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Picture on the front cover: «Paris Lacaton & Vasal». Photo: Ulrik Stylsvig Madsen

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TECTONIC VOCABULARY AND MATERIALIZATION – DISCOURSE ON THE FUTURE OF TECTONIC ARCHITECTURAL RESEARCH IN THE NORDIC COUNTRIES

MARIE FRIER HVEJSEL, ANNE BEIM AND CHARLOTTE BUNDGAARD

Abstract

By referring to the fundamental question of how we unite aesthetics and technology – tectonic theory is necessarily a focal point in the development of the architectural discipline. However, a critical reconsideration of the role of tectonic theory seems necessary when facing the present everyday conditions of the built environment. We see an increasing number of square meters in ordinary housing, in commercial buildings and in public buildings such as hospitals and schools that are dealt with as performative structural frameworks rather than qualitative spaces for habitation and contemplation. On the occasion of the *Second International Conference on Structures & Architecture* held in July 2013 in Portugal the authors organized a special session entitled From open structures to the cladding of control bringing together researchers from the Nordic countries to discuss this issue. Likewise the initiative to establish a *Nordic Network for Research and Teaching in Tectonics* is currently forming. This paper seeks to jointly reflect upon these initiatives in order to bring them further, with the intention to clad a discourse on the future of tectonic architectural research that addresses the conditions of everyday architectural practice. In this matter the paper focuses on the need to juxtapose theoretical studies, to bring the present vocabulary of the tectonic further, as well as to spur further practical experiments enabling theory to materialize in the everyday of the current practice.

Keywords:
tectonic architecture, research, everyday practice, Nordic countries

Introduction

With their contributions *The tell-the-tale detail, Rappel à l'ordre: The case for the tectonic,* and *Studies in tectonic culture,* Marco Frascari and Kenneth Frampton succeeded in repositioning tectonic theory as a medium of architectural criticism in the 1980s and early 90s (Frascari, 1984; Frampton, 1990; 1995). This work has brought further Karl Bötticher's and Gottfried Semper's early discovery of the critical potential of tectonic theory as a theory of construction focused at material culture and seen as a means of approaching the delicate question of architectural quality not as a question of style but of method; a question of how we go about the task of uniting aesthetics and technology in the creation of architecture (Bötticher, 1852; Semper, 1851). In the last decade the interest in the notion of the tectonic has evidently gained speed and has also become associated specifically with the hasty development of digital fabrication and specific experimental material technologies and fractal geometries (Leach, Turnbull and Williams, 2004; Reiser and Umemoto, 2006; Hensel, 2013). However, when facing the conditions of contemporary everyday architectural practice where a huge number of square meters in ordinary housing, in commercial buildings and in public buildings such as hospitals and schools are dealt with as performative structural frameworks rather than qualitative spaces for habitation and contemplation, further development and actual application of tectonic theory still seems to be highly relevant. Indeed there is a need to spur an understanding of the tectonic that is present also to what we can call everyday practice; here understood as the greater part of our practice dealing with ordinary private and public projects of limited budgets as opposed to the few unique, often cultural projects blessed with creative freedom and unlimited funding that in reality define only a small percentage of our practice. It is our hypothesis that the development and positioning of tectonic method, otherwise often exemplified in unique, and also often historical projects such as Alvar Aalto's Säynätsalo Town Hall or Jørn Utzon's Sydney Opera House is specifically needed in everyday practice. This raises theoretical questions for further research such as: what can be learned from these examples? Simultaneously, it raises practical questions such as: what is the possible tectonic quality of a simple pillar and plate system in a prefabricated dwelling? Transforming such performative structural frameworks into inviting dwelling spaces is inevitably a tectonic question and addressing this challenge necessarily entails an increased involvement by the architects with the construction industry. As stated by Kenneth Frampton there seems to be still a growing need for us as architects to maintain, «*command over the art of building as a spatial and tectonic discipline*» (Frampton, 1995, p. 383). It is our observation and point of departure of this paper that the scope of this challenge has only increased since 1995.

Within the Nordic countries several research groups and research projects are currently forming with the aim to address this challenge

through practice oriented research strategies. The research project *Towards a tectonic sustainable building practice* which is performed across the three major Danish research institutions: The Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation, Aarhus School of Architecture and Danish Building Research Institute, Aalborg University is one example hereof dealing specifically with the pressing issue of sustainability related to the tectonic. Another example is the project *Architecture in the making: Architecture as a making discipline and material practice* which is a collaborative Swedish project with participating researchers from Chalmers Department of Architecture, KTH School of Architecture, Umeå School of Architecture, and Architecture and Built Environment, LTH. It deals specifically with the impact of current architectural discourse and technological development on the actual making of architecture in practice. Also in Norway at both NTNU, Norwegian University of Science and Technology in Trondheim and at AHO, The Oslo School of Architecture & Design, tectonic architectural research is currently growing as focus area. Hence, within the Nordic countries there is a particular potential to gain ground in forming a re-positioning of the tectonic present to the current challenges of the construction industry that this paper explores. It is our observation that this particular Nordic research interest in tectonic theory is rooted in a common tradition in which the education of architects has been mainly craft based and supplemented by a high level of professionalism amongst consultants and craftsmen. Likewise, our common heritage, culminating in Scandinavian Modern, witnesses a humanist approach to architecture exemplifying both the ability to experiment with and embrace the development of new technologies as well as a consistent attention to the experienced quality of architecture as space (Frampton, 1983; Lund, 1991 Norberg-Schulz, 1985. Architecturally this tradition is characterized by a decisive attention to detail and ability on behalf of architects such as Gunnar Asplund, Alvar Aalto, Bruno Matsson, Kay Fisker and Jørn Utzon to create architecture that gestures the human scale (Beim and Madsen, 2011; Hvejsel, 2011). By means of details such as the sweeping plywood seat in Asplund's Chapel Crematorium or the window fitting in Matsson's own summerhouse the works of these architects witness a common joy and trust in architecture's ability to move its inhabitants beyond mere practicality as they invite encounters, social gatherings as well as contemplation in solitude by means of an in-depth structural understanding of the detail.

