increased over time, and that the field is getting more multidisciplinary. Future reviews should incorporate this broader perspective, analyzing the different sources of publications.

CONCLUSION

The trends within stormwater management in Norway show that in the 1970s there was a general focus on the quantity and the water's quality, while the sewage system was made of combined pipes that were not dimensioned for the heavy rain peaks. Already in the 1970s, Lindholm put forward a case for dealing with the stormwater through infiltration. The years around 2000 saw the introduction of the three-step principle of: 1. catch and infiltrate, 2. delay and retain, and 3. create secure floodways.³⁴ This linear use of stormwater and its potentials to become a circular use of the water is worth researching further. This would help to deal with water scarcity, and the stormwater can become a part of the solution to the cities' drinking water security with a decentralized system.

Today, stormwater management is increasingly more present in municipal planning. However, the fact that research articles on the effect that built-up areas have on the stormwater – that it can aggravate its effects up to six times according to international studies³⁵ – were published in the 1960s demonstrates that it is not only a question of having the knowledge, but also the time that is needed for its application.³⁶

Current issues within Norwegian stormwater management include drinking water, groundwater, and economic aspects as a widening concern. Overall, current trends and theories suggest that stormwater management is to be resolved within the urban landscape: further research on principles and practices for social and spatial landscape and architectural solutions as well as cold climate specificities are to be developed further.

Stormwater management has become a widening field of concern, moving from a technical question to a central societal question involving many professions. There is a need for adaptation of the administrative system that facilitates tasks such as stormwater that crosses both municipal and administrative borders. There is equally a need for an "underground urbanism": an urbanism that takes the underground characteristics and already built environment into a more active consideration within planning. In the case of stormwater management, the relation between the ground's physical conditions, built environment, pollution, and groundwater merit further consideration in urban planning.

NOTES

¹ Gunnar Mosevoll, Hva gjør vi når regnet styrter ned?, Vann, 49/3 (2014), pp. 382–91.

² European Environment Agency, 2017. *Climate Change, Impacts and Vulnerability in Europe 2016*, EEA Report, January 2017.

³ The politician Fernanda Nissen worked for social reforms; she was active in the late nineteenth century and equally underlined the importance of the town's green spaces. See Jonny Aspen, *Byplanlegging som representasjon: en analyse av Harald Hals' generalplan for Oslo av 1929* (2003), pp. 231–32, AHO, Oslo.

⁴ Ibid.

⁵ Anne Whiston Spirn, *The Granite Garden: Urban Nature and Human Design* (New York: BasicBooks, 1984).

⁶ Vannforeningen.

⁷ Norwegian Ministry of Climate and Environment, *Stormwater managment in Cities and Villages: A Problem and a Resource*" (2015).

⁸ The measures were not completely reliable as they did not have the capacity to register extreme precipitation.

⁹ Gunnar Mosevoll, PRA 2: *Regnvannsoverløp og fordrøyningsbasseng*. PRA-brukerrapport, (1975), p. 12.

¹⁰ Themes of concern in the PRA 2, p. 2, are: 1. The quantity and quality of the sewage water; 2. Cleaning of sewage water and sludge treatment; 3. Use of recipient for disposal for sewage water and sludge; 4. Transport system; 5. Emission of polluted water in recipient; and 6. The industries' sewage problems.

¹¹ Mosevoll, PRA 2: Regnvannsoverløp og fordrøyningsbasseng.

¹² Oddvar Lindholm, Forurensinger i overvann, PRA 4.7, Vann, 10/4 (1975), pp. 297-307.

¹³ Oddvar Lindholm, Overvann – kilde til forurensning av grunnvann?, Vann, 17/2 (1982), pp. 177–82.

¹⁴ Lisbet Westin, Miljömessige aspekter på dagvattenhandtering-Litteraturgenomgång (Stockholm: Statens Råd för Byggnadsforskning, 1977); Per-Arne Malmquist and Stig Hård, Grund-vattenpåverkan av dagvatten infiltration (Göteborg: Geohydrologiska forskningsgruppen, 1981).

¹⁵ Torbjørn Damhaug, *Rensing av spillvann og forurenset overvann fra ny hovedflyplass, Vann*, 27/1 (1992), pp. 17–20; Svein Bøe, "Aktuelle rensetiltak for oljeforurenset overvann fra flyoppstillingsplasser", *Vann*, 30/1 (1995), pp. 147–52; Per Kraft and Roger Roseth, "Overvann med avisingsmidler på Gardermoen – laboratorieforsøk som grunnlag for prosjektering av jordbaserte renseanlegg", *Vann*, 31/2 (1996), pp. 196–207.

¹⁶ Norges offentlige utredninger, *Adapting to a Changing Climate*, Official Norwegian Reports NOU 2010: 10 (15 November 2010).

¹⁷ Oddvar Lindholm and Simon Haraldsen, *Miljøgifter i overvann fra tette flater, renseanlegg og overløp – Case Indre Oslofjord, Vann*, 48/2 (2013), pp. 223–29.

¹⁸ Copenhagen Fire Department (2011).

¹⁹ The fire department in Copenhagen received 180 different alarms during a four-hour period, relating to issues such as: flooding of the basement of the police headquarters resulting in telecommunication failures, flooding of the main hospital resulting in the need to evacuate trauma patients without functioning elevators, flooding in the basement of a prison with a risk for the power supply which put security at risk, and a general power failure that affected 10,000 inhabitants.

²⁰ Jarle Bjerkholt, Lars Buhler, and Oddvar Lindholm, *Hva hvis monsterregnet fra København 2. juli 2011 hadde falt i Norge?, Vann,* 48/3 (2013), pp. 361–70.

²¹ Rune Bratlie, GIS finner flomveiene, Vann, 48/2 (2013), pp. 272-77.

²² Kelly Shannon, Bruno De Meulder, Viviana D'Auria, and Janina Gosseye (eds.), *Water Urbanisms*, *UFO1* (Amsterdam: Sun Publishers, 2008), p. 57.

²³ According to The Norwegian Water Resources and Energy Directorate (NVE).

²⁴ The project of open SWM of "Toftanäs Wetland Park" is an example of a project where a solution of tubes was not economically defensible.

²⁵ Augustenborg in Malmö has also been a reference for the Norwegian SWM. Rasmus Reinvang, David Barton, and Anders Often, *Verdien av urbane økosystemtjenester: Fire eksempler fra Oslo*, Vista Analyse, 46 (2014).

²⁶ It has historically been a tactic to conquer a city by cutting a supply line of basic needs. Today, it is relatively easy to make the water useless through highly polluting elements. Antoine Picon, *Constructing Landscape by Engineering Water*, in Institute for Landscape Architecture, ETH Zurich (ed.), Landscape Architecture in Mutation (Zurich: gta Verlag, 2005), pp. 99–114.

²⁷ Oddvar Lindholm. Veiledning i klimatilpasset overvannshåndtering. No. R162 (2008). Norsk Vann p.8.

²⁸ Translation by the author. Hans de Beer, *Overvann og grunnvann – samspill og hvordan bedre utnytte samspillet, Vann*, 51/2 (2016), pp. 188–90, esp. p. 188.

²⁹ Ibid.

³⁰ Ibid., p. 189.

³¹ When oxygen enters the ground, it breaks down organic matter, including cultural heritage from former generations. Geological Survey of Norway. (2013), *Groundwater and Cultural Heritage*, (22nd NGU Seminar on Hydrology and Environment, NGU Report No. 3013.024). Geology for Society.

³² Peter Stahre, Blue-Green Fingerprints (Malmö: VA Syd, 2008).

³³ Tim D. Fletcher et al., SUDS, LID, BMPs, WSUD and More: The Evolution and Application of Terminology Surrounding Urban Drainage, Urban Water Journal, 12/7 (2015), pp. 525–42.

³⁴ Ibid.

³⁵ For example, Luna B, L. (1968). *Hydrology for Urban Land Planning. A Guidebook on the Hydrologic Effects of Urban Land Use.* (No. 554). Geological Survey. Washington: U. S. Department of the Interior.

³⁶ The 11th International Conference of Urban Drainage, 31 August to 5 September 2009, Edinburgh, Scotland.
THE SUSTAINABLE CITY IN NORWAY: THE QUEST FOR URBAN DENSIFICATION Fabio Hernández-Palacio

ABSTRACT

This paper discusses the issue of sustainable development and how sustainability has become a main aspect of the contemporary agenda in urban planning. Cities are embedded in specific geographic, social, and economic contexts, which require the adaption of urban sustainability premises and the application of tailor-made planning strategies. Norway as a country, despite having many things in common with other advanced economies, also has many particularities that have driven urban development in distinct ways. The Norwegian cities have one of the lowest densities in the world and the Norwegians, thanks to one of the highest income per capita, can afford the cost of low-density settlements. Car usage is high and still increasing. Given these circumstances, this article seeks to explore whether Norwegian cities can become denser and more sustainable. The exploration is conducted through a literature review on both general views on sustainability at the urban level and specific aspects of the Norwegian context, which influence urban policies and their outcomes. Planning for more sustainable cities has propelled the compact city as a paradigm of sustainable urban form and densification as a dominant planning strategy with particular implications for Norway.

KEYWORDS

Sustainable city, urban densification, Norwegian city planning

INTRODUCTION

Cities have become one of the main scenarios for the implementation of the sustainable development agenda. According to this agenda, it is envisioned that cities can minimize the impact on the global climate system and be more efficient in the use of resources, particularly by reducing the use of fossil fuels.¹ The sustainable city, however, is still an abstract idea which does not relate to any concrete physical form. Yet the most widespread interpretation of sustainability in urban space has been the compact city, which allows for

a more efficient use of space and, through the reduction of distances, has the potential of decreasing energy consumption, especially in transport. Less use of energy, given the current technologies of transport powered by fossil fuels, means a decrease in carbon emissions. Denser cities, with mixed land uses and polycentric structures, have been targeted as the archetype of the sustainable city because they enable environmentally friendly transport modes. In such urban layouts, it is easier to commute by using public transport, biking, or walking. Urban densification in consequence has been widely promoted in city planning, but real progress has been limited.

City change towards sustainability involves a complex web of factors and situations of which two issues represent perhaps the greatest challenges: first, cities evolve over long periods of time, and in many highly urbanized regions, large extensions of buildings and infrastructures are already built, not exactly matching the most compact and efficient layouts; second, cities are produced and used by society and their institutions, and social changes are slow, complex, and not easy to steer. These two challenges seem to be particularly valid in Norway, and possibly in the other Nordic countries. The Norwegian context is characterized by a relatively low population density in the larger cities, and a scattered population distribution throughout the country. Norwegians also enjoy one of the highest per capita incomes in the world, allowing them to easily bear the cost of low-density lifestyles. Densification has been a continued planning strategy since the early 1990s with positive gains in overall urban density, particularly in larger cities, but less clear advances in greener transport, the main expected outcome of increased urban density.

This article addresses the aforementioned problem of city change by exploring the role of city planning in driving a transition towards denser and more sustainable cities in Norway. It provides a review of literature on key concepts influencing the planning agenda under the paradigm of sustainable development. A set of four questions guide the argumentation:

- What does sustainable development mean for cities?
- How did the compact city become the paradigm of sustainable urban development?
- Why has there been a shift of the planning agenda in Norway?
- How does the compact city paradigm relate to Norwegian cities?

The article is organized as follow: Sections 2 to 5 address each of these questions and Section 6 presents conclusions and a discussion.

WHAT DOES SUSTAINABLE DEVELOPMENT MEAN FOR CITIES?

The concept of sustainability, despite the controversies, has endured for several decades and has been adopted by numerous national and international organizations. The new sustainable development agenda launched by the United Nations in 2015 set goals "to end poverty, protect the planet, and ensure prosperity for all".² According to this agenda, it is envisioned that cities can minimize the impact on the global climate system and be more efficient in the use of resources, particularly by reducing the use of fossil fuels. Cities already accommodate more than a half of the world population.³ This share is expected to increase in the coming years, not only due to migration from rural to urban areas, but also due to the natural growth of the urban population. Cities, concentrating an increasing part of the population, infrastructure, and economic activities, are the main scenario for sustainable development, adaptation to climate change, and other global challenges. Sustainability and adaptation to climate change are interlinked concepts underpinning the contemporary urban agenda; but the sustainable city is also a concept with multiple facets.

According to Daniela Müller-Eie and Lene Bjørnø, urban sustainability is a "compound concept", formed by various conceptual layers, where other sub-concepts are related to aims, strategies, and actors.⁴ The authors divide the definition into global and local components. In global terms, they define urban sustainability as: "The capacity of a city to meet formal, functional, social, economic and cultural standards that enable its population to live well and thrive without negatively impacting on global environmental, social and economic conditions." ⁵ In the local component, urban sustainability is defined as: "The facilitation and coordination between formal and functional strategies, such as sustainable land use (compactness, intensity, density), sustainable transportation and their integration, as well as cyclic resource management."6 The successful implementation of these strategies is enabled by the sustainable behaviour of the individual and the community, and by urban institutions providing sustainable choices. This is, however, a process where contradictions and tensions are common and where, following the authors' argument, "social innovation" is fundamental.

A very important part of the debate on the sustainable city among planners, architects, and transport engineers has focused on sustainable urban form. What physical arrangements can be made in a real context to provide better conditions for achieving sustainability targets? This question has led to an intensive debate, amongst other things, on how dense a city should be in order to be sustainable and how density should be allocated across the urban space. The compact city model characterized by a concentrated urban layout, high-density urban environments, and mixed-use areas has endured as the paradigm for urban sustainability.7 It is argued that denser urban environments offer a higher potential efficiency, particularly with regard to the use of resources, which is highly valued from an environmental viewpoint.8 This efficiency could be achieved by shortening urban trips as well as by using environmentally friendly means to take these trips, such as public transport, cycling, or walking; it could also be accomplished through the preservation of rural land for agriculture and for the protection of natural resources. The higher potential efficiency argument has been the strongest point made by proponents of the compact city model. However, densifying the vast sprawled peripheries that have developed over decades of car-oriented urban transport seems one of the biggest challenges. Very few opponents have brandished arguments against the potential efficiency of denser urban areas.9 Rather, most of the criticism has focused on the feasibility of densifying existing low-density areas, and on the potential adverse effects of high density on environmental and the social effects at a local level.

The sceptics of the potential efficiency of denser urban areas base their critique in arguments such as the poor correlation between urban density and travel behaviours.¹⁰ For example, it is estimated that a doubling of residential density can decrease journey lengths by only 30 per cent (May 2012). They maintain that travel behaviour is more influenced by income, lifestyle, and free-choice than by urban form.¹¹ Other studies recognize the relevance of non-environmental factors, but they argue in favour of an important role of urban form in personal transport choices.¹² Some other viewpoints maintain that advances in fuel efficiency and the increasing popularization of electric cars will decrease the relevance of more compact urban environments in reducing CO2 emissions, a central aspect of the sustainability agenda.¹³ However, the issue of more compact cities is not only connected to transport and greenhouse gas emissions. The preservation of natural areas and agricultural land is also an important element in this complex puzzle. The critics of the feasibility of the compact city model argue mainly in terms of economic barriers, such as the high cost of redeveloping brownfield sites.¹⁴ Dealing with multiple ownerships, dismantling or refurbishing large obsolete infrastructures, and cleaning polluted soil represent costs and risks that many urban developers are not willing to assume.¹⁵ Other critics have focused on the potential negative effects of higher densities on urban environmental quality and in turn on social acceptability.¹⁶ According to them, higher densities might cause a decline in the accessibility to green areas and might also affect the perception of urban quality in a negative way.¹⁷ Higher concentrations can also lead to increased exposure to noise and air pollution for larger segments of the urban population. From a social perspective, the opponents of the compact city model present two main critiques. The first stresses the lack of acceptability of denser urban environments by the population, as homebuyers are concerned with the potential loss of environmental quality previously described.¹⁸ The second critique is related to gentrification issues. Densification strategies can produce increases in housing prices, which can result in low-income groups being expelled from the most privileged areas, generating inequality and social tensions.¹⁹

Holistic concepts such as sustainability are always connected to a multitude of aspects. A more sustainable society is connected to social attitudes and behaviours, to technological improvements, to institutional changes, and to characteristics of the physical environment, such as denser urban layouts. Despite a persistent debate on its effectiveness and criticism with regard to its practicability, a more compact urban form remains a fairly well-established physical characteristic of the sustainable city. Densification as a planning strategy has become a dominant approach in city planning, promoted by multilateral institutions, such as the United Nations Human Settlements Programme²⁰ and the European Commission Directorate General for Regional Policy.²¹ In Norway, as discussed in Section 4, urban densification has also become one of the main planning strategies towards sustainability.

HOW DID THE COMPACT CITY BECOME THE PARADIGM OF SUSTAINABLE URBAN DEVELOPMENT?

After nearly three decades of the existence of a sustainability agenda, aiming at preserving the environment and ensuring continuous social well-being, the city has become a main scenario for the application of many sustainability measures. Efficiency in the use of resources (energy, raw materials, and space) is one of the main strategies to achieve sustainable outcomes. Wasting less, polluting less, and producing less greenhouse gas emissions to curb global warming are some of the cornerstones of this agenda. Denser cities, as explained in Section 2, have been regarded as the archetype of efficiency because they use less space and may also significantly a reduction of energy consumption, which in turn may lower greenhouse gas emissions.²² This efficiency could, if achieved, reduce greenhouse gas emissions to mitigate climate change, as well as reduce the use of material goods to protect forests and agricultural land. A combination of strategies – such as denser urban layouts, cleaner and more efficient technologies, and the promotion of renewable energy sources – is part of the steps to achieve such targets.²³

How did these ideas become so influential? The answer seems to lie in a synergy of multiple trends and ideas combining old and new concerns that have regained attention mostly since the 1960s. Among the most relevant are: a) the crisis of the modern urban planning paradigm; b) an emergent concern about a global environmental crisis; c) an energy crisis that originated in the OPEC oil embargo targeting the supporters of Israel during the Middle East conflict in 1973; d) the rise of evidence of global warming caused by pollution from human activity; e) sociotechnical changes leading to the rise of a global economy and the migration of economic activities from former industrial centres to new locations in emerging economies; and f) new social trends such as a "new demographic transition" and the rise of the "creative class".

THE CRISIS OF THE MODERN URBAN PLANNING PARADIGM

Throughout the 1960s and 1970s, different manifestations of discontent were emerging against trends in urban development and the way urban planning was operated. Modern planning principles, such as the drastic separation of urban functions, and the urban typologies proposed by modernist architects and planners were questioned, mainly on social grounds, but also on aesthetic ones. Some of the best known critics of this period, who questioned the top-down approach of modernistic plans and its oversimplification of urban complexity, remain highly influential in urban planning and design today. Among the most prominent are Jane Jacobs, Kevin Lynch, Lewis Mumford, and Christopher Alexander.

Jane Jacobs's book *The Death and Life of Great American Cities* is perhaps one of the most influential books of this period.²⁴ Jacobs criticizes particularly orthodox city planning, characterized by a top-down approach based on the expert's view. Such an approach, according to her, has been executed not only by the modernist movement but also by previous movements such as the garden city. She also criticizes the separation of functions proposed by the modern planning approach, advocating instead a need for mingling different functions – functions that support each other and produce lively cities. She also highlights the negative impacts of large facilities on urban functioning. Large facilities, she argues, erode diversity and undermine the vitality of adjacent areas. Jacobs also saw cars as an eroding force of both public spaces and urban diversity. For her, cities are systems of organized complexities composed by a multitude of interconnected factors; therefore, a top-down planning approach has negative effects on preserving diversity. As an alternative, she advocates horizontal and more democratic structures in city planning. Jane Jacobs, a social activist, remains influential for both social scientists and architects involved in city planning alike.

Many of Jacob's claims are aligned with the claims of other critics of city planning and design from the second half of the twentieth century, such as Kevin Lynch, Lewis Mumford, and Christopher Alexander, among others.²⁵ Among these critics of the modernistic planning approach, there is a consensus that there is a need for denser, low-rise urban areas with bigger urban coverage, an increased mix of functions to promote vitality in public space, a more complex and intricate urban fabric to favour pedestrian movement and human interaction in the public realm. There is also a strong position against the monotony of the modernistic approach, stressing the necessity of creating a more meaningful architecture, closer to local traditions and values. According to them, the separation of functions is particularly problematic, that is, artificially separating housing and working areas, and by doing so creating the need for disrupting mass transport infrastructure.

THE ENERGY CRISIS

The oil crisis of the early 1970s became a breaking point in urban planning. The urban sprawl of earlier decades started to be seen as a highly vulnerable urban form in a scenario of energy scarcity.²⁶ Some years later, Peter Newman and Jeffrey Kenworthy published an influential article on urban form and automobile dependency, comparing gross population density with fuel consumption in cites from Europe, North America, Asia, and Australia.²⁷ Their work was heavily criticized with regard to methodology, feasibility, and ideology. The critics argued that fuel consumption is a complex phenomenon, connected to multiple factors, not only to urban form. Additionally, rearranging metropolitan systems and introducing public transport systems can only be made at an enormous cost and requires long-term planning. Such a

strategy also needs a heavy top-down approach.²⁸ Despite controversies, the work of Newman and Kenworthy became one of the most influential studies in the rise of the compact city model as a dominant strategy to combat climate change.

HUMAN-MADE GLOBAL WARMING

The pioneer in an attempt to quantify the effect of CO_2 on global temperatures was the Swedish scientist Svante Arrhenius, who in the late nineteenth century estimated a gradual and beneficial increase of the earth temperature caused by the emissions from industrial activity.²⁹ He estimated that doubling the amount of CO_2 in the atmosphere would result in a rise in global temperature of five to six degrees Celsius. The time needed to double CO_2 emissions by human activities was estimated to be three centuries. However, he also explained historic ice ages in the changes of CO_2 levels produced by volcanic activity.

Further advances in meteorological devices and techniques improved shortterm weather predictions, but difficulties remain in accurately predicating long-term climate changes. In the 1970s, for instance, there was an intense debate about whether the earth was getting warmer or cooler; and whether



Figure 1. Broadacre City, General Plan. Source: The City Club of Chicago, 1916.

this phenomenon was natural or human-made. Thomas C. Peterson et al. outline how popular views driven by the media predicted the return to an ice age, and how this worry contributed to an in-depth study of climate change that ultimately pointed in the opposite direction.³⁰ By this time, it was recognized among the scientific community that variations in the Earth's orbit, aerosols, and the rapid increase in greenhouse gases were the main drivers of climate change. According to Peterson et al., an increasing number of studies supporting the effect of greenhouse gases, such as CO_2 , as a dominant contributor to global warming started changing the political agenda towards climate change and called for urgent action.³¹ Patrick Moriarty and Damon Honnery,³² quoting John B. Heywood,³³ estimated that motorized transport accounts for a quarter of all global greenhouse gas emissions, but this figure is expected to increase due to the rapid industrialization of former agricultural economies in developing countries.

SOCIOTECHNICAL SHIFTS

The development of the modern city is strongly linked to the rise of industrialization and the centralization of production in large factories. The idea of development under this model was characterized by a strong national protectionism of mass production and mass consumption from external competition.³⁴ Such organization of production is strongly linked to a regional pattern of complementary industrial activities influencing a specific urban model. According to Scott, these industrial regions were characterized by an intricate network of connections, containing a large number of urban agglomerations of different sizes and intensities to house the working force required to operate the system.³⁵ The popularization of cars is perhaps the most influential phenomenon in shaping the use of space by allowing personalized mobility and an unprecedented expansion of urban functions in the countryside.

Several visions of the city of the future were proposed by architects and engineers of the time. Some examples are Frank Lloyd Wright's Broadacre City, presented in the book *City Residential Land Development*, published by the City Club of Chicago in 1916 (see Figure 1) and La Ville Radieuse by Le Corbusier in 1935³⁶ (see Figure 2). Broadacre City proposed a relatively low density of two acres per family. It consisted of a mile-wide continuous fringe, extended along the new highway system, where former centralized urban functions would be decentralized. Among the preconditions for the practicability of such a proposal were the development of a vast transportation



Figure 2. La Ville Radieuse, General Plan. Source: pinterest.com.

network, the decentralization of housing and industry, and a shift in land ownership regulations to allocate space to new developments.³⁷ Le Corbusier's proposal, on the other hand, favoured a much denser occupation, aiming to accommodate the 3 million inhabitants of central Paris in the same surface by using high-rise buildings with a footprint not greater than 15 per cent of the total surface. His idea was based on a separation of functions to alleviate what he saw as the chaos of the existing city, providing a large amount of green areas and better access to natural light.

In both proposals, the new motorized transportation technologies were fundamental, and considered ultimate expressions of freedom. Although the ideas of Le Corbusier and Wright were initially regarded as unachievable



Figure 3. Lambertseter plan (1950) by Frode Rinnan. Formed by different types of three-and four-storey apartment blocks, this plan aimed to accommodate 10,000 inhabitants. Source: Oslo City Archive.



Figure 4. Master plan for Tveita in Oslo (1960). Source: Oslo City Archive.

utopias, they became very influential in the rise of master planning in the following decades (see for instance Figure 3 and Figure 4, two master plans for the City of Oslo from the 1950s and 1960s). These visions for the modern built environment were accompanied by mainstream modernization strategies promoting economic and social development, especially after 1945.³⁸

Since the 1970s, technological innovations and market conditions favoured a displacement of low aggregated value and labour-intense mass production to less developed countries with cheaper labour (for example, in the textile and clothing industries, in ship building, and in white goods). Advanced economies gradually shifted to a model of flexible specialization retaining the

production of knowledge-intensive items, research and design, marketing, financial services, and management activities.³⁹ These changes have also had profound implications for the built environment, requiring, amongst other things, the adjustment of infrastructure to new production strategies.

The migration of industrial activities created numerous brownfield sites in the now "post-industrial cities" of the advanced economies. Many cities since the 1980s suffered local crises due to the migration of former economic activities and the need for structural adjustments, not only in infrastructure but also in readapting their workforce to the new condition of a flexible specialization model based in tertiary activities instead of the traditional low-skill industrial activities.⁴⁰ Cities were now expected to be the spearhead of a strategy of global economic competition to attract investment and new economic activities and expertise. In many places, this new scenario has produced a wave of urban renaissance and a return to urbanity as one of the fundamental qualities for competitiveness in a global economy.⁴¹

The new post-industrial economy, mostly based in knowledge production rather than the production of goods, requires human capital as its main asset. Researchers, scientists, engineers, artists, and designers provide the expertise for this new economy. This is, according to Florida, the rise of a new social class that he has denominated "the creative class".⁴² They produce new ways of doing things, new designs, and new solutions to problems that can be massively replicated. The author also includes creative professionals working in knowledge-based business, such as financial services, technology development, law and management, and health-care professions. This new creative class, according to Florida, tends to concentrate in creative clusters that are no longer driven by access to natural resources or transport infrastructure, as was the case for industrial production; nor are the traditional facilities, such as large shopping malls, stadiums, and freeways, the attractors of the new creative class. Instead, the new hubs for the creative class are vibrant city environments with a diverse population. Contrary to some previous beliefs pointing towards a deconcentration of activities due to the advancement of omnipresent communication technologies, the creative class demands specific locations with access to diversity of social and cultural services, only possible in highly intense urban environments.

NEW DEMOGRAPHIC TRENDS

Some significant demographic changes have occurred in many developed nations, and more recently, in some developing nations. Among them are: slower population growth, a decrease in fertility rates, an increase in life expectancy, and an upsurge in net immigration. These changes are also accompanied by an increased number of couple separations, increasing cohabitation, and a growing number of single-occupant homes.⁴³ This phenomenon called "second demographic transition"⁴⁴ is considered a consequence of increased economic development, greater women participation in the labour market, and a growing social shift in values towards secularization and individualization.⁴⁵ Such social changes also influence urban development in many different ways.⁴⁶

One evident effect of demographic change can be observed in the housing market, where sizes and typologies of dwellings have shrunk to shelter individuals and smaller families. Some studies also indicate a strengthening of housing in inner-city locations, instead of the previous pattern of sprawled urban development.⁴⁷ Stefan Buzar et al. remark that these new demographic trends are an important force in urban change. However, this has been marginalized from mainstream literature on city transformation. The influence of this demographic change produces a return to the inner city or an urban renaissance.⁴⁹ This phenomenon, however, is most commonly addressed in academic literature as gentrification, or the exclusion of the less-affluent population from privileged inner-city locations.⁵⁰

A NEW PARADIGM

As the above section has shown, the rise of the compact city as a paradigm of sustainability involves multiple aspects of diverse origins; some of them originated several decades ago, others are more recent. The five aspects presented here are perhaps the most influential globally. However, several other aspects may emerge as relevant in specific contexts. The allure of the compact city paradigm and densification as planning strategy is mainly due to the promise of efficiency and optimization of resources. Efficiency is an attractive ideal, not only in relation to the optimization of resources for future generations, but also in the optimization of resources now, to enable more equitable societies in which it is possible to better meet the needs of vulnerable populations. Urban change, however, is a slow process involving a multitude of factors. As a result of car-based transport systems, massive low-density city expansions



Figure 5. Proposal for the Nyhavna district in Trondheim, prepared by NSW architects (2008)

have added immense areas to existing cities. Reversing such developments, or making those areas more compact, seems to be the biggest challenge of the compact city model. New projects, especially in formerly well-located industrial areas, are becoming the spearheads of compact city development. These new developments propose a return to the traditional block, with a mix of uses and typologies, combining housing and other uses, as well as emblemat-

ic public buildings. Nyhavna, a former port district, close to the Trondheim city centre, currently in the planning stage, is an emblematic case of this new approach in Norway (see Figure 5).

WHY HAS THERE BEEN A SHIFT OF THE PLANNING AGENDA IN NORWAY?

Under the influence of sustainable development principles, in most developed countries, one of the main targets of urban planning has been the decarbonization of urban mobility. This implies increases in the use of public transport, cycling, and walking for everyday commutes. Such increases seem only possible if land uses are intensified, and if distances between origins and destinations for commuters are decreased. There is empirical evidence supporting a direct relationship between an increased density and a significant reduction in CO₂ emissions, both from transport and buildings.⁵¹ Therefore, urban density has been promoted as one of the main characteristics of the sustainable city, and densification has become a common planning strategy.⁵² However, turning sprawled urban patterns into denser ones is not a shortterm issue. Cities are embedded in large processes of permanent adjustment, in which societal, technological, economic, and environmental factors blend and merge. A frequently identified challenge, also in the Norwegian literature on planning for sustainability, is that economic issues and an increasing market approach lead to a prioritization of popular preferences over environmental protection.53

Norway is a good example of such complex transition. The country is ranked high in different sustainable development indices, such as the Environmental Performance Index⁵⁴ and the Sustainable Society Index,⁵⁵ in which a strong emphasis lies on social well-being and equity, good governance, and economic performance. However, Norwegians have the third highest per capita carbon footprint in Europe, only surpassed by Luxembourg and Estonia.⁵⁶ Since the late 1980s, the government has been promoting sustainable urban development with a focus on densification and decarbonization of transport. Progress, however, is not constant. The Norwegian National Travel Survey 2013/14 presents mixed results with some positive advances and remaining challenges.⁵⁷ For example, the accessibility of a public transportation network rated as very good⁵⁸ in the survey has only increased by 4 per cent since the previous survey in 2009, with better conditions concentrated in the largest cities. The accessibility index to a very good public transportation network is 83 per cent in Oslo, 45 per cent in Bergen, and 64 per cent in Trondheim and

Stavanger, according to Randi Hjorthol et al.⁵⁹ Yet at the same time, there has been an increase in car ownership per household from 85 to 88 per cent, and the average length of a trip rose from 12 to 14.5 kilometres. The share of trips by environmentally friendly modes (walking, cycling, and public transport) has remained rather stable around 36 per cent since 1992.⁶⁰ Further improvements are hampered by barriers embedded in society, such as the prestige connected to cars, and the existing urban layout marked by a sprawled form, as well as by economic distortions originating in indirect subsidies to cars (e.g. via tax deductions for commuting), which are further supported by high prices of public transport.

A common view is that urban densification started as a strategy promoted by multilateral organizations as part of the sustainability agenda and then moved to national and local levels.⁶¹ However, the concepts and ideas underpinning such an agenda have been around for a long time and have been tested in different places previously. They have been adopted subsequently by multilateral agreements. This also seems to be the case with urban densification strategies aimed at decarbonizing society. As it has been argued in Section 3, a combination of circumstances created the ground for new approaches to development in general, and to urban planning as one of its important components. In Norway, after decades of urban sprawl, urban containment became a main concern in the 1980s.⁶² The ideas of the seminal report from the World Commission on Environment and Development, *Our Common Future*, led by the former prime minister of Norway Gro Harlem Brundtland, were quickly adopted into local initiatives on urban planning, making Norway one of the pioneers in sustainable city planning.

In the Norwegian context, the principles of the Brundtland Report *Our Common Future*⁶³ were mainly interpreted as environmental goals, particularly addressed to reduce the impacts of human activities on the environment.⁶⁴ Urban development since the 1960s was characterized by an unprecedented expansion and a sharp decline in density.⁶⁵ Containment of urban expansion was already an important element in municipal planning, particularly because providing roads, sewage, and other infrastructure to large, low-density urban areas was seen as an increasing burden on local finances.⁶⁶ The NA-MIT project⁶ was the first initiative to implement sustainable development principles in urban planning. Among its aims were the reduction of energy use, the protection of biodiversity and landscape, the reduction of waste, the provision of better access to green areas, and the enhancement of social welfare. NAMIT was a scenario-based project, testing different alternatives of



Figure 6. Norwegian functional urban areas. Source: Eurostat Regional Yearbook 2013.

development over a thirty-year horizon for the Norwegian communities of Borre, Sogndalsfjøra, and eastern Trondheim/Malvik. One of the main conclusions of this project was that there were significant benefits to be gained by substituting urban sprawl with compact city development.⁶⁸

Urban densification, in connection to sustainable development goals, became a central element in Norwegian planning policies in the years to come. Urban containment measures to protect the environment were introduced in the 1992–93 national policy on land use called Den Regionale Planleggingen og Arealpolitikken (Regional Planning and Land-Use Policy).⁶⁹ Several other initiatives with similar targets have been implemented since the early 1990s. Some examples are: The Sustainable Cities Programme, initially targeting five cities: Fredrikstad, Bergen, Kristiansand, Tromsø, and Old Oslo;⁷⁰ the policy on "A Better Environment in Cities and Towns",⁷¹ promoting compact urban development, mixed use, and improved public transport, as well as the



Figure 7. Urban area in the Oslo region. Source: Norwegian Mapping Authority, 2016.

strengthening of green public spaces within cities; "Cities of the Future,"² aiming to promote sustainable city principles in the thirteen most urbanized municipalities of Norway; and "The Contemporary Sustainable City"⁷³ with a particular emphasis on proximity to public transport, urban services, and workplaces, as an alternative to promoting a greener lifestyle.

Norway was an early adopter of urban densification and the compact city approach in connection to the sustainability agenda in Europe, and many of the ideas developed in NAMIT have had impact beyond the Norwegian borders.⁷⁴ Urban changes such as densification are gradual and affected by the accumulation of persistent initiatives over long time spans. Despite almost three decades of planning towards denser and more sustainable cities, many challenges remain. Although urban sprawl, which was the clearest tendency in urban development until the 1980s, has gradually been replaced by densification, particularly in the larger cities, in smaller urban areas sprawl seems not to bow. Oslo is where the most significant changes have occurred, both in densification gains and in significant gains in environmentally friendly transport. Yet some other places have either maintained a similar density or even increased the urban land area they cover.

HOW DOES THE COMPACT CITY PARADIGM RELATE TO NORWEGIAN CITIES?

With nearly 80 per cent of the population in Norway living in urban areas,⁷⁵ there is a wide range of urban environments with very different degrees of compactness. This is especially the case in the larger urban agglomerations where transportation technologies allow living and working within an extensive area, spilling beyond municipal borders. These agglomerations constitute functional urban areas, which according to Eurostat⁷⁶ are formed by a city and its commuting zone.⁷⁷ The urbanization patterns in the functional urban areas are normally discontinuous, with dense centres, but also a number of smaller compact nuclei and intermediate low-density areas in different forms. In Norway, six functional urban areas were identified by an OECD study of 2013 (see Figure 6);⁷⁸ and even though densification has been increasing in Norwegian urban areas, it might still be difficult to call such urbanization patterns compact.

Urban development trends have noticeable variations through time. As a consequence, contemporary urban form is an archipelago of urban environments with contrasting intensities and shapes. Norwegian cities were



Figure 8. Urban area in the Bergen region. Source: Norwegian Mapping Authority, 2016.

relatively compact until the 1950s. However, in the following decades, they underwent an unprecedented period of growth in the form of centralized sprawl. This means, according to Erling Holden,⁷⁹ that the concentration of the national population is in a few large, sprawled agglomerations, where most of the new growth has taken the shape of an expanding periphery, characterized by a low-density urban form, frequently discontinuous, with large agricultural and forestry areas in between (see Figures 7 and 8). The reason for this fragmented urban expansion is, according to Petter Næss et al.,80 a combination of urban planning regulations addressed to protect periurban agricultural and landscape areas, a sharp increase of car tenancy, and a growing demand for housing in the 1970s and 1980s. However, a re-urbanization trend has been gradually changing the urban landscape since the 1990s.⁸¹ Different figures confirm an increasing tendency towards densification. Gro Sandkjær Hanssen et al.,82 quoting figures from Statistics Norway (SSB),83 have identified an average density gain of 3 per cent in Norwegian urban areas in the period from 2000 to 2012. This tendency is stronger in larger cities. Næss et al., also using figures from SSB for the period from 2000 to 2009,

highlight an increase in density of 4.6 per cent in the ten largest Norwegian cities, and 11 per cent in the case of Oslo alone.⁸⁴ Recent gains in urban density, however, have not significantly changed the sprawled urban development of the previous decades based mainly in the proliferation of single-family houses.⁸⁵ Despite the increase in density, the urban agglomerations of Norway, have on average one of the lowest densities among the cities of the most developed nations. An OECD analysis from 2013 comparing 275 urban areas put the Norwegian urban agglomeration⁸⁶ as one of the least dense, with an average population density of 109 inhabitants per hectare; only Estonian (107) and Finnish (91) cities are even less dense; whereas Swedish (119), Canadian (124), and even USA (288) cities are denser.⁸⁷ The OECD definition of urban area is equivalent to the Eurostat definition of functional urban area addressed above. Lower densities, as it has been said elsewhere, have a direct impact on an increased car dependency for daily commuting. This seems to apply well to the Norwegian case. The average distance travelled by personal cars per day in Norway in 2010 was 33.5 kilometres, the longest in Europe,⁸⁸ this figure increased to 34.4 kilometres in 2015, despite modest gains in densification.89

Answering the question of how the compact city paradigm applies to Norwegian cities is difficult. On the one hand, there is a rather sprawled urban development characterized by a car-oriented irregular urban fabric developed between the 1960s and the 1980s. The lower densities in these urban peripheries do not allow for a high frequency of public transport, and cars remain the main transport mode. Intensifying urban development in these vast residential peripheries seems a very challenging issue, involving highly fragmented land ownership and a potential lack of social acceptability. On the other hand, the tendency towards densification in the larger urban areas seems not to imply automatic and proportional gains in more environmentally friendly transportation (public transport, cycling, and walking). Indeed, a comparison of the figures between the national transport survey from 2009 and 2013 indicates only small gains, or even some decreases, in the use of environmentally friendly transport. Environmentally friendly transport has presented an increase of 3 per cent in the Oslo region, but a 1 per cent decrease in Oslo Municipality and a 1 per cent decrease in the urban regions of Bergen, Trondheim, and Stavanger.⁹⁰ However, further gains in densification might soon be reflected in travel behaviour; and public transport, as well as walking and cycling, should become the prevalent transport mode if increases in density are accompanied by additional policies.

