Learning by Drawing

Investigations into Danish Architecture Education

Hyams, Inger Louise Berling

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LEARNING BY DRAWING

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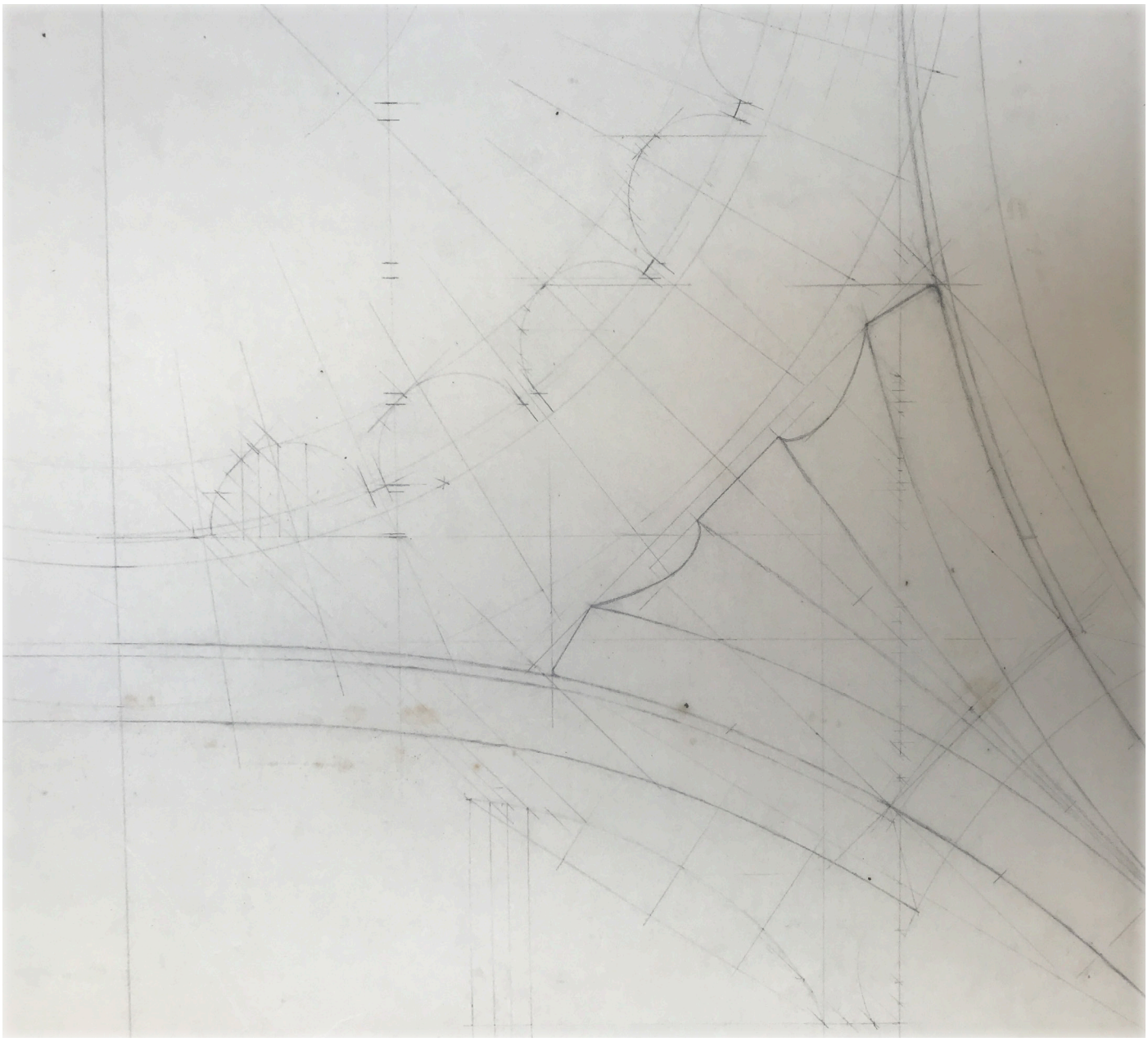

INGER BERLING HYAMS

Ph.D. Dissertation, 2020

RUC

FOREWORD AND THANKS

It is early afternoon in the spring of 2014 and the large ballroom at Charlottenborg, the home of the Academy of Art in Copenhagen, and formerly also of the architecture school, is teeming with life. The conference "What Images Do" is well underway and everyone is assembling in the large neoclassical room that has framed many discussions on the nature of art and architecture. Participants are gathering for a panel discussion with the conference's keynote speakers, and among them are Georges Didi-Huberman and Jacques Rancière. I am a Ph.D. student benched among the rest of the conference attendees. Someone poses the question, "Can you teach art?" and Didi-Huberman answers without hesitation: "this is fact." The simple basis of the straight-forward answer is the empirical observation that we do not do impossible things. We know that it is possible to teach art because we do it. And the same thing of course applies to teaching architecture. Can you teach someone to be an architect? Yes – because we do, and we have done it, in Denmark for more than 250 years. What is a much more interesting but often omitted question is: how we do it? That is in many ways the central question of this dissertation.

My interest in the topic is linked to my own experiences with architecture education and began when – just before writing my master's thesis at the University of Copenhagen – I decided to leave the university to attend architecture school. My interest in architecture had grown steadily from my studies in literature, urbanity and modern culture, but I had an uneasy feeling that there was much that I did not understand. Because I had no drawing experience, it was as if I did not speak the language. So, I went to architecture school. Being a seasoned student with ample knowledge of architectural history and theory, I naively thought that it would be an easy start to the first year courses, but I was soon baffled with the completely different approach to education and to thinking in general. When I returned to university after finishing a bachelor's degree in architecture, I next wrote my master's thesis, in 2011, on diagrammatic drawing and architecture education.[1] Here I began to discover the scarcity of research in the area of architecture education. Since that time a heightened research interest has emerged in architecture education, especially abroad, often spurred on by debates around the restructuring of schools.[2]

The process of researching and writing this dissertation has been a very long, winding, at times confusing, and cumbersome — but always interesting — road to travel. There have been many memorable, enlightening and educational moments along the way at conferences, meetings, or in casual conversation with colleagues. At each bend in the road hosts of inspiring and helpful people have supported the process. They are far too many to mention, but all deserve my heartfelt thanks. A few, however, must be named. A special thanks to: Anne Sejten, who has been much more than just a supervisor on my Ph.D. but a mentor in academic life. Anders Michelsen, whose readings of my chapters, and kind and wise suggestions for edits,

[1] Christensen-Dalsgaard, "Tegningstænkning, diagram og projektudvikling." See Appendix 10.
[2] See as examples Ockman, *Architecture School*. Boling et al, *Studio Teaching in Higher education.* And Salama, *Spatial Design Education.*

have been invaluable. Anne Romme (KADK) and all the students and staff at *Taking Place* who let me follow their projects through an entire semester, and generously agreed to interviews. Jacob Bang (KADK), who helped arrange the six-week course of field studies. Kjeld Vindum and Mette Jerl for giving me access to their insights into the six-week block structure. The many architects who opened their homes or offices to talk to me about their experiences with architecture education, and who dug into their old drawings to show me. Especially, Lise Sass Clemmesen and Charlotte Buhl, whose extensive and exquisite drawing portfolios from their school years, I have relied upon heavily. Also to Arkitektforeningen in Copenhagen for their help with contacting members. Elise Lorentsen (KADK) for sharing my interest in architecture education, many great conversations and the introduction to the Nordic Baltic Architecture Academy. Katrine Lotz, KADK, for taking time out of her busy schedule for an interview with many, many helpful pieces of information. Danmarks Kunstbibliotek for help with archived drawing material, and particularly Claus M. Smidt, who, when I had just started my studies, with his encyclopedic knowledge of architecture education helped nudge me down interesting paths. All of the post-phenomenologists, particularly Robert Rosenberger, Lars Botin and Søren Riis, who welcomed me and showed me a philosophical home that was interested and engaged in research that might not concern architecture education, but followed similar lines of thinking about technology. Peter Woodruff, for copyediting two chapters of the dissertation and additionally for, in conversations, looking underneath my work and seeing the workings of abstract machines. David Possen, for taking over the editing and swiftly and competently mending the sometimes broken English. Ezra, my son, born during my Ph.D. studies, and who since then bravely suffered being the last kid to be picked up from day-care, and who was a superhero, particularly in the final months when *mors arbejde – mom's work* – came in the way of playtime and fun. Alva, my infant daughter, for being good enough to nap and allow me to finish the last chapters. And finally, last but above all others to Avron, my husband, who supported the crazy project of undertaking Ph.D. studies without a salary, not just by providing bread on the table from his hard work, but also listening with encouragement to hour-long monologues on drawing, and sometimes giving me a gentle push to move things along.