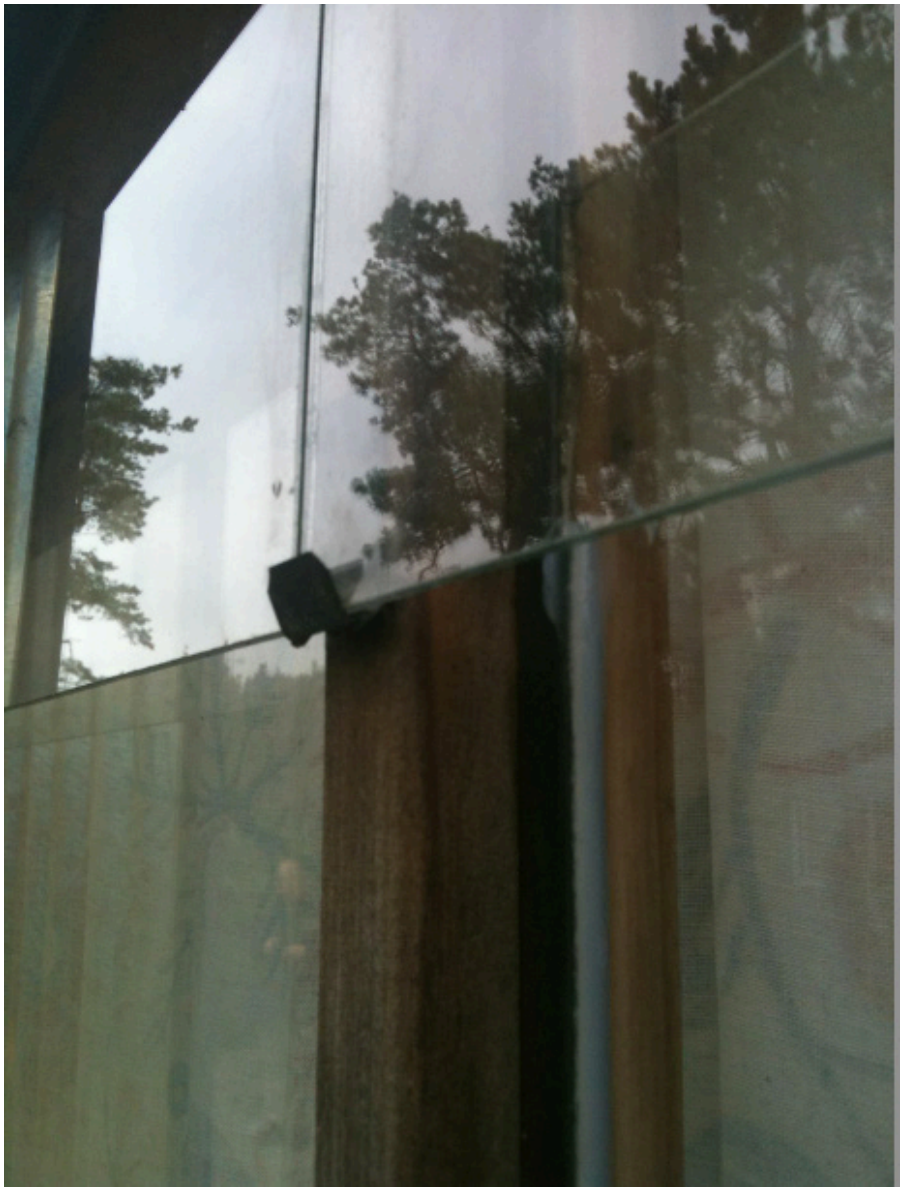

Figure 1
Detail from Bruno Matsson's own summerhouse in Halmstad, Sweden.
Photo: Anne Beim

It is our point of departure for this paper that tectonic method is a common denominator of this heritage, and that it marks a unique potential as a critical basis when seen in relation to the current challenges of everyday practice. As summarized above, there is an urgent need for us as architects to expand our involvement with the building industry and as stated by Charlotte Bundgaard the notion of the tectonic seemingly holds the potential to become an active, progressive means in this matter (Bundgaard, 2013). With the increasing number of parties involved in the building industry, increasing limitations to building budgets, and increasing number of technical installations, ventilation tubes, escalators, elevators, and insulating construction layers, such repositioning of the tectonic is a twofold challenge: Firstly, there is a need for us as architects to develop a vocabulary enabling ourselves to describe and

position the need for tectonic theory and method within this multifarious context. Secondly, there is a need for us to engage ourselves directly in the practice of this industry developing the technical insight needed in order to enable a materialization of tectonic theory in practice. With the planning of the special session entitled *From open structures to the cladding of control – A critical call for current tectonic theories and practices in architecture at the ICSA 2013* conference it was the intention to spur such critical linkage of tectonic architectural theory development and contemporary architectural practice. At the conduct of the session in Portugal the notion of 'cladding' was used as a means in order to provoke positions that link classical tectonic theory to an addressing of future challenges in architectural practice, an approach that we apply further in this paper. However, here we superimpose a novel focus, namely that of 'everyday tectonics' as we reassess the knowledge gathered at the special session on ICSA 2013.