CONCLUDING DISCUSSION

A major focus of the sustainable city development agenda has been on enhancing efficiency in the use of resources. A compact urban form can offer efficiency in the use of space and enables potential gains of energy in transportation. In Norway, densification has been used as a key strategy in city planning since the early 1990s. However, since large parts of cities were already built in a low-density, scattered pattern, the gains in densification achieved through restrictions to further urban expansion are slow and gradual. Indeed, such gains are only possible to the extent to which population growth can be located in the already urbanized space. Thus, the increase in density of large urban regions such as the Norwegian functional urban areas mentioned in Section 5 is linked to greater population growth.

A car-oriented urban development was the paradigm of urban development during the second half of the twentieth century. However, different factors gradually contributed to a shift in paradigm. This article has identified five of them: 1) the crisis of the modern urban planning paradigm, particularly because of oversimplification of urban complexity in favour of a functionalistic top-down approach; 2) the energy crisis originating with the OPEC oil embargo in the 1970s and the disruption it brought to car-oriented urban development; 3) the discovery of the ongoing phenomenon of human-made global warming due to CO₂ emissions linked to the consumption of fossil fuels; 4) sociotechnical shifts such as the improvement of global communication networks (transport and telecommunications) and the relocation of industrial production to emerging markets leading to deep economic crisis in former industrial regions; and 5) new demographic trends such as decreasing family size, ageing, and immigration. It has been argued that the compact city model can aid in achieving environmental objectives such as decreasing CO₂ emissions, in enhancing the possibilities of social interaction by creating diversity of environments, and in attracting the new "creative class" which can help to foster the local economy.

Before the emergence of the compact city as a model of sustainability in the 1990s, there was already concern about the pattern of low-density development. The economic growth of previous decades brought an extensive urban expansion in a patchy low-density pattern. The operation of the extensive infrastructure network supporting the extensive urban development was burdensome for municipal finances, and it was already a concern among local authorities in Norway. Furthermore, there were also concerns about the preservation of forests and arable land. The rise of the sustainability agenda and the compact city model was swiftly adopted in several white papers both nationally and locally. The paradigm shift, however, has met many challenges. Both population growth and concentration of the population in the larger urban agglomerations have contributed to an increase in urban density in general, but such advances have not happened at the same pace in greener transport. Car usage has not decreased. This does not contradict the general notion that denser urban environments are less car-dependent. In fact, significant advances in greener transport have occurred in Oslo, where the gains in urban density have also been the largest. But reversing several decades of expansive and scattered urban development is not a question of a short period of time, unless extraordinary events happen. The transition towards denser and more sustainable cities is a gradual process in which denser urban nodes will coexist with scattered settlements for a long time. This article has outlined some of the most challenging issues of such a transition. The Norwegian case presents an interesting case from which ideas and knowledge can be drawn for other Nordic countries. The role of city planning in driving an urban sustainability transition is one among several other factors influencing how cities change over time and how their space is used by society. To achieve more resource-efficient cities, a technological and a social dimension must also be considered.

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URBAN MICRO-MORPHOLOGY AS A FRAMEWORK TO ASSESS PHYSICAL PUBLIC-PRIVATE INTERFACES AT STREET LEVEL

Anja Standal

ABSTRACT

This article undertakes a theoretical study about built form boundaries which lie between solid and void, between inside and outside of a building, and between the public and the private at street level in a compact city. These subtle and seemingly unimportant micro-morphological physical parts are easily overlooked within urban development, but they have great significance in determining successful urban performance. In the public/private boundary, the private building meets public space, the property developer meets government regulation – and together these meetings provide important premises for urban life.

There is a need for the morphological rethinking of the boundary at the interface between public and private, in order to be able to develop valuable tools for urban development processes. This article argues that one important step is to establish a framework of formal properties and spatial relations between the micro-morphological public and private realms.

This article aims to develop and further elaborate the concept of urban micro-morphology as a theoretical framework, so as to show new directions and assess its relevance in discussing and analysing the micro-spatial components of the physical public-private interface in relation to a bigger whole. It forms a key theoretical building block within a broader study and doctoral research, which focus on and aim to provide new and expanded insights about physical public-private interfaces in compact city development, allowing knowledge to renew and improve the practice of implementation, including design and governance of physical design.

KEYWORDS

Micro-spatial research, urban micro-morphology, plot, scale, public-private interface, urban form, generic structure diagram

INTRODUCTION

This article engages in a theoretical study about built form boundaries which lie between solid and void, between inside and outside of a building, and between the completely public and completely private extremes of the public-private interface, at street level in a compact city. These subtle and seemingly unimportant micro-morphological physical aspects are easily overlooked in urban development, but they have great significance for urban performance. In this boundary, the private building meets public space, the private developer meets government regulation, and together these meetings provide important premises for urban life.

The interface-boundary between public and private is described in many of the classic works of urban design,¹ planning,² and architectural theory,³ in addition to recent research over the last several years.⁴ However, little research has been done to develop a framework to assess and systematically analyse the micro-scale formal properties (morphological) and spatial relationship (syntactical) in the boundary between buildings and streets, between physical public-private properties. There have been a few space-syntax studies considering the way building morphology constitutes local encounters in the street domain, focusing on and emphasizing aspects of crime and safety. A recent relevant contribution in developing a conceptual framing is the article by Garyfalia Palaiologou, Sam Griffiths, and Laura Vaughan,⁵ which addresses the space-syntax concept of virtual community and problematizes the idea of the building-street interface.



Figure 1. Conceptual illustration of the physical public-private interface, (source: author)

The smallest fundamental component for classic urban morphological analysis is the building in its related open space. Urban micro-morphology goes a step further by investigating elements within the smallest level. This means that the components and rooms of the building must be studied in relation to open space. For example, an interior entrance hall is connected by a door to an exterior circulation space linking the building and street.

There is a need for morphological rethinking of the boundary in the interface between public and private; for developing valuable tools for improving urban-development processes; for policy and legislative framework in compact urban-development use phrases, such as good urban qualities and outdoor spaces, attractive neighbourhoods, and active facades to enhance urban-life and vitality. However, these value-loaded terms are stated without a systematic discussion of what they physically comprise, and interpretation can be vague and varying. In addition, planning instruments setting out to achieve and fulfil these policies define boundaries that limit and neglect the spatial overlaps that the compact city comprises, the connections and interactions in these half-public, in-between spaces in the city. Urban development within a compact-city framework could include a wider scope and provide a more systematic approach than that provided by existing policy and guidance. This article argues that one important step in this direction would be to establish a framework for formal properties and spatial relations between the micro-morphological public and private realms. Only by being able to describe, analyse, and challenge the institution of the *planning boundary*, and its role in defining the building-street relation in zoning plans, are we able to address the vague terms and concepts currently provided by policy and guidance.

This article aims to develop the concept of urban micro-morphology as a theoretical framework to reveal new directions and assess its relevance in discussing and analysing the micro-spatial components of the physical public-private interface in relation to the wider context. It forms an important theoretical building block within a broader study and doctoral research, which focuses on and aims to provide new and developed insights about physical public-private interfaces at street level in compact-city development, in a way in which knowledge can renew and improve the practice of implementation, including design and governance of physical design.

In addressing these relationships, my research question for this article is the following:

• Is there a theoretical foundation for understanding the micromorphological element defining the public-private interface in the streets of the compact city?

In order to answer this, three sub-questions are defined for the analysis:

- What makes up the physical public-private interface at street level?
- What is urban micro-morphology?
- How is urban micro-morphology described and defined as a concept in existing research?

METHODOLOGY OF RESEARCH AND DATA

This article engages in a thematic literature search and in background research of secondary sources, namely existing data that other researchers have collected, recorded, and analysed, including background research of fundamental concepts and the works of seminal thinkers and theoretical approaches. This literature review describes theoretical perspectives in my research interest and helps the reader to familiarize themselves with the topic by highlighting previous research findings of relevance to the research question. Overall, it examines morphological perspectives in relation to the public-private interface at street level.

The literature review looked at the existing use of the term *urban micro-morphology* in scientific research and was developed into a sorting and summarizing exercise of the findings. I have conducted a word search for the term in the following scientific research databases: Google Scholar, Oria, Taylor & Francis Online, and WorldCat. The results show a surprisingly limited amount of published material of the term, which is useful for describing the physical public-private interface through established concepts in the study of urban form. The term *micro-morphology* is employed in a range of articles, which generally relate to fine-level structures of an organism, mineral or soil components in the environmental sciences, and rarely occur in connection with studies of urban form and planning micro-structure. The physical public-private interface is a well-established concept in urban design, but is not typically included or represented as a theoretical part of urban micro-morphological research. Within urban morphological research, the term is used in a limited number of papers. Even though a range of research articles handle aspects of *urban micro-morphology*, few directly emphasize the term in a way which might develop its content and potential. Relevant examples of the latter are Whitehand, Moudon, Groth, Børrud, Chen, and Palaiologou et al., found in sources from the *Journal of Urban Morphology* and the *Journal of Space Syntax*, as well as a Norwegian book called *By og byliv i endring*.⁶ I have included information concerning the use of the term as definition, domain, and method and have looked for similarities, differences, and consistency in the approaches; examining whether the instances of the definitions are based upon the same characteristics. I then compared and evaluated the results of the literature review to expand and develop an understanding of the term. In addition, I have included research on the fundamental cell of urbanization as defined by urban design, morphology, and space syntax.

The focus of the literature review has been to investigate the concept of *urban micro-morphology* through connecting elements of micro-scale morphological aspects/elements of urban form with macro-scale city building. It also looked to address the relations between these aspects within a given level of scale. At the same time, it investigated the potential and usefulness of the term in addressing and assessing the physical public-private interface, by including literature from the parent field of urban morphology. This article addresses this gap and looks to develop the theoretical field of urban micro-morphology as a framework to assess the physical public-private interface.

The main source for the background research of the conceptual foundation and the terms "public", "interface", and "private" includes the book *Public and Private Spaces of the City*,⁷ which offers a key contribution to understanding and insight. In addition, the background research leans on knowledge from seminal thinkers and theories within the fields of urban design, planning, and architecture, including Cerdà, Hillier and Hanson, Caniggia and Maffei, et cetera.

ANALYSIS AND RESULTS

Micro-Spatial Intervention in Compact-City Development Micro-spatial interventions of the physical public-private interface in the urban realm are often neglected in compact-city development. Policy and guidance emphasize good development using phrases such as good urban

qualities and outdoor spaces, attractive neighbourhoods, and active facades. However, these value-loaded terms are generally stated without a discussion or definition of what they mean. The Norwegian planning framework establishes prescriptive boundaries and zoning plans which are defined at macro-level affecting function and use rather than defining micro-morphological relationships. The understanding of micro-spatial interventions that links and relates the building to the city and vice versa often appears limited in urban projects. This article aims to highlight the concept of the micro-morphological public-private interface as a tool to better understand the institutional planning boundary. Only by being able to describe, analyse, and challenge the building-street relationship in zoning plans and the planning framework are we able to address the vague terms and concepts from policies and legislative framework. Only by understanding what the micro-morphological properties of the interface comprise can this neglected area begin to act as a new fundament for urban experience. mental concepts and the works of seminal thinkers and theoretical approaches. This literature review describes theoretical perspectives in my research interest and helps the reader to familiarize themselves with the topic by highlighting previous research findings of relevance to the research question. Overall, it examines morphological perspectives in relation to the public-private interface at street level.

Sub-Question: What Makes Up the Physical Public-Private Interface at Street Level?

The physical public-private interface of the *building street* at street level comprises overlapping layers of physical space mediating between public and private in the urban fabric at street level. It comprises micro-spatial components of urban form and different configurations of form. From one perspective, it is private in belonging to the facade of a house; at the same time, that facade forms part of the city's public space. The interface forms a vital area where interaction between people occurs; it is where you greet and say goodbye to your friends or customers, where you expose or conceal your private life to the public, and where goods are displayed and exchanged.⁸

The public-private interface includes a range of tangible and intangible boundaries of space which offer great potential for city life when developed and managed in a good way. These boundaries can be places for strict control and separation, but also vibrant spaces for communication. They can be spatial or symbolic, physical or functional. Some of them are more objective and easier to measure like physical building boundaries and legal plots,
while others are harder to define including more subjective psychological and sociological space. In his book, *Public and Private Spaces of the City*, Ali Madanipour emphasizes the way in which these boundaries are established, articulated, and related to private and public space and how this plays a significant role in urbanism in general.⁹

Within any given street, a spatial interface can be read as an element and/or an aggregation of these elements forming a spatial unit. Palaiologou et al. defines three interface scales between buildings and streets at the street domain: *the building street, the block street, and the street interface.*¹⁰ The *building-street* interface is defined as *the space from the building façade to the street domain,* where the façade includes the three-dimensional surface and visible/implied activity behind it. The block street and the street interfaces are both aggregates of the building-street interface, one facing the same side of the street, while the other faces the same street on both sides.

Conceptual Clarifications: The Terms Interface, Public, and Private as Part of the Building-Street Relation

An *interface* is a place of interaction between two systems; it is a surface regarded as the common boundary of two bodies, spaces, or phases. A study of its synonyms gives a range of potential meanings: *amalgamation, communication, contact, connection, integration, interaction, junction, link, liaison, middle ground, and neutral ground*. In this article, the term is used to link the realms of public and private, the building and the street, the solid and the void: it is the common boundary between the two. Implicit in this is how it includes a standpoint on neutral ground, approaching the terms public and private without giving value to one in favour of the other.

The use of the term *private* has often included a negative connotation, including a sense of loss, separation, and deprivation. Several thinkers have supported this approach by taking a stand in public discourse condemning private life, seeing this as a life not worth living,¹¹ or by taking a stand criticizing private development as a threat to safeguarding area-based common goods.¹² However, the other more positive approach to the private sphere emphasizes a permission to share ideas and intimacies on their own terms. Private space is a part of space that belongs to, or is controlled by, an individual for his or her exclusive use, keeping others out. For example, this may be achieved through established patterns of use, which create a sense of belonging and provoke territorial behaviour. This may also be institutionalized through a legal framework, which entitles individuals to call parts of space their private property.¹³ This article addresses the institutionalized space with regard to plots and boundaries.

The term *public* has a wide range of definitions, both as adjectives and nouns. In this article, it is used to describe physical public space with public government regulation. One definition taken from Madanipour's book is: "Public space is the institutional and material common world, the in-between space that facilitates co-presence and regulates interpersonal relationships."¹⁴

While the morphological terms *building* and *street* can describe the physical interface at the micro-morphological scale, the terms *public* and *private* can address an interface on many different levels of scale. The interface is both structured and transformed over time by the continuous weaving between public and private realms, the formation of interiors and exteriors, and the changing role of buildings.¹⁵ For this article, the focus is morphological, addressing the point where the *private* building meets the *public* street/space. This corresponds to the point where the developer meets government regulation and where private life meets public co-presence, however these aspects do not form part of this article, but are vital for understanding the overall doctoral research.

Sub-Question: What Is Urban Micro-Morphology?

Urban micro-morphology is a subfield of urban morphology that has developed recently, remaining quite limited at the micro-level in this early stage.¹⁶ Urban morphology is a theoretical framework that engages urban form to understand urban development. It is the science of urban form and the processes shaping it, and includes knowledge of cities, villages, neighbourhoods, squares, streets, and built form, all in their respective contexts. The fundamental principle forming the theoretical basis in classic urban morphological research is that the city can be "read" and analysed through the medium of its physical form. Morphological analysis is based on three principles relating to form, scale, and time. Firstly, urban form is determined by three fundamental elements: *buildings and their related open spaces, plot or lot, and streets;* secondly, urban form can be understood at different levels of resolution (scale); and thirdly, urban form can only be understood historically through time since the elements of which it is comprised are undergoing continuous transformation and replacement.¹⁷ The smallest fundamental component for classic urban morphological analysis is the building in its related open space. Urban micro-morphology goes a step further by investigating elements at the smallest level. This means that the components, configurations, and spaces of buildings must be studied in relation to a related open space, its plot, and the street. For example, an interior entrance hall is connected by a door to an exterior circulation space on a plot linking the building with the street.

While research using the term is somewhat limited, existing research within fields of architecture and urban design can be drawn upon to help develop this further and widen the scope of the term – with micro-spatial components and contact within a bigger context.

Micro-Scale Analysis: Seminal Thinkers and Theories about the Fundamental Cell of Urbanization

Although as a concept *urban micro-morphology* is a relatively new term, it has formed part of the fields of architectural and urban design theory for some time. This includes Nolli's map of Rome from 1749, which shows the inside and the outside of public space (white) carved into a mass of private space (black) to Gehl's elaboration of soft and hard edges in the twenty-first century.¹⁸ This shows that major seminal thinkers over the last centuries have valued the micro-components of buildings and interfaces as vital contributors to urban life.

Micro-scale analysis in the urban realm looks at the characteristics and properties of the smallest, elementary city component and their relation to a bigger whole. Ildefonso Cerdà, regarded as the founder of urbanization, spent years investigating and reflecting on the urban realm, resulting in the books *Teoría General de la Urbanización* (1867) translated to English as *The Five Bases of the General Theory of Urbanization*.¹⁹ He defines the city as being constituent of urbs and civitas – the physical city and city society. He connects the micro-components of buildings to the urban spaces of streets and plazas highlighting the physical boundary between the (public) street and the (private) home, writing: "The street is an essential, inseparable, constituent part of the house" (1861, CPE, §21). The genuine *elementary cell* of the urb, the physical city, is what he calls the *inter-axes*, the whole formed by the inter-ways plus the perimeter half-streets. The inter-ways, which he defines as the *primary element* of a city, are the spaces isolated by the network of ways, in other words, the urban-block. We can see that Cerdà views the building and its connection to the street as a vital component in urban form, and the urban block and its perimeter half-street as the elementary cell.²⁰

Similarly, in space syntax theory the simplest spatial structure is also called the *elementary cell* and includes an inside space, an outside space, and a connection between the two: the entrance.²¹ The two basic components that define space are the islands of built form and the open or "carrier space" formed by elements such as streets. Palaiologou tells us that Bill Hillier and Julienne Hanson define settlement as the assemblage of primary cells in such a way that the exterior relations of those cells generate and modulate a system of encounters by virtue of their spatial arrangements.²²

Seminal thinkers within the field, Gianfranco Caniggia and Maffei, identify the plot (*lotto*) as the core "module" of urban tissue. The plot comprises the smallest city component, the morphological properties of the building, and its *area di pertinenza*, its associated private open space. They also go on to distinguish the route (percorso) and plot series (*fascia di pertinenza*) as the constituent parts of urban tissue.²³ The aggregation of these elements creates constellations at different scales in the hierarchy of urban form components. These areas look at the micro-spatial components of the public-private, building-street interface, including spatial relations, configurations, and forms between and within the smallest classic elementary city components, which form the basis of this article. Several researchers within the morphological field have stressed the importance of undertaking research and analysis *at the scale of or within the individual plot*.²⁴ To achieve a higher understanding of what this means, it is necessary to elaborate and dwell a bit more on two conceptual terms: *plot and scale*.

Plot: An Ambiguous Term of Property and Physical Entity

The concept of the plot forms a vital part of morphological terminology. A basic rule of urban morphological research is that the plot constitutes the smallest grain or scale of data used. Analyses that exclude plot-level data will fail to address how urban space is generated and transformed through time.²⁵

In his seminal work *Alnwick, Northumberland: A Study in Town-Plan Analysis*,²⁰ M. R. G. Conzen defines a terminology for discussing the components of the plots as a physical entity, a part of the town analysis. He defines plot as a parcel of land representing a land-use unit defined by boundaries on the ground. The conceptualizations for his terminology are defined based on the "relative position within the plot" (plot head, plot tail, tail-end plot), "as part of the content of the plot" (plot dominant, plot accessory), and "their relation to other plots" (plot patterns, plot series, plot boundary). The plot boundary creates a division between plots, often also separating land ownership units. The frontage is one of these boundaries, defined by Conzen as the interface between the main access street or waterway and the boundary of a plot. It is measured as the length of street line taken up by it.

Karl Kropf discusses the concept of *plot/lot* in a conference paper for the International Seminar of Urban Form in Birmingham.²⁷ He suggests that the term is ambiguous and potentially leads to misinterpretation and a blurred picture of the dynamics of urban form. He refers to a range of sources using the term in different ways, indicating that the plot is at once "an area of land, an area of land with some buildings on it, a land-use unit and a unit of property", defined by different types of boundaries. Based on these, he makes a distinction between the plot as a *property* and the plot as a *physical entity*. A property defines a relation between something and someone with units of control and different kinds of holding or tenure - a physical entity comprising form and composition based on ideas of occupation and access. He thinks that a focus on context and content, in a hierarchy of elements, is more illuminating than discussing the characteristics of the boundaries for this entity. On the other hand, he thinks that an analysis of the internal structure of the plot, the parts from which they are composed, and the number of parts and their arrangements provides interesting feedback on discussing plot as a physical element. A concluding aspect of his paper is that urban form studies must examine the interaction between property and physical boundaries in the morphogenesis of human settlements. He develops his ideas about the hierarchy of elements further in a recent journal article, which connects plot to a certain place in a compositional hierarchy (see below).

Scale: A Double Definition of Grain and Areal Extent

As stated, a fundamental principle in morphological research and analysis is that urban form can be understood at different levels of resolution (scale). In her discussion and thinking about micro and macro urban morphology, Anne Vernez Moudon elaborates on the aspects of spatial scale in morphological research.²⁸ Urban morphological approaches are generally explicit, taking a view that elements in the built environment are organized hierarchically in space. She emphasizes and makes explicit a distinction and double definition between two aspects of spatial scale: the extent of the "geographic area" under consideration in the study and the grain, and the "spatial resolution and units of data" being used. She uses this distinction to be able to define the terms macro- and micro-morphology. For micro-morphology focusing on *grain*, it can be specified to encompass all analyses using *spatial units* of data below the plot level. Focusing on *areal extent* includes studies at the neighbourhood or district scale or below. For macro-morphology focusing on grain, the definition can be specified to encompass all analyses using *spatial units* of data at least at plot level; and on areal extent, on studies above the neighbourhood/district scale.

Areal Extent: Judgement in Boundary Setting

The scalar aspect of areal extent is ambiguous, and different professions of the built environment define themselves within boundaries that include or exclude other important aspects of research. Architects, urban designers, and urban and regional planners all consider areal extent in ways that that correspond to their field of interest and responsibility: rooms and buildings, plots, groups of plots to cities or areas of cities. Defining the areal extent includes a boundary-setting exercise, defining what to include and what to exclude. Boundaries are necessary for defining, but they are not fixed.

Whatever areal extent, this boundary setting is ambiguous, and it can be difficult to know where to draw the line. For example, a neighbourhood can be defined by boundaries based on morphological characteristics, administra-

	Grain	Areal extent		
	Level of spatial resolution	Area of study		
Micro- morphology	Spatial data of units below plot level	Neighbourhood/district scale		
Macro- morphology	Spatial units of data at least at plot level	Studies above the neighbourhood/district scale		

Table 1. Double definition of scale within micro- and macro morphology. Source: Author inspired by Moudon 2002.

tive divisions, or postcodes. The variation in boundaries in defining areal extent shows a need for clarity in their definition.

Grain: Generic Structure Diagram Discussing Spatial Resolution of Data

The second definition of scale is the most relevant for this article and more generally for research on micro-spatial components - the grain as spatial resolution of data. Kropf develops the principles of spatial resolution of data in his article "Ambiguity in the Definition of Built Form".²⁹ The article focuses on the hierarchical relationship between buildings, plots, and streets and their overlapping aspects and elements. He focuses on establishing a framework that includes different levels of resolution and scale, and he introduces the generic structure diagram showing relations between micro-elements of materials, structures, and rooms to macro-elements of the urban tissue. The smallest generic element (material) creates structure that again creates rooms, areas, or street spaces - all of which are types of voids interlinked by boundaries. Rooms create buildings, buildings and areas create plots and plot series, which again create streets making up the urban tissue. The hierarchy can be read in two different ways. First, the basic relationship between the levels in the vertical cross-section is part-to-whole. The levels of the compositional hierarchy are defined in two directions in terms of their position relative to other elements within a larger structure, from below by the domain of its potential parts and from above by the position of the element as a part in



Figure 2 The relationships between and within levels in the hierarchy of built form. (Source: Karl Kropf)



Figure 3. Generic structure diagram (source: Karl Kropf 2014)

a composition. The different levels in the hierarchy are therefore interdependent and influenced by spatial and formal effects produced at the other scales, from above and below. Secondly, the horizontal cross-section addresses the part-to part relation on the same level of scale. These relations can be exemplified as relations and compositions between solid and void, between rooms and spaces, between plot and neighbouring plots, between plot and street. The latter is of interest for a discussion of the micro-morphological definition included later in the article.

Sub-Question: How Is Urban Micro-Morphology Described and Defined as a Concept in Existing Research?

J. W. R. Whitehand introduced the concept of urban micro-morphology in 2001 at an annual conference of International Seminar on Urban Form (ISUF) in Cincinnati.³⁰ In two articles that followed that year, he emphasizes his understanding of the concept. He states that micro-morphology needs to include changes that happen with or within the plot and suggests that examples on this scale influence close-lying, adjacent, and connecting urban forms. This neighbour effect is an interesting concept that occurs within the individual plot, simultaneously affecting the connecting plots, and includes transformation over time. We can see examples of such a neighbour effect in many places. For example, the painting of colourful facades in the urban neighbourhood of Totterdown in Bristol. One inhabitant starts a micro-level process painting their façade and their neighbours continue to do the same. Finally, after enough people have done so, the neighbourhood is transformed into the area of colourful terraced houses.

In 2002, Anne Vernez Moudon discussed micro- and macro-morphology and questioned whether it need be recognized more formally as a subfield within the parent field of urban morphology. She addresses the connection to the urban scale, using two different terms to define scale, grain, and areal extent. She assumes a linear relationship between the size of the area studied and the grain at which it is studied; small areas are studied in more detail than larger areas. Her attempt to define urban micro-morphology focuses on grain, including spatial units of data below the plot level, and on areal extent including studies at neighbourhood, district scale and below.³¹

Paul Groth's article about workers' cottages in California establishes a definition in close relation to Whitehand's initial work primarily relying upon exterior details of buildings. However, he extends the definition to include interior attributes in spatial correspondences with street and neighbourhood form. He focuses on the importance of micro-morphology for studying the relationship between the interiors of houses and their surrounding blocks. Practices of interior connections, additions, and adjacencies link to parallel practices at the scale of the street and block.³²

In a project about immigration and gentrification in the Oslo city-centre neighbourhoods of Grünerløkka and Tøyen/Grønland, called the "Immigentri-prosjektet", Elin Børrud used the term micro-morphology to explain changes in function and the use of the ground floor within a plot. In addressing the concept of *change*, she includes time, defining it as a fundamental principle in urban morphological research. She assumes that changes can be studied separately but will interrelate and exert influence beyond the micro-morphological level of scale. They can therefore initiate other processes of change, leading to transformation on a different level of scale.³³

Fei Chen explores the concept of micromorphology in China and makes links

between morphology and political social economy. Through a range of detailed historical sources, she documents the transformations of built form, plots, and streets through time. She states that investigation of micromorphology offers an opportunity to strengthen the link between urban morphology and social aspects of political economy, looking at the reasons for change, which are usually uncovered by projects focused on individual buildings and their plots than in complex urban entities. Chen suggests that micromorphology is of value to urban design, management, and policymaking.³⁴

A recent article by Garyfalia Palaiologou, Sam Griffiths, and Laura Vaughan explores the term micro-morphology in relation to the micro-structure of "virtual community" (known from the field of space syntax) defined by "spatial relations".³⁵ The theory of virtual community states that people need to be physically co-present for social interaction to occur, and that the probability of this happening is affected by spatial configuration. The article links the syntactical and morphological properties in micro-scale analysis to address both design and virtual community.

All the papers focus on micro-morphology constituted by elements (grains) or within its plot, emphasizing how these elements connect beyond their level of scale. The aspects and elements of the different research papers include "exterior detail",³⁶ "interior details of building types",³⁷ "changes in function and use",³⁸ "transformation",³⁹ and "co-presence/virtual community"⁴⁰ and are connected to a related space and influence a higher level in the hierarchy. The different papers emphasize the different roles where the term can be valid for architectural research, from studies of physical form to social and cultural use and valuable for active management, design, and policymaking.

DISCUSSION: URBAN MICRO-MORPHOLOGY AS FRAMEWORK TO ASSESS PUBLIC-PRIVATE INTERFACE

Research Question: Is there a theoretical foundation to understand the micro-morphological element defining public private interface in the streets of the compact city?

The literature review analysis has highlighted and shown that the term and conceptualization of urban micro-morphology in research is somewhat limited, although to a certain extent familiar as a subject investigated in classic and current urban design and architectural theory. Seminal work within

Urban micro- morphology	Whitehand (2001)	Moudon (2002)	Groth (2004)	Børrud (2005)	Chen (2012)	Palaiologou et al. (2016)
Definition	Includes primary exterior details of buildings on or within plot (Form)	Two levels of scale: below the plot level (grain) or below the neighbourh ood/district level (areal extent)	Interior details of building types (Form)	Changes in function and use of ground floor within the plot (Time)	Transformati ons through time	Micro-structure of virtual community defined by spatial relations
Influence on different scale – related space	Components influence the close and connecting urban form of neighbour effect	Links to parallel practices at the scale of the street and block	Spatial corresponde nce with larger-scale street and neighbourh ood form	Changes influencing beyond the micro-level can initiate processes of change leading to transformati on on a different level		a structural agency at the street interface producing virtual communities and co-presence
Keywords	Change, grain Neighbour effect	Grain Areal extent	Social and cultural use	Time Change Neighbour effect	Links political and social economy	Structural agency
Method	Analytical	Analytical	Analytical	Analytical	Analytical	Analytical
Role in architectural research	Subfield of urban morphology		Social and cultural uses (and uses of street and block) help to understand how social groups use urban space		Valuable for urban design, management, and policymaking	Syntactical – within field of space syntax

Table 2. Summary of the use of urban micro-morphology in existing research. Source: Author.

these fields can help us discuss and expand the micro-morphological field to include important configurational patterns of fundamental cells in the physical city.

From the study of seminal work in urban research, we learn that the fundamental cell of the physical city ("urbs") includes both *building* and *street*. When Whitehand and Moudon are stressing research with or within the plot as a subfield of urban morphology, it raises relevant question for discussion: What does it mean that urban micro-morphology is placed in the resolution of scale within the plot, with the plot as a definer? What does it mean that micro-morphology is locked to a certain scale?

In classic morphological research, the smallest unit is the building on its related plot. This notion corresponds to Cerda's primary element of the city, to space syntax theory about the elementary cell, and to Caniggia/Maffei's module of the urban tissue. However, Cerda's fundamental cell of "urbs" includes both a building (on a plot) and a street, which means that interventions within the plot affect the related urban space/street and vice versa. In addition, space syntax stresses the connection between built-form islands and the open carrier space, and Caniggia/Maffei describe both route and plot / plot series as constituent parts of the urban tissue. This link is not overlooked in micro-morphological research, and the literature review highlights how different authors address influences and links to different related spaces and to scales of resolution. Whitehand explains the neighbourhood effect where components influence the close and connecting urban form, Moudon addresses links to parallel practices at the scale of the street and block, Groth emphasizes spatial correspondence with larger-scale street and neighbourhood forms, and Børrud proposes changes exerting influence beyond the micro-level of scale, initiating processes of change leading to transformation on a different level. So why is the plot used as a definer for micro-morphological research and is this enough? In my opinion, and based on seminal work within the field, the definition of micro-morphological research limited to research with or within the plot somehow limits a dynamic understanding of the vital mechanisms of urbanization. The morphological form of and syntactical relations between inside and outside, building and street, public and private all share dynamic communications that need to be included as part of the definition. The plot with its internal relations to interior and exterior details of buildings and its external relations to a distribution space like a street, route, or carrier space creates the fundamental unit that micro-morphological research needs to address.

As noted in the analysis of the paper, Moudon discusses the relation and distinction between macro- and micro-scale and the potential ambiguity and double definition of the resolution of scale. Her definition of micro-morphology as *grain*, meaning the spatial units of data below the plot level, is the relevant approach to discuss in this article. It is important to stress that the micro-morphological concept is not defined as a distinct boundary, splitting and locking aspects to certain scales alone. Things that happen on the micro-morphological level will both affect and be dependent on the effects produced at other scales. A framework for emphasizing both this double dependency between scales and the plot as a defining unit for micro-morphological research is the *generic structure diagram* introduced by Karl Kropf. I argue that this diagram provides answers to *addressing the challenges of both plot and scale* in urban micro-morphological research.

In Figure 4, I have placed urban micro-morphology into and as a part of the generic structure diagram. Based on the analysis in this article, it is clear that micro-morphology occupies a large part of the diagram. It includes all levels in the hierarchy at the scale of and within the individual plot; materials, structures, rooms, buildings, and plots and their related open spaces (areas and routes / street spaces). The diagram is relevant to the discussion in two distinct ways. First, it addresses the challenges of the plot by including the relation between plot (building / open space) and street. This part-to-part



Figure 4 Micro-morphology as part of Generic Structure Diagram. Source: Karl Kropf

relation corresponds to my suggestion that micro-morphological research needs to address both the primary elements of plots, buildings, and rooms and the routes to get there. Secondly, it addresses the challenges of scale by comprising the part-to-whole relation where interventions on one scale affect and are affected by actions on different resolutions of scale. In this way, the micro-morphological understanding will both affect the horizontal (part-topart) and the vertical (part-to-whole) level in the compositional hierarchy. I would argue that potential ambiguities and uncertainties in the definition of urban micro-morphology from existing research by this move can sit within both the morphological field and within urban design and architectural research.

Why is the framework urban micro-morphology especially good for discussing public-private interfaces?

This new clarification and understanding creates a framework that can be used to answer a range of questions within micro-morphological research. I would argue that micro-spatial research of the public-private interface in the *building-street* relation addresses the fundamental building block, its formal components and syntactical relation, to understanding the establishment of the physical city. As urban micro-morphology addresses both form, relations, and the processes that create it, this theoretical approach can help provide an adequate conceptual framework to address the fundamental building block of city building. The clarified generic structure diagram in Figure 4 establishes an interesting and very relevant approach to understanding and expanding existing knowledge within the micro-morphological field, and it opens up paths to discuss the public-private interface relevant to this article and doctoral research.

I would argue that in research on the physical public-private interface, the *building-street* relation is placed as a horizontal cross-section in the diagram, through the connections and relations of rooms, areas, and routes / street spaces. These are the voids in the diagram situated at the third hierarchical level from the bottom. The three distinct types of voids are clearly embedded in built form and have a distinct role within the multilevel generic structure. Between the voids in the generic structure diagram, forming the part-to-part horizontal relation, there will be natural boundaries between the different types of voids. They correspond to the physical and social boundaries found in specific examples of the public-private interface, including internal, "private" space, external, private / semi-private space, and public space.⁴¹ The

specific aspects of the private-public interface that we can grasp by addressing it from this perspective include an understanding of the production of the city, mainly through its urban form and how the processes that created it are included in the physical output. The framework is vital for addressing aspects on different scales and can emphasize and initiate studies on economy, property, and form. However, we cannot address the user aspect of the interface – how people act and interact in the space. Nor can we address the psychological aspects of how people feel and behave in these contexts.

CONCLUDING REMARKS

This article has engaged in a theoretical study and morphological rethinking to establish a framework of formal properties and spatial relations between the micro-morphological public and private realms. Through a thematic literature review and background research of secondary sources, the concept of urban micro-morphology has been addressed, discussed, and developed into a framework for micro-morphological research in general, and more specifically for addressing the public-private interface within a compact city. The concept of urban micro-morphology has been treated from different perspectives: through a literature search of the term in existing research, with the influence of seminal thinkers and theories in the field of architecture and urban design, and finally as part of a compositional hierarchy of urban form elements known from the field of urban morphology.

Urban micro-morphology is useful for examining both form and the structural relations and processes that create form. It connects the micro-spatial elements of the building-street relations with a macro-spatial understanding of city building. The theoretical framework of urban micro-morphology is useful for connecting formal properties and aspects of urban form both within and across levels of scale. In this way, a small component or spatial unit is always a part of something bigger and in being so can contribute to knowledge about city building. The literature survey shows micro-morphological research as consisting of aspects and elements of form connecting beyond their level of scale. Research on the physical public-private interface, the building-street relation, placed as a horizontal cross-section in the micro-morphological part of the generic structure diagram, links horizontal part-to-part relations to vertical part-to-whole compositions. Knowledge about the part-to-part public-private interface includes relations and compositions between solids and voids, rooms and spaces, plots and neighbour-plots, and between plot and street. The particular focus in such knowledge will include the characteristics of the boundaries between these relations. Knowledge about a part-to-whole public-private interface includes its position relative to other elements within a larger structure, from below in the domain of individual parts and from above in the position of the element as a part of the wider composition.

The limited occurrence of the term urban micro-morphology in the literature review shows that it has not been widely applied to the study of urban form in general or the physical public-private interface specifically. Whilst use of the term urban micro-morphology has been limited, the general theme of the physical interface is well represented in the fields of architecture and urban design. The configurational diagram of Karl Kropf provides a means of addressing and developing the micro-spatial aspects of the subfield, which this article develops further, making links between part-to part and partto-whole relationships together with other micro-morphological research agendas.

The result of the research in this article offers a perspective to conduct micro-spatial research and analysis of urban form components, which can at the same time inform urban planning legislation and development processes within a compact-city framework.

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OBSERVER, EXPERT, OR ACTIVIST: CHANGING ROLES IN DESIGN RESEARCH PROJECT Katja Maununaho

ABSTRACT

This article discusses ethical issues in an urban development design research study. It is based on an ongoing PhD research project which investigates questions of urban housing design in socially diverse, multicultural neighbourhoods. Experience from the case discloses ethical responsibilities in design research that concerns researchers' positions, empirical results, and perceivable effects on the case environment. This article aims to argue for politically informed action that acknowledges ethical responsibilities to the case environment and people living in it as a primary interest in design research.

KEYWORDS

Research-by-design, design ethnography, role of the researcher, design ethics, transformative agency

INTRODUCTION

Architectural research that focuses on design – whether design research, research into design, research through design, or research by design – is a field that has been much debated in recent decades. This article discusses the issue based on a PhD research project that focuses on questions of urban housing design in the context of increasing cultural, social, ethnic, and lifestyle diversity in the Finnish urban population. Design plays multiple roles in the project. The study looks at the change factors caused by current population trends, focusing both on design practices and on the need for new solutions in the urban built environment. Observing an ongoing suburban development case in the research opens an opportunity for gaining insight into different planning and design potentials and restrictions, and considering spatial issues that concern social life in multicultural neighbourhoods. We are in a situation where the contents and forms of design processes need to be reconsidered. A critical look at user perspectives in an urban development case, which in this research is a regeneration case in a multicultural high-rise suburban neighbourhood, Suvela in Espoo, reveals a need for participatory design practices that acknowledge local social processes, and architecture that can open spatial potentials for the ideals of the right to the city.¹ This article focuses on what kinds of ethical responsibilities these changes in perspective cause to design, and also on what sort of challenges they bring to the design research case. This is pursued by reflecting on empirical observations from the case and on academic discussions in contemporary design research literature.²

One motivation for this article comes from my personal experiences as an architect doing research, which seem to have correspondence to the current status of the discipline. Architecture is a young academic discipline, and it has been struggling to establish its position among the fields of science and humanities. Though there has been a growing acceptance of design on its own terms, and a growing acknowledgement and articulation of design as a discipline,³ questions about the fundamental paradigmatic ideas behind architecture as a profession and a discipline have led the debate, focusing to a great extent on the philosophical, epistemological, and ontological issues of the developing discipline of design.⁴ This focus has meant, for a young researcher starting out, that there are still too few representations of peer experiences that would open concrete views on the practical cognitive challenges of doing design research. Therefore, while focusing on the emerging issues discovered in the case, I also wish to contribute to the discourse by elaborating on my experiences during the research project. In particular, I intend to reflect on the roles and responsibilities of research in dealing with a case that involves large-scale changes in an urban environment that is currently lived in, used, visited, lingered on, grown into, and related to by its dwellers. I will start with an overview of the theoretical discussions of the criteria for architectural design research, as addressed by Bruce Archer, Jeremy Till, Nigel Cross, and Ken Friedman, among others,⁵ and point out some seemingly characteristic challenges. I will then discuss the issue of responsibilities in design research, as presented by Jeremy Till, Tatjana Schneider and Till, and Lee Stickells,⁶ and ask what kind of ethical challenges design researchers face when dealing with the existing urban everyday environment that is currently struggling to improve its reputation, perceived social problems, and urban decay. My intention is to argue for an active and politically informed role that possesses transformative potential in design research. I will pursue this in the latter part by reporting on my experiences with the Suvela case, reflecting on them in terms of the disciplinary design discourses presented previously.