- TAK -

PERSPEKTIVER I DANSK ARKITEKTUDDANNELSE: TEGNING, REFLEKSION OG UNDERSØGELSE

Inger Berling Hyams – Roskilde Universitet

RESUME

Der har været forbavsende lidt forskning i dansk arkitektuddannelse, og størstedelen af den eksisterende forskning er af en historisk karakter (Melgaard og Johansen 1904; Millech 1954; Fuchs og Salling 2004; Brandt Poulsen 2015). I en international kontekst er feltet heller ikke overordentligt systematisk eller ekstensivt dækket omend det I langt højere grad end I den danske kontekst er etableret (se f.eks. Joan Ockman (ed) 2013; Perez-Gomez 1984; Salama 2015; Brandt, Cennamo et al 2013; Shaffer 2007). Særligt i den historisk orienterede forskning forbigås spørgsmål, om frembringelse af arkitektur, tegning og dennes betydning for det at lære at tænke arkitektonisk. Inspireret af arbejder som hos Edward Robbins (1994), Dana Cuff (1992) og Albena Yaneva (2012) er afhandlingen interesseret i det mere praksisorienterede og i skabende processer.

Arkitektuddannelse kan siges at være tegningens institutionelle indramning og det er ydermere signifikant for dansk arkitektuddannelse at der er tætte bånd til netop det kunstneriske, skabende og æstetiske. For mere dybdegående at forstå og analysere arkitektuddannelse fremsættes et paradigmatisk rammeværk, hvori der differentieres imellem *Beaux-Arts (jvnf. Harbeson 2008; Lucan 2009; se kap 2.1)*, det *polytekniske* (jvnf. Pfammatter 2000; se kap 2.2) og *practitioner* (jvnf. Schön 1983; se kap 2.3) paradigmerne. Hvert af paradigmerne knytter særlige praksis, tegningsstrategier og epistemologier til sig, og de bliver derved forbundne med hvad man kan kalde *tegningstænkning* – altså at arkitektstuderende tænker *igennem* og med deres tegning.

Afhandlingen er struktureret I tre dele, der bidrager til at etablere det samlede argument på hver sin måde. I *DEL I* opstilles det paradigmatiske rammeværk, hvis skematiske opstilling (se kap 2.4) giver anledning til at diskutere, hvordan de tre paradigmer har grundlæggende forskellige tilgange til f.eks. stringens og kreativ frembringelse og ydermere at opstille tre forskningsspørgsmål, der guider de sidste dele af afhandlingen:

1. *Hvordan relaterer arkitektskolen i København sig i forhold til Beaux-Arts, det polytekniske og practitioner paradigmerne?*
2. *Hvilke evalueringspraksis og -kriterier benyttes og hvordan etableres de?*
3. *Hvordan undervises der i tegningstænkning og hvordan praktiseres tegningstænkning af de studerende?*

I *DEL II* skifter modus til det case baserede og i tre kapitler analyseres uddannelses- og tegningspraksis, først som tre historiske nedslagspunkter (kap 3), dernæst som et tværsnit af oplevelser og erfaringer fra

arkitektskolen i den sidste del af det 20.årh. (kap 4) og til sidst som et dybdegående studie af et førsteårs semester (kap 5). I *DEL III* samles de to deles materiale i tre refleksioner omkring bedømmelse, tegningstænkning og paradigmer. Refleksioner omkring bedømmelse tager udgangspunkt i observationer af en semesterkritik og en vurdering af en evalueringsmodel fremsat af Oh et al. (2013). Gennem en kantiansk forståelse af det skønne som omdrejningspunkt for de æstetiske dele af bedømmelsen problematiseres den, og munder til sidst ud i et forslag om en ændret multimodal evalueringsmodel (Se kap 6). I kapitel 7 fremsættes en skitse til hvordan tegning fungerer som en medieret tænkningsform, hvor dele af Schöns praksisepistemologi (Schön 1983) samtænkes med postfænomenologisk teknologi filosofi (jvnf. bl.a. Ihde 1990) og diagramteori (jvnf. Stjernfelt 2008, Deleuze 2013 og Zdebik 2012). Konkret argumenteres der for at tegningens multistabilitet (jvnf. Ihde 1990; Rosenberger 2016) er grundlaget for den *back-talk*, der med Schön (1983) bliver afgørende for stringent kreativ praksis. Arkitekturtegningens multistabilitet øges og søges igennem dens diagramkarakter. I kapitel 8 munder en paradigmeanalyse af arkitektskolen i København, måske ikke overraskende, ud i at paradigmerne ikke findes i rene former, men væves sammen i forskellige konstellationer. *Beaux-Arts* paradigmet har dog haft større indflydelse end det polytekniske paradigme, uden at det retfærdiggør at skolen tildeles et egentlig *Beaux-Arts* prædikat.

Afhandlingens primære bidrag bliver gennem analyser, cases og refleksioner at tilvejebringe tre byggesten (paradigmer, tegningstænkning og en multimodal bedømmelses model), der hver for sig kan give anledning til mere præciseret forskning inden for feltet, men som også tilsammen begynder at pege imod forståelser, der i fremtiden kunne udvikles til en mere regulær og selvstændig videnskabsteori for arkitekturfrembringelse. En bedre forståelse af praksis og tilgange I arkitektuddannelse er et godt udgangspunkt for at forstå kompleksiteter i arkitektonisk praksis I mere almen forstand, og under alle omstændigheder øver arkitektuddannelse en dyb indflydelse på arkitekter under deres uddannelse. De arkitekter som senere er med til at danne og omforme det bebyggede miljø vi alle bebor.

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CHAPTER 1:
INTRODUCTION - WHY STUDY DANISH ARCHITECTURE EDUCATION?

"If the art is not invariant, known, and teachable, it appears nonetheless, at least for some individuals, to be learnable."[1]

Because it is an art form that is almost impossible to avoid, architecture is highly relevant for all of us. Whereas you could choose not to seek out pictorial art, music, film or literature, and generally be successful, architecture is more or less forced upon you. Architects (and of course the entire framework of planners, developers and decision makers) hold influence concerning our spatial organization and it is therefore only right to ask questions to better understand how they think. Architecture education as a field of study thus becomes critically important to engage in, because it sets up the frame for the skills and knowledge that future architects will have. Put simply: for the reason that architecture influences all of us profoundly, and architecture school forms architects, we should better understand the practices of architecture school.[2] How exactly is it that you become an architect? What sort of knowledge do different exercises give students and how is it that you form the experience that, in the end, enables you to be a good designer? Before we can turn to such comprehensive and likely unanswerable questions, we need a framework for the field of inquiry – and such a framework is unfortunately not yet very well defined.