By describing the methodological implications of architectural creation, the tectonic traditionally denote an honest unification of form, technology/technique and materials. In opposition, the associations of the notion of *cladding* that was the topic of the special session at ICSA 2013 are ambiguous: On one hand it signifies the quality of many of the most recognized works of architecture as an effect of their detailed sensuous adaption to the human scale. On the other hand the notion has – particularly in modern architecture – become associated with dishonesty, an invective denoting an a-tectonic theatrical covering of poor constructions. This critical potential of the notion of cladding is evident in A.W.N. Pugin's early representation of the utilitarian chapel as a decorated shed in his 'True Principles' also referred to by Frampton as well as in Robert Venturi's Postmodern writings (Pugin, 1973 [1841]; Frampton, 1995; Venturi, Brown and Izenour, 1972). In continuation hereof, it is our idea, that the notion of *cladding* likewise forms a key potential in discussing the future of tectonic architectural research. At the conduct of the special session in Portugal this critical perspective on the tectonic fostered a lively and fruitful debate based on the presentation by the invited authors and in the interest and reactions coming from the audience. It is our observation that the ambiguity of the notion of cladding spurred a potential to discuss the current development within tectonic theory in direct relation with the current advancement in the practice of architecture. By referring both to the process of *cladding* as a form of architectural creation and to the actual cladding itself as a physical element of construction it offers a potential to discuss the link between tectonic theory and practice. Consequently, present paper seeks to jointly reflect upon these initiatives in order to bring them further, 'cladding' a discourse on the future of tectonic architectural research that addresses the conditions of everyday architectural practice. In this matter the paper focuses on the need to juxtapose theoretical studies, to bring the present *vocabulary* of the tectonic further, as well as the need to spur further practical experiments enabling theory to *materialize* in everyday practice.

Method

Methodologically this is done by adopting this notion of *cladding* also as a research strategy for mapping key challenges for the future of tectonic architectural research in the Nordic countries related to everyday practice. We do this by recalling the radical approaches to the tectonic by Gottfried Semper and Adolf Loos, who both used the polemic notion of *cladding* as a critical means in approaching the definition of architectural quality related to the emergence of the industrial revolution and the Modern Movement respectively (Semper, 2004 [1861]; Loos, 1982 [1898]). In the hasty current technological development of the building industry and constant emergence of novel materials and technologies, which can be said to mirror the historical contexts of Semper and Loos, it is our hypothesis that a similar critical approach is pressing. Hence, the paper collects elements from the special session held at the ICSA 2013 conference and seeks to systematically relate the research results and future research perspectives stemming from the different contributions by means of the notion of *cladding*. In this matter we have chosen to categorise the results as either contributing to the development of a theoretical *vocabulary* or to practical *materialization* hereby juxtaposing the two. In order to extract elements for a general discourse on the future of tectonic architectural research related to the conditions of current architectural practice we conclude the paper by discussing the mutual overlaps between these two categories.

Cladding

As he found himself in the midst of the industrial revolution, experienced in its totality at the hodgepodge of the world exhibition in the Crystal Palace, Gottfried Semper developed his theory of tectonic architecture in a multifarious context of new materials and construction technologies (Semper, 1989 [1851]). As a response to the pressing need for architectural reasoning in regard of the utilization of these novel materials and technologies that meant new multilayered constructions, Semper saw the tectonic as a means to develop a consistent theory of architecture independent of the earlier stylistic focus that still occupied his contemporaries. As stated by Gevork Hartoonian, Semper's theories mark a break with the classical Vitruvian triad in forming a spatial, a-formal, and sociocultural theory of architecture by means of the tectonic (Hartoonian, 1994, p. 19). Based on a study of the origins of construction techniques Semper claimed that in its outset, architecture is independent of construction as an exterior monumental and stylistic form. In drawing a parallel between the notion of the German Wand signifying wall and the notion of Gewand signifying dressing he stated that the dwelling's immediate emergence as dressing is primary and unfolds a contrast in relation to the often-solid walls behind them, «*necessary for reasons that had nothing to do with the creation of space; they were needed for security, for supporting a load, for their performance, and so on*»