CHARACTERISTICS OF ARCHITECTURAL KNOWLEDGE PRODUCTION

When architectural research is compared to traditional sciences, few clear differences seem apparent. Christopher Alexander identified the distinction clearly: "Scientists try to identify the components of existing structure. Designers try to shape the components of new structures."⁷ To continue with Till's definition:

Where traditional research is often based on an analysis of the given, architectural research-by-design is projective and dynamic. Where traditional research is concerned with the objective, architectural research by design is necessarily speculative inasmuch as it looks forward to a future over which it does not have full control. Where traditional research is often obsessed with method and the correctness of the process of research, architectural research by design is more concerned with the outcome.⁸

Architectural design – as practice or as research – must deal with the uncertainty of the future. This orientation to not-yet-existing situations, conditions, and solutions is considered both a weakness and a strength for the field. On the one hand, it enables perspectives that would remain invisible with traditional scientific methods. On the other hand, it presents continuous challenges to the validity of the knowledge. For this reason, much of the discussion about design research in recent decades has dealt with the questions of whether, or how, it is possible to produce knowledge through the methods of design, and what kind of role this knowledge may have in science.⁹ It can be assumed that all designers share the opinion that the act of design is, in itself, an act of research through which new knowledge is created. Mostly, this is considered to be tacit professional knowledge.

In order to distinguish between these sorts of professional knowledge, Archer discussed research activities carried out through the medium of practitioner activities and defined the criteria for disciplinary knowledge as "a systematic enquiry whose goal is communicable knowledge".¹⁰ Cross follows similar lines and presents five characteristics that distinguish research from professional design practices.¹¹ These characteristics can be further outlined in three sections: the characteristics of the object of knowledge (purposiveness and inquisitiveness); the characteristics of the production of knowledge (informed awareness of previous knowledge and disciplined methodical manner); and characteristics of the distribution of knowledge (communicability,

making knowledge available to others in reusable form). Although, as Cross points out, these characteristics do not inhibit or preclude the production of knowledge through design,¹² it seems that there are also characteristics of architecture that can involve major challenges in achieving them. First of all, architectural design research does not happen in laboratories, and the impact of different design measures cannot be tested in a neutral environment. In many cases, the only laboratory for architecture is a real, everyday environment, with individuals and communities playing the role of test subjects. This lifeworld laboratory is the messy reality for design research. The definition of a research situation with all of its factors is bound to remain incomplete. In addition, the designer or researcher has only limited control over the processes that happen while work is underway. Recognition of these limitations means that the disciplined, methodical manner that Cross requires¹³ cannot be defined similarly to the principles of the Enlightenment, as systems that presume to construct a stable and testable knowledge base by which the cause of things could be objectively analysed,¹⁴ but is dependent on other characteristics. In most cases, architectural design research procedures are one-offs: design aims to make changes to existing conditions, which vary from place to place; afterwards the unique local circumstances have already been changed, and the procedures can't be repeated and tested in similar situations. In addition, the timeline of the changes that architectural design intends to create poses difficulties for research. Some effects of the changes may come quickly, but in most cases the processes continue, and some social outcomes initiated by the changes to the environment may take decades to evolve. This means that during a research project the results may not yet be empirically observable, and afterwards they have been contaminated by so many other variables that they cannot be verified. And most importantly, when targeting existing living environments, if a design research hypothesis about desirable outcomes in a chosen local environment proves to fail, the results are likely to affect people's lives, and they may not be corrected after the fact.

To respond to the challenges of today's urban environment and produce relevant information about future potentials, design research is very much dependent on this uncertain and contingent lifeworld laboratory. This causes unavoidable ethical responsibilities for design research. While a designer working on a commission has the duty to fulfil clients' wishes, a researcher working to establish disciplinary knowledge through a design case has broader responsibilities for both the discipline and the case at hand. Friedman sees design as referring to a process which is goal-oriented.¹⁵ He sees the goal of

design as solving problems, improving situations, or creating something new or useful. He asserts that "those who cannot change existing situations into preferred ones fail in the process of design". This definition, which in my perspective seems to correspond well to the profession's internalized idea of the essence of design, also reveals simplifications that lead to ethical challenges, which will be discussed in the next chapter.

ETHICAL CRITERIA FOR DESIGN CASE STUDY

Architects working on a design commission ultimately have to follow the objectives and instructions given by the client. They are expected to use their professional knowledge to evaluate the problem that has been defined, either before or during the commission, and to present a spatial solution for it. As an example, in my research case in Suvela, which I will describe in more detail in the following sections, the basic problem was considered to be an intertwined combination of social and ethnic concentration and physical decay. The clients' instructions anticipated that the solution would be found in strong constructional measures for the considered trouble spot, the introduction of a new kind of urban typology with a corresponding new visual appearance for the area, and the attraction of private developers. Though there was a suspicion towards targeting social problems with changes to urban typology expressed by the architects, the ethics of the commission inevitably guided their work towards the clients' objectives.

In the worst-case scenario, these kinds of conflicting principles may lead to situations in which the end results are not in line with the original intentions of the project. As Manzini has noted, "Over the past hundred years, even when driven by the most positive intentions, designers have been active promoters of the ideas of wellbeing and ways of living that we have recently and dramatically discovered to be unsustainable."16 Till criticizes the prevailing understanding of design ethics as appropriate professional conduct during a commission,¹⁷ where "the client is seen as primary, and the responsibility for anything beyond framed as a secondary environmental, not social, issue".18 He points out that there are almost inevitable conflicts between clients' shortterm demands and the long-term needs of the users. Nevertheless, Till also sees that architects, more than others involved in the process of construction, have the opportunity and means to deal with this tension. His challenge for architects is to seize the openness and inexactitude of social and environmental issues in order to enable and empower others.¹⁹ For this purpose, he introduces a concept of social ethics - ethics for the other - where environ-

mental elements and social relations are deployed in the name of the other through the formation of an empowering spatial context.²⁰ For disciplinary knowledge production in architecture, this challenge seems even more vital. All professional design commissions necessarily have their limits, every design solution includes compromises between conflicting demands, and there is always the client who has power over the final decisions. In design research, the evaluation and selection process between different solutions is free from the codes of conduct that prioritize clients' requirements. Therefore, research is obligated to challenge the potential internal conflicts of interest in design. Schneider and Till argue that to "challenge the norms of professional behaviour is not to dismiss the role that professional knowledge may play, but it is to argue that the deployment of this knowledge should be set within other ways of acting".²¹ Disciplinary design knowledge has a major responsibility to discuss the tensions between contradictory needs and to produce information and ideas that serve the others, that is, particularly the groups and individuals who are in minority positions in society, whose voices would otherwise remain silent under the forces of market-led urban development.

In today's urban society, with its diversity and unpredictability, the "other" is not easily addressed. In most urban environments, just as in the Suvela case, dwellers do not constitute a uniform group. Population changes, social polarization, and international and interurban migration flows have changed urban populations into a heterogeneous mix. In addition, different ethnic and social groups also eventually become heterogeneous, internally contradictory and dynamic. This suggests that the already otherwise contingent field of architecture must cope with the postmodern condition in which there are no norms or codes for right or wrong solutions, no universal truths. Bauman writes that "the ethical paradox of the postmodern condition is that it restores the agents the fullness of moral choice and responsibility while simultaneously depriving them of the comfort of the universal guidance that modern self-confidence once promised".22 Till's interpretation of Bauman's idea is "that in the face of uncertainty, the individual is thrown back to their irreducible ethical core and is asked to make choices; not certain choices or perfect choices, but the best possible choices in the name of others".²³

In an earlier article dealing with design research, Till presented two driving factors that could guide design research through the relativism caused by the postmodern escape of universal truths and the contingency of architecture: intent and doubt.²⁴ According to him, by surveying and interpreting the con-

tingent field, and then acting with intent, architecture retains a resistive and redemptive potential. By doing so it responds to the forces of the lifeworld in a manner which remains generative, alert, and humble to those forces. In addition to intent, design research has to proceed through doubt, "in a constant unravelling of what may be wrong in order to make it better".²⁵ It could also be stated that in order to attain these requisite factors, design research needs to overcome the straightforward problem-solution thinking of the practice and broaden the perspectives towards reflective critical thinking. One source for critical perspectives has been found in urban studies. Neil Brenner, David J. Madden, and David Wachsmuth describe that "the tasks of deciphering complex and rapidly transforming developments in urban environment, and bringing to light institutionalized assumptions that cause unintended inequalities and sociospatial unevenness have been grappled in social sciences, humanities and in the cognitive fields of planning, architecture and design".²⁶ They also present key challenges for any critical approach, which include considering the inherited concepts and methods for understanding and transforming cities, and generating a new lexicon of spatial difference.²⁷ This pursuit of critical understanding is also essential for architecture. Schneider and Till argue that "architecture as a discipline is inherently political and therefore immanently critical ... critical in the early Frankfurt School sense, as something that starts out with an unravelling of the social reality of the given condition so as to be able to understand how to transform it into something better".28

Despite the similarities, architecture nevertheless remains distinct from urban studies through its attitude towards the observed problems. The revelation of problems such as uneven development or institutionalized false standards is fundamental to urban studies, but it is not adequate for the perspectives of disciplinary knowledge in design. As stated earlier, design looks forward to new structures, so the essence of design ultimately comes from the point when the revealed problems begin to be solved. Or as Schneider and Till present it, critique helps architecture to engage better with the context of the world beyond "in a transformative and emancipatory manner".²⁹ This focus means that the very character that is essential in building independence for architecture as a discipline also brings with it the uncertainties and challenges to the validity of research. These challenges require case-specific consideration, which I will next demonstrate though my research setting.

DEFINING DESIGN RESEARCH SETTINGS

Research designs in case studies are traditionally aimed at forming knowledge and understanding about events, actions, and actors in some ongoing case,³⁰ with a time perspective that usually moves between past events and their observable present effects. The intention is to shed light on a case that is considered special in some regard, but that is also generalizable. The results of case studies are expected to be strongly descriptive, yet usually also interpretive. In comparison, as mentioned above, design research cases aim not only to understand but to alter present conditions, and to have effects on future situations. This setting calls for an added generative aspect in research design.

The subject of my PhD research is issues of cultural diversity and design in an urban residential environment. In terms of scale, the focus of the project is on mid-scale spatial questions between urban configurations at the neighbourhood master-plan level and architectural design solutions in residential buildings. The results are expected to concern both user-oriented design practices and concrete spatial solutions for integrative housing environments. Initially, the idea was to select an appropriate design case or cases that would provide real-life settings for testing different procedural ideas and/or spatial typologies from the perspectives of cultural diversity and encounters in a suburban environment. Soon it turned out that a search for essential spatial questions for culturally diverse neighbourhoods required a hermeneutic approach aiming to form an understanding of the context. Thus the basic idea of the research design was to first gather information about different problems and needs that concern the case through an ethnographic case study. After that, a latter phase was aimed at developing potential solutions to these problems with research by design.

Based on my education and experience as a designer, this framing felt intuitively clear, given that it meets the description of goal orientation in design.³¹ Schneider also describes research though design quite similarly.³² According to him, there are usually three phases: research, design, and publication. During the research phase, the application of social sciences, cultural sciences, and the use of qualitative research methods such as observation or interviews makes design research an interdisciplinary activity.³³ The phase of design (design, realization, and validation), on the other hand, "belongs to the category of 'research through practice' or action research... Action research involves systematic research through practical activities ... which result in the generation and/or checking of new information, forms, processes, concepts etc., and publishing new communicable knowledge."³⁴

However, this kind of framing induces an internal bifurcation to the research project with the objectives of knowledge pointing in two different directions. The research design intends to both produce an objective understanding about the current situation and events, and to define normative perspectives on future possibilities. This also means that the role of the researcher is subject to different expectations that can potentially be contradictory, which I will demonstrate in the next chapters. Yet in my project, this bifurcation felt inevitable. At the start, it was evident that there was an urgent need to form an understanding about what the essential design questions of cultural diversity in housing actually are. Should the focus be on fulfilling different cultural preferences and needs; or creating spatial affordances for intercultural exchange; or should the design focus on experienced problems with spatial segregation? On the other hand, there was a supposition that the relevance of design research comes from the ability to highlight the potential and produce a positive solution, which I considered equally important for the subject.

THE SUVELA REGENERATION CASE

In the fall of 2011, I had just begun to work with the research subject when I had the good fortune to come across a starting neighbourhood regeneration project that dealt with very similar issues to my subject of interest. The regeneration project was called Suvelan Onni – The Happiness of Suvela – and it involved a regeneration of suburban high-rise tenement blocks of over 250 rental flats in the Suvela suburban neighbourhood in Espoo city.

The development in the neighbourhood originated in the 1960s and 1970s era of rapid urbanization in Finland. The tenement blocks were among the first buildings to be constructed after the international competition for the centre of Espoo in 1967. The objectives of the competition were to create an optimally built environment, giving form to a new kind of urban life that was sprawling west from Helsinki centre.³⁵ The main idea of the winning entry was to create a network of pedestrian routes bordered by efficient residential structures, with commercial and service spaces spread evenly throughout the whole network on the first floors, and vehicular traffic outside or under it.³⁶ To some extent, this structure was intended to work similarly to traditional city streets, and thus be more active than pedestrian routes located in green areas. Regrettably, during the next decade, the commercial and service spaces

within the residential structure were mostly not completed. The Suvela pedestrian network remained only as a fragment detached from the Espoo centre service area. In addition, the financial situation at the time had changed rapidly in favour of public housing over owner-occupied housing. Soon after the first completions, the number of social tenements and lack of services gave Suvela the image of a socially problematic neighbourhood. This reputation seems to have persisted over decades, despite many improvements in the area.

According to case material and city statistics,³⁷ these days the Suvela area struggles with many social problems. Compared to other areas, there is a high percentage of inhabitants without secondary education, a high level of unemployment, and low average income rates.³⁸ Ethnic differentiation is also an issue in Suvela. In early 2014, in the city area that includes the Suvela neighbourhood, 16.5 per cent of the population spoke native foreign languages,³⁹ which was the highest amount in Espoo. In part of the tenements in the regeneration case blocks, this number ranged from 40 per cent to nearly 60 per cent in 2010, and in early 2016 it varied from 42 to 73 per cent. This seems to refer to a similar development that has been observed particularly in the largest cities in Finland, where socioeconomic disadvantages and ethnic concentrations caused by international immigration and interurban migration seem to be taking place in the same neighbourhoods.⁴⁰ Besides the social and ethnic concentration, other factors like environmental features (such as poor physical quality), lack of services, and lack of diversification in housing also seem to be affecting differentiation.⁴¹ Similarly, in the Suvela case the tenements were considered troublesome in both social and physical terms. The buildings were coming to an age when major renovations were needed, and the environment appeared to be neglected and messy. People living in the buildings complained about cases of mould and pests in the flats. According to the municipal tenement company, there were also problems with the distribution of flats, with too-large average flat sizes compared to the current high demand for small flats. The property prices in the area were also considerably low compared to other areas in Espoo. This was interpreted to be a result of the combination of the perceived problems in the area.

The initial aim of the regeneration case was to make considerable changes both to the built environment and to the social structure. The City of Espoo would increase the allowed floor area on the site, the tenement flat sizes would decrease after new construction, and the extra floor area could be sold to a developer for owner-occupied flats. This way the social structure would become more stable, private capital would take part in the environmental improvements, and the reputation could be changed considerably. In practical measures, this meant that most, if not all, of the old tenement buildings would be demolished, and due to this the residents' rental agreements would be terminated. In my perspective, this situation led to a hypothesis that there might be a conflict of interest between the city and the dwellers. Therefore, I decided to look into both perspectives in my research project. The idea was to use ethnographic methods to collect information from both the institutional actors in the regeneration project (planners, tenement administration workers, etc.) and from the people living on the area. I was invited to participate in the project meetings, where I silently followed the conversations and tried to take notes on everything that was said. The observations also included interviews with all parties in the project, and the collection of design material. At the same time, I began to develop ideas on how to reach the dwellers in order to gain insight into their perspectives, hopes, and needs concerning the area. After the first design phase of the project, I organized two design workshops in the area, participated in several workshops and events organized by others, and established relationships with people working in the area in different social organizations. The intention was to analyse and reflect on the two different perspectives (institutional and lifeworld perspectives) and to continue from there to a research-by-design phase, seeking to find new working methods and/or new spatial solutions to accommodate cultural diversity in the urban environment.

The regeneration project proceeded to a phase in which preparation material with a preliminary land use plan was approved in political decision-making and presented to the public. The plan involved the demolition of roughly half of the original tenements, and the construction of new mixed typology with high-rise apartment blocks, town houses, and rooftop flats, all fitted with an underground parking facility. The development vision highlighted ecological sustainability, mixed housing tenure types, the potential for new housing concepts, and different outdoor facilities such as rooftop gardens and urban gardening.⁴² In addition, the idea of small commercial and service spaces was reintroduced to the area. After the public presentation, the city started looking for potential partners to develop the owner-occupied part of the block. Despite the presented design solutions for improving the image and attractiveness, the task proved to be difficult. After a two-year delay in the project, the city decided to start the design process again from scratch.

CHANGES IN THE RESEARCHER'S ROLE

At this point I had already collected empirical information from the area and formed a preliminary understanding of different hopes and fears, potentials and threats related to development in the area. The new design assignment for the architects in the project changed significantly, this time highlighting simplicity of solutions, single-use (housing), and cost efficiency. The idea of preserving and renovating some of the old buildings as a sort of recollection of the past was reversed, and all buildings were slated for demolition. This meant that a phased implementation and a corresponding phased eviction of residents would be challenging. The political decision-makers, on the other hand, seemed to give more attention to the issues of urban landscape, demanding a strong and noticeable impact on it. The collected empirical information about the dwellers' needs for the area seemed to contradict both perspectives. Though some of the workshop conversations brought up opinions that stressed the importance of large, visible changes in order to tackle the perceived image problems, the dwellers primarily spoke of their need for spaces that would enable different social gatherings and exchange. Another important issue, which repeatedly came up from the dwellers, was personal ties to the Suvela area, and a wish to stay there.

As a researcher, this information put me in a position in which my role as a silent and neutral observer seemed outdated. In addition to my own conscience-related considerations, knowing about the collected empirical data, the design team was asking directly for my opinions. The situation called for a change in the research design. Sharing the information which I had gathered meant that I would influence the processes I had been observing. This situation is linked to the mentioned bifurcation that was already present in my research design, and which had now been realized as a challenge concerning information validity. On the other hand, the situation also raised questions of design research ethics. Staying silent seemed to do an injustice to the people who had participated in the research.

The duality of the objectives of revealing and solving issues in social reality had presented itself in my research case. If I had remained in the observer role, the position would have allowed me to observe and point out the contradictions or potential misconduct from the perspectives of spatial equality. This, however, would have meant rejecting the design approach from the research. I also felt that this position would have been a disservice to the people who had shared their opinions with me in research interviews and workshops. The participants knew I was an architect and that I was somehow involved in the Suvela regeneration project. It could be assumed that their interest in participation involved a wish to have their voices heard, and to influence the outcome of the process. Hence, hearing people's wishes had brought with it a responsibility to act accordingly. The position of having knowledge from both professional and grassroots perspectives produced the role of intermediary expert between the two sides. Following the ideas and issues that had come up from the empirical material, I decided to start acting with an aim to find the potential for shared spaces and user-oriented participatory design that could be fitted in the spatial configuration and temporal process of the presented design.

The latest phases in the Suvela case were carried out in 2016, with the drafting of the detailed plan proposal. On my part, after the decision to start acting in the role of intermediary expert, I concentrated first on spatial analysis of different design proposals. The aim of the analysis was to evaluate the qualities of different spatial configurations and characteristics as facilitators of potential social life. Since the clients' and political decision-makers' focus seemed to be attached quite firmly to economic and visual issues of making significant changes to the urban landscape, the underlying goal of my action was to place greater emphasis on the questions of social space, and to promote the importance of participatory practices in the area. So far, as a result of this action, the master-plan proposal includes orders that require communal spaces, and a notation that highlights the importance of participatory design practices in the design procedure. The tenement company has also grasped the matter, and the participatory design process is intended to begin after the master plan is legalized.

TRANSFORMATIVE PRACTICES IN DESIGN RESEARCH

In an editorial in *Architectural Theory Review*,⁴³ Stickells encourages the discipline of architecture to rethink architecture's social significance, calling for a capacity for transformative action. "For architecture, urban planning and design, a particularly strong point of mobilization in this regard is the issue of participation and empowerment in processes of spatial production and design."⁴⁴ During the different phases of the Suvela project, one driving factor for the search for this kind of active engagement has come from within the subject, from the processes of social and ethnic differentiation. Hans Skifter Andersen draws attention to the interaction between social exclusion and physical decay in the urban environment, arguing that "segregation is not a simple consequence of social inequality, but a product of both social and spatial differentiation".⁴⁵ One substantial aspect of this interactive process is image. Irene Roivainen has proposed that the image of a problem neighbourhood in the Suvela area has been categorically constructed throughout decades of different media reports that highlighted absent services, social disturbances, and general unpleasantness.⁴⁶ This image has persisted since the early 1970s, despite many efforts to solve the problems. These kinds of constructed images can work quite harmfully as self-generating factors in the process of segregation. A design research case that seeks to enhance the living conditions in this sort of area needs to deal with both real and imaginary aspects of the urban environment. Suvela's history bears witness to the fact that image problems are not easily solved; it could be argued that the image of Suvela needs to be reconstructed brick by brick. There are no right or perfect solutions. There are only, as Till presented,⁴⁷ best possible choices in the name of others. In the Suvela case, this has given further reasons to emphasize and promote positive features and related possibilities, and to engage in the development of potential solutions. The case illustrates the relevance of Till's concept of social ethics⁴⁸ and suggests that, through critical but active agency, design research may have the potential to bring out underlying conflicts of interest in design. The important aspect here is that the focus does not remain on the problems, but that it is set on finding new ways to act that would create an empowering potential for both design professionals and the local community to overcome the conflicts.

Stickells argues that the transformative processes that combine architecture, art, and activism have potential when the emphasis is on "the material organization of communicative situations, ephemeral or temporary constructions, and the modelling of alternative ways to communally inhabit the city".⁴⁹ The Suvela case experiences indicate that this sort of transformative capacity is an essential step that is needed in order to proceed from the critical thinking of urban studies to generative and dynamic knowledge of design. The significance of this dynamic disciplinary knowledge lies in the social dependence that is characteristic of architecture. According to Stickells, "a challenge for architectural theory becomes the development of models for appraising the ways that architecture contributes to structuring the power dynamics of social space. This implies architecture's dependency as a positive expansion of its possibilities, rather than a weakness."⁵⁰ When it comes to urban regeneration, this means that in order to overcome the conflicts of design commission and place the focus more on user perspectives rather than property values, there is a need to establish new tools for participation that would enable people to shape their living environments for themselves.

In the Suvela case, the planning process has shown that, when it comes to participatory communication about social and architectural urban development in a way that would produce meaningful to-and-fro reflection between designers and inhabitants, there is a deficiency in current planning and design practices.⁵¹ During the process, it has also been demonstrated that the necessity of new practical tools and a critical understanding of various transformative practices is vital for design research. The last phases of the Suvela case provide evidence that it is possible to make a difference in the decision-making process through an active researcher position. But the position doesn't possess the power to pre-order the outcomes. As Schneider and Till conclude, "If we take 'agency' in its transformative sense as action that effects social change, the architect becomes not the agent of change, but one among many agents."52 Factors associated with interaction and communication become essential in the process. Based on the Suvela experiences, when data that highlights a need for shared spaces and for new participatory practices are presented on a conference room screen, it transforms into representations that can be just as seductive as a perspective with blue skies and children with kites. The presentation becomes a double-edged sword: it might work as a pursued level for directing attention to intended issues, but then again, it might work only as a sales-promoting stimulant that makes it easier to accept the proposed development, and the related "renovictions".53

This event again clearly indicates the difference in traditional research, planned and conducted in a way as not to allow the enquiry processes to contaminate the phenomenon under investigation, and research where the investigator explicitly takes action in and on the real world, namely Action Research.⁵⁴ By taking an active position, the researcher gives up the authority to make an independent interpretation of the material, and the presented material becomes one actor in the process. Archer argues that essential actions needed for making valid results in this kind of research involve making clear "precisely what the intervention was, and exactly what was the theoretical, ideological and ethical position the investigator took up in making the intervention, observations and judgements".⁵⁵ This means that while traditional research requires that personal values and expectations do not have an effect on the process, in Action Research, values and ethical positions are in fact essential, but they need to be involved explicitly.

The nature of architecture as a discipline is essentially political and critical,⁵⁶ and in design research this orientation seems inescapable. But the ethical responsibilities that follow this orientation involve a temporal dimension that is contradictory to the customary project orientation of both design and research. Schneider and Till bring up the need to change focus from reacting to "short-term market-led demands of clients and developers" to "the longterm desires and needs of the multitude of others who build, live in, occupy, visit, and perceive architecture, acting".⁵⁷ Producing knowledge from these lifeworld desires also requires long-term commitment that may not fit within the usual timely boundaries of design projects, especially when taking into account today's increasingly accelerating pace of consulting contracts. In my instance, the relationship to the case developed slowly during five years. It is not a long time in urban development, but it is long for project work. And though my research field work has a deadline, ethical responsibility does not disappear all at once. Long-term commitment is needed to ensure that the intended issues of social space are kept in the task list and hence that the transformative potentials are delivered.

CONCLUSION

In previous sections, I unpacked my experiences with a neighbourhood regeneration design research case. The intention was, first of all, to take part in the disciplinary discussion about the role of architectural research, and to reflect on it from the perspectives of a project involving an urban everyday environment and the people who live in it. Secondly, I wanted to elicit the kinds of ethical challenges that design researchers face when dealing with an existing urban everyday environment. Based on the reflections on my individual experiences and decisions, I argue that architectural design research needs to build a base for politically informed action aimed at facilitating solutions for empowering social space.

Due to the normative nature of design research, a need for a new set of validity criteria for disciplinary knowledge production is called for. Friedman argues:

To reach from knowing to doing requires practice. To reach from doing to knowing requires the articulation and critical inquiry that leads a practitioner to reflective insight. ... It is not experience, but our interpretation and understanding of experience that leads to knowledge. Knowledge emerges from critical inquiry. Systematic or scientific knowledge arises from the theories that allow us to question and learn from the world around us. One of the attributes that distinguish the practice of a profession from the practice of an art is systematic knowledge.⁵⁸

Experiences and interpretations are factors that characterize architecture, but not architecture alone. The dependence on experiences and interpretations as well as the need for critical questioning is present in many other fields that make use of different qualitative methods, such as ethnographic research. For a source of critical thinking, urban studies opens perspectives that can be parallel to the needs of design research. And yet it is necessary to make the distinction that the essence of architecture comes from the moment when a critical understanding of the world around us leads to ideas and actions that guide its development in the future.

The experiences from my research case brought up some challenges that researchers may face while moving between the two different goals of producing understanding about a case and acting to find suitable solutions for the case. When a researcher steps outside the traditional scientist's position, which avoids personal influence and its contaminating effect on observed events, she comes up against questions of information validity and ethical responsibilities. In the contingent field of design, this may lead to unintended outcomes. Actions have consequences, even though they are performed in the name of research. Hearing about the needs of people may oblige one to inform others about them. Sharing information means that others can make their own interpretations of it. The contingency of the chain of events in urban regeneration means that the time perspective on ethical issues can be long. But both the essential ethos of the design discipline and the associated ethical responsibilities provide reasons for transformative action.

The ethical responsibilities in architecture argued by Till⁵⁹ put an emphasis on the dynamics of social space. He calls for a social ethics of architecture which favours the needs and desires of the "other" – that is, the people whose lives are affected by the design – over the needs of the clients. At the heart of this ethics is a responsibility for the other and an appreciation of the differences of the other.⁶⁰ This leads to a situation in which ideas of universal norms or truths must be abandoned. Both understanding and transformative action are partial at best, and they need to be developed within each situation. Therefore, instead of verification and methodological reproducibility, I call for political responsibility, where the researcher must acknowledge the political implications her actions may cause. In addition, the evaluation of research results, the produced information and potential changes to the environment, must be made in light of that political consciousness.

In my case in the Suvela neighbourhood, this means that the needs of end users, especially those in minority positions, need to be highlighted. Changes to everyday living conditions must be prioritized over changes to attractiveness or economic productivity. The built environment as a static visual landscape has value when it affects the lives of its dwellers and users. The reputation of the area is relevant from the perspectives of its everyday social life. If the lives of the people living in the area are not improved, then the pursued change in social differentiation loses its meaning. In research, this means making normative selections. Knowledge that could work in favour of the dwellers needs to be promoted, and knowledge that might work against the dwellers should be exposed to careful criticism. This responsibility may have an effect on the researcher's role, forcing her to step outside the shadowy position of silent observer, and making her one of the active agents in the case.

NOTES

¹ Katja Maununaho, "Political, Practical and Architectural Notions of the Concept of the Right to the City in Neighbourhood Regeneration", *Nordic Journal of Migration Research*, 6/1 (2016), pp. 58–64, esp. pp. 62–63.

² Other issues of the research case, such as the methodological aspects of the research, as well as the results that concern the characteristics of design solutions, will be discussed in another review.

³ Nigel Cross, "From a Design Science to a Design Discipline: Understanding Designerly Ways of Knowing and Thinking", in Ralf Michel (ed.), *Design Research Now: Essays and Selected Projects* (Basel: Birkhäuser, 2007), p. 48.

⁴ See, for example, Jeremy Till, "Too Many Ideas", in *Research by Design* (Delft, 2001), pp. 315–22, reprinted as: "Best Paper in Conference", *EAAE Newsletter*, April 2001, Copenhagen, pp. 20–24; Cross, "From a Design Science to a Design Discipline".

⁵ Bruce Archer, "The Nature of Research", *Co-design* (January 1995), pp. 6–13; Till, "Too Many Ideas"; Cross, "From a Design Science to a Design Discipline"; Ken Friedman, "Theory Construction in Design Research: Criteria: Approaches, and Methods," *Design Studies*, 24/6 (2003), pp. 507–22.

⁶ Till, "Too Many Ideas"; Jeremy Till, *Architecture Depends* (Cambridge, MA: MIT Press, 2009); Tatjana Schneider and Jeremy Till, "Beyond Discourse: Notes on Spatial Agency", *Footprint*, 4 (2009), pp. 97–111; Lee Stickells, "The Right to the City: Rethinking Architecture's Social Significance" (editorial), *Architectural Theory Review*, 16/3 (2011), pp. 214–27.

⁷ Christopher Alexander, *Notes on the Synthesis of Form* (Cambridge, MA: Harvard University Press, 1964), p. 130.
⁸ Till, "Too Many Ideas", p. 22.

⁹ Archer, "The Nature of Research", pp. 6–13; Peter Downton, "Foreword", in Jules Moloney, Jan Smitheram, and Simon Twose (eds.), *Perspectives on Architectural Design Research* (Baunach: Spurbuchverlag, 2015), pp. 8–9; Richard Foqué, *Building Knowledge in Architecture* (Brussels: University Press Antwerp, 2010), pp. 41–43; Till, "Too Many Ideas", pp. 20–24.

¹⁰ Archer, "The Nature of Research", p. 10.

¹¹ Cross, "From a Design Science to a Design Discipline", p. 48.

12 Ibid.

¹³ Ibid.

14 Till, "Too Many Ideas", p. 21.

¹⁵ Friedman, "Theory Construction in Design Research", pp. 508–9.

¹⁶ Ezio Manzini, "Design Research for Sustainable Social Innovation", in Ralf Michel (ed.), *Design Research Now: Essays and Selected Projects* (Basel: Birkhäuser, 2007), p. 233.

¹⁷ Till, Architecture Depends, pp. 179–83.

¹⁸ Ibid., p. 180.

¹⁹ Ibid., p. 183.

²⁰ Ibid., pp. 173–78 and 183–87.

²¹ Schneider and Till, "Beyond Discourse", p. 98.

²² Zygmunt Bauman, Intimations of Postmodernity (London: Routledge, 1992), p. xxii.

²³ Till, Architecture Depends, p. 186.

²⁴ Till, "Too Many Ideas", p. 23.

²⁵ Ibid.

²⁶ Neil Brenner, David J. Madden, and David Wachsmuth, "Assemblage Urbanism and the Challenges of Critical Urban Theory", *City*, 15/2 (2011), pp. 225–40, esp. p. 226.

²⁷ Ibid., pp. 226 and 237.

²⁸ Schneider and Till, "Beyond Discourse", p. 98.

²⁹ Ibid.

³⁰ Foqué, Building Knowledge in Architecture, p. 146.

³¹ Friedman, "Theory Construction in Design Research", p. 508.

³² Beat Schneider, "Design as Practice, Science and Research," in Ralf Michel (ed.), *Design Research Now: Essays and Selected Projects* (Basel: Birkhäuser, 2007), pp. 215–16.

³³ Ibid., pp. 215–16.

³⁴ Ibid.

³⁵ Espoon kansainvälinen keskustakilpailu (1967), Arkkitehtikilpailuja, 8 (1967), Helsinki.

³⁶ "ARK 1/1969: Projektikatsaus", Arkkitehti, 1 (1969), p. 53.

³⁷ Arja Munter, *Espoon väestörakenne 2013 / 2014* (Espoo: Palveluliiketoimi, Kaupunkitieto, 2014), www.espoo.fi/download/Espoon_vaestorakenne_2013__2014/67916a6a-e60a-459c-999 4-2f49eefef4ce/49858 (all URLs accessed in March 2018); Jukka Hirvonen, *Suvela tilastoissa ja asukkaiden kokemana* (Espoo: Aalto-yliopisto, 2011), lib.aalto.fi, pp. 14–15.

³⁸ Hirvonen, Suvela tilastoissa ja asukkaiden kokemana, pp. 14–15.

³⁹ Munter, Espoon väestörakenne 2013 / 2014.

⁴⁰ Katja Vilkama, Mari Vaattovaara, and Hanna Dhalmann, "Kantaväestön pakoa? Miksi maahanmuuttajakeskittymistä muutetaan pois?", Yhteiskuntapolitiikka, 78/5 (2013), pp. 485–97, esp. pp. 485–488; Katja Vilkama, Yhteinen kaupunki, eriytyvät kaupunginosat? Kantaväestön ja maahanmuuttajataustaisten asukkaiden alueellinen eriytyminen ja muuttoliike pääkaupunkiseudulla (Helsinki: Helsingin kaupungin tietokeskus., 2011), pp. 136–39.

⁴¹ Vilkama et al., "Kantaväestön pakoa?", pp. 492–93.

⁴² Avanto arkkitehdit, Suvelan Onni – alustava maankäyttösuunnitelma 29.2.2012. (2012), p. 2.

⁴³ Stickells, "The Right to the City", pp. 213–27.

44 Ibid., p. 216.

⁴⁵ Hans Skifter Andersen, Urban Sores: On the Interaction between Segregation, Urban Decay, and Deprived Neighbourhoods (Aldershot: Ashgate, 2003), pp. 125–26.

⁴⁶ Irene Roivainen, Sokeripala metsän keskellä: Lähiö sanomalehden konstruktiona (Helsinki: Helsingin kaupungin tietokeskus, 1999), pp. 75–76.

⁴⁷ Till, Architecture Depends, p. 186.

48 Ibid., pp. 173-78 and 183-87.

- 49 Stickells, "The Right to the City", p. 218.
- 50 Ibid., pp. 223-24.

⁵¹ Maununaho, "Political, Practical and Architectural Notions", pp. 58-64.

⁵² Schneider and Till, "Beyond Discourse", p. 97.

⁵³ For more on "renoviction", an eviction of current residents as a result of rampant rent increases induced by value-adding renovations, see Joakim Müllern Skanby, Social Investment Policies in Urban Planning: An Argumentative Discourse Analysis of the Regeneration Dialogue in Lindängen, Malmö (Lund: Lund University, 2014), lup.lub.lu.se/student-papers/search/publication/4463680, pp. 25–26. For more about Suvela case renovictions, see Maununaho, "Political, Practical and Architectural Notions".

⁵⁴ Archer, "The Nature of Research", p. 11.

55 Ibid.

⁵⁶ See Schneider and Till, "Beyond Discourse", p. 98.

⁵⁷ Ibid., p. 100.

⁵⁸ Friedman, "Theory Construction in Design Research", p. 521.

⁵⁹ Till, Architecture Depends, pp. 171–87.

60 Ibid., p. 186.

DWELLSCAPE: THE CONTEMPORARY DWELLING INTERIOR AS A CONTINUOUS DOMESTIC LANDSCAPE Nicholas Thomas Lee

ABSTRACT

This article engages in a discourse on the spatial qualities of the contemporary dwelling interior through a comparative analysis of two single-family homes that challenge common methods of engaging with the programming of interior space, opportunities for inhabitant appropriation, and the treatment of thresholds, both between interior and exterior, as well as between private and communal territories. The domestic interior has great significance given the central position that it plays in our daily lives regardless of cultural, geographical, or economic differences. Despite the importance of this built environment, the current architectural engagement with the dwelling often seems to be focused on the functionalist programming of space or the formalistic expression of the exterior envelope.

The article asks if we can challenge the technocratic attitude towards spatial planning of the contemporary dwelling that is still widely utilized in architectural practice today by engaging in a discourse on the domestic interior as inhabitable landscape?

A comparative analysis is undertaken of House Vandenhaute by Juliaan Lampens and Moriyama House by Ryue Nishizawa, which are considered to be "influential" case study projects. Architectural strategies that have been employed by the architects are identified and compared and then positioned within their specific contexts. As a critical framework for analysis, architectural theory is employed from Josef Frank, Alison and Peter Smithson, Aldo van Eyck, Jonathan Sergison, Stephen Bates, and Georges Teyssot relating to spatial organization, inhabitant appropriation, as well as the significance of the threshold within the contemporary dwelling interior.

It is argued that both dwellings can be considered as continuous "domestic landscapes" where fixed elements define enclosed "places" that accommodate specific functions, as well as delineating interstitial threshold "places" that can be inhabited in a multitude of ways. It is shown that both dwellings encourage participatory appropriation by their inhabitants through intentionally ambiguous "nomadic" places that can support a wide variety of functions and focus on the generation of community by encouraging social interaction. It is hoped that these observations contribute to greater discourse on the spatial planning of contemporary dwellings.