To set the problem in a Danish context: Despite the fact that Denmark has been educating architects since 1754[3] and the Copenhagen architecture school thereby is one of the old architecture schools in the Western world,[4] research into Danish architecture education is still underdeveloped and at best sporadically undertaken. Most of the more comprehensive work that has been undertaken has an historic aim of describing, in more or less detail, the institutions themselves.[5] In *Composition, Non-Composition* Jacques Lucan finds the French Beaux-Arts method of architecture education to be predominantly oral. The same would seem to be true of Danish architecture education in general. Knud Millech, in a chapter specifically on the architecture school in the 1954 jubilee history of the Royal Academy in Copenhagen, includes a couple of

[1] Schön, *The Reflective Practitioner*, 18.
[2] Throughout the dissertation I refer to architectural design sometimes as simply 'design,' and to architectural design problems as 'design problems,' etc. I do not mean to highlight a difference between the two fields of work – although there likely are some differences – but am rather referring here to a general overall concept of design.
[3] Salling and Smidt, "Fundamentet. De første hundrede år," 26.
[4] Knoll, "The Project Method." Knoll states that the beginning of architecture education in academies can be traced back to the Accademia di San Lucca in Rome that opened in 1593. In contrast it was only in the mid-1800s that architecture education became institutionalized in the United States. For more on this see also Lewis, "The Battle between polytechnic and Beaux-Arts in the American University," 68-69.
[5] See for instance Meldahl and Johansen, *Det kongelige Akademi for de skjønne Kunster 1700-1904*; Millech, "Arkitekturskolens historie efter 1904"; Fuchs and Salling, eds., *Kunstakademiet 1754-2004*; and Brandt Poulsen, *Den gode skole*.

descriptions of daily life situations as recounted to him by then students or teachers.[6] But there is no doubt that, from a pedagogical point of view, the architectural teaching in Denmark was at that time not a strong academic tradition. Millech admits as much and quotes the head of the architecture education commission in 1943: "The school is thus not in possession of 'experience' material, that other more well-organized teaching institutions have and use to support their lessons. It has furthermore not had the means to produce pedagogical material which can in a satisfactory manner make this knowledge accessible for the students."[7] Since then some studies of individual programs have been conducted, most notably perhaps *A Beaux-Arts Education for the 21st Century* (where the practice of teaching 1st year students at the Aarhus School is surveyed[8]) and the report entitled *Transforming Tradition* (an evaluation of the Copenhagen School from 2006 which offers an analysis of the Copenhagen School with an outlook on international positioning).[9] In addition, in 1976 Hanne Marcussen wrote a report on architecture education, which focused solely on the Copenhagen School.[10] But the overall image is of a tradition that was never very systematic – and that, indeed, sometimes seemed to deliberately avoid systematization.

Although to a much greater extent than in the Danish case, in an international context the field of architecture education is also not very systematically or extensively covered.[11] The US has in many ways the strongest research tradition in the field, with the Association of Collegiate Schools of Architecture (ACSA) as the main driving force.[12] Research and interest in the field seems to be in the ascendency in the US nevertheless – with relatively recent publications such as Architecture School, a volume edited by Joan Ockman, which declares itself to be the first comprehensive study of architecture education in North America.[13] The heightened research interest in architecture education stems in my view from a detection of the challenges facing the architecture profession, as well as the potential for using certain skills and tools that so far remain unique to designers and architects in a wider context.

To return to a Danish frame of reference, Danish design made an entrance on the global scene in the 20th century, and ever since we have been eager to continue the international success. It is common knowledge that Danish architects and designers work within a much-cherished Nordic tradition for excellence and elegance in both form and function. But, where does it all start? Rather than focusing on the individual practitioners and their rise to fame, we may ask into the characteristics of the institutional

[6] Millech, "Arkitekturskolens historie efter 1904."
[7] Millech, "Arkitekturskolens historie efter 1904," 450-451.
[8] Reinmuth, ed., *A Beaux-Arts Education for the 21st Century.*
[9] The Danish Evaluation Institute, "Transforming Tradition."
[10] Marcussen, *Om arkitektstudiet*.
[11] As examples see Ockman, ed., *Architecture School*; Salama, *Spatial Design Education*; Pérez-Gómez, *Architecture and the Crisis of Modern Science*; Brandt et al., "A theoretical framework for the studio as a learning environment"; Shaffer, "Learning in Design"; or in general articles in *Journal of Architectural Education.*
[12] See for reference the ACSA's homepage: http://www.acsa-arch.org/about/about-acsa
[13] Ockman, "Introduction,"10.

framework that have fostered the architects from the beginning of the 20th century until today. The most pressing motivation for this research is that the Danish architecture schools during these years have undergone large restructuring processes, as well as they are facing growing demands that they conform, or at least position themselves in relation, to standard criteria for academia.[14] This Danish development coincides with similar changes abroad, where for instance the UK has had a hefty debate about the direction and relevance of certain activities in some architecture schools.[15] It is clear that architecture education is currently undergoing change, but it is less apparent what is actually happening. A study not only of contemporary practice, but also a knowledge of different historical methodologies in the underlying design thinking, could help inform the decisions that will shape future design education.

It is significant for Danish architecture education that it has remained closely linked with an artistic tradition, and is thus also, to a highly accentuated degree, based largely on visual expression rather than on language. Drawings are therefore vital sources to consider when analyzing Danish architecture education. Perhaps because architects are primarily educated through the act of drawing, not all of their decisions are necessarily communicated and motivated in language – and this unfortunately can create a gap both between the architect and the general public, and also between the architect and scholars. It is probably naïve to think that such a gap can be bridged, but it is nonetheless necessary to at least investigate it. A well-founded knowledge of how architects learn to make aesthetic decisions could help demystify such practices and perhaps narrow the gap somewhat.

My research was exploratory in its outset, in part because the available literature on Danish architecture education, and architecture education in general, is both sparse and very history-oriented. In this light, to set-up a full framework or analytic view into Danish architecture education as a whole would be far too great a task to embark on in a Ph.D. dissertation, so I shall make do with a more modest outline or a sketch to pin a deeper investigation to. Three different themes emerged during the course of the research: educational paradigms, *drawing epistemology* and technology of architectural drawing. Of the three the theme of paradigms in architecture education has been singled out and prioritized in this dissertation. The paradigm focus was developed as a way of structuring the approach to the otherwise vaguely defined field of architecture education and I thus propose a framework for a paradigmatic analysis of architecture education that distinguishes between the Beaux-Arts, the polytechnic and the practitioner paradigms.