(Semper, 1989 [1851], p. 104). Semper hereby introduced a hierarchy that can be seen as an elaboration upon the internal relations between Karl Bötticher's precedent theory on 'Kunstform' and 'Kernform' (Bötticher, 1852). This radical approach to the tectonic led Semper to the conclusion that the technique of weaving is the source of the oldest forms of ornamentation, hereby implying that weaving as a form of construction plays an important role in the general history of art. With Semper's introduction of this dual purpose and layering of the wall the notion of 'honesty of construction' commonly attributed to the tectonic is literally reversed: The architectural expression of the space is no longer destined to technically reveal its underlying structure, rather the structure must 'carry' the spatial intent of the work in an aesthetic addressing of the human body and mind defining the primary responsibility of the architect (Hvejsel and Kirkegaard, 2013, p. 402). In other words, one could say that the notion of 'honesty' is here aesthetically rather than technically conditioned; that Semper has introduced a hierarchy between the two of significance also in relation to architectural practice. Adolf Loos brought this tectonic view of architecture into the Modern era in his 'Principle of Cladding' unfolding a nuanced elaboration upon this primary architectural purpose which has since often been misconceived in favor of the catchphrase 'Ornament is Crime ' (Loos, 1982 [1898]). When seen in relation to the current challenges of the general architectural practice a re-reading of the works of Semper and Loos holds a potential in approaching a contemporary repositioning of the notion of the tectonic. Especially their utilization of the notion of *cladding* holds a critical potential: With the current increasing complexity in construction technology the notion of cladding stresses the need for a theoretical *vocabulary* articulating a tectonic approach to the current building industry as well as the need for concrete strategies for how to *materialize* this theory in practice.

As opposed to the notion of structural honesty and transparency traditionally attributed to tectonic theory, the notion of *cladding* embraces the complexity of the current construction practice as a condition. As an example Frampton's historical review of tectonic theory, referred to above, shows how the notion has been employed as a means to attain a rational approach to the otherwise complex field of architecture in which the idea of form and structure as an ideal transparent unity is tempting as a means of explanation (Frampton, 1995, pp. 29–60). With the notion of *cladding* as a critical point of departure a potential to discuss how to make sense of all of these layers whilst embracing the complexity of the matter opens up. This, as stakeholders, installations, materials, budgets, infrastructures etc. become part of the tectonic architectural discourse rather than being dismissed as part of an a-tectonic current practice expanding the gap between this present practice and earlier acknowledged examples in architectural history accentuated as key examples of tectonic architecture. Hence, by re-introducing the notion of cladding

as a critical means we can begin to juxtapose developments within all of these aspects conditioning architectural practice. As stated by Loos: «*Every material possesses its own language of forms, and none may lay claim for itself to the forms of another material*» (Loos, 1982 [1898]). Thus, when applying a re-reading of Semper and Loos' works as a vehicle in approaching a current tectonic architectural theory it becomes clear that there is a particular need to reintroduce a discourse on the spatial, even ornamental and theatrical potential of architectural form related to material culture, a discussion of architectural quality, at the center of the construction industry. Currently, measurable aspects such as energy emission bias the conditions and development of the construction industry and a reintroduction of the notion of the tectonic understood as a spatially founded theory of construction is pressing (Beim, 2013, p. 385). If following the line of thought of Semper and Loos, such theory is dependent on a juxtaposition of knowledge of the earliest quality of architecture as a place-making discipline with uttermost eager, initiative, and innovation into the current development of material- and construction technologies. Hence, the notion of cladding bring us back to Frampton's call for us as architects to involve ourselves in the construction industry and allows us to focus our attention on our role as architects in this industry (Frampton, 1995, pp. 377–387). In the following we will discuss the outcome of our initial initiative to use the notion of *cladding* as a critical developer in this matter at the special session held in Portugal.

Reflections from ICSA 2013

With the notion of *cladding* as a point of departure for a discussion of the future of tectonic architectural research, the nature of the architects task and responsibility related to the construction industry is stressed as discussed above. At the conduct of the special session held at ICSA 2013 the potential hereof became evident as we discovered how the response to the rather provocative call made it possible to juxtapose theory development and practical exemplification. At a general level, the papers that formed the session exemplified different focus areas in the development of a current tectonic architectural theory and practice, ranging from a discussion of emerging theoretical notions providing a novel *vocabulary* of the tectonic to specific inquiries into the *materiality* of the current building practice related specifically to the Nordic countries. Adopting the notion of *cladding* here also as a research strategy for how to juxtapose the research results and perspectives stemming from the different focus areas allows us to map common challenges for the future of tectonic architectural research in the Nordic countries.

At the session in Portugal, Fredrik Nilsson, Professor at Chalmers University of Technology presented a paper entitled *Architectural assemblages and materializations – changing notions of tectonics and materiality in contemporary architecture* in which he presented and discussed the