KEYWORDS

Dwelling, interiority, spatial organization, inhabitant appropriation, threshold

INTRODUCTION

The domestic interior has great significance given the central position that it plays in our daily lives, regardless of cultural, geographical, or economic differences. Despite the importance of this built environment, the current architectural engagement with the dwelling often seems to be focused on the functionalist programming of space or the formalistic expression of the exterior envelope where interior space is a mere consequence. "Domestic developments account for the majority of the built environment, but are often realized without the involvement of architects at all, and if so, our engagements are most likely limited to the expression of the façade whereas the actual spaces which are to be inhabited remain uninviting constructive frameworks."¹ A technocratic approach to spatial programming where activities are fixed in defined boxes typically results in dwellings that lack adaptability and fail to meet the complex human needs of our built environment. The architectural theorist Bernard Leupen has written that "a successful dwelling is more than a programme of requirements translated into material form."²

To understand the current architectural approach to the domestic environment, it is important to recognize the legacy of functionalist modernism on the contemporary dwelling interior. In the early twentieth-century, we started to see an "industrialization" of domestic space with the objective of improving efficiency, utility, and living conditions, particularly for the working classes. Perhaps one of the best-known examples of this was Margarete Schütte-Lihotzky and her work on the Frankfurt Kitchen between 1926–27, which embraced the idea of optimization of utility and the principles of standardization by taking inspiration from ships" galleys and railroad dinning-car kitchens.³ In 1928, the Russian born architect Alexander Klein published the text "The functional house for frictionless living,"⁴ where he introduced and advocated the concept of the "functional" dwelling layout. The spatial arrangement of the "functional" dwelling removed "unnecessary" circulation space and consigned specific functions to individual rooms that were then sized and proportioned accordingly. "The justification of Klein's plan is explicit in his title: 'The functional house for frictionless living'. All accidental encounters are regarded as a threat to the smooth running of the domestic machine. This logic is embedded in the regulations, codes, design methods and rules-of-thumb which account for the current day-to-day production of contemporary housing."⁵

Despite the dominance of functional rationalism over the last century, there have been many architects who have challenged the design of dwellings based upon the quantifiable optimization of domestic space. During the 1920s, Le Corbusier introduced his theory of the "Promenade Architecturale" as an organizational device for the spatial arrangement of dwellings by using his early single-family homes as archetypal precedents.6 This intentional curation of sequential spaces went far beyond the simple positing of relational functions within a floor plan. A decade later, in the essay "The House as Path and Place" (1931), the Austrian architect Josef Frank introduced the notion of composing a dwelling from a "path" that linked inhabitable "places" in the same way that a city is composed of streets and squares.7 From the 1950s onward a new generation of more anthropologically minded architects that included Alison and Peter Smithson⁸ and Aldo van Eyck⁹ focused their attention on the creation of "place" that supported the "small pleasures of life" and the building of social community through inhabitant appropriation rather than merely building spaces to accommodate explicit functions. Today, architects and theorists such as Jonathan Sergison, Stephen Bates,¹⁰ and Georges Teyssot¹¹ continue to argue for architects to challenge a technocratic attitude towards planning by engaging with an approach to the spatial organization of our dwellings that allows for a more "nomadic" appropriation of the domestic landscape and that considers the significance of threshold "places".

This article asks if we can challenge the technocratic attitude towards spatial planning of the contemporary dwelling that is still widely utilized in architectural practice today by engaging in a discourse on the domestic interior as inhabitable landscape? I will utilize architectural theory related to spatial organization, threshold, and inhabitant appropriation as a theoretical framework for the study. I will undertake a comparative analysis of House Vandenhaute by Juliaan Lampens (1964) and Moriyama House by Ryue Nishizawa

(2005), which I consider to be "influential" case study projects based upon their deviation from common spatial organization strategies. From an architectural perspective, shared characteristics will be identified that surpass the functionalist programming of space in order to contribute to the current discourse on the contemporary dwelling interior.

THEORY

I will primarily refer to architectural theory related to spatial organization, threshold, and inhabitant appropriation from more anthropologically minded architects. In 1928, Le Corbusier first outlined his theory of the "Promenade Architecturale" while discussing the spatial organization of Villa Savoye at Poissy. "You enter: the architectural spectacle at once offers itself to the eye. You follow an itinerary and the perspectives develop with great variety, developing a play of light on the walls or making pools of shadow."¹² One could essentially describe this as an approach to designing an interior layout through the cinematic sequencing of spaces that would assist inhabitants in the process of "savoir habiter", or knowing how to live. This was the "Le Corbusier of multiple asides, cerebral references and complicated scherzo",¹³ who in practice expressed a far more complex approach to dwelling design than his iconic and somewhat misleading statement, "A house is a machine for living in."¹⁴

The Austrian-born architect Josef Frank, who was a contemporary of Le Corbusier, objected to what he viewed as "technological romanticism" and in particular to functional rationalism when it was imposed on the domestic interior, as promoted by modernist architects such as Alexander Klein¹⁵ and Ernst Neufert.¹⁶ Josef Frank was adamant that practical requirements should never be the principle for spatial arrangement and instead took inspiration from the "organic" formation of cities. In the essay "The House as Path and Place" first published in 1931,¹⁷ he outlines his claim that a dwelling should be composed of paths and places in the same way as a city is composed of streets and squares. Frank takes inspiration from Camillo Sitte's "Der Städtebau nach seinen künstlerischen Grundsätzen" (City Building According to Artistic Principles, 1889)¹⁸ to reimagine the Loosian notion of the Raumplan in a more liveable and relaxed fashion by using his own design for Villa Beer in the Wenzgasse (1930) as an archetypal case study. Josef Frank introduces the notion of composing a dwelling that strives for a harmonious equilibrium of form and content, by utilizing a "path" to link a series of inhabitable "places", which should feel intuitive to navigate and yet recall the intriguing feeling of exploring an unfamiliar town's streets and piazzas.

At this point I would ask the reader to consider the Western tradition of categorizing space within the domestic environment which emerged in the latter half of the nineteenth century with the introduction of technical services such as running hot water, indoor plumbing, and electricity into the home. Rooms became specialized and were typically named after the function that took place there, for example, living room, bedroom, dining room, and bathroom. In his book Japanese Houses: Patterns for Living, Kiyoyuki Nishihara contrasts this Western tradition of denominating dwelling spaces with the traditional Japanese home where the room nomenclature reflects their spatial relationship to one another rather than a single defined function.¹⁹ The names Zashiki (main room), Naka-no-ma (middle room), and Tsugi-no-ma (the room next to the big room) help to describe the spatial organization of the house, while at the same time leaving the programmatic function of each space open to interpretation by the inhabitants. "Nishihara argues that whereas the Western concept usually features single-function spaces, spaces in the Japanese home are used in much more diversified ways."20 This subtle difference in the categorization of space clearly has great consequences in terms of flexibility, adaptability, and inhabitant appropriation.

From the late 1950s onwards, a new generation of architects emerged who were interested in a more anthropological approach to spatial organization. Architects like Alison and Peter Smithson and Aldo van Eyck focused their attention on promoting architecture that supported the building of social communities through inhabitant participation. In 1957, Alison and Peter Smithson defined a set of experiential "criteria" for defining moments within the domestic landscape rather than the fulfilment of explicit programmatic functions.²¹ These "criteria" took into account the changing requirements of the inhabitants as well as their complex emotional needs by accommodating what they described as the "small pleasures of life". Emphasis was placed on qualities of spaces such as light, views to the outside, and even the enjoyment of fresh cool air on a summer day. Rather than a prescribed set of principles to follow, the Smithsons' "criteria" were merely a means of challenging the dominance of functionalist planning by introducing a new way of describing interior spaces and how they could be inhabited.

During the 1960s, the Dutch architect and theorist Aldo van Eyck placed emphasis on creating "place" rather than "space" and on designing architecture that provided the opportunity for "occasion" rather than merely existing in "time". He wrote, "space has no room, time not a moment for man ... Whatever space and time mean, place and occasion mean more … For space in the image of man is place and time in the image of man is occasion."²² Aldo van Eyck believed that the architectural elements of the dwelling interior, such as windows and doorways, provided opportunities for the architect to create "place" and "occasion". When discussing these architectural gestures, he stated, "make of each a place; a bunch of places of each house and each city, for a house is a tiny city, a city a huge house."²³ Aldo van Eyck claims that there is a fundamental reciprocity between the house and the city and the way in which the two habitats are structured, echoing the earlier sentiments of Josef Frank. Aldo van Eyck believes that we must conceive architecture "urbanistically" and urbanism "architecturally" in order to arrive at "the singular through plurality". When considered in this way, the threshold between house and city is diminished and one can see a continuation and therefore a direct relationship between the two entities.

Throughout his writings, Aldo van Eyck consistently places emphasis on the importance of articulating threshold places, or what he refers to as the "In-between realm". Once again this has to do with the reciprocity that he sees between twin phenomena such as interior / exterior, urbanism / architecture, or even between interior spaces and the opportunities for creating "place" and "occasion" where they interact. No longer is a doorway or window merely a "borderline" space dividing two entities, but rather a "place" where transition can be inhabited. This is quite different from the modernists' obsession with spatial continuity and the free-flowing plan where the tendency was to remove any articulation between spaces. Aldo van Eyck writes, "Instead I suggest articulation of transition by means of defined in-between places which induce simultaneous awareness of what is significant on either side."²⁴

In recent years, the architectural theorist Georges Teyssot has also written extensively on the subject of both physical and metaphysical thresholds within the context of the dwelling.²⁵ He discusses the various borders, frontiers, and thresholds present in a dwelling as places that serve a mediating role by permitting communication and allowing for passage. He believes that these thresholds blur the division between interior and exterior spatially, technologically, and metaphysically. "Perhaps the modernist inhabitant is not so much to become exteriorized, or nomadic, as to find the home no longer neither simply an interior nor an exterior. Living is somehow to now occupy the space between the two, inhabiting the threshold."²⁶ Rather than a pure obstacle, he considers these thresholds as "spaces between" that can be appropriated. "The frontier loses the meaning of pure obstacle and becomes voidal and interstitial, a space where things can happen, a happening, a performance, an event or a narrative, for instance – an in-cident."²⁷

Recently, the architects Jonathan Sergison and Stephen Bates have written extensively on the contemporary dwelling interior and are critical of what they see as a continued focus on a technocratic approach to spatial organization from the architectural profession. In the chapter "An open plan of rooms" from the book "Papers 3: Sergison Bates Architects",28 Stephen Bates argues for a reconceptualization of the house as a spatial whole comprised of a "society" of rooms that have variation in character allowing for a greater flexibility in "active" appropriation by its inhabitants. Bates starts by emphasizing the importance of the "room" within the discipline of architecture and argues, through the use of both historical and contemporary dwelling examples, for variation and flexibility in room types and their spatial arrangement in favour of the current trend for "mono-functional" rooms and ambiguous "open plan" spaces. The authors purpose is to make the reader question the status quo in the spatial organization of dwellings by imagining a more "nomadic" appropriation of rooms, where domestic spaces have both individual character and flexibility.

METHODS

This article involves a comparative analysis of House Vandenhaute by Juliaan Lampens and Moriyama House by Ryue Nishizawa. I will refer to written and photographic documentation of the two case study houses, my own architectural drawings of the projects, and published interviews with the multiple actors involved in the dwellings where possible. I will focus my analysis of the two case study projects on the spatial organization of the dwellings, the opportunities for inhabitant appropriation, and the treatment of thresholds, both between interior and exterior, as well as the private and communal territories present in the buildings. I will utilize the architectural theory related to spatial organization, inhabitant appropriation, and threshold introduced earlier as a theoretical framework for the study. Shared qualities present in the design of the two houses will be identified that go beyond the functionalist programming of space in order to contribute to the current discourse on the contemporary dwelling interior.

There were several criteria that were used in the selection process of the two case study dwellings. Firstly, the two houses had to be internationally pub-

lished and therefore recognized by the architectural community as noteworthy examples of single-family dwellings. Secondly, I consider both buildings to be "influential" case studies as defined by Jason Seawright and John Gerring in the essay "Case Selection Techniques in Case Study Research",²⁹ based upon the projects' deviation from typical spatial organization strategies for dwellings. The two projects challenge common methods of engaging with the programming of interior space, the opportunities for inhabitant appropriation, and the treatment of thresholds, both between interior and exterior, as well as between private and communal territories. It was also intentional to select two dwellings from different time periods, cultural backgrounds, and typo-morphological contexts in order to identify shared qualities that transcend these contextual parameters.

CASE STUDY ANALYSIS

House Vandenhaute

House Vandenhaute was designed by the Belgium architect Juliaan Lampens in 1964 and built between 1966 and 1967 for Gerard Vandenhaute and his family. The house is located in the village of Huise, Belgium, on a strip of land sandwiched between a quiet country lane and a vast cornfield in a predominantly rural context. Lampens designed the house within a square footprint of 14 x 14 metres which was laid 1.5 metres below the level of the road and was made accessible by foot via a winding path. The dwelling is defined by its completely open plan living space contained under one continuous concrete roof slab. Two staggered solid concrete walls facing north delimit the private dwelling from the public road. The remaining three facades of the house are defined by full-height glazing with recessed frames allowing the surrounding landscape to flow directly into the interior of the dwelling uninterrupted.

The interior of House Vandenhaute can essentially be described as one continuous open plan "archipelego" where geometric elements imply the po-



Figure 1. House Vandenhaute Perspective. Drawing by Nicholas Thomas Lee, 2016.

tential usage of space. A combination of fixed "anchors" providing essential technical services in the form of the bathroom and kitchen, together with moveable furniture elements, are used to delineate the programmatic functions of the house. Two concrete cylinders, one polished and one slightly wider with an exposed timber shuttering finish, rise from the concrete floor to just above eye level to provide visual privacy for the toilet and the bathroom areas. Suspended concrete planes drop down from the ceiling to just below eye height defining the kitchen area, as well as forming a skylight and a "baffle" to help contain fumes from cooking. Moveable wooden furniture elements form "sleep hutches", work stations, and seating areas that can be arranged in several locations around the house to define interior territories for the individual family members.

Spatial organization within the house is largely self-curated through the inhabitants' utilization of the moveable furniture elements in between the three fixed programmatic anchors. Due to the openness of the plan and lack of interior divisions, there is not one single predefined "promenade architecturale" as one moves through the domestic landscape. The interior can be seen as a landscape that offers a multitude of temporal "paths" and "places" that can be appropriated to support the "small pleasures of life", such as enjoying the panoramic views out over the surrounding fields from almost anywhere within the house. The geometric "landmarks" require a certain level of inter-



Figure 2. House Vandenhaute Plan and Section. Drawing by Nicholas Thomas Lee, 2016

pretation with respect to use and appropriation. The moveable "sleep hutches" for example require active appropriation through their potential to be placed in several territories within the house resulting in differing dwelling experiences daily.

In terms of adaptability, Lampens has created a dwelling which allows for both adjustability in the day-to-day life of the inhabitants and flexibility in program over a longer period of time that can respond to changing lifestyles. "The human scene that unfolds under the baldachin is variable over time, thus nomadic by nature. The wooden cupboards, for instance, have been moved over time, following the changes in domestic life as time goes by."³⁰ House Vandenhaute's spatial layout, where its fixed and moveable objects facilitate temporal partitioning that creates momentary "places" to dwell, is quite radical when compared to the typical house model where specific functions are consigned to individual rooms that are sized and proportioned accordingly and separated from one another with equally distinct thresholds in the form of partition walls, corridors, and hallways.

Through the radical spatial organization adopted for House Vandenhaute, thresholds between private and communal spaces within the house have been softened or removed completely. There is almost no acoustic or olfactory privacy between the bathroom, WC, and moveable "sleep hutches" inside the dwelling. The architect has been strongly defensive of this decision, which was made in close collaboration with Mr Vandenhaute. "Living together is something rational. If a couple decides to live together, that's a rational decision. Agreements are made. So it is with an open-plan house. The residents make clear arrangements as to whom, what and when. In that way, father, mother and children can each lead their own lives and can do so together under one suspended roof."³¹ One could argue that the dwelling takes on the form of a settlement where the family can be viewed as a community, where private territory has to be established through the appropriation of objects within a communal landscape.

The importance of landscape cannot be overstated when it comes to the architecture of Julian Lampens and in particular the design of House Vandenhaute. The architect has stated that "The Landscape is the first commissioner and the last operator" of every project.³² House Vandenhaute becomes part of its surrounding environment through its integration into the slope of the site, seamless full-height glazing, and the choice of materials which weather into



Figure 3. House Vandenhaute Context. Drawing by Nicholas Thomas Lee, 2016

the natural landscape. The interior of the dwelling can also be described as a landscape in its own right, where the various fixed and flexible objects define territories within an "archipelago". A blurring in the threshold between interior and exterior space is also encouraged through the use of geometric elements outside mirroring those inside to delimit functions in the landscape surrounding the house. "Driven by timidity and respect for this landscape, the house aspires to be 'an absent presence', as Lampens calls it. The house is nomadic in its outer appearance and in the inner experience of its daily use."³³

House Vandenhaute could well be described as an archetypal example of Brutalist Modernism taking cues from Le Corbusier's sculpturalism and Mies van der Rohe's structuralism, as well as making a strong reference to the Second World War bunker aesthetic typified on the north Atlantic Coast of Belgium. The sparse material palette used in the house is restricted to exposed concrete, with a polished surface and a timber grain shuttering finish, wooden furniture, black painted metal window frames, and simple off-white curtains. The exposed concrete finish on the exterior walls and roof eaves has absorbed the surrounding landscape and nature through a patina of moss and lichen. One could argue that the Brutalist aesthetic is rooted both in the immediate geographical context and the historical context in which House Vandenhaute was designed and built. Juiliaan Lampens has spoken about his interest in the architecture of the remnants of the Second World War defences scattered around Belgium. "The bunkers of the Atlantic coast are for Lampens the most beautiful examples of brutalism: 'the integration with the sea and nature is just perfect""34

Moriyama House

Moriyama House was designed by the Japanese architect Ryue Nishizawa for Yasuo Moriyama, and the building was completed in 2005. It is located in a typical suburban neighbourhood of Tokyo called Kamata, which is characterized by single-family detached houses. The mass of the house is fragmented into ten free-standing box volumes varying in height between one and three stories. The individual buildings are all prefabricated utilizing steel panels to make the walls as thin as possible in order to maximize the interior volume of the dwelling. A network of streets or *Roji* weave in between the boxes, allowing for inhabitation among the building fragments. Mr Moriyama inhabits five of the buildings, switching among the various living and dining rooms depending upon the seasons and his personal circumstances. The remaining five units are currently rented out to tenants, although the building fragments can be reappropriated as one dwelling at any time in the future if required.

Due to its fragmented plan, the dwelling absorbs the surrounding context; in effect the house becomes part of the city and the city becomes part of the house. Ryue Nishizawa has stated, "instead of putting up a fence around the plot, I opted for a comfortable continuity throughout the house, the garden and the roji and the city, like one gradual movement."³⁵ Comparisons to the reciprocity that Aldo van Eyck sees between the house and the city seem wholly appropriate here, where the threshold between house and city is diminished and one can see a continuation and therefore a direct relationship between the two entities. The dwelling unmistakably represents a collection of urban block houses with streets and squares in between reflecting the sur-



Figure 4. House Moriyama Context. Drawing by Nicholas Thomas Lee, 2016

rounding city landscape. Moriyama House is an explicit example of what Aldo van Eyck would define as architecture that has been conceived "urbanistically". The composition of the spaces in between the dwelling fragments seems to have been just as well considered as the composition of the individual units themselves. The "gradual movement" found in the frontier between house and city also recalls Georges Teyssot's notion of a threshold as "spaces between" that can be inhabited.

Another striking feature of the spatial organization of Moriyama House is the lack of a central core or of centric planning to the dwelling layout. By distributing the home into separate fragments across the full site with little or no hierarchy between the units, Ryue Nishizawa creates a series of overlapping territories that can be interpreted in a multitude of ways. "What I wanted to establish with this project is a relationship that doesn't have any centre. Inside the plot, you can create your own centre even when you are living at the edge. In that case the edge suddenly becomes the centre."³⁶ There is no one single defined "promenade architecturale" in which to experience the various dwelling fragments, but rather it is a network that can be navigated in a multitude of ways. Josef Frank's concept of composing a dwelling from "paths" and "places" that imitate a town's streets and squares seems wholly applicable here.



Figure 5. House Moriyama Perspective. Drawing by Nicholas Thomas Lee, 2016

The design of Moriyama House blurs the threshold between public and private domains in several ways. Firstly, there is an ambiguity in ownership of the garden spaces and alleyways in between the individual building units. Neighbours can use the alleyways as shortcuts, and indeed in principle the general public can explore and inhabit the threshold spaces without physical hindrance although, interestingly, signage has now been established that declares these in-between spaces as private. Secondly, the individual tenants of Mr Moriyama's house not only form a community but to some extent perform the function of a traditional family unit through their close-proximity living. The atmosphere of the interior and exterior spaces flow uninterrupted, and informal gathering opportunities are provided at the threshold entrances of the individual building fragments. Ryue Nishizawa's architecture offers a variety of threshold "places" opening up onto the garden spaces and alleyways that can be used for communal social activities, or in other words social "occasions" as Aldo van Eyck might say. Large, openable glass windows in the various box units also challenge traditional notions of privacy.

To fully appreciate the design of Moriyama House, we also have to understand its cultural context and in particular the significance of *roji* in Japan. *Roji* are traditional gardens and public alleyways typically located in between houses that form communal territory where public interactions can take place between inhabitants. Many traditional *roji* have disappeared since the



Figure 6. House Moriyama Plan and Section. Drawing by Nicholas Thomas Lee, 2016.

Second World War, as the public domain has been privatized and people have become more concerned with privacy. Moriyama House is fundamentally defined by the communal territories located in between the dwelling fragments, and the presence of *roji* in the design gives rise to a strong cultural significance in Japan. One could also view the intended social interaction encouraged by the radical layout of the dwelling as a reaction to the contemporary Japanese phenomenon of *hikikomori*, which essentially refers to the social withdrawal prevalent in the younger generations.³⁷

The minimalist form of Moriyama House's cube units, together with the removal of traditional architectural dwelling motifs, results in an ambiguity in function of the various buildings within the complex. This ambiguity could be seen as a way of encouraging individual creative appropriation of the architecture by its inhabitants. "Moriyama House doesn't want to limit the programme. It allows the freedom to start thinking about the function or programme. People coming to the house can imagine for themselves how to use the buildings. It could as easily be a kindergarten, a group home or a school."38 Multiple kitchens and bathroom facilities allow Mr Moriyama to decide for himself which fragments of the house he wants to inhabit at any one time. Programmatic possibilities of the various cubes are kept as ambiguous as possible so that the residence can adapt to changes in the life of its inhabitants. Ryue Nishizawa's deliberate ambiguity in the design of Moriyama House effectively turns each inhabitant into a creative active participant. "We use the function to create the building, but also the building creates the function. It is a very dynamic relation: the building creates the program, the program also creates the building."39

One could claim that Moriyama House as a piece of architecture is activated by the participation of its community of inhabitants due to the dwelling's lack of prescribed spatial programming. This layer of user participation in affect is required to complete the architecture, and through appropriation the true qualities of the dwelling can be realized. Moriyama House with its "ambiguous circulation spaces, places of density and lesser definition, realms of overlap and interference would without its people and furniture "merely seem a collection of reflections and multiple shades of white".⁴⁰ The domestic landscape of Moriyama House invites "nomadic" appropriation by its inhabitants as advocated by Jonathan Sergison and Stephen Bates. Ryue Nishizawa together with Kazuyo Sejima often uses the analogy of a park to describe their approach to architectural design, where a multitude of diverse activities can take place in a cultivated landscape through the participation of inhabitants. $^{\rm 41}$

In architectural terms, the formalistic language of Moriyama House could be described as minimalist, with a uniform palette of white painted panel walls, both inside and outside, concrete and timber floors, and utilitarian grey steel-frame windows. The strict material and colour palette creates a strong relationship between the dwelling fragments, clearly associating them as one entity. Through this strong uniformity in visual appearance, a large degree of diversity in the size and articulation of the individual units can occur without compromising the unity of the house as a whole. One could also say that the uniformity in colour and detail creates a democratic community among the residents through the removal of hierarchy. It is unclear to a passer-by which member of the "community" lives in which fragment of the house. The exterior envelope of the various building units has a striking uniformity with its minimal thickness. "The wall is reduced to its minimum, to eliminate the hierarchy that exists between structure and partition, in a way that the weight of materiality of each of the elements - plan, door or wall - may be the same."42

CASE STUDY COMPARISON

House Vandenhaute and Moriyama House both challenge the notion of the contemporary dwelling interior as an exercise in the programming of space purely to accommodate function. Juliaan Lampens utilized a spatial arrangement based upon a continuous open plan that contains both fixed and flexible "landmark" elements which define a series of networked "territories" that can accommodate a wide variety of activities. Ryue Nishizawa arranged Moriyama House as a series of separate fragments across the full site, creating a network of individual buildings with interstitial places that can be navigated and inhabited in a multitude of ways. The layout of both dwellings allows the inhabitants to self-curate their own sequential spatial experiences continually. The networked spatial organization of both House Vandenhaute and Moriyama House recall Josef Frank's claim that a dwelling should be composed of paths and places that recall the intriguing feeling of exploring an unfamiliar town's streets and piazzas. There are also clearly comparisons to be made with Aldo van Eyck's theories on the production of space based upon a composition of "places" that support the "small pleasures of life" rather than the positing of explicit functions in plan.

On initial inspection, the open plan arrangement of House Vandenhaute and the fragmented building layout of Moriyama House are very different. Lampens appears to remove any circulation space from the dwelling, whereas Nishizawa celebrates circulation space through the articulation of roji and garden spaces in between the individual building fragments. I would argue, however, that if one considers the two buildings as continuous dwelling landscapes where both interior and exterior spaces are combined, then the approach to their spatial organizations seem remarkably similar. One could take inspiration from Giambattista Nolli and his iconic "Nolli" map of Rome (1748), which was revolutionary in its development upon the traditional figure-ground map by highlighting enclosed public spaces as well as open civic spaces. The result of this technique was that one could now appreciate the interstitial spaces in between as much as the spaces enclosed within the buildings. The two houses can be considered as continuous domestic landscapes where fixed elements define enclosed places that accommodate defined function as well as in between places that can be "nomadically" appropriated by their inhabitants. The design of House Vandenhaute is often referred to as an "archipelago" landscape where fixed "anchor" landmarks delineate "territories" within the interior and exterior. The layout and overall form of Moriyama House can be interpreted as a collection of urban block houses with streets and squares in between, reflecting the surrounding cityscape of Tokyo. It is an explicit example of what Aldo van Eyck would define as architecture that has been conceived "urbanistically". The fixed building fragments define more private interior territories where functional requirements can be accommodated. Ryue Nishizawa underlines the landscape quality of Mori-



Figure 7. House Vandenhaute and Moriyama House "Nolli" Plan. Drawing by Nicholas Thomas Lee, 2017

yama House and its opportunities for explorative inhabitation by referring to the analogy of a park when discussing its spatial organization.⁴³

The two dwellings encourage participatory appropriation by their inhabitants through flexibility in their plans that challenge a technocratic functionalist attitude towards spatial planning. House Vandenhaute's radical open plan "archipelago" populated by a combination of fixed "anchors" marking the sanitary areas and the kitchen, together with its "nomadic" furniture that can be positioned in a multitude of ways, allowing the inhabitants to constantly change the spatial layout of their built environment. The building layout contains enough articulation to loosely define territories within the domestic landscape, differentiating it from the type of ambiguous open plan that Jonathan Sergison and Stephen Bates are critical of. Ryue Nishizawa has designed Moriyama House to be a series of simple buildings that have been reduced to minimalist white cubes, where functional requirements such as kitchens and bathrooms have been repeated throughout the units, effectively removing any fixed hierarchy. This allows Mr Moriyama to appropriate the house in a multitude of ways, deciding how many tenants he would like to share the whole complex with. The building fragments effectively form the type of "society" of rooms advocated by Stephen Bates,44 where there is both multiplicity in shared functions and individual specificity in character. This intentional lack of a prescribed programmatic organization of the interior and exterior spaces encourages active participation from its inhabitants. "After being used by individuals, the architecture is now given the names of programs that were missing at the beginning. Each individual user guides a different program. Each program reveals a different flexibility."45

The two dwellings have been designed as a continuation of their surrounding contextual landscapes, allowing inhabitants to occupy the threshold space as defined by Georges Teyssot.⁴⁶ In the case of House Vandenhaute, the threshold between interior and exterior is minimized through the use of full-height glazing on three of the facades of the house, the extension of structural walls into the surrounding landscape, the placement of corresponding geometric elements both inside and outside, and the integration of the building into the slope of the site. The house which is slowly being weathered and absorbed into the landscape through the growth of mosses and lichens on the exposed concrete façade reinforces Lampens's ideology that the landscape is both the "first commissioner" but also the "last operator". Ryue Nishizawa describes Moriyama House as a "gradual movement" of continuity between the indi-

vidual dwelling units, the interstitial gardens and *roji*, and the surrounding city. The building blocks absorb the surrounding context through fragmentation, in effect blurring the perimeter threshold of the house.

Both houses also work with the threshold between "public" and "private" in innovative ways. One could argue that House Vandenhaute and Moriyama House are both focused on the generation of community within the dwelling interior. Clearly one should remember that House Vandenhaute has been designed for a family and Moriyama House has been designed for a single inhabitant together with five tenants. Despite an apparent difference in population density, the actual internal floor area per inhabitant of the two dwellings is comparable with 49 m² per inhabitant in House Vandenhaute and 40 m² per inhabitant in Moriyama House, which does not include the outdoor interstitial spaces in between the building units. Through the removal of interior walls, Juliaan Lampens has designed a house that eliminates traditional notions of hierarchy between the family members, such as a master bedroom for parents and designated bedrooms for children. Instead, the Vandenhaute family has democratized "sleep hutches" that can be utilized by all and positioned in a wide variety of ways within the interior of the dwelling. Lampens has in effect created a non-hierarchical community from a family comprised of two parents and two children. In the case of Moriyama House, it is clear that the intention from the start was to create a community living within the dwelling fragments as well as to encourage social interaction between inhabitants and passers-by. This focus on encouraging physical interaction between people is a central theme in the work of Ryue Nishizawa and SAN-AA. They believe that, "in an age of non-physical communication by various means, it is the job of the architect to provide real spaces for direct communication between people."47 The two dwellings both support the building of social community through inhabitant appropriation, recalling the more anthropologically minded architectural theory of Alison and Peter Smithson and Aldo van Eyck.

One could argue that both dwellings reflect and respond to their specific contextual phenomena. The Brutalist materiality of House Vandenhaute is a clear reference to the military fortifications on the Atlantic Coast of Belgium. The robust architectural language of the dwelling as a bunker also reflects the post-Second World War / Cold War zeitgeist of paranoia from the threat of nuclear destruction. Moriyama House references both historical and contemporary Japanese cultural phenomena. The interstitial gardens

and pathways that define the house are clearly inspired by the traditional *roji* of the Japanese city. The creation of a synthesized community comprised of Mr Moriyama and his five tenants also seems to be a reaction to the trend for isolation and withdrawal from society as characterized by the phenomenon known as *hikikomori*.⁴⁸ The approaches towards temporality employed by the two architects are radically different and yet both seem contextually attuned. The massive concrete shell of House Vandenhaute suggests a permanence and longevity akin to the monumental bunkers that Juliaan Lampens has taken inspiration from. One gets the impression that the nature of the landscape will eventually absorb the house over a period of centuries. Moriyama House, on the other hand, celebrates temporality and suggests a fleeting architecture. The building's volumes appear to be dislocated from the ground through the use of a shadow gap, which further emphasizes their ephemeral character. The thinness of the walls and doors also helps to create the impression of a disposable architecture to match the fast-paced life and seismic instability of the surrounding Japanese metropolis.

CONCLUSION

House Vandenhaute and Moriyama House share many characteristics despite the fact that the two dwellings were built almost forty years apart in very different geographical, political, and cultural contexts. Fundamentally, they both challenge the notion of the contemporary dwelling interior as an exercise in the programming of space purely to accommodate function. House Vandenhaute achieves this through a spatial arrangement based upon an open-plan "archipelago" landscape where fixed and flexible "landmark" elements define a series of networked "territories" that can accommodate a wide variety of activities. Moriyama House, on the other hand, is composed of independently arranged building fragments and interstitial spaces that form a continuation of the surrounding city in "one gradual movement", creating a network of more defined interior spaces and flexible interstitial places that can be navigated and inhabited in a multitude of ways.

Although the spatial organization of the two dwellings appears to be very different, I argue that both houses can be considered as continuous domestic landscapes where fixed elements accommodate defined functions, as well as delineating interstitial threshold places that can be "nomadically" inhabited in a variety of ways. The interior architecture of the two dwellings also encourages participatory appropriation by their inhabitants. Ambiguity in function, thresholds, and ownership of space allows the inhabitants to constantly reinterpret how they use their built environment and encourages their active participation in the "art of dwelling".

The two houses blur the threshold between interiority and exteriority by functioning as continuations of their surrounding contextual landscapes, allowing inhabitants to occupy the in-between realm. House Vandenhaute achieves this through full-height glazing, the extension of walls into the landscape, the placement of corresponding geometric elements, both inside and outside, and the integration of the building into the slope of the site. Moriyama House, on the other hand, uses fragmentation, a permeable façade, and structural thinness to blur the perimeter threshold. The two houses also work with the threshold between "public" and "private" in innovative ways. With House Vandenhaute, Juliaan Lampens removed all internal dividing walls and introduced shared furniture that can be utilized by all. Ryue Nishizawa, in turn, used a fragmented plan and introduced permeable thresholds between social domains in Moriyama House to encourage social interaction. At this point, one must acknowledge that the two buildings support very different forms of community. The social dynamics of a family unit living in rural Belgium are very different to the social dynamics of a group of tenants sharing a house with their live-in property owner located in a dense suburban neighbourhood of Tokyo. Regardless of these two very different conditions, both architects have placed an emphasis on encouraging social interaction between the members of each domestic "community".

Juliaan Lampens and Ryue Nishizawa have created dwellings that challenge the notion of the domestic interior as an exercise in the programming of space purely to accommodate function. I have shown that the two case study projects display characteristics of theory from more anthropologically minded architects and theorists such as Josef Frank, Alison and Peter Smithson, Aldo van Eyck, Jonathan Sergison, Stephen Bates, and Georges Teyssot. I have argued that despite having radically different plan layouts, both houses can be considered as continuous "domestic landscapes" where fixed elements define enclosed places that accommodate defined functions, as well as delineating interstitial threshold places that can be "nomadically" inhabited. I have shown that both dwellings encourage participatory appropriation by their inhabitants through intentionally ambiguous "nomadic" places that allow for a wide variety of functions and focus on the generation of community through the encouragement of social interaction. It is hoped that these observations will contribute to greater discourse on challenging the technocratic attitude towards the spatial planning of contemporary dwellings that is still widely utilized in architectural practice today.

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NEIGHBOURHOOD PLANNING AND HOUSING FOR THE AGING POPULATION: A CASE STUDY Ira Verma

ABSTRACT

The population is aging and especially the percentage of very old persons is increasing. The aim is to assist people in their own homes for as long as possible. The challenge is, however, to plan neighbourhoods that support people in their daily lives. Inclusion and participation are important factors for life satisfaction even in old age. Planning of housing and neighbourhoods can promote the social and functional activities of persons who live in their own homes with physical or sensory impairment.

The article is based on research activities conducted at the Sotera Institute, Aalto University. The aim was to assess daily living environment and access to services from the viewpoint of older persons in an urban environment. The research question was: How can planning of built environment promote independent living? The residents' experiences regarding their own neighbourhood were studied with qualitative methods and user participation. Knowledge about immediate surroundings, use of local services, and public transport was collected through questionnaires targeted to residents over sixty-five years. Residents living in their own homes were involved through workshops and walking tours to assess the neighbourhood.

Integral planning of housing, services, and public transportation enhance the self-contained life and inclusion of older age groups. Walkable neighbourhood and access to public transportation support the use of local services daily. Health services and activities for older people have to be easily accessible by public transportation. Moreover, collaboration between the public, private, and third sector locally offers possibilities for the multiuse of spaces for various resident groups.

KEYWORDS

Keywords: older persons, the elderly, neighbourhood, accessibility, services

INTRODUCTION

The whole population in Europe is aging rapidly. In Finland, according to population projections for 2030, the age group sixty-five and over will account for approximately 26 per cent of the population;¹ and the oldest segment of the population, persons over eighty-five years, is growing rapidly in particular. This development, together with the decrease of birth rates, will increase the dependency ratio. The dependency ratio refers to the proportion of young persons aged 0–15 years and persons sixty-five years or over compared to 100 persons at working age. In Finland, according to population projections, the demographic dependency ratio (57.1 in 2014) is going to reach the limit of seventy dependents by 2032.² The number of dependents will grow and, at the same time, the human and economic resources are diminishing.

Whilst the population is aging, there is a need to reduce the number of persons living in institutional care facilities and sheltered houses and to assist them in their own homes. At present, almost 91 per cent of the older persons seventy-five years and over live in their own homes.³ The aim is to help people to live in their own home by offering accessible housing solutions and home care for frail older persons. The national target for 2017 was that at least 91-92 per cent of people seventy-five years and over still live at home. This target has been achieved in most of the municipalities. Moreover, the goal set for the municipalities was to provide regular home care to 13-14 per cent of persons seventy-five years and over.⁴ Today the government has launched a new Key Project to further develop Improved home care for older persons and enhanced informal care in all age groups⁵. Moreover, there is a need to assist older residents and their careers at the neighbourhood level. This development will affect the notion of access to local environment and the use of daily services. The challenge is to adapt neighbourhoods and the local service infrastructure to support older persons in their daily lives.

For sustainable development and for the aging society, mixed land use, integral planning of housing, transportation, and services are important. Access to daily services by walking or by public transportation enhance mobility. Moreover, local services, grocery stores, leisure activities, and green areas that are in walking distance may promote physical and social activity.⁶ Comprehensive understanding of both population characteristics and built environment is important, especially in the case of urban densification or refurbishment of old neighbourhoods. These neighbourhoods with both an aging population and old building stock undergoing renovations need attention. New accessible housing developments suitable for older residents situated near existing services promote living at home. Moreover, the public, private, and third-sector service providers can form a local network, able to offer more personalized services to assist the diversity of residents.

The case study area is a district of approximately 22,000 inhabitants in southwest Helsinki. It is undergoing transformations due to densification and modification of transportation networks. The number of inhabitants is expected to increase by another 3,000 by 2025. The percentage of persons over sixty-five living in the district (19 per cent) is higher than average in Helsinki (17 per cent).⁷

BACKGROUND

Inclusion and participation are important factors for life satisfaction.⁸ Planning of housing and neighbourhoods can enhance social activities and functional capacities of persons who live in their own homes at very old age with physical, sensory, or minor cognitive impairment. The access to daily services enhances independence and self-contained life. A walking tour to the grocery store is an activity to maintain both the physical and social functioning capacities.⁹ Neighbourhood quality and access to local services are major components of residential satisfaction.¹⁰ Moreover, according to a previous longitudinal study, perception of a safe neighbourhood environment was significantly associated with recovery from a mobility limitation.¹¹ Previous research on older people's mobility¹² showed that environmental barriers were correlated to frequency of activity.

Access to local green areas enhances the well-being of the elderly.¹³ Studies in settings with senior housing accompanied by services have shown that where natural outdoor features were proximate and visible, more people participated in a social physical activity.¹⁴ Moreover, there is considerable evidence that natural settings and gardens can relieve stress and anxiety.¹⁵

Mobility is one of the main things enhancing quality of life and inclusion of the elderly. Walkable neighbourhoods and access to public transportation support independence and daily use of local services.¹⁶ In the case study area, there will be major modifications as a new metro line opened in autumn 2017. The plan is to develop feeder traffic to connect to the metro station. However, this will affect the accessibility of some of the services. The seniors are an important user group of cultural and recreational services. They go to concerts and the theatre more often than younger generations.¹⁷ Therefore, good connections to the city centre are important in order to reach these activities.

The person-environment relationship changes during the process of aging. The circle of daily living is reduced and the neighbourhood becomes more important for the well-being of the elderly. The effective use of local services and facilities (sports centres, schools, health services) for the purpose of elderly care can enhance multigenerational contacts and inclusion. The personal abilities for social and physical activity vary within the age group. There is an increasing demand for various types of more collective housing solutions or facilities at a local level, especially among those living alone. The speed of decline of functioning capacities can be improved at any age through individual and public policy measures, such as promoting an age-friendly living environment in urban centres.