Both the Beaux-Arts schools and the Polytechnic schools are described in scholarly literature, but to lift the labels from something historical and into the more epistemic, I attempt to describe them in relation to specific epistemologies and drawings practices. Therefore the paradigms become interconnected with the

[14] See the Rector of KADK, Lene Dammand Lund's, blogpost from April 2nd, 2015 as an example of this debate. Dammand Lund, "Kære Sofie Carsten Nielsen," KADK, Accessed May 29th, 2019, https://kadk.dk/rektors-blog/kaere-sofie-carsten-nielsen.
[15] UK Architectural Education Review Group, *Pathways and Gateways; And Wainwright,"Towering folly."*

themes of drawing as a technology and an underlying interest in what I term *drawing epistemology* [tegningstænkning]. That is to say, how, as an aspiring architect, you achieve experiences through the act of drawing. The in English rather inelegant term of *drawing epistemology* is directed at the sort of knowledge and knowledge formation architects achieve through drawing. Therefore drawing is set before epistemology, rather than the more grammatically correct form of 'epistemology of drawing', were epistemology comes first and not as a dependent of drawing. Architectural drawing and aesthetics are fields where values and judgments are almost notoriously 'fuzzy.' I carry out investigations into educational and cognitive practices connected with drawing, to explore an underlying interest in studying the formation of knowledge through drawing. With this I do not wish to imply that experience through drawing happens only in architecture schools. In fact, most architects doubtless maintain drawing experience and wisdom via the act of drawing throughout their lives and careers. Architecture school is just a very 'pure' instance of both knowledge creation and the acquisition of existing knowledge. The main hypothesis or assumption of this dissertation is that the thinking that architectural students are trained in is a sort of interaction with a material, and therefore drawing as technology, although not given much priority in this dissertation, is important. Learning to think like an architect is to learn to think through a material – often a drawing. This is a slightly different motion than thinking and then representing the thoughts in a material. Of course this sort of 'assisted thinking' is not unusual, not even with regards to visual outputs as in the field of 'diagrammatic reasoning'.[16] What is particular to the architectural context is the syncretic nature of attention. The architect must not simply learn mathematised representational forms to be able to work with technical aspects of design, but works with aesthetic and symbolic impressions as well. Intrinsic to this dissertation is an ambition to understand the framework for explaining and legitimizing the in part aesthetic decision-making that is gradually learned as the basis for becoming a proficient architect. Nowhere is better suited to research *drawing epistemology* [*tegningstænkning*] than an architecture school: it is where it comes into being, where it is taught, or if not taught then at least learnt. This dissertation thus has not only an interest in better understanding the general practices in architecture school, but what the particular drawing practices are and how they are related to thinking through drawing.

1.1 A GUIDE TO THE DISSERTATION

The intention here in Chapter 1 is to make an introduction both to the dissertation in general and its overall research questions. Furthermore, this chapter will introduce the methods as well as the different data sources that the dissertation relies on in the empirical work. Apart from the introduction and conclusion the

[16] For a plethora of examples and reflections on this see Glasgow, Narayanan and Chandrasekaran, *Diagrammatic Reasoning*.

dissertation is structured in three parts: Part I - Framework: Genealogy of Architecture Education, Part II - Cases: Architecture Education in Copenhagen, and Part III - Reflections: Diagram, Judgements, Paradigms. This is done to reflect three different modes or approaches in the research. Part I consists of only one chapter, Chapter 2, which is both a positioning of the dissertation in relation to selected literature in the field of architecture education, and also the establishment of an analytic framework. The departure for this chapter is the dichotomy between the artistic and the technical as a central discussion in architecture education. First, I lean on the generally accepted differentiation between the Beaux-Arts and polytechnic traditions, but then also draw lines from the practices in order to establish explicit epistemologies and ontologies for these two. I then argue that one cannot understand contemporary architecture education purely on the basis of these two paradigms; I therefore sketch out what I term the practitioner paradigm, which leans heavily on Donald Schön's theories concerning the reflective practitioner. Different ontologies, epistemologies, views on creativity and pedagogic activities are then linked to these different paradigms through an analytic discussion of their respective origins. The analysis in Chapter 2 is also used to tease out the following specific research questions:

- *How does the Danish architecture school in Copenhagen relate to the paradigms of Beaux-Arts, the polytechnic and the practitioner?*
- *What evaluation practices and criteria are present, and how are they established?*
- *How is thinking through the act of drawing taught and how is it carried out by students in the drawing process?*

PART I is therefore intended to be the analytical motor that sets the work in motion.

In PART II - Cases: Architecture Education in Copenhagen, the mode of research shifts to case based work and in three chapters I present three different case studies, or probes into the context of architecture education in Copenhagen. The first case presented in Chapter 3 seeks to capture the span of the beginning of the 20th century to present day through a view into three different moments: the beginning of the 20th century, the mid-20th century, and contemporary practice at the Danish Royal Academy of Arts, Architecture School (KADK). The focus of the chapter is largely the structure of architecture education, but with special attention to early and mid-20th century drawing practices. Following upon this are two chapters that each present a study. Chapter 4 that is based upon interviews with 17 Danish architects is a study of a cross-section of architecture education in Copenhagen in the last half of the 20th century. The accounts about the educational experiences of the architects, whose studies took place from the 1950s to the 2000s, form the basis of reflections on approaches to both drawing and architecture education. Chapter 5 focuses on what I have called the foundations of architecture, and follows the first semester of the KADK bachelor program entitled *Taking Place*. The study is based on ethnographic field studies, qualitative interviews and

photographs of student drawings. The chapters of PART II are both analytical, but also intended to work as thick descriptions of their contexts and as such provide data for the again more theoretical reflections of PART III.

In PART III - Reflections: Diagram, Judgements, Paradigms, the mode of research shifts again and the research questions are addressed based on the empirical work and the analytic framework. In Chapter 6 the question of how style, taste and aesthetics play into the evaluation of architectural drawing – particularly in the pin-up situation, which is explored as an instance of Kantian judgments of taste – leads to a reading of four different approaches to the evaluations. The chapter reflects on the syncretic nature of architectural projects and therefore in the most solution-oriented moment of the dissertation develops a multimodal framework for scaffolding evaluations. Based on the empirical findings, postphenomenological theory, and theory of diagrammatics, in Chapter 7, I discuss how thinking happens through drawing, and how it is taught. In short, I argue that diagrammatic theory opens a way of understanding how thinking happens through drawing, not only in the instance of technical, mathematized drawing, but also in freer more aesthetic and explorative approaches to drawing. With regards to the interconnection of the paradigms and *drawing epistemology* then it is an important point that the three paradigms vary with regards to how *drawing epistemology* is conceived (as argued in Chapter 2). This, in turn, brings about the equally important point that there is no *drawing epistemology* in the singular, but instead multiple *drawing epistemologies*. *Drawing epistemologies* are situated within the contexts of particular drawing practices. That said, there are also stabilities within drawing that lend themselves well to theorization: the diagrammatic, a particular form of mediation, and the dialogical will be highlighted as such in Chapter 7.

In Chapter 8, I attempt to connect and compare the practices that are uncovered in the empirical chapters to traces of the educational paradigms that are described in Chapter 2. Rather than crass categorizations, the intention with the paradigms is to set up an analytic framework that enables structured comparison and discussion of the different educational practices either over time or between different institutions. Unsurprisingly, as will be shown in Chapter 8, the educational practice studied at KADK does not fit squarely into any of the three paradigms. The analysis does, however, presents an image of the Danish educational tradition as one that has always been rather independent, but demonstrates how the paradigmatic framework allows for a deeper understanding of the complexities of the tradition. On the background of the dissertation, the conclusion in Chapter 9 aims to establish the argument that a perhaps different type of rationality has been, and remains, dominant in the architecture school. The object is to establish a first, and still perhaps premature, sketch of the notion of knowledge in architecture education, and as such hint towards a 'theory of science' in the field. The particularities of architecture education and especially *drawing epistemology* necessitate that an analysis become situated within, and work from the

point of departure of, empirical study, as I will argue in the next section, where I present the methods employed and the general research design.