potential of a series of emerging theoretical notions of the tectonic with the aim «*to contribute to the critical understanding and further development of central concepts and tectonic theories in contemporary architecture*» (Nilsson, 2013, p. 408). Taking on a more practice oriented approach to the session topic Charlotte Bundgaard, Associate Professor at Aarhus School of Architecture, proposed the notion of 'montage' as a specific approach by addressing the need for a current tectonic theory and practice addressing the specific issues of energy requirements and resource consciousness. With her paper entitled *Tectonics of montage. Architectural positions for a tectonic sustainable building practice,* she raised the question of «*how we manage to respond to these challenges and at the same time develop architecture with tectonic strength and quality*» (Bundgaard, 2013, p. 392). With a paralleling practice-oriented approach Anne Beim, Professor at The Royal Danish Academy of Fine Arts presented an inquiry into contemporary building practice with her paper *Structural cladding/clad structure – Studies in tectonic building practice*. By studying heavy- and light-weight constructions comparatively she investigated «*How to learn from traditional construction principles*» as a means in developing a current sustainable tectonic theory and practice, asking: «*When do we see limitations of tectonic maneuver; how does the performative logic challenge the heavy building constructions*» (Beim, 2013, p. 383). Finally, Marie Frier Hvejsel, Assistant Professor at Aalborg University, and Poul Henning Kirkegaard, Professor at Aarhus University, investigated whether the principle of cladding unfolds a tectonic potential in re-awakening the sensuous and narrative quality of architecture that signifies our recognition of its quality but is often lost within the multifarious conditions of the current construction practice in their paper *Wallpaper & Tectonics – a critical discussion of the state of the architectural discipline* (Hvejsel and Kirkegaard, 2013, p. 400). As it appeared in the panel discussion in Portugal, and when beginning to break open the contents of the individual papers a series of mutual relations and overlaps appear that can help clarify elements contributing to the development of a theoretical *vocabulary* as well as to practical *materialization* respectively. In the following we have systematically mapped, extracted, and grouped the research results and perspectives stemming from the different papers within these two categories in order to jointly reflect upon these initiatives an bring them further, 'cladding' elements for a discourse on the future of tectonic architectural research related to everyday practice.

Vocabulary and materialization

The most obvious of the papers to deal directly with the development of a *vocabulary* defining a current tectonic architectural theory is the paper by Fredrik Nilsson that can be said to map a state of the art of currently emerging notions in architectural theory in general. Nilsson deals specifically with the influence that the radical current development of digital design and fabrication technology in architecture has on the

current advancement of tectonic theory in architecture. With subtitles progressing from *The field of actors, networks, materialities, objects over A theory of assemblages* and *Novel tectonics and material practices* to *Building components in swarm tectonics* and *Tectonic articulation in an architecture of continuity* his paper witnesses an attempt to position the dynamic possibilities of digital technology in relation to the built environment. Especially, the point of departure in emerging digital technologies motivates a focus upon the notion of 'performativity' envisioned in a dynamic bottom up relation between building and component, and finally 'assemblage' stand out as a central potential. By referring to the work of Michael Hensel, Achim Menges and Michael Weinstock in their *Emergent technologies and design* it is Nilsson's observation that «*to engage with emergence requires more than the development of new materials and innovative production technologies, but rather an understanding of the behavior of complex systems and the mathematics of their processes, and of the systematic transference of that knowledge to design and production*» (Hensel, Menges and Weinstock, 2010; Nilsson, 2013, p. 409). According to Nilsson the development in emergent digital technologies related to architecture is driven by a particular interest in a «*reconceptualization of architectural theory and the way we look at objects*» (Nilsson, 2013, p. 410). Referring to the works of Bruno Latour and Albena Yaneva and Reiser + Umemoto, Nilsson uncover a particular focus on performance and herein an interest «to ask 'what does this do?' rather than '*what does this mean?*'» witnessing a dynamic understanding of architecture as process rather than product (Nilsson, 2013, p. 411). If summarizing Nilsson's positioning of the notions of 'emergence' and 'performance' as central elements in the development a future tectonic vocabulary implies a renewed focus on the process of creation, likewise it questions the architect's role herein. In this matter Nilsson stresses Manuel De Landa's concept of 'assemblage' as a possible means of describing these novel conditions of the process of architectural creation stating that «the account that the synthesis of the properties of a whole is not reducible to its parts» is central to assemblage theory: «*the parts of an assemblage do not form a seamless whole. Assemblages are rather wholes whose properties emerge from interactions between parts*» (De Landa, 2006; 2011; Nilsson, 2013, p. 410). In approaching a material conception of what this entails in relation to the built environment Nilsson refers to Kas Oosterhuis' notion of 'components' which cannot be described solely as either bricks and mortar or bits and bytes. Rather, it is «*the merger of bits and atoms that interests Oosterhuis, the merger of the material real and the virtual real, the merger of the physical materials and the immaterial information and relations. Parts interact and through their relations form the whole of the building*» Nilsson states (Nilsson, 2013, p. 413). Whereas Nilsson's paper can be said to present and discuss central theoretical notions emerging from a growing interest in complex systems and mathematic processes made possible by digital technology hereby pursuing a transfer of knowledge from theory development into the built environment, Anne Beim's and Charlotte

Bundgaard's papers can be said to reverse this process. By studying specific built examples they are transferring knowledge from these specific practical examples into theory development – from *materialization* to *vocabulary* one could say.