Care at home is increasing since a growing number of more frail persons still live in their own homes. Care and assistance provided to older persons generate new opportunities for local services. Home care services will continue to increase in the coming years. The goal is to provide more personalized and more effective services for the growing older population. The economic situation may generate collaboration between public, private, and third-sector service actors. In the case study area, the municipal actors participating in this project had been previously trying to develop a network between different elderly care service providers active in the neighbourhood.¹⁸

AIM AND RESEARCH APPROACH

The aim of the research project was to evaluate living environment and access to daily services from the viewpoint of older residents in an urban context. The goal was to develop further knowledge about criteria that promote independent living of the elderly at home. The focus was especially on the immediate surroundings and connection between home and services. Accessibility of the built environment was regarded as a basis for mobility and independent coping of the older persons. A research question involved how to design outdoor spaces and services at a local level to promote independent living. The aim of this study was to gain comprehensive knowledge of user experience for further development. The study focused on housing environment, travel chains, walking paths, and use of local services. The housing environment has been discussed in a previous paper.¹⁹ This article, in turn, focuses on the services and semi-public to public spaces in the neighbourhood.

METHODS

The residents' experiences related to the neighbourhood and access to services were studied with qualitative methods. A multidisciplinary research team was assessing the district with the participation of the residents. The case study method was used in order to obtain a comprehensive understanding of the challenges faced by older people in their own neighbourhood. Knowledge about immediate surroundings, use of local services, and public transportation was collected through a questionnaire targeted to residents over sixty-five years living independently at home. In total, sixty-four residents answered the questionnaire. Furthermore, workshops and walking tours with residents, as well as observation on site, helped to identify the current challenges. Voluntary participants for the workshops were recruited through local newspapers and established local associations. In total, eighty residents over sixty-five years participated in the study. Three workshops were organized with the residents. Each workshop focused on a topic related to housing and services. Eight to ten residents participated in each workshop. Maps and photos, taken prior to the workshop by the researchers, were used to talk about the neighbourhood. The last workshop was also attended by service providers from the public and private sectors, as well as by non-profit associations.

Moreover, another questionnaire targeted local retail shopkeepers and was also published on the Internet. As Healy points out, the goods and services currently designed for younger consumers may require modifications.²⁰ New opportunities for local business may open when these goods and services become more user-friendly for older consumers. Therefore, the questionnaire was related to the accessibility of the premises, the age profile of the clients, and the possible adjustment of the services for older clients. From local retail shops, twenty-two responses were gathered. Moreover, analyses of networks consisting of actors in elderly care, and their collaboration locally, were studied from the point of view of network management and service design.

FINDINGS

The findings of this study confirm the significance of the neighbourhood level. The services that are in walking distance from home or easily accessible by public transport enjoy enhanced use. However, the walking-friendly envi-

ronment and topography influence the use of the services. Respondents over sixty-five years (N=64) considered grocery stores and public transportation stops the most important local services for daily coping. The proximity of health care services - a pharmacy and a health care centre - was regarded as important. The persons eighty-five years and over (N=10), especially, considered a pharmacy to be important, and they went there more frequently than respondents on average (Figure 1). Public transportation was used by 90 per cent of all respondents. However, only half of the persons eighty-five years and over reported using public transportation. A majority of the respondents self-reported that they go to get groceries weekly, and almost 40 per cent reported going there daily. The respondents over sixty-five years reported going to the grocery store mostly alone (90 per cent). The walk to get groceries was described as being physical exercise as much as a possibility for social interaction. The older persons reported going to coffee shops or restaurants less often and seldom alone. Those who mentioned going to get coffee preferred to go there with a relative or a friend. However, some reported that they did not have anybody to go get coffee with.

ACCESS TO COMMERCIAL SERVICES

The residents participating in the workshops expressed that they would have preferred to support the local small retail shops along the main street. They appreciated the personal service provided by them. The local shoemaker, es-



Figure 1. Grocery stores were the most important services for all respondents of the questionnaire. Source: The author

pecially, was famous among the older residents for his service and customer-friendliness. According to the results of the questionnaire, the proximity of the grocery store was the most important for all respondents (N=64) as well as for persons over eighty-five years of age (N=10). Seven out of ten of the persons eighty-five years and older responding to the questionnaire self-reported going to the grocery store alone. However, discussions in the workshop revealed that hindrances, such as uneven pavement and entrance steps to small retail shops (Figure 2), made the older residents choose the easily accessible new shopping mall located in the south of the neighbourhood (Figure 3).

The persons participating in the workshops reported going by foot to the nearby grocery store and by public transportation to the specialized retail shops further away. However, they were not able to return home walking from grocery store carrying heavy bags. Instead, they had to return home by bus. On the main street especially, the hilly terrain made access to the small retail shops difficult. Furthermore, the older residents were concerned about the narrow pavements that they needed to share with bicyclists.



Figure 2. Pharmacy on the main street. Photo: Sotera



Figure 3. Entrance of the new shopping centre. Photo: Sotera

The questionnaire for the retail shopkeepers focused on the accessibility of their premises and services. In total, twenty-two retail shopkeepers responded to the questionnaire. The vast majority of the respondents were small-sized companies employing one to four persons (Figure 4). More than half of them (59 per cent) reported having been situated in the same neighbourhood more than ten years. They regarded the access by bus to be the main advantage of the location of their shop. In the future, however, the traffic lines within the neighbourhood may not connect the older population to the daily services they need, as the local bus routes will be modified. The projected transport network connects residents to the metro station. However, transport services inside the neighbourhood will weaken.

One of the shopkeepers expressed that she lives and is herself ageing in the neighbourhood, together with her clients. Moreover, the shopkeepers were asked about possible adjustments of the premises or services with a view to older clients. More than 40 per cent of the retail shops responding to the questionnaire had already adjusted their services for older clients. They were, for example, arranging longer appointments with their clients, lowering



Figure 4. Retail shops according the number of persons employed (N=22). Source: The author



Figure 5-6. Adjustments in the services and premises made for senior clients. Source: The author

prices, or providing information using a bigger font. However, as yet, only three shopkeepers out of twenty-two reported that they have made modifications in the facilities.

ACCESS TO HEALTH SERVICES AND SOCIAL ACTIVITIES

Health services and activities for older people have to be easily accessible by public transportation. In the case study area, activities for seniors were organized mainly in the local parish centre, in the west, and in the health care centre, in the north. These services were both situated on hilly terrain. The difference in level from the senior housing to the pharmacy and the health care centre was up to 11 meters (Figure 7). The parish centre was on a hilltop and not reachable by public transportation. The persons with mobility limitations had to go there by taxi.

NETWORKS OF SERVICE PROVIDERS

The network analyses of actors in elderly care locally revealed that especially the third-sector actors seemed weakly connected to each other within their group (Figure 8). The Finnish association for the welfare of older people, as well as other non-profit organizations or resident groups, did not have



Figure 7. The local services (in blue) and the topography within a radius of 200 meters and 500 meters from senior housing (in red). Map by L. Nenonen.
any collaboration with each other. The collaboration worked mainly through public actors, and less directly between third-sector organizations. The third sector and the volunteers might need a common space, offered for example by the public sector or another organization, to provide low-threshold activities for residents and to interact with each other. Moreover, the management of the network and the connections between the actors from the private sector was identified as a challenge.²¹ Collaboration between the public, private, and third sectors locally would offer possibilities for a better and larger range of services. The human and economic resources of small service providers are very diverse from the public sector, however. Therefore, building up common goals and participation in a network on an equal basis is a challenge.

The flexible use of existing local spaces for various user or resident groups would increase the efficient utilization of the premises. Moreover, the services for children, adults, and older persons can be provided in the same premises to avoid segregation and to increase natural cross-generational contacts. The older workshop participants wished for more social contacts in general and also for more contacts between generations. The residents in the workshops also communicated their wish to have an informal place to meet each other without organized activities. They would also use affordable local restaurants and sports facilities if they were available in the neighbourhood.



Figure 8. Network of service providers for elderly care (Nykänen 2013).

ACCESS TO NATURE AND WALKABILITY

The participants in the workshop preferred to use, when possible, the walking paths through parks to the services rather than narrow uneven pavements. The maintenance of the streets and walking paths in the neighbourhood was criticized. The paths in the parks were felt to be safer, even in winter conditions. The questionnaire revealed that some older residents were not able to access the seashore, which was one of the main recreational areas in the neighbourhood (Figure 9). In the summer, it was the common living room for all generations. However, long distances and lack of benches made it inaccessible.

More than half of the respondents to the questioner regarded their neighbours as one of the best things in the neighbourhood. However, the densification, the new housing developments, and the new inhabitants raised some concerns about the possible degradation of the neighbourhood. The participants in the workshops expressed their desire to have more low-threshold informal meeting places. They were hoping for social activities with residents of all ages in the neighbourhood. They also pointed out that courtyards lacked places for spending time or doing any activities. Moreover, they noticed that people in different life cycles had different daily schedules.



Figure 9. The coffee place at the seashore is a common living room in the summer. Photo: Sotera

DISCUSSION

Topography and travel route affect the reachability of the daily services. Quality of the walking environment affects the accessibility of the services. Hindrances at entrances of the retail shops and narrow pavements are challenging, especially for persons with a walking aid. Maintenance of pavements and separation of bicyclists and pedestrians can add to the safety of the walking environment. Transport connections to the city centre are important. However, the public transportation network should connect housing and daily services within a neighbourhood, as older people may walk to the grocery store but need transportation to bring provisions home. Moreover, the existing infrastructure should be in use by various resident groups in order to use it effectively. Some initiatives like the Mehrgenerationenhaus in Germany, for example, offer open spaces to all age groups and associations of volunteers.²² These multigenerational centres have become common living rooms for the neighbourhood. The potential of the seniors is used as they provide services themselves in these centres. They may participate in activities by helping schoolchildren with homework or by teaching language to immigrants, for example.

The aim is to create and strengthen the local communities and to invite people from different generations and from various backgrounds to come together. Social activity among neighbours is more likely to occur spontaneously when people meet and interact with each other.²³ In addition to spaces for structured activity, the spaces for spontaneous informal meetings were missing. Common living rooms and low-threshold spaces will encourage exchange, interaction, and social contacts locally. Different stakeholders can use the premises for promoting a sense of community and participation. The older persons themselves may organize activities and peer support to produce well-being in their own living environments.

This qualitative study was done in one neighbourhood with a limited number of participants. The approach, however, can contribute to the further understanding of neighbourhoods and the importance of daily services.

CONCLUSION

Elderly residents want to be active members in their own neighbourhood. Integral planning of housing, services, and transportation enhances self-contained life at old age. Integration can be promoted at a local level. Effective use of resources and spaces enhance multigenerational encounters and prevent age segregation. The seniors are also an important consumer group who can contribute to the local economy. Natural settings and recreational areas are places to meet people of all ages. They promote well-being and should be accessible to all residents. Commonly used open facilities would promote social activities at a local level and offer possibilities for organizing meaningful activities.

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HEALTHY HOUSING ENACTED: A QUALITATIVE APPROACH TO INDOOR ENVIRONMENT Turid Borgestrand Øien

ABSTRACT

The present exploration is part of a PhD study concerning healthy housing, a project generated against the background of problems related to damp and mould in Danish homes. These problems can be caused either by constructional conditions or by the use of a building. One can say that it is the interaction between the house and its users that determines whether it is healthy or not. However, the scientific field of indoor environment research has largely been addressing single variables in quantitative measures. And even though behavioural issues have been addressed as one of the main causes of the problem, this has not been a topic investigated further. Rather, it seems as if the questions of user issues are sidestepped by a persistent belief that technical solutions such as mechanical ventilation can solve the problem by itself.

The article explores the interaction of human and non-human actors in the role of causing the problems, but also in the role of creating and maintaining a healthy home. It calls for a qualitative approach to the field, engaging with the participants in their everyday practices, but also being perceptive to the material, the artefacts, and the inscriptions that are of great significance to the everyday practices. The article is based on the initial fieldwork conducted during the autumn of 2015 and reflects the different methods applied to capture the practices and interaction at play. Some of the interviews included a walk-through in the apartments, where interviewees demonstrated their everyday practices, including the handling of windows, ventilation systems, drying facilities, and other appliances and technologies. The qualitative approach enables a black-boxed understanding of the phenomena to be opened up, with the findings illustrating the complexity of housing and public health.

KEYWORDS

Housing, mould growth, qualitative methods, everyday practices, wicked problems

BACKGROUND

It sounds so easy and straightforward: "ventilate and keep an even temperature, and you'll prevent damp and mould." But the fact is that the mould issue is far from easy and straightforward. In many ways, it can be seen as a wicked problem: as a result of multiple, contingent, and conflicting issues,¹ as a social or cultural problem difficult or impossible to solve for various reasons, as being subject to incomplete or contradictory knowledge, as having a huge number of people and opinions involved, as a large economic burden, and not least as interconnected with other problems.² Political attention has been increasing, and during the last ten years we have, in Denmark, been introduced to different initiatives on the topic by the health authorities, the ministry of construction, the municipalities, and the different housing associations. Proposals followed or were initiated by research and innovation, and by the whole machinery of specialized consultants, laboratories, insurance companies, and new niches in the legal system. Despite this increasing scientific knowledge and growing concern, the problem of damp and mould growth is still widespread.

The objective of the PhD project has been to contribute to the understanding of this wicked problem, by paying attention to the phenomenon as part of everyday life. This has included working across the fields of science, sociology, and architecture, and adding qualitative methods to an otherwise quantitative field of research. Exploring analytical tools for grasping the complex realities of everyday life, trying to open up and make the complexity of the real world transferable and operational.

Equally important, the article addresses practitioners – architects and others, the ones capable of doing these transfers and operations. The fragmented process of designing buildings in post-industrialized society makes the matter of responsibility put to the test by the everyday use and operation of the building.

Quantitative measures can say something about what's at stake, but not necessarily why: we know a whole lot about the phenomenon, but not necessarily about understanding the wickedness of the problem and how to work with it.

THE BLACK-BOXED PHENOMENA

Mould grows on the surface of organic material and is triggered by damp conditions. In our houses theese conditions are mainly caused by constructional or behavioural issues. Most often it is a combination of the two, and to embrace the human-environment interaction at play I have employed an actor network theory (ANT) approach to the field. ANT attempts to break with the subject–object dichotomy by focusing on relations in networks consisting of both human and non-human actants. When the continuous process of stabilizing succeeds, different components of the network are obscured, leaving the network as a single entity – a black box.³

The scientific understanding of the mould represents a stabilized network. The laboratory and the microscope are determining factors for what we know of the phenomenon. By growing samples on agar plates, scientists are able to explore their biology, determine and classify different samples. Findings are translated into digit values for the quantity and a Latin term representing the genus and species, for instance Penicillium chrysogenum. As depicted in Laboratory Life by Bruno Latour and Steve Woolgar, these kinds of representations play a major part in constructing scientific knowledge.⁴ Representations - your interest translated into material form - known as inscriptions in ANT.5 Inscriptions communicate agencies between the different actors and have a significant role in the process of negotiating, enrolling, and mobilizing a network. Professionals adopt the inscriptions and employ the knowledge in their practice. Inscription devices can make an otherwise inaccessible phenomenon accessible;⁶ in the case of the microscope and telescope, they change the size or scale of things. Professionals specialized in detecting damp and mould growth are producing inscriptions by sampling materials, which are processed, analysed, and identified at yet another laboratory. Because mould growth requires a high level of relative humidity (the amount of moisture contained in the air), a building evaluation will often be supplied by measuring, for example, moisture, relative humidity, and/or temperature: operations done by other inscription devices like a hygrometer or an infrared camera that follow standardized methods for operation and calibrations.

The inscriptions used in the field of indoor environment research represent a positivist and generalized model view: referring to standardized models based on controlled laboratory experiments where humans and their environment are reduced to generic variables.⁷ Scientists and professionals have constructed a rather stable network, where the inscriptions work as *immutable*

*mobiles*⁸ – easily transportable without changing the inherent characteristics. To be easily transportable, the complexity of the real world is simplified. However, the understanding(s) of moulds are challenged by the complex reality outside the scientific network. As part of everyday life the different interpretations sometimes conflict with one another. Occupant behaviour has for example often been articulated as the main cause that "the tenants don't open the windows" or "they are plugging the ducts." But why is it so?

OPENING THE BLACK BOX BY EXPLORING RENOVATION PROJECTS

Many housing estates built in Denmark from the 1940s to the 1970s are currently undergoing renovation and provide a great opportunity for investigating the phenomenon in new ways. Not least because each renovation project has already "opened up", gathered, and questioned a lot of knowledge about the current situation. In the seven cases addressed in this paper, a colleague and I conducted twenty-eight semi-structured qualitative interviews, each lasting one to three hours. In each case, separate interviews were scheduled with two tenants, operating staff, and with a representative from the housing association. With the semi-structured qualitative interview, the objective was to understand themes of the everyday life from the subjects' own perspectives. I approached this field study as an instrumental case study, where each case is of secondary interest and the main role of the case was to support and facilitate the understanding of a phenomenon.9 Robert K. Yin defines the case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context.¹⁰ In addition to humans and their relations, the empirical objects of the fieldwork include the physical environment and the materiality of the field. Additionally, by investigating the mould phenomenon I have gained a better understanding of our interactions with the built environment. I have had an emphasis on observing the everyday context and have drawn on the concept of desire lines - physical traces that tell us how people really behave,¹¹ things working and things not working in the actual setting.

UNFOLDING PRACTICES OF ENACTING

The fieldwork shows that damp and mould growth are perceived in different ways, both physically; dependent on each individual's biology, but also socially; dependent on the interviewees' professional and cultural background. Some recognized the phenomenon from decomposing food; knew the smell of "basement" or from entering an unused or abandoned building. Others knew of the problem from family members or neighbours, or from newspaper articles or other media. It had been discussed whether to use the term mould at all, as not all were quite sure about the actual mould growth. This correlates with earlier studies that show that due to its microscopic size, mould is often seen as an abstract and inaccessible phenomenon.¹²

Opening up a "black-boxed" scientific understanding of the world shows that everyday life is perceived as an experience configured from many mixed fragments. The isolated indoor environment parameters listed in the literature are not what your body recognizes. Fieldwork conversations convey richly described corporeal experiences. As the recurrent narrative of experiencing odour: "but there was a very special smell when I came into the bedroom,

I just knew that it was no bedroom smell ... there was such a wrong smell". As another tenant put it: "... often when I get home it strikes me as a great wall against me ..." And another describes entering a neighbour's home: "I thought 'it smells strange in here' ... And it has indeed been the moisture."

For some it constitutes a range of allergic symptoms, while others take no notice of it at all. The interviews illustrate that tenants experience the moulds due to their state of health: "… I can feel it when it's there … So I start to cough and splutter and react …" [The tenant touches her chest and coughs to demonstrate the feeling.] "I could just feel it. … First of all, I could feel it when my breathing was so affected by it …"

The sensory perception of the moulds was described as a very physical and bodily experience. Like a tickling in the nose or the throat, or watering and itching eyes. Some used the sensory experience as a discrete way of inspecting a given room. One of the caretakers describes it like this:

... when there is someone who says there is moisture, I take a look around. And if I can feel it, I think you can feel it when you come in, it's like my nostrils are saying, "hey, it's damp in here". It tickles a little in the nose ...

The mould issue has been a conflicted area, and as previously described several of the interviewees hesitated to use the term "mould". Some even commented that they preferred to talk about "damp" and "humidity" than about "mould". One of the staff put it like this: "As soon as people hear about

moulds, they think they are going to die, but moulds are everywhere, you know. And it's not the moulds we need to prevent, it's the damp." Accompanied by one of his colleagues from another housing section: "... but mould is indeed a strange thing. It can be the building, but it can also be caused by the behaviour ..."

The phenomenon of mould exists in several contexts: in the laboratory, as part of public health policies, in the built environment, and as part of people's everyday life – but more importantly, each field considers their own version the most valid. To get a better understanding of the different interpretations of *mould*, I needed a framework that would allow these different understandings, both the scientific understanding and the understanding informed by bodily experience. Annemarie Mol describes the concept of a multiple object, embracing the fact that the different existing perceptions of this object are related to the same.¹³ She uses the term "practices of enacting" to describe the diagnoses and treatments of a disease: "Atherosclerosis enacted is more than one – but less than many. The body multiple is not fragmented, it hangs together." John Law describes this as a move from *about* reality to *in* reality: from studying *representations* (about reality) to studying the *interference of practices* (in reality).¹⁴

In the case of the built environment and housing, we are dealing with more than a single object, which is why I've expanded the concept of enacting to even include norms and societal conditions. For this article, I draw on an interpretation of the human-environment interaction as the dynamic relations between complexes of "everyday practices, material artefacts, conventions and competences" inspired by Elizabeth Shove.¹⁵

ENACTMENT I: EVERYDAY PRACTICES

Everyday life can be explored by looking at existing practices. The cases had experienced problems with damp and mould and were selected based on an initial screening and phone interviews. At the time of the field study, the housing estates were at different stages of the renovation process. Although we did touch upon moulds in the interviews, the conversations largely concerned the conditions and everyday practices potentially causing or preventing mould growth rather than the substance itself. The stories about what the interviewes *did* – and how the circumstances had an impact on their practices – illustrated their relations, thoughts, and concerns regarding the phenomenon much more richly than when asked more directly about the mould growth.

As part of the visit, I asked the occupants to guide me through their everyday routines in the house related to practices like airing and cleaning. "Following the actors", and indeed their practices, was introduced as an attempt at understanding the interaction between the occupants and their dwelling. The *walk-through* enriched my understanding of the different everyday practices: both by enabling the interviewees to articulate their practices and by allowing me to ask about the different interactions. Practices and things are closely related, and my approach embraces the "things" even further: not just as a means of human activity, but as actants making a difference. Walking through the apartment or house, from room to room, gave the opportunity to emphasize the materially mediated aspects of the practices, but also to observe what things, appliances, and technologies "did" themselves.

Sarah Pink and Kerstin Leder Mackley used a similar video tour method to explore the experience of atmospheres and environment homes.¹⁶ Their tour was led by the participants' re-enacting their routines, but guided by the researchers' agenda. As it is staged, this reenacting is most likely a more abstract and generalized version of the daily routine. Even though the atmosphere was informal, my role as an observer could have made the informant more aware of his/her performance I was aware that using the camcorder would be appropriate in all situations, so I timed the *walk-through* as the last part of the visit. When the questions in the interviewees were addressed and felt that I had gathered the data needed, I encouraged the persons to show me their routines. Asking what was working and what was not working in the apartment, and enquiring further into their everyday practices.

The interviews showed that the tenants were to a great extent interacting with their home environment, adjusting and regulating fans, windows and doors. Additionally, the walk-through and observations provided me with some interesting input. The first film recorded illustrated an example of embodied knowledge that had not been addressed during the interview, and which I did not really notice until I watched it on screen. The occupant described a favourite window and a window less preferred. As the interviewee demonstrated the two, the video showed how handling the favourite window was done by a one-handed single move, versus the other which required two hands; opening the burglary/children's protection, opening the windows' two handles, and finally a steady push from respectively the right underarm and hip. This awareness from the first film helped me notice similar bodily interactions / embodied knowledge in the other cases, even if I did not capture it

on tape. I had audio recordings for all cases, so even if the walk-through was only filmed a couple of times, the transcriptions, the stills, and the field notes enabled me to gather the information requested.

Ventilating

The challenge of condensation was common knowledge in the departments, and the tenants had been encouraged to ventilate – either by receiving informational materials or being informed by the caretaker about the importance of fresh air:

... we are well tuned with "windows and drafts" and all that, and it's probably also in our statutes: 10 minutes at a time and airing with a draft through ...

... in the beginning we were just told that we had to air some more. And we had the windows and doors open all the time ...

Some of the residents had adapted to the demanding conditions by developing different everyday practices. Opening doors and windows was often related to other practices like getting up in the morning or going to bed at night, as a morning or night ritual. In fact, many of the interviewed tenants enjoyed a cold sleeping environment and kept the bedroom window open, whether it's open all day, all night, or both: "... in the bedroom it's always ajar all night and in the morning when we get up, I open the window. And it's open all day ..."

Others preferred ventilating by opening door(s): "... I appreciate the fresh air,



Figure 1. The two everyday scenarios presented in this essay; ventilating and handling laundry. Source: Turid Borgestrand Øien

so my front door is very much open. All summer I would say, and even today it's been open for several hours. I also like it in the morning, even if it's cold, I like that it's open ..."

Others opened the door/windows to add a more effective draft through the building: "... when I cook I keep the window open for an hour, to get the smell out, occasionally it has been necessary to keep the patio door open to get a proper draft ..."

Several tenants had the windows open all day, although they knew that it was not recommended. The open windows also had a social value as the occupant felt connected to the people outside and to each other:

... many keep their windows open: I do not think it's because people have a bad indoor climate. I think it's about habit. We live with many people close together in these estates, so do some of the neighbourhoods ... You don't feel you are all alone when you have the window open ... like a hot summer and the balcony door is open and people sitting out there ... That's more the psychology of it ...

Laundry

Another related issue among the interviewed was the drying of laundry. Even though most of the housing estates had laundry and drying facilities, it had been a challenge to get people to use them. The various renovation projects handled the issue in very different ways. In one of the cases, the outdoor drying facilities were articulated as a primary function to be included and rebuilt in the new plans: "... we've been so happy about our outdoor clothes lines, so we've planned it into the new garden plan. You can actually see where it hangs; it's not hidden in a corner ..."

This use of the outdoor drying facilities was actually an exception, since most the housing estates had phased out these common facilities. They had experienced barriers in using them: "... I do not want it down in the basement, I simply cannot." Some had experienced the clothes getting stolen: "... it's more in the basement that it's a problem. And especially if people let it hang overnight, they take it ..."

Laundry was one of the activities where guidelines, good intentions, and practical solutions didn't always fit with a hectic everyday life. A drying rack placed somewhere in the apartments was mentioned as one of the signs relating to inappropriate behaviour. Several of the caretakers come regularly to the different homes and could tell stories about people drying their laundry in the flats. One case described piles of wet laundry all over the apartment. The caretakers usually tried to handle the issues as they occurred, but as one of them put it: "... of course we can recommend, but we cannot decide for them ..." One of the caretakers argues that the problem must be solved collectively; "... and it's nothing I can solve by myself – we have to do it together ..."

ENACTMENT II: THE BUILDING STRUCTURES

The other half of the human-environment interaction concerns the building structures. In each case we got a walk-through of the building site. The overall picture was of poorly insulated buildings, as expected for estates from this period, and they all had challenges with thermal bridges and condensation. The most critical locations were at end walls and attics, making these apartments more exposed than the others. The interviews also revealed scenarios where wallpaper was falling off the walls due to rising damp and water seeping through the basement floors. Most of the damages had continually been repaired, however the measures were only temporary solutions, as it was difficult to identify the actual reason for the problem.

Due to the renovation project, detailed investigations had been conducted; opening up constructions, digging out foundations, revealing clues for the problems that had "haunted" the buildings for decades.

Three of the housing estates consisted of apartment buildings of three to four floors, including basements. The main constructional challenge for the multistorey buildings was thermal bridges and the cold surfaces. The two estates of detached single-family houses and the two departments of terraced houses did experience additional problems. Without a basement they had issues with cold floors, and some of the houses had severe problems with rising damp in both the exterior and interior walls.

Adding to the complexity, some of the buildings had contextual challenges. One of the cases was built on glacial till where subterranean water pressure led water into the building in the most unpredictable ways. The investigations revealed other unknown conditions, such as a missing capillary layer, inappropriate base material (slag), damaged building materials, or worn-out building elements. One apartment was still exposed to major damp several years after the tenants had left and the house had been emptied. The cause



Figure 2. Fieldwork documentation: stills from the walk-throughs and conceptual drawings. Source: Turid Borgestrand Øien

was found when opening up the construction: the capillary break was placed on the third brick course, keeping a constant humid indoor environment. As one of the interviewees put it: "... it was partly due to shoddy workmanship and partly due to the fact that it doesn't last forever ..."

All the cases studied in this fieldwork had a range of temporary repairs, and for some of them this ongoing refurbishment was not the first. Caretakers had developed different practices for handling the mould issue: procedures for accommodating different types of occupants and managing different types of buildings, including temporary repairs and giving information to prevent new problems. It turned out that in most cases the caretakers knew a whole lot about many different parts of the housing section, from the individual tenant to the building structure and the housing association. As we walked through the building sites, or inside an apartment emptied for destructive testing, the staff provided knowledge of great value and of things not raised at the table during the interview.

Moving through the actual sites also provided other kinds of knowledge, such as the feeling of stuffed air, certain smells, or the perception of a tension I couldn't capture on film. After every visit I sat down with my notebook, my computer, or the audio recorder, trying my best to describe what had caught my attention. At the time it felt very obvious, and most certainly things I would remember, but after just a couple of days, or even hours, these imprints were replaced by new impressions and notions.

ENACTMENT III: CONVENTIONS

Time was a crucial variable in all of the cases. As described in the following, time affected all the variables at play. Mould growth is in itself a sign of decay, but the very societal changes during the span of the forty to seventy years that the seven building structures have existed also represent a kind of temporality. The time of construction, the use, the management and maintenance in the everyday running of the buildings, the everyday practices, and the political environment all likewise played a role in the enactment of the situation. When discussing behavioural issues during the interviews, one of the reoccurring subjects was the different standards for housework among young and older tenants. This was related to another conventional change during this period: the housewives leaving for the labour market and the introduction of a new world of household appliances. The everyday practices and continuous effort of the housewives to keep the home up to date made running a household a completely different matter in the 1950s and 1960s, where every second woman (aged fifteen to seventy-four) stayed at home.¹⁷

The oil crisis and the increasing heating expenses in the 1970s were articulated as another reason for the problems. A comment from several informants was that damp was not a problem in the 1970s when the heating was cheaper:

... then you simply opened the window if it was too hot. But the more expensive the heat, the bigger problem ... And the major problem emerges when you switch off the heat and close the window, then it's a hundred percent for sure there will be mould ...

In the 1960s when some of the tenants moved into the housing section, mould growth was not considered a health risk, and at least not a case in the newly built dwellings. The shortage of housing following the post-war period created a building boom in all of Europe, and people were happy to receive accommodations: "... We were so happy that we had the opportunity for renting this apartment and did not realize how dangerous it really was ..."

However, some of the buildings from this period were built too quickly, with new construction techniques and materials, causing problems from early on. Some of the reported problems date back to the 1960s as regards the new buildings: We didn't understand it. It was the bedroom. Our son was born in December and he was in here the first year. He got bronchitis and high fever, and they could not figure out what was wrong. And that was probably it ... He simply always had a fever ... I was constantly at the doctors with him ...

In the following years, these personal encounters were accompanied by reports on similar accounts and studies of health-related issues in the built environment were conducted nationally and internationally. By the end of the twentieth century, mould was classified as a health risk.

These findings argue that a range of different conventions have played a role in the problems at stake: the industrialized field of construction, the oil crisis, the housewives leaving, the consumer society, and the rise of the risk society have all somehow been part of enacting the mould issue.

Drawing Things Together

The fieldwork revealed a whole range of different actants at play in enacting the mould issue: both human and non-human, material and non-material. Different versions of the problem had been negotiated and managed in different ways. But my question was now how to process this empirical material? For transcribing the audio files from the interviews, I used software designed for qualitative data analysis, where I also could map and organize my findings. Yet working with the material in this software proved to be a challenge. Based on the notion of human-environment interaction as dynamic relations,18 I organized the main actants of the mould problem into the three categories; material artefacts, everyday practices, and conventions. The categories were further organized as: material artefacts included the subcategories of architectural design, engineering design, materials, and implementation. Everyday practices covered the variables *daily use, maintenance*, and *temporary* solutions. Finally, conventions included obduracy (as lingering belief in natural ventilation), new technological development, ethnical or social changes, and organizational or societal changes.

From this I was able to extract data on parameters at play in each case and across the cases. Material artefacts represented nearly half (46 per cent) of the variables causing the problems identified, while one third (36 per cent) of the variables related to the practices, and 18 per cent was categorized as conventions. However, this did not explain much about the actual problems other than that all categories were represented.

INTANGIBLE WICKEDNESS

In some cases, I found it difficult to define categories and subcategories because the variables were intertwined and ambiguous. The same variable could both be good and bad; across the cases or even on the same case. I needed to tame the complexity in order to process the empirical data, but charts and quantitative numbers reduced the picture to a degree where the variables more or less worked as static representations. In a setting where the complexity and wickedness were the main features, this representation blurred the picture. It did not embrace the insight that these variables were interconnected in a more or less complex and obscure way and that the wickedness of certain cases could not be seen from these representations. The following anecdote of a haunted house illustrates the dynamics of relations that could be at stake.

The Haunted House

The field study shows that the constructional state of the buildings was in general very poor, yet some of the residents still experienced more challenges than others. In one of the cases, it was hard to establish a through-draught due to a low ceiling height and one-sided window distribution (where the windows couldn't be opened). Consequently, the house had very stagnant air. The resident described how she had developed tailored routines in keeping the humidity at an acceptable level and preventing the mould growth. This included the practice of wiping off the soles of her shoes with disinfectant after use and placing them on a shoe rack on top of a table (according to her, they could not be placed in the hall or on the floor without getting mouldy after some time), constantly having all the cupboards doors open to prevent the clothes from being "attacked". She kept both her front and back door open most of the day, had a system of where to put her clothes when worn, and never dried clothes inside the house. "The house is haunted", she said, shaking her head. She had contacted the caretakers several times; even the director of the housing association had inspected the terraced house. A couple of years ago they identified damage in the roofing, which was repaired, but the problem had obviously returned. On the few occasions when the house had been unoccupied for more than a couple of days, the humidity had caused mouldy surfaces several places in the apartment: on shoes, a bag, and on clothes inside a cupboard.

These scenarios may sound strange, but based on the two hours we spent in the house, we could clearly feel there was something wrong. The best way of describing it would be the feeling of heavy, stuffed, and stagnant air, and a constant urge to sneeze. My colleague pointed out that he could feel it the moment he stepped inside, despite the garden door having been wide open all morning. We could not see any signs of water damage or visible mould, and the feeling was more or less in every room. It was strange.

A couple of weeks after our visit, it turned out that there had been a hole in the roof causing the intensified humidity. For many years, the tenant had played a central role in keeping a tolerable indoor environment, without getting the problem acknowledged – quite the reverse, she had been accused of causing the problems. This anecdote illustrates the effort to prevent and modify, which in this case made it difficult to recognize the underlying cause.

PROCESSING THE MATERIAL

When I returned to my empirical data after the fieldwork, the amount of material and the many different outputs were chaotic. The first attempts at processing the material in the software felt as if it were reducing my fieldwork too strictly. Mapping and categorizing reduced the complexity of the real-life situation: tidying up the mess which characterized some of the cases. The software was black-boxing the process of analysis – where I needed to see the transitions and negotiations. The story of the haunted house illustrates the great effort and constant process of mitigating and keeping the mould growth at bay. To be able to capture these situations and to understand what was going on, it was crucial to get hold of the qualitative knowledge of the specific case. And to keep the case open until all pieces (voices, observations, etc.) were processed.

John Law argues that the only way of handling wicked problems is by treating them as if they were benign, and by mobilizing techniques for slicing and dicing the problem into smaller chunks.¹⁹ But for the mould issue this only seems to take us halfway.

Mapping and Sketching

As an architect by training, sketching has always been a very useful analytical tool for exploring problems in creative design processes, and it turned out to do its work once again. While going through the transcriptions one more time, I drew the section and plan of the different homes visited. The drawings worked as a framework when sketching the different scenarios that were revealed as I listened to the interviews again. This also helped me to



Figure 3. Processing the empirical material in series of collages. Source: Turid Borgestrand Øien

focus on relations between the persons and their home environment, but also the enactments of everyday practices, material assemblages, and conventions. The specific elements were all mapped into the drawings.

The process of mapping was a way of translating the data from the interviews and the observations without losing, or forgetting, the context and the spatial connection. Albena Yaneva refers to mapping as "the art of describing" whether it's architectural objects, processes or practices: "... to trace the complexity of phenomena, without replacing the specific with general."²⁰

In this way, each case held its own collage of different sketches. John Law describes how the pinboard holds another complexity besides the narrative: made up of different postings that overlap, juxtapose, resemble, and differ.²¹ This metaphor of the pinboard enabled me to hold the process of analysis open much longer and to dig deeper into the appearances of the different versions enacted.

Even though a housing estate had constructional challenges, not all the occupants experienced problems with damp and mould growth in their own home. Several of the narratives and the observations showed that in the same case a range of variables played a part in triggering the problem, with other variables counterbalancing this by keeping or enacting a healthy environment. The same variable could change its role and correlate from case to case, and even in the same setting. The architectural design was the main cause of the problem in one scenario, the robust variable in another, and a neutral part in a third setting. This was the case for all the variables.

Scale

A reflection that unfolded while drawing the scenarios of the cases was the notion of SCALE. The method of scaling holds parallels to the translations done in the laboratories when identifying type and species of mould, but it is also a very essential tool for architects and planners. When drawing the plans and sections of the dwellings, I somewhat unconsciously drew in the scale of 1:100, both to fit a standardized sheet of A4 paper, but also in a detail that did embrace certain things and leave other details out. Some of the drawings had vignettes, zooming in on particular elements of importance, such as joints, the missing vapour barrier, or a damaged roof. These vignettes could also be certain practices described during the interviews or observed while walking through an apartment: drying racks, doors and windows, the manager, or even a cat. Changing scales shifts the focus and the level of abstraction. One can say that the 1:100 is specific in another way than the 1:20,000. Albena Yaneva describes scaling as experimental moves and manipulation materialized by different tools and instruments: models, diagrams, sketches, and technical drawings. By scaling up and down, over and over again, the architect possesses a tool that connects the abstract to the more concrete. As configuring a *body multiple* or a multiple object – "designing a distant building requires knowing it more and knowing it less at the same time" ... "with both abstraction and precision".22 In moving between scales, the different scales express different things, and the "conversation" between them shapes and transforms the object.

Dynamic Relations

The phenomena encompasses different practices in different scales that often exclude one another. The practices are not necessarily realized simultaneously but still relate to the same but different mould(s): under the *microscope*, mould is a culture of microbes, in the *organization of the health care system*



Figure 4. Mapping the different actants: from dampness to individual repairs and top-down decisions. Source: Turid Borgestrand Øien

moulds are a potential health risk, in the *housing association* moulds are a maintenance problem, in the *home environment* moulds are an allergen, and in the *environmental protection agency* moulds are a political issue.

The different scales and versions are seldom coordinated, and this un-coordination concerns both the problem and the effort to solve it. Despite the best of intentions, the many initiatives are typically not correlated. Scales can be seen as a way of handling the multiplicity and complexity, but we seem to be missing the operation of configuring the "multiple object" of housing. One of the characteristics of working with a design (or a wicked) problem is the simultaneous process of identifying the problem and the solution to the problem. In some of the cases, the problem was technical, where the involved parties agreed on both the problem and the solution. Conflicting interpretations of problem and solutions characterize the wicked problems. This could be due either to actual controversies or to uncoordinated initiatives. And adding to the complexity, the relations change and develop. Oswald Mascarenhas describes two types of complexity a) *detail complexity* as the multiplicity of variables involved in a problem and b) *dynamic complexity* as the multiple interactions that occur between these variables over time.²³ Returning to the



Figure 5. The material processed in collages. The timeline vignette was useful due to mapping the trajectories and scenarios. Source: Turid Borgestrand Øien

discussion of representation and processing in the beginning of this section, one of the challenges was to capture this dynamic complexity: that the same variable could effect and affect, and both cause and prevent, the mould growth.