1.2 WHY WORK EMPIRICALLY? – RESEARCH DESIGN AND METHODS

For the reason that it presents a complex field of historical sources, individual experiences, practices, materials and theories – to mention just a few – studying architecture education necessitates using mixed methods in the collecting of data. Drawing on Foucauldian theory, in his *The Portfolio and the Diagram* Hyungmin Pai argues that "modern architecture is a discursive practice."[17] To regard architecture as a discursive practice does not necessarily imply that it is regarded as language, but as Bacchi and Bonham have argued, for Foucault discourse practices describe "practices of knowledge formation by focusing on how specific knowledges ('discourses') operate and the work they do."[18] As the focus for the research is drawing and drawing practices, the data collection includes the collecting of drawings from architecture students for analysis. In order to establish context, however, the research design is largely based on interviews. When working with past architecture education one has to rely on those sources that remain available today: thoughts that were written down, drawings and protocols kept, and memories from former architecture students – but when turning to the present-day practice, many more options become available. Therefore, concerning the contemporary situation the methods used to collect data are more varied, consisting both of interviews and ethnographic field observations. These methods, available in the study of contemporary and recent historic practice are used not simply because of their availability, but because, I believe, they give a better basis for answering the research questions. Because questions concerning drawing epistemology are not directly observable, qualitative interviewing can be an approach. As Martin Forsey in his *Handbook of Qualitative Research in Education* puts it: "If the questions one wishes to pursue do not lend themselves to observable moments, interviews are likely to be the best way to address the research questions."[19]

I have chosen to work empirically and not just theoretically, or based solely on data already known from previous studies. It follows a different path than the comprehensive systematic literature review – although it could be a relevant contribution to the sprawling (and yet somehow still relatively sparse) field of research into architecture education, and especially Danish architecture education. That said, I base almost the entirety of Chapter 2 on theoretical literature connected with the themes of architecture education that I have selected. Working empirically in the majority of the rest of the dissertation is primarily, but not purely, done out of necessity, but also for the deeper methodological concern that the claims that are made here be

[17] Pai, *The Portfolio and the Diagram,* 3.
[18] Bacchi and Bonham, "Reclaiming discursive practices as an analytic focus," 174.
[19] Forsey, "Interviewing Individuals," 365.

situated in a particular context – within the context of this particular frame of research – as will be expanded on in 1.2.2. Where it is relevant, appendices have been made that contain referenced material such as excerpts from the interviews, drawings, field notes and photos. When I refer to interviews these will simply be referenced by a name and timestamp, but other material will specifically refer to the relevant appendix. A few of the appendices are not linked to specific chapters but contain more general material – this is for example the case for Appendix 12, which contains those of my published articles that I have chosen to refer to in this dissertation.[20]

The following sections on methods will roughly follow David Silverman's prescriptions from his *Doing Qualitative Research.* I address: 1) the data studied, 2) how I obtained data access and consent, 3) methods for collecting data, 4) why these methods were chosen, 5) how the data has been analyzed, 6) advantages and limitations in data analysis methods, and 7) what claims are made for the case study with regards to generalizability.[21] I shall start by presenting the data.

1.2.1 DATA SOURCES

The empirical work in this dissertation consists of different methods that produced the following different data sources: 1) theoretical literature studies, 2) archival research, 3) 2011 study source material, 4) *Taking Place* study, 5) *six-week block* study, and finally 6) the 'historical' interviews. In the following, I will give a more comprehensive description of data collection and analysis strategies for the three different methods used: visual research, qualitative interviews and ethnographic field studies. First, I shall offer a short description of each of the data sources and the methods used to obtain them.

Archival Research

Instead of relying solely on published histories, I have also supplemented these with some archival research in order to support some of the historical parts of the research. These parts had initially been intended to have more prominence in the dissertation, but are now mainly found in Chapter 3. The archival research was documented via field notes and photographs, and those referred to in the dissertation have been collected in appendices. The most important part of this research has been into the school drawings held in the Danish Art Library. I have especially studied the student drawings of Danish architects Kaj Gottlob and Gerhardt Poulsen from the early part of the 20th century. The Danish Art Library in Copenhagen governs a large collection of architectural drawings, including the drawings of students from the Copenhagen School of Architecture. Sadly, there has not been a systematic collection strategy for student material, so the

[20] See list of appendices.
[21] Silverman, *Doing Qualitative Research*, 235.

collection that exists is based on donations of drawings to the library – this of course mostly from famous or 'interesting' architects. With its drawing collection the library is however an invaluable source for research into the history of architecture education. Kaj Gottlob and Gerhardt Poulsen were selected for study firstly because they were students in the early years of the 20th century; secondly because, in the case of Gerhardt Poulsen, the collection of student drawings is extensive (if perhaps not entirely complete); and thirdly, because Kaj Gottlob's final project contained his own notes for his exam, and therefore presented a multimodal insight to his thoughts about the project. The archival research also included research of material located at the Danish National Archives: final project protocols, semester plans and meeting minutes at The Royal Academy Copenhagen, Architecture School.

2011 diagrammatic practice study

As part of my 2011 master's thesis I conducted qualitative semi-structured interviews with seven students and two teachers from Department 6 at the Copenhagen Architecture School, and collected an archive of their drawings. This small study indicated that the students were acquiring the majority of their learning through drawing practice. I also found an indication of what I called 'diagrammatic thinking,' which pointed to an epistemology where the students are able to get real experience from their "fantasy drawings" (the drawings are of course real, but the houses will never be built). Excerpts from the material from that study have been attached as Appendix 10. Access to the interviewed students was obtained through the program leader who had selected them: one first-year student, two second-year students, one third-year student, one fourth-year student, and two fifth-year students. Along with the interviews, diagrams from the students' portfolios were selected by the students themselves and collected in a diagram archive. The interviews were anonymized, and the interview subjects provided their consent to participation through email correspondence. The study and the data are referred to multiple times, but particularly in Chapter 7.

Six-week block study

In the fall of 2014 KADK changed the structure of their curriculum, separating each semester into a six-week block of courses taught to all BA students of the same year, and twelve weeks of training in specific programs. The study of the six-week block consisted mainly of field observations conducted in 2014, along with a semi-structured interview with Jacob Bang, who was responsible for the six-week block during the first semester. The field observations were logged in field notes and supplemented with photographs. In addition, parts of the visual exercise material from the sessions were collected. Access to make observations during the sessions was obtained from Jacob Bang, whom I was referred to when I approached the rector of KADK, Lene Dammand Lund, about KADK's participation in my research. In the summer of 2018, I was able to do further studies on the six-week block structure, and conducted a semi-structured interview with Mette

Jerl and Kjeld Vindum, who organize all of the six-week blocks as well as the curricular studies for the compendia of the blocks. In the spring of 2017, I had planned a series of interviews with heads of institutes at KADK, but only Katrine Lotz, head of the Institute for Architecture Urbanism and Landscape (IBBL), responded to the invitation. Significant parts of the Lotz interview concerned the 2014 structure, and the interview was therefore instead used in connection with the six-week block study.

Taking Place: first semester study

Taking Place is a BA program under the department of Architecture and Culture (IBK) at KADK. I observed a first semester course for the study that I carried out in the Fall 2014/Winter 2015. At the time, KADK had just implemented a new structure, and this was the first semester that the new BA program was running. The study includes observations and field notes, but in great part also relies on in-depth semi-structured qualitative interviews with six first semester students, and two of their teachers. Student interviews were carried out twice for each student, with different themes for each interview, with the last part of the second interview left unstructured and related to the students' drawings. The drawings were photo-documented and analyzed. The series of interviews presented in Chapter 5 focused on the first semester students' first introduction to architectural thinking in the studio, and also formed the basis for the study of the evaluation practices in Chapter 6. The first semester of study was selected partly because of access to – and interest from – this department, and partly because of a research interest in how the very basics of design were taught and learned. It presented a chance to meet students who were still mostly unfamiliar with the practices of design and therefore noticed and wondered about them. My access to the program leader at *Taking Place,* Anne Romme, was obtained after recommendation from Jacob Bang. All participating students signed written forms of consent that informed them of the study. I recruited the students to the study on a random basis (deliberately before I had seen their drawing material), but I selected three students from each class (the students were split between BBK1A and BBK1B) and distributed the selection evenly on gender. I interviewed Anne Romme, who also taught in BBK1A, and Tine Bernstorff Aagaard, who taught in BBK1B.