This change of research method is visible in Beim's conception of the tectonic, which she defines as a «*a central attention towards the nature of the making, and the application of building materials (construction) and how this attention forms a creative force in building constructions, structural features and architectural design (construing)*» (Bech-Danielsen, et al., 2012 cited in Beim, 2013, p. 384). As described above Beim and Bundgaard cooperate on the research project Towards a tectonic sustainable building practice, which both of their papers is related to. Especially when dealing with the subject of sustainable architecture, the role of the architect and hereby the question of tectonics is challenged by multiple technical requirements and project parties. In their research they address these actual everyday conditions of the built environment and «*the fact that new guidelines for construction and building regulations are formed by theoretically based standards defined by other professional stakeholders in the construction industry, than the architectural profession. In that sense – a basic understanding of the tectonic aspects and of a culturally rooted building practice is not necessarily included in this ongoing evolutionary course of building constructions*» (Beim, 2013, p. 384). Beim pursues this challenge by looking «*at specific performative tendencies, which can be traced in the use of materials, the structural features and the construction details of building systems in selected architectural works*» (Beim, 2013, p. 383). What is of significance in our discussion of tectonic vocabulary and materialization here, with regards to our attempt to map key concepts in a discussion of a future tectonic *vocabulary*, is the fact that she also uses the notion of 'performance', but seeks to exemplify its architectural meaning directly within actual heavy- and light-weight constructions hereby offering a radically different account for the notion than Nilsson's. Hence, within this linguistic link of the two papers there is a potential to discuss a possible *materialization* of the 'performance' described by Nilsson. The specific works that Beim is analyzing are Casa Nova by Prisme Arkitekter, DK and a single-family house by Knut Hjeltnes, and in her analyses Beim uncover specific tectonic principles for arriving at a sustainable architecture. In the case of the single-family house Beim has found that:

> *Hjeltnes applies the diaphragm principle in the masonry construction of the load bearing walls. Here it is part of both the vertical load bearing walls and horizontal constructions and it is designed in such a way that it also becomes part of the interior furnishing. Although, the diaphragm wall is a cavity construction, it provides not only some of the thermal qualities previously described, but similar to the Casa Nova Project, it offers soundproofing, longevity and low maintenance of the exterior wall due to the surface properties of the brick (Beim, 2013, p. 387).*

Hence, this diaphragm principle described by Beim is at once aesthetics and technique; it performs both as a spatial gesture and as a structural instance. Bundgaard's paper takes this approach of investigating and attempting to position tectonic theory directly within the construction industry further by applying the specific notion of 'montage' as an analytical notion used in two 'architectural tales' dealing with Latapie House by Lacaton & Vassal and Æblelunden by Vandkunsten. Again, we see a direct linguistic link to Nilsson's account for 'assemblage' theory but like Beim, Bundgaard's use of the notion 'montage' is exemplified in specific physical constructions. In this matter Bundgaard characterizes tectonic thinking as being not only «*about portraying a constructional logic. Tectonics is to create material realities that reveal narrative meaning. Tectonics is to construct with cultural references*» (Bundgaard, 2013, p. 392). In the case of Latapie House she describes how Lacaton & Vassal «*provide a ready-made space that can be used for many different purposes, adding just a limited extra fitting; and this at a much lower cost than "normal" building systems. By introducing ready-mades into their architecture Lacaton & Vassal attempt to take advantage as much as possible of what is already there*» (Bundgaard, 2013, p. 395). It is Bundgaard's observation that Lacaton & Vassal hereby succeed in telling «the story of a relaxed approach, with room for both construction and meaning» in which technology is employed as a spatial instance that transmit a sense of pleasure and usage (Bundgaard, 2013, p. 396).

Paralleling this focus at the narrative spatial dimension of tectonic theory Marie Frier Hvejsel and Poul Henning Kirkegaard uses wallpaper to stress the question of the role of the architect in revealing this narrative potential of architecture. In this matter Hvejsel and Kirkegaard uses two historical case studies in which wallpaper, otherwise understood solely as a decorative element, is employed as a decisive tectonic constructive means. This is done with the intention to provoke a nuanced discussion of the tectonic related to Semper's dual understanding of the wall and definition of the architect's primary task in the creation of a gesture of interiority. In this way Hvejsel and Kirkegaard's paper takes its point of departure in a spatial understanding of 'performance' studying in detail what the spaces in the two case studies do, hence, again related to Nilsson's theory review. However, here 'performance' is, as in Beim and Bundgaard's papers exemplified in physical examples with the intention to extract principles for a future tectonic theory and practice. Whereas the examples analyzed, the guest bedroom of Charles Rennie Mackintosh's Derngate 78 and the garden of Arne Jacobsen's Søholm, are exclusive unique works they exemplify the subtlety of means needed to transmit such gestures of interiority and stresses the tectonic role of the architect in this matter. Referring to Eric Arthur Entwisle's historical studies of wallpaper, Hvejsel and Kirkegaard argue «*that spirits are raised, as much as they are lowered, by a wallpaper. And wallpaper, which by its very nature is a commodity and not a luxury, is one of the few branches*