DISCUSSING HOLISTIC APPROACHES AND SHARED RESPONSIBILITY

The mould issue can be discussed on a societal level as a challenge of risk management. Risks have been seen as a way to normalize, control, and safeguard society: "The welfare state is tied into the basic suppositions of modernity – that security comes from the ever more effective control by human beings of their material and social environments".²⁴ Anthony Giddens addresses preventive strategies as the way to handle the manufactured risks, balancing responsibility between the individual and the collective.²⁵ Prevention strategies concerning mould growth have been seen in both maintenance instructions and guidelines for household practices, including information campaigns – however, they largely support individual responsibility. In the late modern society, the individual is set to navigate the complex risk, consumption, and information society, where the health risk of mould growth is only one of an ever-growing pile of concerns addressed.

In Denmark, millions are spent on repairs and remediation from damp and mould growth. These funds are important but are often symptomatic treatment and temporary solutions. By putting the cause and responsibility on single variables, like the building or the tenants, most of the seven cases have for years been treating the symptoms, not the *real* problems. The renovation projects presented in this study are more ambiguous than the temporary solutions, but also costly; the about six hundred dwellings in the seven cases have an overall renovation budget of nearly half a billion Danish kroner. However, the renovation projects have had a technical (and quantitative) approach to both the interpretation of the mould problem and the solution, which largely fail to address the social aspect. For example, new technologies implemented without adjusting to existing practices or contextual conditions. As a result, there are already new issues at stake.

The renovation projects seek to stop the current mould problem and prevent it from reoccurring by upgrading the building structure. The building is located in between the individual and the collective, but also between the technical and the social. As the fieldwork has shown, the building takes part in enacting the indoor environment in several ways; concerning materials, damp and thermal conditions, air circulation and pressure, and not least the use of the building.

In line with Dawn Day Biehler and Gregory L. Simon's statement on indoor environment as a site of both effect and affect,²⁶ one could also say the same about architecture. The human-environment interaction goes both ways: people influence and change the environment as it influences and changes them. Yaneva describes how objects or sociotechnical devices mediate our actions.²⁷ She claims that we perceive architecture simultaneously as technical and social, and by following the use of a house, as it unfolds and interacts, one will discover that there are not two separate worlds: no architectural content on one side and social context on the other:

Neither the building nor the context will be static – architecture will appear neither as infrastructure nor as a frame in which we situate moving subjects and project subjectivities, identities, roles and meanings. Architecture will become a moving target.

Tim Ingold describes the built environments' "hard surfaces" as an attempt to get the world to conform to our expectations of it.²⁸ However, these surfaces are reincorporated and rearranged by the lives of the human and non-human; people react and adapt.

A real house is never finished. Rather for its inhabitants it calls for unremitting effort to sure it up in its phase of coming and goings, in its manifold of the human and nonhuman inhabitants, not to mention the weather; rainwater drips through the roof, where the wind has thrown off a tile, feeding a fungal growth that threatens to decompose the timber. Legions of ants are thresholds of doors. To inhabit the house is to join in the gathering; to participate in the thinging.²⁹

A lot happens after leaving the drawing table and construction site: the house is used, inhabited, and redesigned. The occupants furnish, cook, light candles, clean (either themselves or other things), sleep; they operate the windows, the thermostat, the ventilator, the exhaust hood, the washing machine, and the tumble dryer. The house and its occupants shape each other twenty-four hours a day, and the building accumulates the record of that intimacy.³⁰ The

caretakers maintains the day-to-day performance of the buildings, keeping an eye on the common areas, the heating and water systems, and inspecting the apartments for things out of order or signs of mould growth. Maintenance and repair requirements have increased in recent decades as our building technologies get more complex and people acquire more and more things, appliances, and household technologies.³¹ It is not a quick fix keeping a house – it *is* hard work.

WORKING WITH THE WICKED

The design approach is one way to work with complex issues: Donald A. Norman argues that taming complexity is a partnership between those who design and those who use.³² To take part in the shared responsibility for the buildings in use, the social must be acknowledged and reintroduced as a task for the architects. By this I do not mean that architects should predetermine the use of the buildings, but to be aware that the design makes the conditions for the future use and the buildings trajectory. The design could be promoting good and convenient practices or solely regulating and controlling the inconvenient ones. Whether architects or another profession take on the responsibility of configuring and coordinating the solution to future use, it is an assignment whose success depends on the ability to acknowledge the complexity and shared responsibility and to negotiate common goals.

Working with the wicked also means identifying the character of problems; the wicked calling for other approaches than the tame problems. In this study, neither the number of variables at play, nor the extent of the mould growth determined the wickedness of the mould problems. Rather, it seemed that the nature of the problem was determined by how it had been acknowledged and handled: the day-to-day management, communication, dialogue, and collaboration.

Responsibility: Obstacles and Possibilities

The indoor environment has more or less become a non-theme in architectural discourse, or at best reduced to light and well-being. This can, of course, be a Danish thing, where the architectural education has a more artistic orientation than at the polytechnic universities. However, I will argue that there are other types of societal changes involved in this lack of interest or concern: First, the industrialization, followed by the building boom in the post-war era, is one of the factors causing great changes to the field of building construction. Amos Rapoport argues that the rise of specialization and differentiation have instigated a loss of common value systems and common goals.³³ The specialization has increased ever since, and in the case of indoor environment, the health- and comfort-providing technologies have additionally alienated the indoor environment from the practice of architecture.³⁴

Second, the ontology of architecture is also at stake. The understanding of human-environment interaction taken in this article – as complexes of material artefacts, conventions, competences, and practices – resembles an architectural ontology based on the Vitruvian qualities of balancing commodity (usability), firmness (durability), and delight (beauty). But due to the contemporary discussions in the Danish setting, it could be questioned whether architecture solely concerns beauty. Steward Brand stresses a need for conversion from image architecture to an architecture focusing on processes:

The conversion will be difficult because it is fundamental. Transition from image architecture to process architecture is a leap from the certainties of controllable things in space to the self-organizing complexities of an endlessly ravelling and unravelling skein of relationships over time. Buildings have lives of their own.³⁵

Architecture as a process has parallels to the time, space and dynamic relations emphasized in my mappings of the cases. Juhani Pallasmaa insists that the very task of the architect is to internalize the client and imagine the specific human situation.³⁶ Peter Zumthor shares this view of architecture as a human environment, placing the use and coherence as main criteria of architectural quality, and argues that "the proof of the pudding is found in the eating".³⁷

In line with these arguments, I argue that the holistic approach that constitutes the core of architectural practice should accommodate the dynamic relations throughout the lifespan of a building in use.

MY OWN ENACTMENT

Quantitative methods have played a main role in the studied renovation processes. However, in addressing the wickedness, it has been crucial to understand "the real problem(s)". In order to comprehend both the technical and the social, it has been helpful to recognize the housing as a network consisting of the relations between the building, its users, and all the explicit, embedded, and embodied knowledge it takes to run it. Particularly in the process of renovation, the discrepancies between the designers' intentions (of already existing design objects) and the observed user behaviour provide valuable design information for future designs.

The mould issue demonstrates the sociotechnical aspect of architecture in use. In this article I wanted to share my attempts at grasping and understanding this moving target of the technical and the social. The qualitative approach has revealed a complexity of different actors and changing relations. My attention to the social relations across scales has been translated into material form in the drawings. Using the drawings to process and translate the empirical data, as inscriptions, not immutable, but open for discussion and adjustments, has enabled an exploration of the problem that supports and helps navigate the complexity. By moving between the small details in the technical and biological processes, and the bigger picture in the societal and political processes, some of the black boxes of everyday practices have been opened. Unfolding black boxes do leave a comment, even at a scientific distance: by approaching and employing the complexity, the social and the "wicked", I am both addressing an alternative or additional understanding of the mould phenomenon, and on the other side addressing an architectural ontology that can accommodate these different practices.

CONCLUDING REMARKS

Moulds play one of the key roles in nature's decomposition processes, however, as explored in the fieldwork and discussed in this article, in our modern society mould has become a wicked problem. Not easy to regulate or to control. It is socially constructed and enacted by material artefacts, everyday practices, and conventions.

In order to maintain a healthy indoor environment, there were no quick fixes. I will end my article with an anecdote that illustrates this never-ending story:

During the reconstruction of the buildings in one of the housing departments undergoing refurbishment, the winter storm named Bodil took the construction workers by surprise. The storm tore the tarpaulin off the open construction which resulted in severe water damage. Additionally, it turned out that the construction was closed off too early, resulting in the brand-new kitchen cupboards a couple of weeks later being covered by a small, black-dotted coating – the moulds were back.

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MAKING A CASE FOR URBAN TIMBER HOUSING – BY RESEARCH, TEACHING AND DESIGN Ute Groba

ABSTRACT

This article aims to make a contribution to the debate on architectural research and academic education. Although their detailed roles and reflective procedures are still disputed, research and design are becoming more and more acknowledged as complementing sources for architectural knowledge. Design can happen within practice or as independent design explorations, in order to add to more traditional research. In contrast to various other design fields (e.g. service design or graphic design), architecture involves much longer production processes and larger costs, so that the realization of fullscale projects – exceeding pavilions or the like – within academic research is difficult. Lately, education too has received some attention for the role it can play within research. Design exploration within a master studio course has the potential to produce multiple illustrations of what is possible and also relevant for a defined context, but it is independent of everyday practicalities.

As a first part of this article, literature is synthesized into a triangular model of architectural knowledge, joining research, practice, and education. In the case of a research project on urban timber architecture (*Wood/Be/Better*), this model has been tested and modified at The Oslo School of Architecture and Design. An early-stage PhD project set the literature-based framework for a master studio course. Both the process of supervising a broad range of architectural projects and the finished student projects gave important feedback to the research project and added to the limited amount of built and unbuilt reference cases. Quality criteria for research formulated in various academic texts frame the discussion of the suggested model for architectural knowledge, its relevance for wider implementation and ethical concerns.

KEYWORDS

Architectural research, master studio teaching, urban timber housing

INTRODUCTION

Debates about what architectural research is or should be are broad and multifaceted.1 Especially for research novices, it is challenging to get an overview of the various options for research design, and how they are discussed and assessed. Each research project has to find its own way of relating to a defined context and school of thought, and of framing and answering questions. Also, an increasing number of architectural offices claim to conduct research-based design.² Academia is sometimes criticized for self-legitimating and practice-irrelevant research. Research-based design within offices, in turn, can lack academic rigour³ and is usually not shared with a greater audience or even documented internally and transferred to the next project.⁴ Time and money constraints⁵ can limit the depth of such research. Financed by the offices, the gained knowledge has to contribute to competitive advantage and is most often only disseminated in the form of built projects.⁶ At the same time, academic education is discussed controversially, as researchers are merited for published work, but not for teaching. In a recent Norwegian newspaper article, it is described as "career suicide" to use time and energy on students - meanwhile universities earn money for each student finishing a course successfully.7 Teaching funding seems to even cross-subsidize research activity in some cases.8

However, scholarly arguments and precedents for a methodological research framework integrating theory, practice, and education exist.⁹ This article claims that a combination of academic and "designerly" methods¹⁰ involving activities within research, practice, and teaching promises to produce knowledge that is relevant and applicable as a contribution to all three mentioned fields. The combined benefits can go beyond isolated activities and discussions. For an ongoing research project on urban timber housing, academic research and master studio teaching have been harnessed as mutually beneficial sources of architectural knowledge, also giving access to information released during design processes. Results of this research will be useful for the future design of urban timber housing, as well as for raising awareness for the relevance of new urban timber housing typologies and a broader understanding of sustainability linked to the use of timber as a construction material. The PhD research objective, methods, and first results are described briefly in this text and discussed more in detail elsewhere. This article focuses on a contribution to the debate on architectural research and academic education. It includes literature studies that contextualize the suggested approach for research, teaching, and practice within an ongoing discourse. This approach is then discussed on the basis of current PhD research and an affiliated master studio course at the Oslo School of Architecture and Design. Criteria for good design research formulated in various academic texts structure this discussion. The European Recognition of Professional Qualifications Directive,¹¹ from 2005, is referred to here, since it serves as a base for the set-up of architectural education in Europe and at The Oslo School of Architecture and Design (AHO).

THEORETICAL BACKGROUND Hats and Triangles: Three Sources for Architectural Knowledge

Is there a research landscape appropriate for assessing complexity, and flexible enough to fathom scholarly and artistic reasoning, rationality and intuition, objectivity and subjectivity?¹²

Many scholars have argued for the complementary potential of research and design, harnessing their respective inherent approaches to knowledge production. While research and design have common traits, they are also fundamentally different: Although implying quite distinct activities, research and design are related in their way of processing disparate information "towards a comprehensible, or desired, end".¹³ Both seek to identify a problem and to find solutions for it. But while research searches - that means analyses and systematizes - past and/or present phenomena in order to answer a question with generalizable knowledge and/or applications, design generates proposals for artefacts or interventions as future answers to an existing or anticipated problem. Thus, research works descriptively and design acts prescriptively.¹⁴ Science can identify, analyse, and solve things that "are", with methods validating the results. This implies a focus on existing phenomena, thus on past and present. However, scientific research does not exclusively focus on things that exist already. There has been an inventive, creating component of scientific research for a long time as well, such as the development of new chemical compounds. Design, too, can invent, shape, and construct things that don't exist yet, and as they "ought to be", directed towards future scenarios.¹⁵ David Salomon consequently argues that design and research, in the context of architectural research, can both be seen as hybrids, applying quantitative as well as qualitative methods, and producing "objective truths" as much as "personal fictions".16 The complementary strengths of a positivist and a constructivist approach, of "rational problem solving" and a "reflective practice", can contribute to multifaceted "designerly ways of knowing".¹⁷

In contrast to design practice, scientific research tries to isolate aspects that then are researched in depth, aiming at generalizable and repeatable or applicable results with external validity.¹⁸ In contrast, due to the unique context of every design tasks, in practice design results must not be offhandedly repeated or copied.¹⁹ Architectural projects are complex and touch on a broad thematic variety, and their quality is measured on the successful consolidation of a whole range of at times conflicting requirements.²⁰ So how can these contrary approaches be beneficial for one another?

I don't think you can design anything just by absorbing information and then hoping to synthesise it into a solution. What you need to know about the problem only becomes apparent as you're trying to solve it.²¹

As Richard MacCormac states, design does not function by first gathering information and then transforming it into design. Instead, knowledge gaps appear in the process of understanding the design task and searching for design solutions. This suggests that design can, just as scientific experiments might do, inform research areas. As much as in research as in design, processes may happen in a less ordered and linear way than presented afterwards, and both might use similar ways of experimenting and constructing logic on various levels. Design knowledge is often intangible²² or tacit²³ and applied intuitively through design activities. As suggested by Steadman, research can "help designers to be more effective in their decision making ... by widening their knowledge of options in design".²⁴

Recently, yet another field has come to awareness as an area for knowledge production. Architectural education can both benefit from research input and feed back into research in turn. In fact, theory, practice, and education are jointly responsible for shaping the field of architectural design²⁵ and should exploit possible synergies. According to Wortham, studio teaching can be a research activity with "multiple contributions – to the academy, to education, and to the serving and reshaping of society".²⁶ Multiple design solutions as architectural speculation produce "if-then propositions". Dunin-Woyseth and Nilsson see a "new practitioner" species emerge that unites the qualities of "professional practitioners, of educators, and of field-specific researchers". These have the potential to contribute to a "more robust, self-confident, and dialogue-oriented field of practice and inquiry in architecture and design".²⁷
This statement addresses three fundamentally important criteria for research assessment that are referred to throughout a broad range of texts on architectural research, with slightly varying wording and weighting.²⁸ The rigour (or robustness or reliability), relevance (or significance), and communication (or accessibility) of all research endeavours should be ensured – be they predictive, descriptive, prescriptive, speculative, or even fictional.²⁸ Without taking a stance on current alternative currents in architectural research here, I would like to emphasize the importance of some common values allowing for a discourse across disciplines (and sometimes just across the hallway in one institute). They can make all the difference between mere *fact-finding*³⁰ and *understanding*,³¹ or between individual artistic development and something with a value for others, too.³² A range of means to these ends are listed here – with an awareness that the relevance of each varies with different perspectives and might make sense in one context, but not another,³³ and acknowledging that such a list is never complete.

Concerning doctoral theses, the current Bologna Directive puts more emphasis on learning to be a researcher than on producing new knowledge. Nevertheless, the relevance of research question and results will at least be on the list again when applying for research funding or grants. Predetermining results as new, original, and a substantial contribution³⁴ by moving the field forward or by allowing for new or substantially improved insights³⁵ might be naïve or restraining. But setting out purposively,36 with clear goals,37 contributes not only to the significance of the work,³⁸ but will also add to research rigour and ease the communication of a research contribution. Even though often concealed in the final format of a doctoral thesis or research presentation, the way to gaining this clearness might be "messy" throughout the whole process.³⁹ One way to make an impact on society more probable is to address current questions that are important to and applicable by practitioners.⁴⁰ But also in other approaches, a certain degree of generalizability⁴¹ must show the results' interest beyond the actual case. A reflective critique⁴² might lead to understanding in addition to new knowledge,43 and also support research communication.

Research rigour refers to a consistent and systematic⁴⁴ way of processing information, reducing it to data, leading to knowledge and ultimately understanding.⁴⁵ Research that becomes informed and inquisitive⁴⁶ in this way needs adequate preparation⁴⁷ and problem setting.⁴⁸ Proceeding methodically,⁴⁹ with appropriate methods,⁵⁰ increases the validity and reliability⁵¹ of the research. Positivistic, quantitative approaches rely on measurable, explainable, and repeatable results more than qualitative, interpretive methods that are committing to different, less defined assessment criteria and which might evoke intense discussion.⁵² However the individual research approach is framed – making use of more conventional methods or moving away from them, relying on one school of thought or combining methods – a clear account of the research practice strengthens its validity.⁵³

A "bricolage" or mixed-methods approach allows for pragmatically picking and mixing research methods that promise to produce the most relevant answers to the research questions, across academic paradigms or schools of thought, and methodological categories.⁵⁴ Also called triangulation, a combination of different ways to collect and to analyse data (e.g. from different perspectives, or by using multiple tactics⁵⁵) promises a more stable, holistic, and objective base for research with the aim of increasing credibility (reliability and also relevance).

Finally, the communicability⁵⁶ of research, evident in its effective presentation,⁵⁷ ensures its accessibility for others. As referred to by John Forester,⁵⁸ Jürgen Habermas lists the following expectations (as opposed to rules) towards pragmatic communication: it should be comprehensible, sincere, legitimate, and true. While the first two aspects address form and intention, the latter two could be linked to the discussion of relevance and rigour.

According to Nigel Cross, "the best examples of design research are: purposive, inquisitive, informed, methodical, and communicable. This requires articulation and shared knowledge within and across the field. This, again, requires articulate communication of explicit knowledge."⁵⁹ Publication, but also conference presentations and academic lectures, exhibitions, or prizes indicate the research's importance to a wider audience.⁶⁰ Peer reviewing processes prior to publication again guard research rigour.

Figure 1 illustrates a synthesis of the assessed literature into a model for the production of architectural knowledge. It joins the three elements of research, design, and teaching in order to increase the effectiveness, relevance, and reliability of the research results: research can inform practice with relevant questions and contribute to better-informed decision-making, and result in efficiency and innovation gains.⁶¹ Design on its part can inform research questions. Design also informs education with state-of-the-art aspects of architectural conception, construction, and processes. While education can contribute to research by offering an increased capacity to produce a range of examples for which there is often no time or money in research, it can also benefit from the communication of questions of general concern and of first-hand knowledge. This is also a form of dissemination of research knowledge, which then will be transported further to practice, when students enter their professional careers.⁶²

The questions addressed further in this article are:

How can design research, but also education and practice, benefit from one person wearing different hats, that means shifting between the roles of a researcher, a designer, and a teacher? How can this model contribute to research credibility (rigour and relevance) by means of triangulation? How does it affect research communication?



Figure 1. A synthesis of literature on architectural knowledge production involving research, practice, and education. Ute Groba, 2016.

METHODS

A Take on Design Research

The general triangle of architectural knowledge production introduced before has been developed through a study of literature on sources of architectural knowledge, design research methodologies, research and design, research and practice, the combination of research and teaching, as well as research-related design studios, and finally on assessment criteria for research. For the application in an actual case, it has been adapted to a PhD project on urban timber housing (see the section on results). Design, as differentiated by Fallman,⁶³ can happen within practice ("the real") or as design explorations ("the possible"), to add to more traditional research ("the true"). In the described case, design explorations were to happen within a master studio course. The researcher thus had a more indirect, partly collaborative role in the design process through discussion and supervision.

Suggested modification options for the general triangle – based on the experience and reflective process around the described master studio teaching and research – form part of the discussion. While the main focus lies on the research contribution of master studio teaching, a short account of advantages for education is given, too. The European Recognition of Professional Qualifications Directive 2005 lists eleven points on which to base architectural education. They are also part of the ambitions of The Oslo School of Architecture and Design.

MAKING A CASE FOR URBAN TIMBER HOUSING: A MASTER STUDIO COURSE AT AHO

Thematic Background

In the light of growing environmental concerns, building dense urban housing up to four floors in timber promises to have ecological and practical advantages.⁶⁴ It is also eased by current Norwegian building codes and by new timber products. Nevertheless, only few recently built examples exist in Norway. So what are the range, and the architectural potential of these timber typologies?

With decreasing energy consumption during the use phase of buildings (operational energy), the material aspect (embodied energy) gains importance.⁶⁵ As numerous studies show, timber as a construction material has clear environmental benefits.⁶⁶ However, the potential reduction of CO₂ emissions by replacing concrete and steel with timber construction is limited in a global

perspective. Other aspects, beyond the empirically measurable, have to be explored, too, offering a more holistic view of sustainability. The "loveability" of our built environment, as phrased by architect and professor Dietmar Eberle (in an interview with Peter Andreas Sattrup⁶⁷), leads to longer lifespans and better caretaking of buildings, increased value, identification, and well-being. A positive experience of urban density depends fundamentally on architectural quality.⁶⁸ However, an objective and universal definition of architectural quality is not possible⁶⁹ and often eschewed by academics. Yet architectural quality is seen as part of sustainability and vice versa (as for example recognized by the German Sustainable Building Council in its new version, 2017, and by the Green Building Council Denmark, 2017).⁷⁰ In order to move from a subjective to a discursive perspective (or intersubjective - as Forester⁷¹ refers to Habermas, also described as "mutually ... understandable" by David Wang⁷²) - sorting aspects into categories promises to be helpful (e.g. into properties, value, coherence⁷³) and is therefore applied in this study. Based on literature studies, the notion of quality is deconstructed into preferable properties of urban density, housing, and timber construction.74

Several aspects of architectural quality, sustainability, and prefabrication are seemingly contradictory, and prioritized differently among stakeholders. These relate in varying degrees to the building's geometry and to the social conditions that this urban form fosters. They include rationality and diversity, coherence and individuality, community and privacy, spaciousness and compactness:

The discussion of rationality and variety addresses the contradiction between repetition as often associated with prefabrication and mass production, and spatial diversity as an important quality for a positive experience of urban density. Coherence and individuality are two aspects of dense housing that can be conflicting or complementing, referring to a visual wholeness and consistency, and the human need to mark one's own territory and to express one's individuality. Privacy and community are not necessarily mutually exclusive. Advantages of living in a community are many, but should be balanced with possibilities to retreat. While compact building volumes relate to a reduced consumption of space, energy, materials, and possessions, spaciousness is associated with a good home and can support a stimulating spatial experience.

Can dense timber housing provide rational variety, allow for coherent individuality, offer privacy within a community, and invent spacious compactness? As part of the PhD research, these questions were used as a filter for a pilot analysis of four reference projects. Seventeen low-tech design strategies to achieve a consolidation of these contradictory requirements were revealed.⁷⁵ These include all three scale levels that have been used for the discussion of architectural quality: urban form, architectural strategy, and detail design. Although derived from timber projects, the design strategies are valid for any other building material, too. So what is the specific role of timber in this context?

All of this forms the background for a master studio course, where urban density had to be negotiated with qualities on urban, architectural, and detail levels, and relationships between the construction and the experience of spaces were to be explored. By transferring the design strategies identified in reference projects to a new context, their general applicability is tested. Moreover, a range of new precedents is added to the few existing current projects in this category, illustrating possibilities that might exceed what is built or buildable today and inspire future development.

The hypothesis that the combination of low-rise high-density housing with prefabricated timber construction is relevant for present and future urban areas in Norway can only be investigated on the basis of the few existing reference projects that correspond to all mentioned parameters. These two aspects of a building (urban typology and building material) mark the two extremes in a hierarchy of urban elements⁷⁶ (urban scale and detail scale). In contrast to urban typologies, research on timber construction most often has a technical focus. Can they be researched in combination in spite of this? Although the choice of material and construction method was found to also have an impact on urban quality (urban scale),⁷⁷ typology and material most obviously come together in a built project (building scale). The creation of new precedents for a Norwegian context promises to reveal both further information and new or more detailed questions. Time limits, financial restrictions, and workforce restraints complicate the planning and building of full architectural projects as a source for research by design. Nevertheless, involving education and design into research can create suitable conditions to simulate design processes for realistic and approvable architectural suggestions for a Norwegian context.

COURSE SET-UP

In order to explore the aspects described in the section above through the students' projects, the course input was directly related to these questions and challenges. "A series of lectures by academic researchers, engineers, producers, architects and OBOS (the largest Nordic cooperative building association) shed light on a broad range of relevant themes - some contradictory, some complementary. These include quantitative and qualitative aspects of urban density; timber technology and Norwegian timber tradition; fire and sound requirements; various timber construction products and possibilities for prefabrication."78 Some of the lecturers additionally offered expert supervision in short workshops after the lectures. Moreover, a lecture about the research background of the task introduced the students to the design strategies derived from reference projects,⁷⁹ making them explicit - without prescribing them for their own projects, however. Although architecture design tutors often deny conveying specific design methods, Curry found this to be especially useful for novice designers.⁸⁰ At AHO, master studies beginners and students with their last course before the diploma project meet in the master studio courses. In the described case, there were especially many novices.

The lectures were complemented by analyses of reference projects for low-rise high-density housing (most not in timber) and of different options for timber prefabrication. A day trip in and around Oslo and a study trip to Vorarlberg, Graubünden, and Zürich allowed a direct experience of reference projects for low-rise high-density housing and timber construction. All of this input had to be documented by the students, by lecture reports, written presentations, and photo collages.

An introductory two-day task at the wood workshop was meant to kick-start imagination together with a feeling for wood as a construction material, and to encourage the use of working models to develop the projects (which indeed happened). A realistic setting for the studio projects is provided by a collaboration with OBOS, an important housing developer in Norway. Rather than defining the course's content, OBOS suggested a relevant site where matching considerations are in progress in reality. The students worked in groups on a revision of the master plan. After discussing the suggested alternatives critically, the class voted for one version to continue working on. This master plan was divided into sites for the individual projects that then got distributed by drawing lots. Students were allowed to work alone or in pairs. The student projects had a broad scalar focus, with attention focused on the urban context, the architectural strategy, and detail solutions.

Supervision was provided by two fix teachers and by workshops with experts. A series of interim presentations structured the semester and allowed for discussions in the whole group. The final review was joined by an external reviewer, who also contributed during the final evaluation of the projects. This could be seen as a form of peer review, with a focus on the conceptual and constructive rigour of the projects.

COURSE RESULTS

Course results include a new master plan for Mortensrud in Oslo (sent in to Oslo Municipality for consideration in an ongoing planning process, Figure 4); twelve projects documented in drawings and models in various scales, illustrations, and renderings (Figure 5); but also documented learning content in the form of lecture reports and reference project analyses made accessible for all AHO students (Figure 3); conceptual models and texts (see Figure 2); and individual project-related investigations (e.g. on the air-cleansing capacity of plants; on traffic noise blocking; on the suitability of different typologies for the different sites; or on multistorey buildings without elevators on steep sites). All of the students handed in, and all students passed. The course results (see also Figures 6-8), in addition to the course framework and accompanying tasks, are documented in a course book.⁸¹ They have also been exhibited at AHO WORKS, a biannual event at The Oslo School of Architecture and Design. Minna Riska, partner at MDH arkitecter, and external examiner for the course, commented on course layout and knowledge production at the final review:

Generally, the quality in the projects developed in this course is very high. It is quite exceptional that we can discuss the projects on so many levels – urban plan and piping in one session!

It is also remarkable how the studio is laid out, with the collective development of an urban plan and a "site lottery".

Some sites are challenging, and many turned that into an advantage for a very articulate project.

Discussions in a review like this are a project in itself. A last possibility to produce knowledge.⁸²



Figure 2. Results of a two-day task at the wood workshop: "A prefabricated sense of home." Helene Offer-Ohlsen, Marie Callin Østern, and Ingri Heggebø, 2016.



Figure 3. Reference project analysis. Silje Træen, 2016. Timber construction system analysis. Jon Erik Dybedal Brekken, 2016.



Figure 4. Cut-out of the suggested master plan for Mortensrud. Master students at AHO, 2016



Figure 5. "Urban Belt Mortensrud." Oda Frøyen Nybø and Ingeborg G. Svalheim, 2016.

RESULTS FOR THE RESEARCH TOPIC

A (not yet published and only sketched shortly here) reflection on the course's contribution to the research topic takes up the question of how urban typology and timber as a building material are related. Criteria supporting a positive experience of urban density were examined more in depth and found to address three main fields: location-related factors (functions and connections), form of the built mass, and social composition of a neighbourhood. In each field, timber construction was found to be able to make a difference, most importantly in the third field. Not surprisingly, there is no causal link between "good" urban density and timber construction, but a mutual influence. Neither is timber the only suitable material to achieve these qualities nor always the best. Nevertheless, timber construction can support the achievement of desirable characteristic on various scales. This is



Figure 6. Mapping the students' projects, assessing urban pattern and density. Ute Groba, 2016.



Figure 7. Mapping the students' projects, assessing different density indicators in a Spacematrix scheme (kindly provided by Berghauser Pont). Ute Groba, 2016.



Figure 8. Mapping the students' projects, assessing building type and construction aspects. Ute Groba, 2016.

especially the case for aspects that support user diversity and stable neighbourhoods: dwelling variety, dwelling flexibility/adaptability, and options in different price segments. Here, the workability of timber plays an important role (weight, size, no drying time, off-the-shelf products and tools, prefab options, etc.), as well as different price options (e.g. exposed massive timber elements that allow for housing a "raw" building without any facing layers, where the construction itself also provides the final surfaces). The described range of urban typologies also makes demands for constructive decisions: constructive clarity eases later changes; free spans maximize adaptability; the positioning of ducts and shafts affects flexibility; fewer horizontal or vertical overlaps ease sound- and fire-related issues, especially when exposing the construction. All five main arguments (a timber contribution to a mix of functions; to visual diversity; to greenery woven through neighbourhoods; and to user diversity and stable neighbourhoods) can be illustrated by the course's student projects. With this reflection, the equal-weighted consideration of urban qualities and material influence comes to an end in the research project.

The design of urban timber housing can be enhanced by an awareness of potentially conflicting, potentially complementing requirements across scales, and by a conscious integration of the described qualitative aspects into the project. If applied consciously, timber construction choices can have an impact on urban level. These qualitative aspects complement the view on sustainability that for a long time has been dominated by empirical factors (technical, practical, economic, and ecological). Based on academic literature, they allow for a more conscious, grounded, and explicit inclusion of semantic arguments into discussions with clients, developers, municipalities, or consultants. This also implies a focus beyond rashly assumed sustainability criteria for the use of timber, which will be developed further in the remaining part of the thesis.

REFLECTIVE PROCESS AROUND A PHD SET-UP

The following paragraphs address the reflective process around the overall research set-up that happened during the teaching period. Although including personal reasoning related to the presented research, the paragraphs illustrate how the triangular model shown in Figure 1 supported decision-making: the specific function of one research component was identified so that it could be replaced by a better-suited one.



Figure 9. Architectural knowledge production within a thesis on urban timber housing (v1). Ute Groba, 2016.

In a first adaption of the triangular model shown in Figure 1, literature studies were linked to master studio teaching and to the design of a competition entry (Figure 9). The general knowledge extracted from literature was to get contextualized in the master studio projects. A synthesizing reflection on the design parameters and the actual design results was intended to culminate in the design for yet another context defined by the competition brief. The design and its motivation would be discussed by a professional jury, alongside alternative approaches handed in by other practitioners. In this way, the competition entry would both provide insights gained during the design process, provide an illustration of the materialized research results, and function as a "probe". To probe means to "examine something with a tool, especially in order to find something that is hidden".83 Accordingly, the competition entry would work as a device to "search into or examine thoroughly; question closely"84 the reception, discussion, and acceptance of the suggested combination of typology and construction by peers (competition jury) and eventually the public. I generally see the format of a competition entry as a promising choice when including design into architectural research for several reasons. A design task defined outside the research projects strengthens the relevance of the design work, as it relates to a real physical context, programmatic need, societal concern, et cetera. The entry will not stand alone but be compared with and discussed alongside other entries. The competition jury's role might be compared to peer reviewing, providing professional assessment and critique. Finally, the limited time frame of a competition seems to fit a PhD project well.

So far, so self-convincing. While "Life is what happens to you while you're busy making other plans",⁸⁵ research sometimes takes other turns than originally intended, too. In the described case, reasons for a turn were a reoriented research focus, opportunities, and practicalities:

Most importantly, after refining the research questions, design speculation did not promise to yield as many new answers as exploiting existing conditions in a selected range of buildings. These hold not only information about their built constellations, but also realization processes and user experiences. Although a first reflex often is to use tools or techniques one is familiar with,⁸⁶ like a trained architect might be familiar with designing a competition entry, I personally became increasingly drawn to exploring "researcherly" ways of knowing more in depth. While there is a certain probability of designing (research-informed) competition entries later in my career again, I wanted

to seize the opportunity (= funding) to immerse consciously into unknown waters to gain a firmer understanding of more established research crafting. It also became clear that cases were relevant for my projects that I have special access to – through personal contacts, my native language, and through my working experience with one of the projects. Some practical issues added up to this: the envisaged competition did not seem as relevant anymore after reframing the research focus, and working with it would have consumed the time and attention I needed for arriving at an adjusted research design.

The revised version of the personalized research model from Figure 9 now includes case studies instead of the competition entry (Figure 10). Leaning on Daniel Fallman and Erik Stolterman,⁸⁷ the research components represent "the true" (literature research), "the real" (design practice manifested in built projects), and "the possible" (student projects as a result of design education). Instead of discussing the potential of this adjusted version for my personal research endeavour, I would like to zoom out to a more general view again.



Figure 10. Architectural knowledge production within a thesis on urban timber housing (v2). Ute Groba, 2017.



Figure 11. Modification options of a model for multimodal architectural knowledge production. Ute Groba, 2017.

DISCUSSION

Dead Ends and New Traces

Rather than seeing the redesign of the model set-up as a flaw, it shows the strength the model can have already in early research phases and especially for doctoral theses. When still framing and reframing the research area and approach, the visualization of research components and their relation to each other can support reflection, communication, and discussion of the research set-up.

A series of sketches shows how the model might be adapted to other research frameworks (Figure 11): it can weight the contribution of each element differently; it can take the researcher's main perspective into account; it can describe the relations between each element in a more nuanced way; and it can visualize a connection to different stages of a research project.

Sketching the model in this way is useful for gaining clarity about the components and their role in relation to each other in a research project. Its simple visualization format supports the communication and discussion of a research approach or of different options.

Last but not least, it symbolizes the complementary value of three sources of architectural knowledge; acknowledging that they might each reside in their disciplinary corner, but that they can (and should) communicate with each other in various ways to release their synergetic potential.



Figure 12. Synergies between research and education: mutual feedback. Ute Groba, 2017.



Figure 13. Synergies between research and education: additional dissemination and impact. Ute Groba, 2017

MUTUAL BENEFITS AND POTENTIAL CHALLENGES

Often in competitions the winning scheme is the one that tells the client something ... that is terribly important to them and was not in the brief. Although we tend to admire designers for their solutions, it is often their ability to find the right problems which distinguishes good from adequate or poor design.⁸⁸

Harnessing academic research and master studio teaching has had many mutual benefits in the presented PhD project's initial stages already. As explained more in detail below, the most important advantages are the mutual feedback between research and teaching activities (Figure 12), additional knowledge dissemination and areas of impact (Figure 13), increased depth and breadth of both research and education, and the master studio course offering laboratory-like conditions for a multitude of design explorations (Figure 14).

In order to be productive for the PhD thesis, the preparation of the master course required a clear formulation of research goals, methods, and anticipated outcomes. These have to be relevant for the design of student projects (and thus probably also for practice) – and, if nothing else, convincing and easily communicable. The need to communicate content, goals, and questions clearly in a phase when they were not yet settled fuelled the reflective process and gave it an audience outside the PhD student's mind and apart from supervisor meetings. Every researcher knows how congenial ideas can sound in one's own head – and how they slip through one's fingers when



Figure 14. Synergies between research and education: multiple design explorations. Ute Groba, 2017.

intended to be put down on paper. Sometimes it is necessary to tell a line of thought to someone else in order to be able to put it together in a consistent way.

The immediate transfer of researched knowledge from academic to student is much more direct and efficient than publishing a thesis that might only be read and shared by few. Undoubtedly, the quality control by means of peer reviewing and approved admission to the thesis defence has an essential function ensuring sound and coherent research contributions and is not to be questioned here. But up-to-date information acquired through literature studies and specific investigations are a side product of PhD research that can be of great value to students. Education is enhanced by anchoring the transfer of knowledge and understanding in academic grounds. This is a very direct impact that research can have on future architects and thus on society. It is both a chance and a responsibility to use this opportunity at its best.

In the described example, it facilitated taking various aims for architectural education into account that are defined in an European Directive and that are part of AHO ambitions, such as considering both aesthetic and technical requirements in the design; and developing concepts on urban, human-related, structural, and detailed levels.

Not only by giving access to relevant knowledge can ties to research give teaching more depth, but also by relating student tasks to actual academic discourse. Conversely, knowledge gaps on the researcher's side can be filled by inviting relevant lecturers, or by even inviting lecturers with contrary or complementary research backgrounds, to debate a topic of interest (as was the case in the presented research project).

For research novices coming from practice, so-called "research by design" might be the most tempting option to embark on, and "designerly ways of knowing" are an important contribution to architectural knowledge. However, it can also be challenging for young researchers to firmly defend this approach in front of colleagues and peers committed to more conventional research.

Teaching can offer a perspective in between research and design – with framing (course brief), communication (course lectures), and discussion (course review) of a research problem on the one side, and stepping in and out of multiple co-design processes through student supervision on the other. In this way, the teaching role can be an alternative way to gain access to insights from design-led processes.

Multiple design explorations can add to the breadth of research, for example by exploring the interaction of different design strategies, or by applying them in various contexts.

Due to financial and time restrictions, PhD-related architectural research has difficulty involving real building processes. But – as well as the design of a competition entry by a researcher experienced as a practitioner might do – a multitude of consciously developed student projects can reveal, develop, and test relevant design strategies for early design phases, when the architect's influence on a project is at its peak. This link between research, testing through design, and having access to more hands and brains through an educational context might also happen in a comparable way in the engineering sciences. More than just offering an increased workforce to the PhD researcher, students can contribute with a multitude of ways of seeing a research problem or design task.⁸⁹

Decoding tacit knowledge (or "knowing-in-practice"⁹⁰) contained within existing reference projects can serve as data for the research project but also feed into the student projects. The student projects increase the available precedent data and make research results visible and communicable as an alternative or supplement to text.