'Historical interviews'

The interviews consist of 17 semi-structured qualitative interviews with architects who completed their education from the architecture school in Copenhagen at different times, ranging from the 1960s to the 2000s. The interview series gathers experiences and drawing material in order to get first-hand perspectives on previous educational practices. The nature of these interviews is of course a retrospective look at the architects' time at the architecture school; but since there are no (or very few) sources for this sort of first-hand account, I deem them potentially highly valuable historical sources. The interviews were initially planned in the following way: two architects who had graduated from 2000 to 2010, two graduates from

1990-2000, two from 1980-1990, two from 1970-1980, two from 1960-1970, 2 from 1950-1960, and if possible older graduates. In order to recruit volunteers to the interviews, the Architects Association in Copenhagen kindly shared a request to their members in the greater Copenhagen area. As interest in participation exceeded the original scope, I decided to expand the study somewhat. The interviews were carried out in a location selected by the participant – most often in their home or their office. The participants were asked to find drawings from their school years, if possible, which seven of them did – predominantly from the 60s. The drawings were covered in an unstructured final part of the interview, and documented photographically. All participants signed forms of consent that informed them of the study, and were offered anonymity. However, many of the participants did not wish to remain anonymous and are therefore presented with their real names.

1.2.2 AN EXPLORATORY COLLECTIVE CASE STUDY

Although it does not paint a complete image of KADK or Danish architecture education, the focus on KADK and its history categorizes my research as a kind of case study. As there are several minor cases within the larger case study, it can be described as a collective case study. According to Bruce L. Berg's *Qualitative Research Methods* collective case studies often involve the "study of several instrumental cases, intended to allow better understanding, insight, or perhaps improved ability to theorize about a broader context."[22] I regard for instance as minor case studies the *Taking Place* study (as opposed to a study of all BA programs), and the study of the drawings of Gerhardt Poulsen and Kaj Gottlob, as cases or instances of architecture education in the early 20th century. Apart from obvious categories that would have to be mentioned in a quantitative approach to the subject (age, gender, background etc.), there are many factors that could play a part in the picture of architecture education, for – just to mention one – in architecture education there is also a difference between different study departments or studios. To explore this difference, and to comparatively cover all the different directions, would necessitate a much larger sample group and breadth in each of the studies. A qualitative in-depth study of such a large sample group was not within the practical limits of this project, nor would it have been the aim. The dissertation focuses on drawing practices in a more general way, and therefore a smaller sample group is suitable. The strategy of selecting the collective case approach is of course for the research to span more broadly – that is, to cover more than just one instance of educational practice in the 20th century. Nonetheless, this of course comes at the expense of more nuance that, for instance, a study of all BA programs could have provided.

[22] Berg, *Qualitative Research Methods*, 326.

The emphasis on the span of the research was elected based on the relative scarcity of existing research and because my case study of KADK and Danish architecture education can be said to be an *exploratory case* study, since the more specific research questions were only formulated during and after the empirical research.[23] The aim of each of the minor studies is depth rather than breadth, and a smaller sample group enables more thorough interviewing, interview analysis and drawing analysis. I will not deny that I believe the area of Danish architecture education calls for much more research. Even with that said, some of the studies are not as exhaustively worked through; this is for instance the case with the historical interviews, where Chapter 4 focuses only on parts of the interviews. To address the issue of the generalizability of the case study, I will certainly not claim to have studied – and therefore do not say anything about – the entirety of Danish architecture education, or drawing epistemology, through the empirical studies presented in this dissertation. However, I do argue that some of the empirical findings point to tendencies that can be understood to apply more generally, as will be the point of departure for Chapters 6 and 7. I do not argue this on the same basis as would for instance Berg, who brings forth a belief in a general predictability of human behavior.[24] Rather, I adhere to the argument made by Robert Rosenberger pertaining to the value and claims of 'nonfoundational' and 'anti-essentialist' research such as postphenomenology.[25] To very briefly recount part of his argument, Rosenberger establishes that postphenomenology works with what Don Ihde has called invariant structures,[26] and that these should be understood to "be features that hold across certain stabilities, and perhaps even in some cases all known stabilities, but which do not point further past those particular stabilities toward an essential character independent of them."[27] As such, my research works to discover structural invariances across some, but not all, stabilities concerning the technology of architectural drawing and architecture education. The paradigms proposed in Chapter 2 should therefore be viewed as different stabilities within architecture education, and my claims about them are situated in the context of this investigation.[28] To work with the particular stabilities, empirical data was collected that in general relied on three different types of methods: 1) visual research, 2) qualitative interviews, and 3) field observation. In the following, I will describe my approach to the three methods, why they have been chosen, and their advantages and disadvantages. I shall close out with an overall description of the coding and analysis strategy, and then finally address the focus of the dissertation.

[23] Cf. Berg, *Qualitative Research Methods*, 327.
[24] Berg, *Qualitative Research Methods*, 330.
[25] See Rosenberger, "Notes on a Nonfoundational Phenomenology of Technology."
[26] Rosenberger, "Notes on a Nonfoundational Phenomenology of Technology," 480.
[27] Rosenberger, "Notes on a Nonfoundational Phenomenology of Technology," 486-487.
[28] Cf. Rosenberger's prescription 3. Rosenberger, "Notes on a Nonfoundational Phenomenology of Technology," 487.

1.2.3 QUALITATIVE INTERVIEWS

Qualitative interviews were chosen as a method for data collection because parts of my project's interests are non-observable phenomena that are linked to the architecture students' understanding and experience of drawing practice. In his Qualitative Interviewing, Seidman suggests that it is precisely such interest in the experiences of others that are often the foundation of qualitative interviewing: "At the root of in-depth interviewing is an interest in understanding the lived experience of other people and the meaning they make of that experience."[29] For the historical interviews, part of the motivation was also to simply record the accounts of individuals as historical documents. Whereas drawings, as well as protocols, and papers, have to a certain extent been collected from the institutions. There are very few systematic accounts of lived experience of Danish architecture education – if in fact any. Together with the archived materials, individual experiences of architecture education are vital – not least if the aim is to understand 'drawing epistemology' and educational drawing practices. As a method, the interview was further chosen on the background of positive experiences from the 2011 study. Here the argument for carrying out interviews was that architecture students are used to talking about their drawings, and drawing process, with their teachers at the weekly *desk crits*.[30] The student interviews in the *Taking Place* study were therefore conducted at their desks in front of their drawing material, in order to mimic the familiar situation. For the historical interviews, they were carried out in a location selected by the participant, most frequently the participant's home or office. As a note, I use the term 'participants' for the interviewees in order to underline their engagement in and contribution to the research. Concerns about interviewing as exploitation is a commonly raised issue.[31] As a group, Danish architecture students cannot be considered excessively vulnerable, and the topic of my research was not, for instance, psychological pressure in architecture education, or some similarly sensitive subject. I was however aware that questions around creative learning processes are for instance of a personal nature and can be difficult to express, particularly to strangers, as are well the frustrations and insecurities that naturally follow from the learning process. All participants (barring the participants of the 2011 study that had previously been carried out) read and signed a consent formula that informed them of what their participation consisted, offered them anonymity (but stressed that their drawings might be recognized even so), and informed them that they could withdraw from the study at any moment, should they so desire. Whereas few of the architects from the historical interviews desired anonymity, it was significant that all the students elected to be anonymous. As it would have been impossible to sufficiently conceal their identities, the teachers and heads of departments and programs interviewed at KADK were not