of applied art where it is true that a good design need not be more costly» (Entwisle, 1954; Hvejsel and Kirkegaard, 2013, p. 402). In this way Hvejsel and Kirkegaard repositions the question of architectural quality in relation to the tectonic and stresses the need on behalf of the architect to prioritize clearly in everyday practice, and to reveal this quality with limited means, a task that may even involve theatrical means as it is the case in the Mackintosh example. In parallel Bundgaard's specific focus at 'montage' is introduced both as «*as a means for investigating possible strategies and as a generator for creating architecture…'Montage' is about prefabrication and assembly – about the process of material construction, but montage is also an aesthetic approach based on heterogeneity and juxtaposition*» (Bundgaard, 2013, p. 393). If referring back to our application of cladding as a method for mapping central directions for future tectonic research here, Bundgaard's 'montage' seems to point out an architectural strategy for materializing architectural quality by means of tectonic theory within the diverse conditions of everyday practice. One could say that Bundgaard's 'montage' strategy exemplifies architecturally how tectonic theory is capable of framing and realizing the potential of the emerging heterogenic and dynamic quality envisioned in the development of novel digital technologies reviewed by Nilsson. In Beim and Bundgaard's papers and also in Hvejsel and Kirkegaard's more historical studies, the actual physical solutions developed by the architects of the respective works are evaluated in great detail and the role of the architect in this matter is hereby clearly visible. On the other hand Nilsson's paper is evidence of the potential and need to embrace a new heterogeneous understanding of architecture that is driven by the development and implementation of digital technology both as work and as process. Hence, by juxtaposing the four papers a unique opportunity to confront the two has opened up. If we are to summarize, judging in this matter is of little relevance, rather what we would suggest is to look for possible overlaps and means of linking the two. Hence, we have found that there is a simultaneous need to develop the present tectonic vocabulary, as well as to spur further practical experiments materializing theory in everyday practice. Likewise we have found that the question of articulating the delicate matter of architectural quality within this everyday practice is central in this matter. In our attempt to 'clad' a vocabulary for a current tectonic architectural practice above we have discovered that the notions of 'performance' is a common focus and interest of architecture and industry, and that the notions of *Assemblage* (that refer to a mere bottom up understanding of architecture as a dynamic process represented in the complex systems that characterize emerging digital technologies) and *Montage* (that refer to a mere top down understanding of architecture as work deliberately orchestrated by the architect as envisioned in the classical master builder) form potential components of such vocabulary as they define a link between the theoretical notions of 'performance', understood both as work and as process, and the actual *materialization* of everyday practice. This is

a potential that we will discuss further below, specifically in relation to the Nordic context, with the intention to clad a discourse on the future of tectonic architectural research addressing the conditions of everyday architectural practice.

Discussion

As pointed out by Kenneth Frampton, Niels Ole Lund and as visible in the theories of Christian Norberg-Schulz and in the works of Gunnar Asplund, Alvar Aalto, Bruno Matsson, Jørn Utzon and Arne Jacobsen among others, tectonic method can be seen as a common denominator of Nordic architecture (Frampton, 1983; Lund, 2008; Norberg-Schulz, 1997). The works that define our common Nordic heritage are characterized by an ability on behalf of the architects to transmit a gesture of interiority, of addressing the human scale through architecture, by means of a detailed understanding of the structural principles of architecture. In an attempt to continue this heritage, it is a critique of the current conditions of the building industry and a critique of the state of the architectural discipline – of everyday architectural practice – that has driven us in writing this paper. We see a need to join forces across the Nordic countries in order to develop the current tectonic vocabulary, as well as to spur further practical experiments enabling theory to materialize in everyday practice. With the current increasing interest in tectonic theory that is clearly visible across the Nordic countries in recent years, the potential for such joint effort is forming. In relation to this it is an overarching challenge to grasp and exploit the «*highly developed industrialization of construction and its impact on products and processes in our built environment. The new industrialization is based on advanced IT technology and high-tech means of production. The production machinery is flexible and adaptable and requires no longer the repetition of completely similar elements*» as described by Bundgaard (2013, p. 392). As outlined by Nilsson this opens up for an architecture of variation and individuality in which «De Landa's dimensions of variable material and expressive roles that components may play in assemblages have clear connections to the ontological and representational aspects in more traditional theories of tectonics» (Nilsson, 2013, p. 415). However, as outlined in the above juxtaposition of the four ICSA 2013 papers the future role of the architect within these changing conditions of practice is still unsettled.

As stated by Beim, «*it is interesting to see how the architectural profession will approach the present challenges in the construction industry. How they will form part of the leading stakeholders and if they will come up with significantly different and sound ideas in order to help recovering current building practice*» (Beim, 2013, p. 384). In this relation the above joint reflections from ICSA 2013 have showed that the notion of 'performance' defines a possible common focus point of architecture and industry, and that the notions of 'assemblage' and 'montage' form