However, one has to be conscious about the circumstances of the projects' development, as frame and goal of the course have the same source as frame and goal of the PhD research. Rather than being a neutral source of informa-

Purposive	 Objectives: Explore the potential of a combination of dense housing and timber construction to make it discussible Produce and disseminate knowledge for the design of dense timber housing Bring the relevance of dense timber housing to broader attention, raise awareness, initiate discussion
Inquisitive	 Identified contradictions explored by: A project review Lectures for the master studio course and following discussions A revised master plan providing sites for the student projects Master students' design projects
Informed	Sources for knowledge: - Literature studies - Precedents - Technical information - Lectures and conferences - Discussions, some with experts; final review with external reviewer - Design challenges when theory meets context - Peer reviewing of publications
Methodical	 Development of tools: Definition of a filter to extract relevant properties from literature (scale related criteria) Development of a method to assess precedents (contradictory pairs of criteria) Extraction of design strategies to achieve a consolidation of these contradictory requirements (urban form, architectural strategy, detail design)
Communicable	 Knowledge transfer: Formulate course goals, discuss students' projects Communicate research content to students Exhibit and publish course results (AHO WORKS and course brochure) Articles, Essays, Papers, Symposium talks

Figure 15. Quality criteria for design research developed by Nigel Cross, applied to a research project at AHO. Ute Groba, 2016.

tion, the new precedents have to be seen as a result of collective explorative research. Also, sources of course input and design assessment (possibly from the same person) are to be decided consciously, as they might result in bias around the design projects. Other issues that might render rigour and relevance of the design studio questionable⁹¹ make criteria for good research also valid for good studio teaching in this context.

The better prepared and the more explicitly framed the task (similar to a laboratory set-up), the more relevance the students' works will hold as actual research results. Nevertheless, ethical issues have to be handled with care, as the first duty of a teacher is the teaching, not the research. A strong focus on the research contribution must not lead to exploiting student labour for personal or institutional interests.⁹²

RELEVANCE AND RIGOUR

The application of theories, hypotheses, or design strategies within a master studio course is an advantageous opportunity to test them on their repeatability, transferability to other contexts, and thus generality.⁹³ Their communicability is an essential premise for this endeavour.

In the following overview (Figure 15), criteria for research quality formulated by Cross⁹⁴ are used to list the research contributions by the master studio course. They will be complemented by other elements of the PhD project not addressed further here (case studies).

CONCLUSION

Architectural Research as a Joint Venture

Based on literature studies and personal experience, this article argues for mutual benefits and synergies when joining academic research, practice, and teaching as important sources for architectural knowledge. As an illustrating example, a doctoral thesis and a master studio course conducted jointly at AHO are described and discussed.

The respective roles and mutual influences of these components are illustrated by a triangular model, linking research, practice, and education together. Tying a PhD project and master studio teaching more closely together can have multiple advantages for both parts, as in the described case at The Oslo School of Architecture and Design. It allows for mutual feedback and input between research and teaching, it increases breadth and depth of both realms, it offers alternative ways of accessing knowledge unveiled through design processes, and it increases the dissemination and impact of architectural knowledge.

For research, the teaching component was found to be fruitful even at an early research stage, when the supportive effect on research framing processes can be more important than actual design results. If it is set up accordingly, the master studio course can function as a test field for design hypotheses or strategies, where consequences, combined effects, or suitability for different contexts can be explored. Actual design results are potentially more relevant in later research stages, as multiple if-then propositions or illustrations of possible scenarios.

Several iterations of the triangular model show how it can be adapted to other research projects to release synergies in different project stages. As architects seem to have a preference for visual communication,⁹⁵ accompanying the reflective process and visualizing a research concept to support its communication are seen as important strengths of the model.

Both Wang⁹⁶ and Fallman and Stolterman⁹⁷ mention a broad variety of accepted design research approaches and methods. Instead of claiming that any design activity can be research, and thus equalizing different disciplines or scholarly research and teaching and their distinct importance, their complementary strengths should be nourished and drawn on for more integrative and holistic results of architectural research. Although the actual methods applied might be similar, each research activity has its own purpose, internal logic, and intended outcome. Each investigation must thus be assessed in its own right, with a notion of rigour and relevance specific to the particular case.⁹⁸ It might be necessary to become aware of differing or overlapping terminologies or methodologies to recognize common ground.⁹⁹ Communication across disciplines and institutes (or sometimes just across a hallway) is thus of key importance.¹⁰⁰

Linking education to design research has the potential to increase research relevance and rigour and can offer additional communication arenas. Taking up different positions in the role of a researcher, teacher, and designer may strengthen one's standpoint by way of triangulation. Complementing academic research and "designerly ways of knowing",¹⁰¹ "teacherly" ways of doing design research thus yield various opportunities to produce and to en-

hance architectural knowledge. These possibilities can be explored without exploiting students as mere workforce and without limiting the researcher's role to serving the ends of practice or education.

NOTES

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SITUATED KNOWLEDGE PRODUCTION: URBAN BIOPSIES, FRAMEWORKS OF PERCEPTION, AND CRITICAL SPATIAL PRACTICES

Espen Lunde Nielsen

ABSTRACT

In my PhD project (2013–16), I explore the infraordinary as a condition and catalyst for social coexistence and interaction. People coexist and interact through everyday topography, using architecture as a medium. It is the overall claim that the infraordinary dimension of the city plays a vital role in the social coexistence of and the correlation between its inhabitants.

The research is facilitated through a series of *urban biopsies*, where a range of spaces considered infraordinary are explored from within – some emerging directly from my own subjective lifeworld. By using various *situated probes and frameworks of perception*, being artistic and critical spatial practices, the intention is to get at the distance of the well known and explore it through an analytic apparatus and thus bypass the usual hierarchies of perception to gain new knowledge. Hence, there is a constant interplay between submersion and distance.

In this article, the methodological approach is exemplified by three of the (distinctly different) urban biopsies that I did during my PhD (seven urban biopsies performed in total), followed by a discussion on how these generated specific knowledge, contributed to the overall sum of knowledge, informed each other, and have their own specific nature, potentials, surprises, failures, and pitfalls. Finally, I argue that through the situated knowledge production these critical spatial practices take on a prospective and sociopolitical character, by re-choreographing the infraordinary.

KEYWORDS

situated knowledge production, urban biopsies, frameworks of perception, research-by-design, infraordinary, everyday, critical spatial practices, artistic practices, situated knowledge, site-writing

SCOPE THE INFRAORDINARY

In my PhD research project, titled "Architectural Probes of the Infraordinary: Social Coexistence through Everyday Spaces" (2013–16), I investigate the *infraordinary* (as coined by Georges Perec¹) as a condition and catalyst for social coexistence and interaction. The infraordinary is defined 1) as what is "below-ordinary" and worn half-invisible by use and 2) as an antonym to and the opposite of *extra*-ordinary. People coexist and interact through the everyday topography and unregarded spaces, using the architecture as a medium. These interactions happen through event in real time and through spatio-material *deposits over time*. The first is a direct encounter (e.g. meeting someone at the stairway), while the other is an indirect encounter that is somehow mediated by the built environment or material interface (e.g. the name sign of a former inhabitant on the doorbell or the fumes from a newly discarded cigarette at the entrance). This is true on multiple scales, from the collective memory of neighbourhoods, street names, and (extraordinary) monuments to the more trivial everyday (non-)events and encounters through stairways, partitioning walls, windows, kiosks, bars, dry cleaners, shop fronts, bus stops, and so on.

METHODOLOGY

URBAN BIOPSIES

To enquire into the everyday topography, a tactical research methodology was adopted, informed by a variety of alternative artistic and interdisciplinary practices, different from the prevalent working methods within architectural research. Accordingly, the research is facilitated through a series of *urban biopsies*, where a range of spaces considered infraordinary are explored from within.

In Italo Calvino's *Invisible Cities*,² two ways of understanding the city are put forward: that of the *cartographer*, who knows the city in numbers and overall features, and that of the *camel driver*, who knows the city through its physical, everyday appearance and encounters based on lived experience.

As with the camel driver, I am exploring other ways of understanding the "infraordinary" sociospatial dimension of the city than the diagrammatic and reductive macro-views often favoured by planners and architects. Although the process of simplifying complex situations through tracing and "drawing out by lines"³ is in itself a valid and powerful tool, it is ultimately

a process of excluding information until the desired relations are rendered visible. However, one may ask to what degree this act of filtering and classifying is based on a set of culturally inherited practices within the profession and the predefined world view, and how it rather constitutes what we already know and hence is less productive for spatial invention and other ways of understanding everyday topography. Perhaps the process of understanding the city on a macro-level is often a projection of concepts or ideas onto the city, rather than the other way around. Conversely, the city is multiperspectival and -dimensional and thus resists being reduced to an overall diagram or singular macro-view.

Therefore, it is the aim of this project to embrace the specificity of the given situation, rather than trying to create an objective account and universal claims. The approach is partly auto(bio)graphical and takes its point of departure from my own experienced lifeworld since I am, after all, part of the urban reality myself. It is a position that takes into account both the agent of the knowledge producer (me) and the object of study, and is thus in line with Donna Haraway's definition of "situated knowledge", which favours the partial and situated view and questions traditional objectivity.⁴ She explains:

... how to have simultaneously an account of radical historical contingency for all knowledge claims and knowing subjects, a critical practice for recognizing our own "semiotic technologies" for making meanings, and a no-nonsense commitment to faithful accounts of a "real" world, one that can be partially shared ...

In medicine, a biopsy is defined as an examination of tissue removed from a living body for diagnostic purposes. However, originally the word combined *bios* ("life") and *opsis* ("sight" or "to see") and thus means "to see life" ⁵. Hence, I propose the concept "urban biopsy" as a methodological position and a way of sampling the actual city and of seeing lived life as part of this spatial entity. Therefore, the city becomes an active and living laboratory on a scale of 1:1.

As is medicine, the process of taking an urban biopsy calls for specific types of formal devices or instruments, which will be examined in the coming chapter.

SITUATED PROBES AND FRAMEWORKS OF PERCEPTION

Through each performed urban biopsy, a variety of situated *probes* and ways of *probing* are explored. The word probe has a double meaning: it may signify both a physical device (noun) as well as an activity (verb).⁶ Both are active modes of enquiring into something in an explorative manner:

A common factor though is that probes always act as instruments to answer (research) questions. When an experiment is labelled as a probe, it designates it with an explorative nature, rather than making them instrumental in solving a known problem.⁷ In this way a probe is something created and observed in context.⁸

In the field of design, the concept of *design probes* (at times also referred to as cultural probes) is established as a way of enquiring into a given situation with the help of artefacts, as a way to embody a different set of sensibilities than most social research methods:

Probes are a method for developing a richly textured but fragmented understanding of a setting or situation. Developed in a design context, their purpose is not so much to capture what is so much as inspire what might be.⁹

Situated probes propel conversations between designers, people, situations, and places. These alternative research instruments make a virtue of uncertainty and risk, different from the ones offered by traditional methods: their primary aim is to open up new possibilities, rather than converging towards singular truths. This approach drew from the theory and playful techniques of the Situationist International and (to some extent) the surrealists: for instance, the surrealist techniques of "provoking new dialogues" and "elevating the unconscious".¹⁰

The infraordinary and everyday surroundings are hard to see, because of their ambiguity and indeterminacy.¹¹ We are at "at once engulfed within and deprived of the everyday" and thus it is "most difficult to discover".¹² Perec goes even further and says that "we sleep through our life" in a sort of spatial anaesthesia. The familiar as a condition worn invisible by daily use is echoed by Siegfried Kracauer¹³ and, more recently, by Anthony Vidler.¹⁴ By using various probes – some which also could be labelled *frameworks of perception* – the intention is "to get at distance of the well-known and explore it through an analytic apparatus to gain new knowledge".¹⁵

Various artist, photographers, and film-makers have operated with different frameworks of perception for looking at the everyday topology. Often, these incorporate other ways of enquiring into the urban and spatial reality than those typically used by architects, often with a focus *on open-ended question-ing rather than on proposing answers*.

The architecture of architects usually expresses architecture's internal stylistic set of codes more than the individual ways of living of the inhabitants, whereas the milieus of artists, photographers and film-makers resonate with the characteristics and fates of their inhabitants.¹⁶

These artistic practices serve as inspiration and stepping stones for the practice-based experiments and research conducted throughout the PhD work – one such inspiration being Perec, for whom this was one of his four cornerstones throughout his oeuvre (alongside the autobiographical approach, etc.). He asks:

How can we speak of these "common things", how, rather, can we stalk them, how can we flush them out, rescue them from the mire in which they remain stuck, how can we give them a meaning, a tongue, so that they are at last able to speak of the way things are, the way we are?¹⁷

He deployed sets of formal constraints that "motivate a kind of conceptual thinking in parallel with that of any architect".¹⁸ These frameworks of perception offer a way of slowing down perception: the first step is simply to stop and describe that which is so trivial that it is hardly noticeable:

You must set about it more slowly, almost stupidly. Force yourself to write down what is of no interest, what is most obvious, most common, most colourless.¹⁹

By meticulously following game-board-like rules, it is possible to "by-pass the usual hierarchies of perception"²⁰ and this enables us to capture what lies at the fringe of our perception or latent in the spaces surrounding us. In his Paris Documents (1998),²¹ Dalí set out on a similar endeavour and wrote everything down that entered his field of vision, be it a bar table or a 25 x 25 cm imaginary square in the sand perceived from a nearby bench. Similarly, in the essay "Aesthetic Geography: Jean-Luc Godards Mapping of Lausanne" Frederik Tygstrup puts forward the idea that the camera with the moving image, in the case of "A Letter to Freddy Buache",²² is a sort "prosthesis of insight" *(erkendelsesprotese)*, through which we can see the world differently and thus gain new knowledge. As Godard himself puts it toward the end of the filmed essay, the aim is "to get out of the documentary, of the place where we live or lived, and try to examine it scientifically".

These constraining techniques, being a device, probe, or formal constraints, provide a sort of exteriority while at the same time being situated within and grasped by the space of enquiry: as Lefebvre overlooking the street from his liminal position on the balcony.²³

PRODUCTIVE AMBIGUITY

The situated probes explained in the following part of the paper navigate the yet unknown in order to come somewhere new. They truly present a way of probing without an already predefined plot, but rather following a central idea or a hunch that there is *something* of importance there, without knowing exactly what. As Emma Cocker puts it:

To place value on not knowing as generative or productive is itself is to work against the tide of certain teleological thought, which imagines progress as a one-way passage, the move from what is not known to-wards the goal of knowing and knowing more.²⁴

Also, the final state of the experiments retain some of this productive ambiguity that is open to various interpretations and conceptualizations, rather than producing hard scientific facts. Of course, this methodology is perhaps not the most cost-effective strategy: sometimes you find what you are looking for, sometimes nothing at all. Nevertheless, in order to see things differently, it is necessary sometimes to get lost and find oneself at a dead-end street.

The question perhaps is how the experience of not knowing can lead towards new lines of flight, conceived as new forms of invention and intervention within reality, rather than performed as an escape from it. Not knowing is not experience stripped clean of knowledge, but a mode of thinking where knowledge is put into question, made restless or unsure. Not knowing unsettles the illusory fixity of the known, shaking it up a little in order to conceive of things differently.²⁵
CRITICAL SPATIAL PRACTICES

Inevitably, even the slightest intervention, physical or not, affects the space that it is positioned in. This is a well-contested fact related to, for instance, the discussion on bias in ethnography. Especially, a paradox arises when pointing at something infraordinary, since it will then cease to be infraordinary (perhaps even become extraordinary), by default. The infraordinary is bound to the viewing subjects, the situation, the cultural context, and temporality. Rather than seeing this as an insurmountable problem, in this PhD project I have instead chosen to work *with* it.

Here, the concepts of *site-writing* and *critical spatial practice* by Jane Rendell lend themselves to this.

Here, conversely, the focus is on how to write site, rather than writing *about* the site²⁶ through aiming for situatedness and site-specificity. The concept of critical spatial practice originated in a critique of art criticism, as a way to acknowledge and draw out the spatial qualities of the critic's engagement with the specific art piece as opposed to the traditional, objective written encounter.²⁷

I suggest a new term, "critical spatial practice", which allows us to describe work that transgresses the limits of art and architecture and engages with both the social and the aesthetic, the public and the private. This term draws attention not only to the importance of the critical, but also to the spatial, indicating the interest in exploring the specifically spatial aspects of interdisciplinary processes or practices that operate between art and architecture.²⁸

Thus the performed urban biopsies, to different extents, not only become representational but also *presentational* and gain direct relationships with the actual space and people of the enquiry.

THREE URBAN BIOPSIES

The urban biopsies conducted throughout the PhD work fall into two thematic groups: some emerge directly from my own subjective lifeworld (e.g. my own apartment), while others are a selection of (often semi-public) places within various cities (e.g. a London dry cleaner) that I then inhabit. However, often the line between these two types are blurred and undefined, since all of them are selected bottom-up, rather than through a top-down analysis. In what follows, three of them will briefly be explained and outlined. These have been chosen because of their inherent differences and the dissimilar techniques and methods used. It is important to state that the practice-based experiments and overall methodology are developed in parallel. The following should therefore not be seen as unidirectional answers to the methodology, but just as much a part of the questioning.

THE STAIRWAY AND THE APARTMENT

Urban Biopsy: Own Stairway and Apartment Probe: 3D scanning, photographic device, and writing

This urban biopsy is performed through the apartment where I was living at the time. Here, the social coexistence and correlation between the inhabitants within my apartment building are explored, by using my own experienced lifeworld and 3D scanning in combination. The dwelling forms the primary interface between ourselves and the larger social entity of the city. Consciously, or partly unknowingly, one interacts with others through spatial demarcations, using the embedded spatial devices (such as a squeaking floorboard, a peephole, mailboxes, etc.) that project life and thus the presence of other people through sound, light, or matter.²⁹

After initially building a situated probe that captured photographs of the stairway (out of the peephole), attention was turned towards the apartment itself. Using the 3D laser scanner as a probe for gaining insight, I toured my apartment systematically for two days, mapping out the ways we interact with our neighbours in less obvious ways than the direct encounters on the stairway. It became evident that the coexistence is as much an auditory encounter as it is visual, if not more. As laser scanning is a slow process, it slowed down my own bodily perception as well. Or rather, it heightened the sensitivity towards all the banal and vague sounds that through their habitual presence had become a sort of trivial sonic wallpaper of our everyday life. This was processed by combining writing with the 3D point-cloud. In the end, sixteen spatial projection devices and encounters within the apartment and stairway were identified. Some more obvious than others: for instance the doorbell, peephole, or window. But also devices that served other practical functions, but had these unintended bi-effects, emerged: thinly walled areas, radiator pipes, technical shafts, creaking floorboards, and discarded cigarettes by the entrance door.

Both probes (the peephole camera and the 3D scanning) captured not only the blank spaces of architecture but also everything in between: the occupation of people, the imperfections and the messiness of inhabitation. Not only what it was projected to be like from the architects' drawing table, but what it ultimately ended up being like (for the time being). Usually, architectural drawings are prospective, while this is more in line with surveying. Architects do architecture that is then "undone" when occupied by people.³⁰

The architecture is more porous that we may think, like in the case of Walter Benjamin and Asja Lacis's Naples (1978).³¹ Even in our own cocoon, the dwelling, we are in a constant relationship with the other, through the spatial demarcations that we consider solid and impenetrable. Life is projected across these demarcations, directly or indirectly. The construction method and century-long life perhaps resulted in a larger quantity and degree of imperfection and porosity in this particular building. Nevertheless, this enhances the sense of belonging to a larger collective entity and being. In modern building practices, there is a tendency to strive towards the opposite: ultimate auditory (and sometimes visual) isolation from others. Instead of attributing negative connotations to these phenomena, there lies a spatial potential in embracing this porosity, so as to prompt future building practices and architecture with a larger emphasis on (indirect) sociospatial interaction, if the city is to remain socially sustainable.

THE HOT-DOG KIOSK

Urban Biopsy: Local Hot-Dog Kiosk(s) Probe: Interactive installation and full-automatic 3G camera Materials: Copper pipe, aluminium sheets, hard wood, Arduino UNO microprocessor, sim5218e, Raspberry Pi 2, solenoid valve, thermal printer, thermal paper, bone connector transducer, plastic, misc. electronics Techniques: Routing, water-jet cutting, 3D printing

This urban biopsy explores the often unregarded function of the classic Danish hot-dog kiosk, currently disappearing due to processes of gentrification. The hot-dog kiosk is a hybrid typology between the mobile hot-dog stands, which emerged on the streets in the 1920s, and the much more recent and fixed grill-bar restaurant. Despite its unassuming appearance, it is a vital place for everyday social interaction and coexistence on an informal basis. Its architecture, often referred to as "undesigned", is in fact a composition of spatial situations and artefacts, which has functions besides the utilitarian one: through *events in real time and deposits over time* it articulates relationships and creates a sense of collective being. It mediates social interactions between "familiar strangers"³² of the neighbourhood dropping by for a quick meal and, perhaps, a small conversation with the proprietor or other customers – or just to read the daily paper by themselves, while monitoring the life of the street. Unlike many of the modern cafés around, it presents a rich diversity of people. The proprietor of Grill-House at Vesterbro Tory, Aarhus, where



Figure 1. Urban Biopsy: "The Stairway and the Apartment". Full exposition available in the Journal for Artistic Research, 8 (Espen Lunde Nielsen, 2015).

the urban biopsy was initially going to be conducted, said that you could see this diversity by the shoes that entered: workers' boots, patent leather shoes, high heels, sneakers, et cetera. His statement later lent itself to designing the nature of the actual probe.

However, this typology is expelled by processed of gentrification and not included in new urban areas, since it is considered lower class and its social function is not appreciated or acknowledged by most planners and politicians (who operate on a macro-view, with grand master plans, etc.).

The probes in this urban biopsy are a twofold spatial installation: one that inhabits a hot-dog kiosk in Aarhus and another located at an exhibition space. Here a dialectical relationship between 1) a *situated probe* and 2) a *representational instrument* are developed in parallel:

At the kiosk the situated probe(s) frames and captures the occupation. It favours the partial and constrained gaze, by photographing only the shoes of the users coming there. Thus it not only applies to and circumvents the current legislation on surveillance³³ but also engages with imagination rather than giving the full account. The shoes become signifiers of the diversity, as an alternative to portraits. The photographs are triggered by motion (PIR sensor) and automatically sent to an online server through the cellular network, which processes and stores everything in a database.

Whenever food is handed over the desk, a printed-out thermal receipt accompanies it – although in this case, it is not a pragmatic account of items bought, price, and tax level, but instead includes a photograph of someone else's shoe, which occupied the hot-dog kiosk previously, alongside a text fragment. This develops the latent relations between people, stages encounters, and reintroduces the space to its users and thus spurs a public discussion on the subject.

Re-Choreographing the Infraordinary

Elsewhere, in an exhibition space, the "Archiving Instrument" stages the occupation in real time, offering a framed and re-composed view of this seemingly banal space through a strictly curated set of elements: the main element being a continuous roll of thermal paper onto which the photographs are printed in real time in between historical images, quotes, statements, and statistical facts. Simultaneously, it works as a piece of communication/dissemination and a device for archiving and collecting the fragments of occupation captured from day to day – and infinitely piling it up on the floor. Here, the longue durée and the ephemeral daily occupation are counterposed and mixed together into a continuous bulletin. Also, the archiving instrument incorporates a miniature ketchup dispenser and a speaker that initially played sounds from the hot-dog kiosk. The installation becomes architecture in its own right, or the promise of a potential architecture to come.

Exhaustive Accumulative Practice

The extensive collection of photographs captured at the hot-dog kiosk mirrors Georges Perec's attempt to "exhaust" a place in Paris through his all-embracing view from various temporal positions at Place Saint-Sulpice.³⁴ Also, it relates to the French photographer Eugène Atget's claim that he "possesses all of Paris" through his more than 20,000 images.³⁵ Then, what does it mean to possess, exhaust, or represent a slice of the "real world"? According to the philosopher Maurice Merleau-Ponty, no representation can do justice to the lived experience of space.³⁶ Conversely, he states about cinematographic drama that this is "finer-grained than real-life encounters: It takes place in a world that is more exact than the real world". Hence, the representation becomes something else – and perhaps this is what its true potential is: that it is at the same time more exact and different from what we experience when being there. In all the cases (Perec, Atget, and myself), there is a focus on retaining something about to disappear or change, being the urban structure, disappearing typologies, or the ephemerality of the moment. As put in the closing sentence of Species of Spaces:

To write: to try meticulously to retain something, to cause something to survive; to wrest a few precise scraps from the void as it grows, to leave somewhere a furrow, a trace, a mark or a few signs.³⁸

More than merely consolidating the past, they envision new beginnings, as I will explain in the closing chapter of this article.

THE DANISH TABAC

Urban Biopsy: Memory of My Grandmother's Kiosk (Tobacco & Wine) Probe: Installation (neon sign) and sound installation (interview) Materials: Neon sign (by neon-sign-maker), aluminium, wood, surface transducer, Raspberry Pi 2, misc. electronics



Figures 2 and 3. Urban Biopsy: "The Hot-Dog Kiosk". Source: Epen Lunde Nielsen

This urban biopsy is a bit different from all the others, since the space in question does not exist in its original physical form anymore. This is a space where I spent a lot of time during my childhood, and thus it may be the true starting point for my interest in the infraordinary and these slightly retrospective typologies.

In a recorded interview during lunch at my grandmother's dining table, she recollects the many years of running her tobacco shop "H. Hansen – Svan's Efterfølger" in Ballerup, Denmark, between 1970 and 1993.

In between the sips of coffee, bites of salmon and apple cake, and everyday conversations, the life story of the shop gradually unfolds: the diversity of people who came there; how the space functioned as an informal (and partly unofficial) social vertex of the neighbourhood; how she became known as "Moster" (Aunt) who was always there to talk and, more importantly, listen; how the neighbourhood changed; and how it eventually ceased to exist because of the construction of the nearby mall "Ballerup Centeret" and a rerouting of the street. It shifts back and forth from the personal to the general, the situation at the dining table, the tobacco shop, and the histories of our family, friends, relatives, and strangers.

Although my grandmother's tobacco shop existed for twenty-three years, not a single photograph exists. Maybe it was so common that simply no one thought about it, as it was just a background for everything else to unfold. Even my mother, who was a keen hobby photographer, didn't waste film on it. The memory of the existence of this space – and its qualities as a social vertex – exists solely through the remembrance of my aging grandmother and the people that visited it. Even the shop front itself has been patched up with bricks.

The situated probes of this biopsy likewise take on a prospective nature: a (facsimile) neon sign (itself a specific technology of that epoch) is situated first in an exhibition setting and later at the former site of the kiosk, alongside a sound installation situated at the nearby drainpipe. It becomes a monument to the prior existence of the tobacco shop and a person that made a tiny mark within the city: at the same time ordinary and miraculous. It is not a direct replica or representation of what existed (since no photo exists anyway, and for sure the sign was never in expensive neon letters), but rather a commemorative and mnemonic device as delusive as memory itself. As an infraordi-

nary monument, it adds to and engages with the collective memory of the city³⁹ and thus public discussion on the sociospatial relevance and future of this typology.

The extent and "completeness" of the biopsies varies. Some took a few weeks, others several months. Some were abandoned along the way. Besides the three selected biopsies, other biopsies include:



Figures 4 and 5. Urban Biopsy: "The Danish Tabac". A facsimile neon sign to be set up at the former location of the kiosk. From the exhibition at the Aarhus School of Architecture.

"Tongue of the Dry Cleaner",⁴⁰ site-specific and situated writing that follows the production line of a London dry cleaner, collected in a publication and experimenting with creative writing and other forms of intertextual coded messages and text fragments. Furthermore, the evocative text fragments were circulated by the dry cleaner itself, and the customers of the dry cleaner started inhabiting the book (this laid the foundational stones for the bulletin of the thermal receipt printer of "Footfall at the Hot-Dog Kiosk"). "Window Panorama" is an extension of (or perhaps rather appendix to) "Hinges of Correlation" (explained in this article, see note 28) through lasers scanning and observing the inhabitation of windows near and far. The narrated short film Accumulations explores the infraordinary up against the extraordinary collective memory and history of cities through a field trip to Detroit, New York, Chicago, and Copenhagen. This later case is the only one that works across several sites and could thus be understood as one probe embedding several urban biopsies. Also, it is the latest and thus also a process of summing up some of the overall research questions and subject matter. A few other biopsies were initiated along the way, but not all of them were finished. Nevertheless, they informed the others and the overall research project along the way.

Finally, there is the conceptual question throughout this project as to when something could be considered an urban biopsy and when not. Could a photograph of a shop front be qualified? After all, it is a fragment of the actual city possessed through the act of using the camera as prosthesis. Nevertheless, in this project I use this notion only about more extensive probing. The rest could be understood as a sort of "ragpicking" of everyday fragments, as often assigned to poets and photographers⁴¹ (but should apply to architects as well), that supplements and supports the overall research project and performed urban biopsies or could even be the starting point for yet unrealized ones.

FINAL DISCUSSION AND A CONCLUSION OF SORTS SITUATED KNOWLEDGE PRODUCTION

Often, the *outcome* and *findings* of one probe leads directly to another. For instance, this is the case with the photographic device of my stairway that led to a shift of attention and instead probed the apartment itself through laser scanning and writing. At times, it is the given *nature, techniques, or framework of perception* of the probe itself that leads to the coming practice-driven experiment, urban biopsy, or theory. For instance, this is the case of "The

Hot-Dog Kiosk" which is a continuation and hybrid of the constellation of coded messages previously explored in a London dry cleaner and the photographic probe built for "The Stairway and the Apartment". At other times, the overall urban biopsy leads to the next, as with "The Bedroom and Window Panorama" (not described in this article) which leaps directly from some key findings and identifications in "The Stairway and the Apartment" that called for further examination in a different context. In between these urban biopsies, a fine web of relations form. Through these relations, concepts and theoretical perspectives is tested out, counterposed, filtered and discussed through various urban biopsies, situated probes and contextual frameworks. Here the practice-based experiments and parallel theory work as "relays"42 to push the overall project forward and gain new knowledge and conceptualization of the subject matter, through abductive reasoning. Hence, it is crucial to understand the urban biopsies and situated probes not as singular experiments, but as a combined assemblage, which constantly cross-fertilizes its parts to draw out multifaceted perspectives and overall propositions.

Through these situated probes and critical spatial practices, the encounters for knowledge production are manifold: spatial, sociological, historical, technological, ethnographic, tactile, and so forth. It does not simply reproduce or apply existing knowledge (answering a hypothesis), but actively produces new knowledge (generates hypotheses) by situating existing theory, concepts, and previous findings through practice-based experiments. First of all, being situated (physically or through a probe) on a given site for an extensive period of time spurs unimagined dialogues and could be understood as an alternative to user participation, letting the lived life of the inhabitants inform the research (directly or indirectly). The artistic nature of the situated probes provide a body of knowledge focusing on everyday, ephemeral occurrences, which is otherwise hardly communicable through traditional research - and often even considered too banal to even mention. It brings in alternative (tactile) perspectives on the subject matter, both explicitly and implicitly. The situated probes provide other ways of negotiating, understanding, and facilitating the infraordinary and social dimension, in an alternative way to the prevalent methods applied within architectural research. These critical spatial practices lend themselves as a mechanism of reflexivity and as a performative dialogue, through an oscillation between asking questions and proposing answers. Making, constructing, and designing are integral parts of this reflexive practice and hence in direct prolongation of the architectural profession as a making discipline.

The three examples explained in this article have distinctly different agencies and ways of triggering and producing knowledge. "The Hot-Dog Kiosk" and "The Stairway and the Apartment" navigate a complex terrain through the critical activity of making, while "The Danish Tabac" is less about exploring an existing condition and more about a statement and way of disseminating and consolidating knowledge site-specifically. "The Stairway and the Apartment" is a survey-like and static *representation*, while "The Danish Tabac" is a sociopolitical catalyst, and the "Archiving Instrument" of "The Hot-Dog Kiosk" becomes an interactive *presentation* of a re-choreographed reality.

The main objective of the methodological framework has been to "question the habitual" and, in this way, to reconceive and reconceptualize the social dimension of the built environment through the lens of the infraordinary. Deploying critical spatial practices and situated experiments, the partial view and partial conclusions are favoured rather than the all-viewing gaze and totalitarian theories. Although emerging from an implicit critique of our profession, this is not intended as a substitute or prescriptive approach to doing research(-by-design) but offers an alternative to already established discourses within research and practice. As much as I criticize that some knowledge "cannot be caught in the net of science", as formulated by Adorno,⁴³ this methodology, inevitably, has its shortcomings.

RE-CHOREOGRAPHING THE INFRAORDINARY

Several of the situated probes deployed take on an attitude towards altering the situation in question, especially in the urban biopsies "The Hot-Dog Kiosk" and "The Danish Tabac". Through what could be considered a spatial re-choreographing, it has been the intention to develop some of the latent potentials, rather than simply identifying them.

Although at first glance some of the typologies presented may seem retrospective, the endeavour of the performed experiments and the related enquiries incorporates the past, present, and future tense simultaneously. By pointing at and re-choreographing (or perhaps re-writing) the infraordinary, the project takes on a *prospective* attitude. Despite learning from artistic practices, all the practice-based experiments are considered architectural probes that – rather than consolidating the present past – may envision future building and urban practices. Buildings themselves are prime frameworks of perception and situated probes, which control and orchestrate how we perceive our surroundings and the social entity of the city. Consequently, the situated probes deployed, as explained in this article, can be understood as *architectural miniatures*, in their own right. Like with mapping, they can be seen as productive instruments that are more than a reproduction of what exists, but rather possess an agency that "lies in neither reproduction nor imposition, but rather in uncovering realities previously unseen or unimagined" by "first disclosing and then staging the conditions for the emergence of new realities".⁴⁴ By manipulating existing infraordinary phenomena, new spatial realities are invented.

PROSPECT FOR RE-CALIBRATING THE CITY

The prime and overall contributions of this project are to present another way of perceiving and treating the infraordinary and the everyday social dimension of the city. The endeavour of the paper, and the PhD at large, contributes with one possible route to understanding the everyday topography and our social coexistence within it, through an alternative and more nuanced prospect. Through critical spatial practices, the infraordinary is uncovered in a micro-scale in order to see new opportunities for spatial invention – and to potentially inform large-scale planning and the architectural discourse at large.

NOTES

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ON URBAN HARD SURFACES Elin T. Sørensen

ABSTRACT

This academic essay presents some angles to an arts based doctoral study, where one aim is to fuse methods from the arts, landscape architecture, and science for the sake of arriving at visionary urban design propositions. In respect to the discourse of artistic research, the aspiration is to shed light on the underlying forms of knowledge particular to the field of arts and landscape architecture. Thus, the study evolves around the artist/architect as societal actor, skilled in critical, aesthetic, and poetic thinking. An anticipated contribution is to elucidate mentioned traits that are of relevance to the advancement of architectural research per se, as well as to educational practice. What is at stake is the development of legitimate and relevant scholarly activity.

Moreover, the essay addresses the cultural and biological enrichment of urban hard surfaces through a transdisciplinary approach; specifically, through the possible establishment of *biologically active* urban covers – for the pleasure of people as well as ecological functions. Here notions such as *green building envelopes* and *eco-engineering* are introduced. Moreover, in order to achieve new cognition through work with form and space, the study initiates a series of *living labs*. The artwork *"Mosses/circuits"* is the study's first outdoor-laboratory proposal, where mosses in combination with microhabitat reliefs inspired by electronic circuit boards are the main ingredients. In this fashion, the work addresses interrelationships between nature, technology, and human values.

KEYWORDS

Artistic research, transdisciplinary practice-based exploration, urban hard surfaces, urban living labs, microhabitat experiments, eco-engineering



Figure A. Chlorophyta / graffiti [Kværnerbyen Oslo 59°54'13.2"N 10°47'12.6"E], ink print on paper. Artwork for the Drawing Biannual Oslo, 2016. Artwork: Elin T. Sørensen 2016 © BONO. Photo: Knut W. Alsén.



Figure B. Tortula acaulon is a minute (1–2 mm high) ephemeral moss with immersed capsules. This example was growing along with Bryum lanatum, in a backyard porch under a barbecue grill in New Mexico. Photo: Russ Kleinman & Karen Blisard (photomicrograph 400x of cross section of mid leaf, March 2015. Accessed from: https://wnmu.edu/academic/nspages/gilaflora/t_acaulon2.jpg.

PROLOGUE

Fascination | Deep Green

When little, I was a dreamer ... and a particularly attractive setting for this preferred imaginative mode was the atmosphere attached to mosscapes, as for instance discovered on forest floors. Miniature universes; lining up between curbstones, or as green shapes that made boulders look soft. Folded tinder fungus, lichens, and the many mushroom caps made up a community of small forest people. Walking barefoot - it was as if they tickled my skin. The ground felt like a cold and damp cushion, into which each step would sink slightly under the body weight. I remember the somewhat thick, heavy smell of the wood floor's moist soil, and of entering a silence - as if the soft green layers protected against sharp, unpleasant noise. Moreover, there was the touching of rotting tree stumps and wood smouldering between the fingers. I was aware neither of the ecological value of these decaying habitats, nor of the intricate underworld of mycelia: its interconnected communication via biochemical cascades or signal pathways such as the woodland's fungus Internet. Mosscapes revealing colour gradients from deep green to black, from velvety and friendly to dark zones behind curtains of hanging roots. Moss carpets, ornaments with stars, trumpets, and folds. I was a child absorbed by the forest floor's fairy-tale scenography, imagining that I could collect the dewdrops containing rainbows and bring them home.

Bryophytes are small, non-vascular plants, such as mosses, liverworts and hornworts. They play a vital role in regulating ecosystems because they provide an important buffer system for other plants, which live alongside and benefit from the water and nutrients that bryophytes collect. Some bryophyte species are amongst the first to colonise open ground. Bryophytes are also very good indicators of habitat quality as many plant species in this group are sensitive to levels of moisture in the atmosphere, which are lower in disturbed habitats because there is less shade.¹

INTRODUCTION

The following text was developed in the context of the symposium *Knowledge Production in Architecture by PhD Researchers in the Nordic Countries*, organized by the Nordic Association of Architectural Research. Accordingly, the text presents some sides of a doctoral project which is being carried out at the Faculty of Landscape and Society, at the Norwegian University of Life Sciences (NMBU). The study has two points of departure: first, an interest in the interface between arts, landscaping, and science as a way to arrive at visionary urban designs; and second, an interest in reaching a deeper understanding of the city as habitat, and possible interactions between people, ecology, and urban form. The study's main theme, thus, is the potential for cultural and biological enrichment of the dense inner city. The theme connects to overall concerns about urban resilience and the so-called *Green shift*, which imply great societal changes concerning climate impact and environmentally friendly restructuring of cities.²

Particularly, this article focuses on the possible treatment of urban hard surfaces by so-called biologically active covers – for the pleasure of people as well as for environmental benefits. In this, notions such as *microhabitats* and green *building envelopes*, together with strategies such as *eco-engineering*, are introduced. The attempt is to concretize the mentioned strategies by presenting the study's ongoing practical endeavours, exemplified by using urban sites as outdoor laboratories. The artwork "*Mosses/circuits*" is the study's first *living-lab* proposal, where mosses in combination with reliefs inspired by electronic circuit boards are the main ingredients (p. 429 will provide closer look at this work). These site-specific investigations are based on the mentioned coupling of ecology with urban form, again by seeking to fuse methods from the arts, landscape architecture, and science. They are inherently transdisciplinary.