[29] Seidman, *Interviewing as Qualitative Research*, 9.
[30] Christensen-Dalsgaard, "Tegningstænkning, diagram og projektudvikling." See Appendix 10.
[31] Seidman, *Interviewing as Qualitative Research*, 12.

offered anonymity, but they were fully informed of this before signing their consent formula.[32]

For the purposes of understanding *drawing epistemology*, an obvious problem with interviews is that they are hinged on language rather than on the visual. Even so, one might argue that a drawing, or the drawing process in itself, also does not give full access to what the designer thinks. An interview approach that could perhaps be explored in further studies would be documentation and interviewing during the drawing and design process. The drawing's development could be video-documented, while the architecture student was intermittently asked about what they were doing with the drawing and why. Such a method would however be immensely time-consuming, as project development typically runs over an entire semester, or at least a few weeks for each of the semester's deliverables. The method would also be intrusive for the student, who might be encumbered by the observations and questions; and the observation would in itself be likely to affect the design and drawing approaches, and also the reflection on them. For all of these reasons, the interviews for the *Taking Place* study were planned for after the semester course. Most of the interviews rely on the participant to remember and reflect on experiences – and it applies to an extreme degree for the historical interviews. This is a near natural process, but does of course influence the data as the answers are based on what the participant now believes to be important.[33] An example of this is the architecture student "Lukas," who both remembers the frustration of not being steered by teachers in his creative process, but who then on reflection detects and recounts the value of the teachers approaching him in precisely such a way.[34]

Including the ones made in the 2011 study, all interviews were conducted as semi-structured or semi-standardized qualitative interviews.[35] That is to say, they followed a carefully prepared interview guide, but that I from time to time also let the conversation digress in order to follow paths that a strict adherence to the interview guide might not have discovered. Several different theorists of interview method suggest that this is often an advantage.[36] The number of interviewees for the *Taking Place* study was chosen partly because of the practicalities of limited resources, and also because the 2011 study, which had included seven students and two teachers, had provided a rich and sufficient amount of data for the inquiries conducted. In the three different interview surveys, the 2011 study consists of interviews with seven students and two teachers; the *Taking Place* study consists of six interviews with students and two teachers; and finally the historical interviews consist of 17 interviews with architects. Concerning the number of interviews, it must be emphasized that my research is not based solely on interviews, but is built on different sources – such as visual material and observation – in addition to the interviews. On a practical level, because

[32] See Appendix 1 for a blank copy of the consent formula.
[33] Cf. Seidman, *Interviewing as Qualitative Research*, 90.
[34] Lukas 1 # 17:57,9 - 19:00,5; see also quote in Chapter 5.4.2.
[35] Cf. Brinkman, *Qualitative Interviewing*, 25; Berg, *Qualitative Research Methods*, 107.
[36] Brinkman, *Qualitative Interviewing*, 21; Berg, *Qualitative Research Methods*, 105; Hoepfl, "Choosing Qualitative Research", 52.

I was collecting drawings and doing archival research in addition to interviewing, the number of interviews was reduced in relation to a solely interview-based study.[37]

Five different interview guides were made as part of the research process: 1) the *Taking Place* student interview guide, 2) the *Taking Place* teacher interview guide, 3) the historical interview guide, 4) the institute leader interview guide, and finally 5) the six-week block interview guide.[38] All interview guides started with a very open introductory question, to ease the participant into the interview as well as establishing their context.[39] Each of the interview guides was adjusted to fit the different contexts of the different interview surveys, but also contained many similar questions, since the overall research interest did not differ dramatically from study to study. For example, all of the interview guides pose one or several questions about the role of drawing in architecture education.[40] The student interviews in the *Taking Place* study were carried out over two different meetings so that the interview could be thorough without tiring the participant. The interview guide was split into sections. The first interview covered the context (containing questions around regular pedagogical activities such as desk crits, and how the students interacted with each other) and the discipline section (containing questions around how they viewed the field they were entering). The second interview included a section on drawing practice, a section devoted to digital drawing, and a section on drawing and language. The questions were open-ended to avoid leading answers. That said, the questions were also designed to stimulate reflection on the practice, and in case the open-ended approach was not taken up by the participant, multiple options or examples were used to explicate the question. The student interviews, as well as seven of the historical interviews, ended with an unstructured section where the participant showed drawing material and explained their thoughts about it. The visual research was based both on my photo-documentation of the students' drawings and on the audiotaped interviews with the students regarding their drawings.

1.2.4 VISUAL RESEARCH

Much of the analysis of the drawing material is situated at the intersection of the drawing and the students' narratives about the drawing. Thus, the coding process was practically carried out by listening to the recording of the student, while surveying the drawings they were talking about, and then noting down codes in the same three coding layers as those used for the interviews (see section 1.3). For this reason, the

[37] Cf. Forsey, "Interviewing Individuals," 369; Kvale, *Interview,* 102.
[38] The interview guides can be seen in their entirety in Appendix 1.
[39] Cf. Forsey, "Interviewing Individuals" 371.
[40] See appendix 1

unstructured parts of the interviews, in which the participants were talking about their drawings, were not transcribed. Additionally, a different approach to the drawings was also needed to catalogue and compare them outside of the narratives they were associated with. In her book on visual methodology the British professor of geography Gillian Rose proposes a framework in which visual materials can be researched through an investigation of one (or more) of what she calls sites and modalities.[41] Rose distinguishes four different sites: 1) site of production, which concerns where and how the image is made; 2) site of image itself – the visual content of the image; 3) site of circulation, in other words how the image travels; and 4) site of audiencing, where a spectator views the image. Each of these sites has three different modalities, which Rose lists as a) technological, b) compositional, and c) social.[42] While Rose does not deal specifically with drawings, her methodology encompasses a great variety of visual media and is conceived as a general framework. It would therefore seem reasonable as a structure for architectural drawing, too. I have worked mainly with the site of production in the analysis of the drawings, being for instance interested in how students produce their drawings. As is the case especially with the drawings from the early 20th century, where there is no possible access to the students who drew them, the analysis of the drawing is mainly focused on the site of the image itself, as is for instance the case in the analysis of Kaj Gottlob's final project (Chapter 3). This type of analysis of the visual material would fall under what Rose calls compositional interpretation, where the focal point is what the images are, rather than on how they are used.[43] According to Rose, compositional interpretation pays close attention to content, spatial organization, color and light, but miss the social practices of the image.[44] In order to mitigate for this weakness, in my analysis of the drawings I specifically target their production as part of student practice. Using the three modalities as a point of departure, the drawing material collected was categorized and sorted. Under each modality I specified more particular categories, such as "digital drawing from 3D software" or "analogue drawing pencil on opaque paper." The lists below are not exhaustive but demonstrate central examples under each modality:

TECHNOLOGICAL MODALITY – How was the drawing made?	COMPOSITIONAL MODALITY – What type of drawing is it?	SOCIAL MODALITY – What is the purpose of the drawing?
Digital drawing from 2D Software	Plan	Diagram to develop form, drawn mainly for the designer himself
Digital drawing from 3D software	Section	Technical drawing to present constructive details
Analogue drawing pencil and opaque paper	Elevation	Visualization made to show space for a critique

[41] Rose, *Visual Methodologies*, 24-25.
[42] Rose, *Visual Methodologies*, 24-26.
[43] Rose, *Visual Methodologies*, 57.
[44] Rose, *Visual Methodologies*, 84.