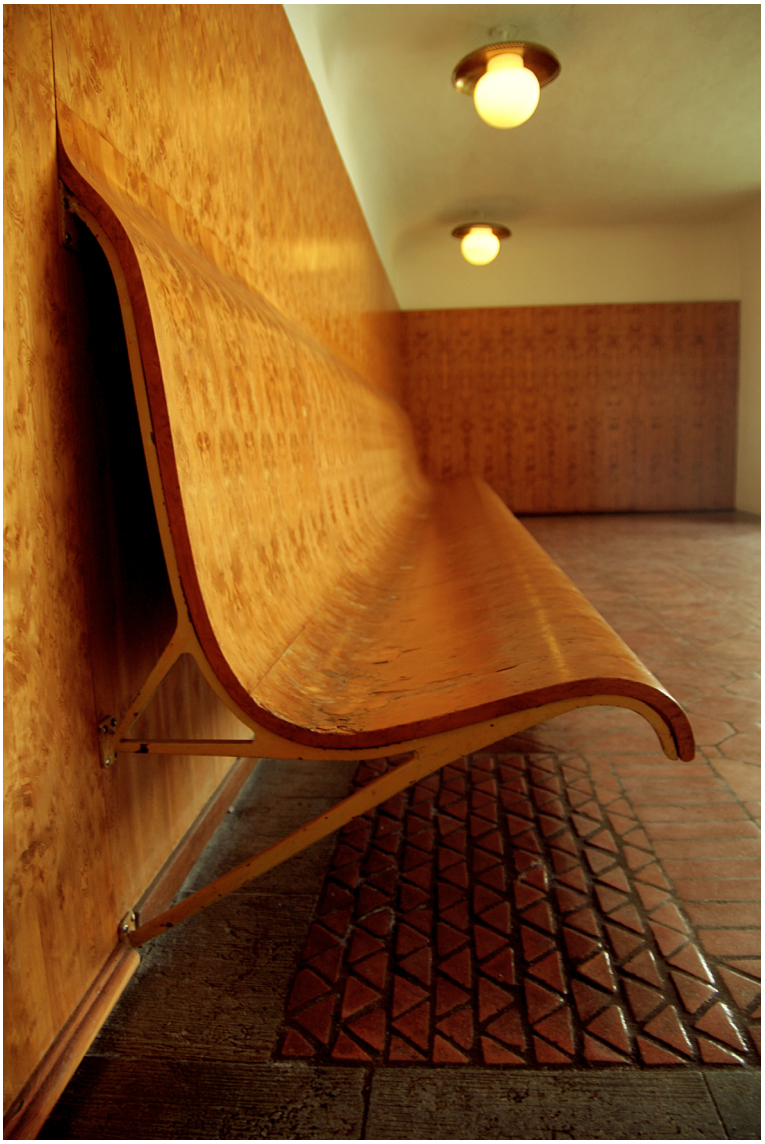

Figure 2
Gunnar Asplund's Chapel Crematorium in Stockholm, Sweden.
Photo: Trevor Pratt

potential components of a future tectonic vocabulary as they define a link between the theoretical notion of 'performance', understood both as work and as process, and the actual materialization hereof in everyday practice. In this matter it is our observation that our shared Nordic heritage offers a potential to elaborate both theoretically and practically to the meaning of 'performance' as a focal point in future tectonic research. Given its consistent attention to detail and ability on behalf of architects such as Gunnar Asplund, Alvar Aalto, Bruno Matsson, Kay Fisker and Jørn Utzon to create architecture that gesture the human scale, it is our observation that a future Nordic interpretation of the notion of 'performance' must likewise emanate in the question of the quality of architectural space related to the human body and mind. As exemplified in the sweeping plywood seat in Asplund's Chapel Crematorium and in the window fitting of Matsson's own summerhouse, such interpretation entails a tectonic positioning of architecture's ability to move its inhabi-

tants beyond mere practicality as well an in depth structural- and material understanding of the detail that form a possibility to physically anchor and architecturally apply the otherwise network theory based purely digital emergence of the notion of 'performance'. In both of the examples, Asplund's seat and Matsson's window fitting respectively, there exist an element of 'assemblage' and 'montage'; the word cladding even applies. However, each one in its own way the complexity of elements involved seems orchestrated by a clear intention and the results are 'performative' spaces in a Nordic sense of the word unfolding a clear gesture addressing the human scale. The synthesis and subtlety of principles applied in revealing these gestures are exemplary in approaching the development of a tectonic method applicable in everyday practice in their ability to give shape to structural elements. In the case of Matsson the window fitting addresses the scale of the hand suggesting an active bodily interaction with the built environment that stresses a tectonic spatial approach to the topic of sustainability, which is clearly visible also in Asplund's sweeping wall that results from a simple cladding of an otherwise insignificant wall surface. In both cases the principles applied are subtle but the spatial effect grand; even seemingly employing an element of magic akin to that of the theater. Hence, most importantly, the above mapping study positions the question of articulating the delicate matter of architectural quality within everyday practice, both when we explore novel digital technologies in research and when we engage with other parties in the actual context of everyday practice. Likewise, in particular in a Nordic context it positions the development of critical tectonic method in architecture as a central research, educational, and practical potential to be explored further.

Conclusion

If referring back to our application of the notion of *cladding* as research method and to our re-reading of the theories of Semper and Loos in this matter, it is our observation that often we experience architectural quality in works that succeed in awakening our curiosity by means of crookedness or even theatricality rather than simply due to structural honesty: Architecture should move its inhabitants beyond mere practicality, otherwise it is just a construction, but structural insight and inventiveness preconditions our ability to reveal this potential especially in everyday pratice. In relation to the question of how to continue the tectonic heritage in Nordic architectural research and practice we believe that recalling our common joy and trust in architecture's potential to move its inhabitant beyond mere practicality is central. Given the current conditions of everyday practice in which this potential is easily oppressed and even lost, the revelation of this primary spatial quality of architecture requires of us (the architects) to mobilize our ability to join seemingly opposing components. This with regards to the processes that govern everyday practice, where we need to maintain our ability to take

on a leading role while grasping and uniting the perspective, whishes, and knowledge of multiple project parties. But also with regards to the actual materialization of architectural work; where we need to be able to juxtapose custom designed elements with ready-mades, combine prefab and onsite-construction, and maybe even employ an element of theatricality. In any case there is an urgent need to address the development of a tectonic theory and method that is present to everyday practice. The establishment of a Nordic Network for Research and Teaching in Tectonics that will allow us to join forces in this matter may be the first step in this direction that we look forward to contribute to.

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