ARTISTIC RESEARCH: INVESTIGATING THROUGH PRACTICE

The idea of an expressive component in research is important to the architectural industry, thus possibilities of expressing the qualitative aspects of the world and adding something new to the existing through experiments and proposals is characteristic for the field. Research is "coloured" by traditions and professions, and research in architecture should be coloured too, taking into consideration that the practice of architects stretches from natural science and sociology to art and that the most important way in which the architect achieves new cognition is through work with form and space – drawings, models and completed works.³

This article presents some angles of an arts based doctoral study, in its initial phase. The work follows a practical and processual path typical for architectural creation, as is pointed out in the above quotation. Compared to the academic and scientific tradition, architectural and artistic research are the

younger branches – characterized by Professor Halina Dunin-Woyseth, Oslo School of Architecture and Design, as "hybrid modes in the continuum from scientific research to creative practice".⁴

In the OECD Glossary of Statistical Terms, research is defined as "any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications".5 According to the Norwegian Artistic Research Programme, artistic research should include dimensions, such as a sound basis in artistic practice, that provide for new artistic perspectives and contributions to the development of the field. Furthermore the candidate should be committed to articulating and reflecting on methods and work processes; promote critical dialogue within one's own discipline and with other relevant disciplines; and make results accessible to the public.6 Catharina Dyrssen, professor of architecture and design methodology, elaborates on architectural research as being "not pure, often contradictory and vague, impossible to regenerate, open for interaction, logical thinking intertwined with associative and intuitive conceptualisation".7 Hence, an arts based approach may be seen as "breaking boundaries" of "established behaviour", such as the research methods and traditions from the natural sciences and the humanities. Naturally, their similarities and differences are debated in this context, as for example by Birger Sevaldson⁸ and *The Routledge Companion to Research* in the Arts.9 In respect to this discourse, the study associates with design theoretician Nigel Cross's concept of "designerly ways of knowing, thinking and acting", and his statement that "designers should concentrate on the underlying forms of knowledge particular to themselves".¹⁰ Maarit Anna Mäkelä, Associate Professor in the Department of Design at Aalto University, Helsinki, discusses his emphasis on the experience of the "work performance" when she addresses designerly results in the form of artefacts as embodying design-knowledge.11 Hence, artefacts can be seen as transmitters of research as much as written language. Correspondingly, Jørgen Hauberg, Vice Dean at The Danish Academy of Fine Arts School of Architecture, claims that this particular research branch arises from design: "from the proposal, model or experiment to the generalisation and rationalisation by consciously extracting rules about the object of the research process."12

In the doctoral study presented here, part of the exploration is done by way of self-reflection, where data are drawn from the author's experience as a practicing visual artist and landscape architect (since 1996 and 2008 respectively). *Architectural experience* is harvested through the part-time PhD position in combination with freelancing in the mentioned fields. Altogether, the work address artistic and aesthetic skills – specifically the critical, analytical, and not least poetic approaches. These are aspects that seems less present in more "conventional" landscape design work, which, however, have potential to arrive at more vital and even economically sustainable results.

In order to establish a professional merit true to both field- and site-specific concerns, contributions to the advancement of architectural research are of great importance. What is at stake is the development of legitimate and relevant scholarly activity. Thus, the study aims at articulating some angles of view on landscape architectural research, where an inquiry through design practice sets the scene.

THE SUGGESTION IS OF UNPOLISHED WRITING

Essay (v.) from Latin exigere "drive out; require, exact; examine, try, test", apparently meaning here "to weigh". Also "short, discursive literary composition", first attested in writings of Francis Bacon, probably in imitation of Montaigne. The suggestion is of unpolished writing (etymonline. com/word/essay)

The PhD study's written, visual, and practical outcomes follow an essayistic path, such as a dialogic structure; with a process-oriented open form – testing trains of thought by experimental, associative, and critical approaches.¹³ Jo Bech-Karlsen describes this approach as tracing the "travel of thoughts". He sees experience as the main "fodder" to such travels: the vantage point, from which the writer combines her knowing of the world with the reflections of others through a sequence of reflective steps.¹⁴ The so-called father of the essay, Michel de Montaigne (1533–1592), characterizes this dialogic structure as "replanting': through complementary exchange between the writer's own accomplishments and existing literature, insight is sown and eventually unfolds in experiential transactions between the receiver/reader and sender/writer.¹⁵

Along these lines, both in the urban design experiments and the PhD's written outcome I seek to cultivate an *essayistic approach*. Whereas academic texts tend to use visual input illustratively, and as such tend to place the textual at the top of the hierarchy, an essayistic form gives room for an equal integration of various narrative agents. As for visual representation, the essay correlates with the sketch as well as the *collage*, where the assembly of elements such as pictures, text, or movie clips forms a connected whole – similar to the *montage*, where the mix of narrative elements collectively bring forth the message. The essay allows for "collisions" of ideas, concepts, and images stitched together rather roughly. In comparison, academic papers may be perceived as a collage of scholarly voices, too, however sometimes edited quite artlessly. Be it as it may, the strategy of "unpolished writing" has served as an inspiration for this particular text, by seeking to demonstrates the "digestion" of existing literature, and its juxtaposition with quotations (the scholarly voices) with visual input and personal reflections.

Urban Essays: The Site as Laboratory

As each site is a story in itself, comprising for instance people, physical conditions, and the tensions between them – the above-mentioned approach is assumed applicable to place making and site transformation.

Like natural processes, the city too is in a state of perpetual change. Thus, urban transformation and development should provide many occasions for research and experimentation. In order to achieve new cognition through work with form and space, the study initiates the mentioned *living-lab concept*. By concrete experiments adapted for specific urban milieus, the intention is to harvest insights on some benefits of nature-based solutions. The test sites specifically focus on the properties of the dense inner city's hard surfaces, and with the above-mentioned essayistic approach as the explorative frame. As the opening of this text, and likewise the mentioned ongoing artwork "*Mosses/circuits*", is based upon a long-standing fascination with mosses – mosses play an essential role in the suggested outdoor experiment.

GUIDING CONCEPTS FOR LOOKING AT, DECIPHERING, AND TREATING CITYSCAPES URBAN ECOLOGY

Urban ecology is an amalgamation of several disciplines, and is closely aligned to the relatively new discipline of landscape ecology. Today, urban ecologists are trained in and utilize terminology, paradigms and methodologies from a diversity of disciplines such as ecology, human ecology, planning, architecture, geography, economics, political science, engineering, sociology, social work, anthropology, psychology, and health sciences.¹⁶ In order to comprehend the urbanscape as habitat, the PhD study builds upon the broader field of urban ecology. In this article, the understanding of the latter mainly leans on Jari Niemelä and Jürgen Breuste's *Urban Ecology: Patterns, Processes, and Applications*,¹⁷ the first research-level book to define the field of urban ecology with a focus on the functioning of cities as integrated social-ecological systems.

Herein the introduction entitled "The History of Urban Ecology: An Ecologist's Perspective" accounts for the field's development.¹⁸ The author there claims that the discipline of ecology has shown relatively little interest in the "ecology of human settlements". Some biological researchers have even viewed cities as "anti-life", that is, without nature, and thus have considered the city as "undeserving of study".¹⁹

These are tendencies that, to some degree, still linger within some scholarly perspectives; for example, in the new description system for Norwegian natural resources (NiN), which was tested as part of the present study (see p. 419 below). We discovered in it a lack of categories that adequately cover urban environments. According to Mark J. McDonnell, such attitudes connect to the so-called "equilibrium paradigm" which is considered outdated and thus has been replaced by the "non-equilibrium paradigm", a concept that "incorporates recent knowledge of how ecosystems are structured and function".²⁰ Similarly, Barbara Clucas and John M. Marzluff present human/ non-human relationships as a new direction to the field,²¹ concluding that a "fuller understanding of urban ecology can be gained by explicitly studying the degree to which humans and nature are linked in reciprocal feedback loops".²² By this, humans are included as components of ecosystems, and thus human activities are acknowledged as important agents of ecosystem change. (Figure 1)

McDonnell brings forth influential contributions to this branch of knowledge. One is UNESCO's *Man and the Biosphere Programme* (MAB), launched in 1971 as an Intergovernmental Scientific Programme that aims to establish a scientific basis for the improvement of relationships between people and their environments.²³ Another is Boyden et al.'s classic *The Ecology of a City and Its People: The Case Study of Hong Kong*, published in 1981.²⁴ As stated by McDonnell, this work's intellectual framework is still relevant since it provides the first "model for integrating the ecological and sociological dimensions of urban ecosystems".²⁵ Furthermore, he points at the field developing from a traditional focus on terrestrial environments, to include perspectives that are more diverse – mentioning, amongst others, topics such as marine environments, remnant vegetation, aesthetics and recreation, human health, and urban environments in developing countries.²⁶

COMBINING URBAN ECOLOGY WITH "ARTISTIC WAYS OF KNOWING, THINKING, AND ACTING"

Blue-green infrastructure is a life-giving and thus an essential part of the urban tissue – broadly defined as "a strategically planned network of high quality natural and semi-natural areas ... designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings".²⁷ Structures and alignment of pathways, parks, and recreation areas in between built environments are of relevance, for instance, to health, well-being, and urban resilience. Specifically, enhanced city performance in relation to natural cycles is a topic currently discussed within the context of urban densification. With statements such as "evidence base for the effectiveness of nature-based solutions needs to be developed and then used to implement solutions",²⁸ the Horizon 2020 expert group puts renewed focus on the ecosystem approach within urban regeneration.

As the doctoral project is geared towards landscape design processes that may contribute to enhanced city performance, notions such as *biomimicry* and eco-engineering are sources of inspiration (as discussed in p. 224 below). The overall line of inquiry relates to proposed strategies concerning transitions from a "poor" into "richer" environments, by way of place making that actively involve transdisciplinary workways. Hence, several of the study's activities are in effect bridging natural science and aesthetic competences trying to "solve problems" by transdisciplinary efforts and thus better understand the role of landscape architecture. As an example, the focus on urban hard surfaces was sparked by a conversation between a biologist and the author of this article. Immersed in the tsalk, we entered a mutual "thought travel" through a city where the built geometry popped from the ground like towering cliffs, and where the streets appeared like narrow, dried-out canyons. Thus, moving about in a topography of synthetic surfaces, a cityscape transformed in our eyes into possible urban nature types, as we imagined the mineral façades corresponding to i.e. bare rock or a steep north-facing cliff. From this, questions arose concerning this fabricated urban condition - moreover to the durability of the comparison between the cityscape and the cliff ecosystem. Culminating in questions on how we can arrive at "better-performing cities"? For the sake of the latter, urban planners and designers need to understand how ecosystems work in and on the city matrix.



Figure 1. Distribution of nature types, according to the NiN system, along an urban transect. The red line across the transect indicates the contrast between the dense inner city and semi-dense residential areas towards the Østensjøvannet nature reserve. Digital collage: Sørensen & Ullerud 2017 © BONO.

Studying Urban Tissue

Seeking answers to the above questions, a *transect walk* was performed on 18 August 2016. This specific action facilitated an explorative exchange between architectural research and the natural sciences. The latter were represented by Heidrun Asgeirsdatter Ullerud, a PhD fellow and part of the Geo-Ecology Research Group at The University of Oslo.

As a method, the "transect" is borrowed from ecological surveys implying registrations along a predefined line that provides analysis through an environmental gradient. Thus, it allows for studying a delimited area with a larger spatial reference – in this case the transition from Oslo's industrial harbour within the city core via semi-dense residential areas and the suburb towards the Østensjøvannet nature reserve. Moreover, the walk was triggered by a common interest in testing the new classification system *Nature Types in Norway* (hereafter NiN), and its applicability to urbanscapes.

The NiN-system was developed as a commission by the Norwegian Biodiversity Information Centre and was launched in spring 2015 - aiming to establish a common and verifiable survey and description system for all Norwegian natural resources. In short, NiN has its foundation in mapping and describing natural processes, providing detailed categories for a diverse set of nature types. In contrast, NiN classifies the urban landscape based on how humans have used, and thus have imposed, structural changes in natural environments. As an example, the urbanscape is described as nearly 100 per cent "highly modified synthetic substrate".30 Even though not all categories are considered synthetic, the NiN-system provides little differentiation and ecological information concerning the urban nature context. For instance, NiN includes eighty-five types of *bare rock* but only one category covering urban built structures. When it comes to biodiversity and well-being, a world covered by highly modified synthetic substrates may associate to a rather "poor" place to linger. Thus, the metaphoric trail of "cliff" and "bare rock" may have a certain relevance. From this perspective, my interest in NiN takes an opposite direction – based upon an assumption that such a nature-typebased descriptive system has the potential to inform nature-based designs. However, this would require the NiN system to develop more differentiated descriptions on the urban-nature context and urban ecological traits.

As Figure 1 reveals, the city core has notably fewer categories in comparison to the stretch through the semi-dense residential areas and the suburbs. From this, the question is whether the "urban grey" has received its rightful place in the NiN system.³¹ As a suggestion, NiN could develop towards becoming a knowledge base for the definition of *urban nature types*. Henceforth, these thoughts are further reflected upon in a co-written article on NiN and urbanscapes.

Urban Grey

It is [an] urgent matter to adequately investigate and evaluate the "urban grey" in its ecological relevance and physical functionality.³²

Did you ever stumble over loose concrete slabs, and thus have your attention drawn towards these unintentional mosaics? In a sense, hard surfaces "choke" and constrain the urban environment by counteracting and preventing the usually beneficial functions of natural cycles, such as returning freeze and thaw (Figure 2). Niemelä and Breuste articulate an appearing research gap, thus from their point of view the "Planning of urban grey does not exist or is fragmented at best".³³ Consequently, challenging the function and aesthetic appearance of urban hard surfaces represents a timely topic.



Figure 2. Photo-note [59°55'45.5"N+10°45'36.0"E, 2016-08]. Photo: Elin T. Sørensen 2016 © BONO.

The term *green building envelopes* addresses solutions for countering the negative impacts of hard-tissues typical to urban habitats. Here, adding biologically active material to the urbanscape provides the "dense inner city with surfaces for effective and applied green infrastructure".³⁴ Accordingly, they put forth the following thought experiment:

If we imagine that we could replace 30 % of the total sealed areas of cities by offering about 20-25 % of the buildings and making use of about 20-25 % of each building envelope, i.e. façade and roof areas, we could achieve significant benefits to improve the micro-climate in cities.³⁵

As the "clean slate" for a better practice, urban hard surfaces are seen as steadfast "habitat templates regardless of where they are found".³⁶ Thus, strategies related to the enhancement of urban tissue, by for instance facilitating bioactive structures and covers, may apply to a wide range of urban sites.

A New Physical World

A new physical world is created – the city. However, it is not only a new physical, but also a new ecological environment.³⁷

Breuste points at the surface material properties of, for example, concrete, asphalt, plates, glass not being biologically active. Consequently, this "new" urban tissue fundamentally changes environmental properties such as its thermal characteristics and before-mentioned natural cycles. With negative impacts of climate change and resilience in mind, the water cycle and changes in hydrological processes are well-known debates. Moreover, urban hard surfaces influence both acoustics and air quality.³⁸

These Anthropocene habitats are often designed for aesthetic and visual purposes, which have a profound effect on their composition and structure. Correspondingly, the city planners' decision-making processes have an impact on the structure and functions of biological processes in these constructed landscapes.³⁹ *High aerodynamic surface roughness* is the technical term for the three-dimensional variation of the urbanscape. This phenomenon, together with radiation and the heat budget, the aforementioned emission from traffic, greenhouse gasses, pollutants, and direct heat release comprise a complex surface for all exchange processes.⁴⁰ Hence, by its appearance, the urban condition is likened to, for example, canyon-like streetscapes or cliff-



Figure 3. The peregrine [Falco peregrinus] resides in Oslo City Hall together with the public officers. Photo: James Ewen. Accessd from: https://www.aftenposten.no/osloby/i/2mov/Krever-hekkeplass-til-vandrefalk-i-radhustarnet.

like ecosystems – all in all representing rather harsh habitats.⁴¹ Architect and façade designer Tessa Brunette suggests that a better understanding of the mentioned nature types may yield useful guidelines for the creation of more "nature-like" building covers.⁴² Similarly, ecologist Jeremy Lundholm points to rock cliffs as rare features in natural landscapes. Thus, the "proliferation of walls in cities represents a significant expansion of habitat for rock specialist species"⁴³ (Figure 3).

PASSING ON THE RELAY BATON FROM BIOLOGY

So-called *biomimicry* may provide a constructive approach to the "choked urban skin". The term comprises the Greek *bios* (life) and Latin *mimesis* (imitation) to express a method of teaming up with nature. Biomimicry as innovation strategy seeks:

Sustainable solutions to human challenges by emulating nature's time-tested patterns and strategies. The goal is to create products, processes, and policies – new ways of living – that are well adapted to life on

earth over the long haul. The core idea is that nature has already solved many of the problems we are grappling with. Animals, plants, and microbes are the consummate engineers. After billions of years of research and development, failures are fossils, and what surrounds us is the secret to survival.⁴⁴

One can say that biomimicry forms a conceptual backdrop to so-called *ecological engineering* as an emerging field integrating "engineering and ecological expertise to create more ecologically-friendly urban environments".⁴⁵

In the name of economy, efficiency, and habit, there is a tendency to apply standardized methods and materials – without paying attention to actual site preconditions, whether social or ecological, as discussed in above sections. Thus, the practical manner in which marine biologist Louise Firth and her team, associated with the Faculty of Science and Engineering at Plymouth University, perform their research inspires the mentioned *living lab* approach. Furthermore, the way these researchers aim at informing engineering by providing input to the enhancement of biodiversity and thus place making encourages transdisciplinary thinking.

In several studies, Firth and her fellow researchers explore and determine patterns of biodiversity on natural rocky shores. The team points out how artificial structures "inserted" into a place tend to differ from the given context and, as an effect of being more homogenous, substantially alter the existing situation. A coastal defence structure, for instance, may change a location from exposed to sheltered, influencing sediment transport and living conditions related to the motion of the waters. Such alterations may result in the colonization of non-native species with an eventual adverse impact on local habitats and species variety. Accordingly, an essential objective is the mimicking of natural surfaces and structures for increased colonization of beneficial marine plants and organisms. From my understanding, many of their practical pieces of advice may as well apply to terrestrial milieus. For example, by increasing the porosity as opposed to the impermeability of surfaces, or by introducing surface rugosity such as pores, pits, and crevices and other structural adjustments that provide for enhanced biodiversity in the city.⁴⁶

In summary, a main concern is the combination of "soft" and "hard" designs that in turn provide us with the services of nature – so-called ecosystem services. The design of microhabitats adapted to beneficial plants and organisms



Figure 4. Flowchart for the BioGen methodology, including the various phases to be addressed in order to generate a biomimetic design solution. Digital collage: Elin T. Sørensen 2017 © BONO inspired by Badarnah & Kadri, 2015.

Table 1. Biomimetic analysis; three examples from the analysis summary (Badarnah & Kadri, 2015, p. 127, Table 5).

both supplement and correspond to the way architects strive for friendly and thriving environments for people. Concerning biomimetic designs, the researchers Lidia Badarnah and Usama Kadri see the "absence of a systematic selective design methodology that is capable of identifying the relevant systems and then abstracting their strategies and mechanisms" as a major challenge to this practice.⁴⁷ Figure 4 and Table 1 exemplify their endeavour to articulate such a methodology.

The Fabulous Traits of Mosses

The thin, green patina of bryophytes (mosses), lichen, and algae belong to early ecological succession, that is, the process by which the structure of a biological community develops over time. As people are crowding in cities, the city gets denser and the space for blue-green structures decreases. Teaming up with algae, lichens, and mosses may be a good idea –embracing the natural graffiti and the benefits of nature's time-tested patterns and strategies.

Lundholm mentions the silvery leaf hairs of silver-moss that are likely to increase the reflection of solar radiation from the surfaces on which they grow:⁴⁸ a trait that could possibly inspire a biomimetic design. However, with reference to a large number of ecological tests of weed control methods, Lundholm brings forth how mosses on anthropogenic surfaces often are seen as a nuisance. "Similar to their animal counterparts, the rat, the cockroach, and the pigeon, plants attracted to the hard surface habitats that mimic their habitats of origin are not always welcome on structures built to fulfil human purposes."⁴⁹ Nonetheless, organisms colonize almost all structures in our environment. Under certain circumstances, special microorganisms may alter the properties of a building's coat and, according to biologist Wolfgang Hofbauer, this might not only have negative consequences but may even be beneficial.⁵⁰ Mosses soak up water like a sponge and thus have the ability to store water (water retention). In addition, mosses collect dust, reduce pollutants, function as an air filter, and have a positive influence on acoustics.

Some of these lineages may actually be adapted to grow on modern building surfaces – and therefore could be used for moss gardening. This could be beneficial for insulation purposes, to reduce air pollution and climate gases (CO_2 scavenging), to increase biodiversity within an area, and, last but not least, for aesthetic purposes: greening cities and visually breaking up expanses of concrete.⁵¹

In their research, Hofbauer and his colleagues seek to identify selective biocontrol of moss growth. At the Fraunhofer Institute for Building Physics (IBP), the work objective is to both prevent and enhance the growth of microorganisms. Amongst other things, they have built up a living database containing 650 single cultures, 400 strains, and 250 species, together with 1:1 scale test sites for the study of bryophytes in relation to, for instance, outdoor weathering, as well as coatings and surfaces that enhance moss growth.⁵²

Likewise, moss experiments take place on the art scene. Figure 5 presents the exploration of moss's ability to deliver renewable energy from photosynthesis, so-called "biophotovoltaics", as well as power to a radio by mossbased "biological solar panels". Back to the scientific context again, Figure 6 is drawn from a study on "active moss biomonitoring". In regard to the latter theme, Angela Ares et al. claim that mosses enable the simultaneous monitoring of a large number of contaminants with the same sample (i.e. metals, and metalloids, PHAs, radionuclides), and also have other advantages over current methods (e.g. simplicity, reliability, cost effectiveness and the lack of the need of electricity).



Figure 5. Experiments with biophotovoltaics: generating renewable energy from the photosynthesis of living organisms such as moss (left, "Moss Voltaics" by Elena Mitrofanova); "Biological solar panels" to power a radio (right, by Fabienne Felder, Paolo Bombelli & Ross Dennis). Accessd from: www.dezeen.com/2014/02/10/moss-biological-solar-panels-radio/; www.designindaba.com/articles/creative-work/moss-wall-creates-clean-green-energy.



Figure 6. Active moss-biomonitoring study for the sake of identifying sources of atmospheric pollution: wetted moss bag during exposure (left); suspended dry moss bags (right). Accessd from: www.envpl.ipb.ac.rs/bio2.htm.

Along these lines, exploring moss's advantages through concrete site experiments in the city has a potential to invert established views and presumptions.

"MOSSES/CIRCUITS":

ESTABLISHING MOSSES ON A FLUVIAL RETENTION WALL

The microhabitat strategy presented above was taken on in the "*Mosses/cir-cuits*" project, an ongoing study that came to life by devloping aproposal for the development of mosses on a fluvial retention wall, commissioned by the Agency for Urban Environment and Water Management in Oslo. The wall is supporting a newly reopened stream running through the Oslo Centre for Interdisciplinary Environmental and Social Research (CIENS). On the one side, the agency wished to establish mosses in order to prevent graffiti – on the other, to harvest experience on the controlled development of mosses in urban milieus.⁵³

The concept is developed as a collaborative piece between the author of this article and the botanist Magni Olsen Kyrkjeeide, researcher at The Norwegian Institute for Nature Research (NINA) – starting out with a couple of straightforward questions:

- How can we facilitate moss growth through the creation of microhabitats, informed by natural habitats, which may work well in the long term?
- How can we turn a conventional retention wall into a contemporary artwork involving *living material*?

Seeking to test how the urbanscape can function as an outdoor laboratory, the proposal has led to a broader dialogue with other municipal agencies. Our next move is to carry out small scale experiment at NMBU Campus as well as searching for suitable sites for establishing microhabitat experiments in central Oslo.

AT THE INTERSECTION BETWEEN ARTS, LANDSCAPING, AND SCIENCE

By studying mosses in nature, you quickly discover their preference to colonize uneven surfaces. Drawing from this, our contribution deals with creating relief structures that act as moss microhabitats. In the case of the fluvial retention wall, the overall aim was to transform a dull concrete structure into a public attraction well fit for the location within one of Oslo's central research clusters, as Figures 7–8 exemplify. However, in the Norwegian context, there is no documented experience on controlled moss development in urbanscapes. Thus, this project seeks to explore and highlight moss's many qualities – aesthetically, culturally, and environmentally.

The client wished the artwork to reflect activities within the CIENS cluster, which, amongst others, houses the Department of Informatics. The architecture and systems of informatics are part of almost all we do, from leisure to professional activities – and even incerted into our bodies as part of medical progress. As such, this motif has a potential for outreach to a wide audience. Moreover as a visual reference, the circuit board may be interpreted in multiple ways, as resembling metropolitan infrastructure, graphs of signal currents in biochemical processes, pulse flows in the brain, or even the crack reliefs of mountain walls exemplified. Accordingly, in relation to the reliefs' basic pattern, the design is inspired by electronic circuit boards (pointed out in Figure 7, *"Mosses/circuits"* study #1–2, and in Figure 9).

On the artistic-conceptual level, the synthetic and technical infrastructure will slowly be "taken over" by an organic moss cover – as in an abandoned place. In this fashion, the artwork addresses interrelationships between na-


Figure 7. "Mosses/circuits", examples from the design process – circuit board pattern study. Digital collage: Elin T. Sørensen 2018 © BONO.

ture, technology, and human values – even more, in the sense that much technology development relates to nature emulation.

Evidently, artistic and scientific practice is performed through investigative processes. In both cases, not all results are useful. In the case of artworks, the result must express an "extraordinary dimension" – that is, a potential to expand the viewer's perspectives and horizon of understanding. As follows, the art piece should lead the viewer into an aesthetic, sensuous experience and thus provide a new perspective on worldly phenomena. Moreover, the artistic process behind the microhabitats have similarities with the research layout proposed: the application of *moss-growth mixtures* to the relief surfaces are both controlled and improvised, and left to spontaneous succession in order to "see what will happen …"⁵⁴

Facilitating Moss Microhabitats

According to Hofbauer, there are knowledge gaps related to succession as well as ecophysiology such as water, temperature, and light requirements, which are important prerequisites for an efficient management of mosses.⁵⁵ Our objective is to study how different mosses establish themselves on the microhabitats in contrast to "clean" control spots, that is, the retention wall's original concrete surface. In this way, different revegetation strategies that work under different growth conditions can be monitored. The *microhabitat design* thus functions as a fieldwork arena that provides information on how mosses develop, from controlled colonization to spontaneous growth.

By experiments with different *moss-growth mixtures*, we will gain a sense of establishment of successes and failures. The assumption is that many species in a mixture can increase the likelihood that one or more species thrive and establish themselves. On the other hand, the application of *single-species mix-es* to the substrate will provide opportunities to study that particular moss" growth on the suggested *microhabitat reliefs*. Testing with different species on different substrates will provide knowledge on this. Consequently, we may arrive at a basis for comparison of different *microhabitat designs*, with the further growth taking place somewhat uncontrolled. Hence, "*Mosses/circuits*" unfolds as a living piece of art.⁵⁶



Figure 8. "Mosses/circuits", examples of suggested wall zonation. Digital collage: Elin T. Sørensen 2017 © BONO.



Figure 9. Natural microhabitats for mosses, such as silver-moss (Bryum argenteum), on boulder rocks by the retention wall. According to Lundholm (2011, p. 97), silver-moss is considered the quintessential urban moss, tolerant to trampling, nitrophilous, and xerophytis – with silvery leaf hairs that likely increase reflection of solar radiation. Silver-moss has nearly global distribution. Photos: Elin T. Sørensen, April 2017 © BONO.

Time and succession	When it comes to plant development, mosses have a slow growth rate. In addition, spontaneous colonization may take time. Here the application of growth mixtures composed of moss particles mixed with nutrients will facilitate establishment, and thus accelerate growth. Concerning time, it is assumed that at least one growth season is required until any substantial results are achieved. However, growth rate and the development in time before major surfaces are covered with mosses is uncertain and will depend on access to water. In order to document the moss development over time, points for photography will be established where pictures are taken on a regular basis.
Moisture availability	Mosses are generally divided into two groups, those that tolerate drying out and those that avoid drought. For the retention wall at hand, it is advisable to select drought-tolerant species that thrive directly on rock surfaces. In this way, we ensure that the species applied withstand a stressful environment and periods of drought. Moreover, periods with good water availability and/or high humidity represent optimal growth conditions. In the case of the retention wall, it is located in relation to an urban stream. Thus, it is assumed that "natural watering" from the stream should be sufficient for the mosses established. Here water spray from the stream will provide a more stable water regime. Moreover, the relief structures with angles, cavities, and crevices provide microclimate conditions that are beneficial in terms of moisture.
Structure	In general, irregular surfaces enhance natural colonization. The microhabitat reliefs will thus help the moss particles to establish, in that the spores and vegetative material will not be flushed away from rainfall or for other reasons. In order to harvest experience on the development of different species, we apply a wall zonation for the "moss tapestry", adapted to different growth requirements. On the upper level, we facilitate drought-tolerant species, and at the base aquatic mosses exemplified in Figure 8.
Material composition	The relief structures are suggested to be built in slow-grown pine, slate, and/or in concrete, the latter mixed with more or less lime (as pH adjustment). Variation in materials allows several species to thrive, which will be crucial from a long-term perspective and for the emergence of new species on the wall. Moreover, mosses come with great variation in growth forms and colours: greyish, such as silver-moss (<i>Bryum</i> <i>argenteum</i>) or brownish red as great hairy screw-moss (<i>Syntrichia</i> <i>ruralis</i>). Thus, the <i>Mosses/circuits</i> design facilitates for variations in structure as well as colour and contrast as the pattern unfolds.

Table 2. Success criteria's for moss microhabitats⁵⁷ (Kyrkjeeide & Sørensen, 2017; Lundholm, 2011, p. 95).

REFLECTIONS AND GAINED INSIGHTS HOW FASCINATIONS PUSH EXPLORATIVE WORKWAYS

Fascinare (v.) from Latin fascinus "a charm, enchantment, spell, witchcraft" as by the power of the eye; to enchant and to charm are to bring under a spell by some more subtle and mysterious power. Sense of "delight, attract and hold the attention of." (etymonline.com/word/fascinate)

The 1983 Nobel laureate for discoveries on mobile genetic elements, Barbara McClintock, claims that her discoveries in plant cytology (the study of the structure of the cell) are due to her ability to acquire a "feeling for the organism" – in which she opens herself up to "what the material has to say". Close identification provided her the insights, later to be synthesized with observation and explanation grounded in more traditional scientific workways.⁵⁸ All the same, by daring to immerse herself, and by trusting "hunches" and "keen intuition", McClintock generated new knowledge.

Similarly to how McClintock "feels" and "listens", fascinations work as "mind-openers" and thus serve as important concept-development tools. For example, by paying attention to seemingly insignificant clues (that eventually may even constitute a work's conceptual backbone) – a fascination can be seen as an "empathetic crowbar" providing "design-problem breakthroughs". In the work-process, seemingly insignificant "moments" often trigger a state where so-called *stream of consciousness* may take place. This method is described as an "inner monologue" rendering "a person's chaotic and more or less unconscious thoughts and feelings".⁵⁹ With regard to this, fascinations may be likened to keywords in a browser, giving access to consciousness's constant thought-streams and their idea-generating impressions and associations.

Framing Unruly Imagination

Arriving at landscape architecture from the arts, the combination of the "ungovernable" with strict structuring is of particular interest. Off course, architectural practice may be rebellious, going beyond a "normal" production sequence – towards the visionary and even unrealizable. Conversely, an artistic practice may be dry, factual, and in the worst case uncommitted. However, the limits to architectural projects often stand clearer: on the one side, there are the work's physical borders such as those steering spatial and contextual conditions; on the other, there is the push towards efficiency and market orientation that may result in a repetition of "safe solutions" and business as usual.

The development of a strong conceptual backbone is an essential success criterion to any project. Thus, concerning the cultivation of an "unruly imagination", the ability to trust "imaginative hunches" has to be refined in the creator's experience over time. Such embodied knowledge or so-called *tacit knowledge* is a type of awareness difficult to transfer by means of writing or verbalization, thus more likely to manifest as an insight or intention in the form of a gut feeling. Whether being a scientist or artist, these may be understood as the traits of a creative practice. All the same, through the refinement of artistic authentic thinking and skills, profound critical, analytical, and ethical thinking is cultivated – and none the least poetic perspectives. From my experience, these aspects often strengthen the production outcome, and as such are of great relevance to urban planning and place making.

One may say that design, architecture, or the arts happen in the combination of accessing "what the material has to say", while at the same time interacting with places and situations. In her PhD, landscape architect Rannveig Søndergaard Holm discusses how the researcher "creatively interacting with her material" in investigations is naturally generating nonverbal results.⁶⁰ This is a strategy clarified by Mäkelä:

As an object made by an artist–researcher, the artefact can also be seen as a method for collecting and preserving information and understanding. However, the artefacts seem unable to pass on their knowledge, which is relevant for the research context. Thus, the crucial task to be carried out is to give a voice to the artefact. ... In this process, the final products (the artefacts) can be seen as revealing their stories, i.e. the knowledge they embody.⁶¹

EPILOGUE

The contributions from a self-reflective study may be to better articulate artistic and architectural skills of relevance to the advancement of architectural research per se, as well as to the educational practice. Therefore, architectural research has importance for the development of the profession's role in society.



Figure 10. Forest floor/darkness study #1–2 – the atmosphere attached to mosscapes, as for instance discovered on forest floors. Photo: Elin T. Sørensen 2017 © BONO.

The crossing of professional boundaries may yield manifold reflections on how to look at and decipher, in this case, the cityscape, through different (disciplinary) lenses. From collaborating with professionals of various kinds - such as water engineers, ecologists, and biologists - my experience is that, besides contributing indispensable professional knowledge, they most often fall short on design competence and aesthetic awareness on a high level. A lack of critical distance to design processes and results is often the missing link between mediocrity and excellence. Conversely, I assume that architects, product designers, and others, in most situations, do not possess adequate insights on all facets of the artefacts produced. Accordingly, taking on the relay baton from applied science to urban design explorations has potential. The PhD fellowship provides an opportunity to experiment with both design expertise and transdisciplinary interaction. Taking such skills to a higher level would better enable the transition from a "poor" urban habitat to enriching a place. Particularly, developing the ecological function as well as the aesthetic appearance of urban hard surfaces.

An emerging hypothesis is that by "listening to" and looking more closely at the urban habitat, the designer may access essentialities. Those are particular clues for the development of liveable and possibly more easily maintained cityscapes, for instance by turning the "urban grey" into biologically active surfaces. This is an approach that requires opening up to what urbanscapes "tell us": its physical properties and people's needs, its ambiences and hidden treasures – as for example the wonders of minuscule moss colonies.

NOTES

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3 (Hauberg 2011: 46)

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⁸ Birger Sevaldson, "Discussions and Movements in Design Research: A Systems Approach to Practice Research in Design", *FORMakademisk*, 3/1 (2010), pp. 8–35.

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¹⁰ (Cross 1982: 55; Cross 2001)

11 (Mäkelä 2007: 158)

12 Hauberg, (2011: 52)

¹³ Gerhard Haas, *Essay* (Stuttgart: J. B. Metzler, 1969).

¹⁴ Jo Bech-Karlsen, *Gode fagtekster: Essayskriving for begynnere* (Oslo: Universitetsforlaget 2003), pp. 34 and 107.

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Ann Legeby, PhD, is a researcher at the School of Architecture, KTH Royal Institute of Technology. She is specialized in urban design with a particular interest in segregation and social sustainability. The dissertation *Patterns of co-presence* (2013) studies segregation in public space. Legeby has recently finished two research projects financed by Boverket as part of the governmental initiative Urban Development: "Dela[d] Stad" (Shared City), a Mistra Urban Futures project carried out together with the city of Gothenburg, and "Storstäder i Samverkan", a collaboration with the metropolitan cities Malmö, Stockholm, and Gothenburg. She also teaches at the KTH School of Architecture, among other places, and is deputy supervisor for two PhD students. Since 2015 she has been co-editor of the *Journal of Space Syntax* (Bartlett UCL). Besides research and teaching, Legeby practices at Sweco Architects in planning and urban design, where she has been since 1998.

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Marie Markman, PhD, works within a combined field of theoretical and practical exchange, currently in relation to a development project of a new city with 20,000 inhabitants initiated by a private investor. Markman graduated as a sculptor from the Jutland Academy of Fine Arts, Aarhus, with a focus on questioning how we design and use urban spaces. She has worked with self-organized projects and more formal exhibiting (i.e. in Hamburg, Bremen, Montreal, Copenhagen, and other places). Markman earned an MA as a landscape architect from the Royal Veterinary and Agricultural University in Copenhagen (2007), refining the work of integrating art, landscape architecture, and urban planning. In 2014, she finished the PhD *Landscape Sprawl: An Artistic Response to Living in the Anthropocene* at Aarhus School of Architecture. She is a consultant to the Danish Ministry of Defence on where and how to integrate art in their buildings, and she is a consultant to the Municipality of Aarhus on strategies for art in public space and the installation of site-specific artworks.

Fredrik Nilsson is an architect and professor of architectural theory at Chalmers University of Technology, where he leads the strong research environment "Architecture in the Making" in a national collaboration between the Swedish schools of architecture at Chalmers, KTH, LTH, and Umeå universities. He is also the head of research in practice at Älvstranden Utveckling AB. Nilsson's research is directed to developments in contemporary architecture, architectural theory, architectural methodology and practice, with a special interest in the epistemology of architecture and interaction between theory, conceptual thinking, and design practice. Important aims are contributions to reinforced exchange between research and architectural practice.

Henrik Reeh, PhD in comparative literature, is an associate professor of humanistic urban studies and modern culture in the Department of Arts and Cultural Studies, University of Copenhagen. He previously graduated as "cand. mag." of history and the social sciences (Denmark) and as "Maître Ès Lettres" of modern literature and "Diplômé d'Études Approfondies" of the history and semiology of text and images (University of Paris VII). He also held a one-year scholarship from the German Academic Exchange Service (DAAD) in the Department of Philosophy at Johann Wolfgang Goethe University in Frankfurt am Main. Reeh has been a member of the PhD committee in the Faculty of Humanities at the University of Copenhagen since 2008, and co-chairman since 2013. In 2005, Reeh was visiting professor at the Royal Danish Academy of Fine Arts, School of Architecture, Copenhagen. He is a Danish director of 4Cities – Erasmus Mundus Master Course (4Cities.eu) and an author of books on urbanity, art in public space, and cultural theory. Reeh's *Ornaments of the Metropolis: Siegfried Kracauer and Modern Urban Culture* was published by MIT Press in 2005.

SECTION II

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Ute Groba has held a research fellowship at the Oslo School of Architecture and Design (AHO) since 2015. Her research on urban timber housing focuses on its semantic qualities. It traces how they are generalized in theory, how they are conceptualized by architects, how they are contextualized in buildings, and how they are perceived by inhabitants. This research interest follows Groba's professional experience with timber architecture as a practitioner at Helen&Hard (Stavanger and Oslo) and as a master studio course teacher at the Institute of Architecture at AHO. Prior to 2008, Ute worked at kadawittfeldarchitektur and taught at RWTH Aachen University in Germany, where she also received her diploma in 2005.

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Nicholas Thomas Lee started his PhD at the Royal Danish Academy of Fine Arts in Copenhagen in autumn 2015. Titled *Dwellscape*, it is focused on "The Interiority of Dwelling". The research areas of the PhD include dwelling (analysis of case study projects), interiority (an anthropological approach to inhabitant appropriation and the creation of place), spatial arrangement (sequencing), in-betweeness (inhabiting thresholds), and the picturesque (as a spatial agent).

Espen Lunde Nielsen is a practitioner and independent researcher working in the intersecting position between art, architecture, and technology. A particular focus is on the "infraordinary" as a catalyst of everyday socio-spatial coexistence among the inhabitants of a city. In 2017, he was awarded a doctoral degree for the research-by-design project "Architectural Probes of the Infraordinary: Coexistence through Everyday Spaces" at the Aarhus School of Architecture, where he also earned a Master of Art in Architecture in 2012. In 2014, he was a visiting research student at the Bartlett School of Architecture, University College London. Practice experience includes SLETH (2012) and Studio Christian Wassmann (2010). In 2017, he founded NO38 Architecture+Research in Copenhagen. **Katja Maununaho** is currently working on her PhD research and as a project researcher in the School of Architecture at Tampere University of Technology. Her research interests focus on the relations between spatial, functional, cultural, and social factors in housing environments and on the diversity of urban dwellers in everyday life. In addition to research, Maununaho works with housing design in her architectural studio in Helsinki.

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