Analogue drawing pencil and Manifold paper	Sketch	Perspective drawn for training purposes
Analogue drawing, watercolor and opaque thick paper	Detail	Map drawn to plan building site
Model - plaster	Perspective/view	Sketch drawn over other drawing to test a redesign idea
Model - wood	Diagram	3D model constructed to test space and generate views

Although the type of categorization can seem a little rigid, it did open up onto important insights. An example of this would be the focus on drawing as analysis in the *Taking Place* study, which is visible among other things through the absence of perspective drawings.

1.2.5 ETHNOGRAPHIC FIELD OBSERVATION

The point of ethnographic field studies, very squarely put, is to understand a culture and provide as thick a description of it as possible.[45] Due to my background and my personal experience as an architecture student, my role as researcher was not quite as non-knowledgeable as a true outsider of the field would be. As someone who had studied architecture far more than the students had, but who had never taught at an architecture school or worked professionally in an architectural practice, I was however not really an insider, either. My hybrid position in the field enabled me to focus on certain parts of the educational practices that I knew from experience (desk crits, pin-ups, etc.). Moreover, the observations that I carried out were what one might call *focused observations* in that they targeted specific activities that I knew were significant in architecture education (for instance, the pin-ups).[46] The observations were, however, relatively open, and were not what could be termed *selective observations*, in which the focus is on specific attributes of activities. Such observations could only be made upon the deeper understanding of practices, achieved, for instance, through the studies that I have now carried out.

The field observations were firstly carried out to gather data about the context of the drawing practices, but, as described in the qualitative interview section, they did not include specific observations of drawing practice. Secondly, the observations were intended not only to familiarize me with the specifics of the first semester studies, but also to familiarize the students with *me* before the interviews were carried out at the end of the semester. In the case of the *Taking Place* study, the observations thus supported the qualitative

[45] Thick descriptions cf. Geetz; see Berg, *Qualitative Research Methods*, 190-191.
[46] Angrosino and Mays de Peréz, "Rethinking Observation," 677.

interviewing and the visual research. The observations were carried out on the 13th of October (which marked the beginning of the semester); the 15th and 20th of October; the 4th and 13th of November; as well as the 10th and 12th of December. I attended and carried out observations at the first pin-up on the 31st of October, as well as the final pin-up on the 26th of January – both for BBK1A. For the six-week course, weeks 3 (the 15th, 17th and 18th of September), 4 (the 26th of September) and 6 (the 6th, 7th and 9th of October) were observed. I visited the final exhibit of the works on the 10th of October, as well. In each study, each observation lasted approximately 2-3 hours; during the observation I constructed field notes in the form of keywords, and photographed the situations. The field notes were typed up and expanded upon as soon as possible after the observation. After the collection of the data, it was assembled and analyzed.

1.3 CODING AND DATA ANALYSIS

The interview material was imported into the qualitative analysis software Nvivo in three separate files – one holding materials from the six-week block study, one containing materials from the *Taking Place* study, and a third containing materials from the historical interviews study. Materials from the archival research and the 2011 study were not processed in Nvivo. The 2011 study already had a separate coding system and had been transcribed. Moreover, despite the fact that Nvivo advertises that it can process images, I deemed that it was not suited for the processing of drawing materials due to the lack of a zoom function. Therefore, all the visual material was not thematically coded in Nvivo as had been the initial plan, but examined and analyzed in a regular Windows image viewer, and in some cases Adobe Illustrator. As a part of getting to know the material better, interviews were transcribed in Nvivo by myself, and the interviews were subsequently coded using two different coding strategies. For the historical interviews only parts of the material was used in the dissertation and therefore transcription focused on four questions of the interview: Q2: How was your education structured? Q3: What did a normal day at architecture school look like for you? Q6: What type of drawings did you do and did you use different drawings at different stages in a project? And Q9: What role does drawing play in architecture education, in your eyes? First, an open coding was carried out; Strauss and Corbin describe open coding as a sort of labelling or conceptual naming.[47] I did this using the "code in Nvivo" function, which turns the marked text into the code; the codes were later sorted and categorized under the appropriate overarching themes, as described in relation with grounded theory.[48] This strategy was used in order to pick up unexpected themes in the material, and is what I refer to as coding layer 1. The second strategy used thematic coding, with preselected codes. The codes were rather general categories that aimed at sorting the data to answer research questions. Three of the codes used were: Beaux-Arts paradigm,

[47] Strauss and Corbin, *Basics of Qualitative Research*, 106.
[48] Strauss and Corbin, *Basics of Qualitative Research*, 114-115.

polytechnic paradigm, and practitioner paradigm; this analysis therefore focused specifically on the links between the material and the three paradigms in the proposed framework. I referred to this as coding layer 2. Three other pre-set codes were used in the analysis of the material, namely: surface structures, pedagogical activities and epistemology. This focus was inspired by David Shaffer's study of the Oxford studio at MIT, where he differentiates between the three different analytical categories in the architectural studio. Shaffer's study is exemplary in many respects and will be more thoroughly discussed in Chapter 5 as an inspiration for the *Taking Place* study. For Shaffer, the architectural studio can best be described through the three categories, although they are of course interlinked.

1) The *surface structures* that are comprised of both physical spaces for learning, the furniture, materials available, etc., as well as time available, restrictions on access, etc.
2) As a category, *pedagogical activities* refers to the structure of practices that comprise the learning environment, and
3) *epistemology,* beliefs about, for instance, design methodology, or what "good architecture" is.[49]

The epistemology category in Shaffer's study is additionally referred to by Katherine Cennamo as "beliefs about what constitutes 'knowing' and how knowledge is constructed."[50] In her article on what constitutes a studio, Cennamo endorses Shaffer's approach as useful for analyzing, and eventually comparing, different studio practices.[51] I referred to the coding that is based on the Shaffer categories coding layer 3. Each passage of the interview material could be coded in multiple coding layers at the same time, that is, as Beaux-Arts paradigm, pedagogical activity, and with an open thematic code. An example might be:

> *"And then the workshop, where you have to get your hands even more dirty. In first year for instance they are learning drawing, in second year geometry and statics, and then it'll shift in the spring. So there are these two types: the salon and the workshop."*[52]

The section was coded with '*polytechnic'* because it related to characteristics of the polytechnic educational paradigm, as well as it was coded with '*pedagogic activity'* and the open thematic coding: 'the salon and the workshop'. The three coding layers have supplied material to different parts of the dissertation. Coding layer 1 and 3 is used primarily in Chapter 4 and 5, and coding layer 2 is the backbone of the analysis in Chapter 8. The layered coding system, as well as the two different coding strategies, were applied as a means to remain open and responsive to the data. The open codes permit themes to emerge from the data, as well as steering the investigation to specific points of interests, such as the paradigm view. The preset codes that follow Shaffer's categories also helped to organize the themes in the open coding process. More finely-masked

[49] Shaffer, "Learning in Design," 103.
[50] Cennamo, "What is Studio?" 252.
[51] Cennamo, "What is Studio?" 251.
[52] Anne Romme # 6:13,9 - 6:41,3.

coding could perhaps be carried out to advantage, especially with regards to coding layer 2, which only very roughly separates the paradigms, but could perhaps have been coded under categories that were established later, such as *polytechnic creativity* or *practitioner epistemology* (presented in Chapter 2).

1.4 FOCUS OF THE DISSERTATION

Unlike the majority of previous research into the Danish system of architecture education, this dissertation does not mainly focus on the history of the institutions or on their prominent teachers. I am – partly inspired by the work of Edward Robbins, Dana Cuff and Albena Yaneva – chiefly interested in the more practice-oriented aspects of architecture education.[53] The focus is therefore also on the process of making, rather than on the made work. The aim of this focus is directed toward the gap between what one might call applied architecture and architectural theory. There is research within each of these two fields, but there is a scarcity of studies that investigate how the theory becomes applied, or what theory is hidden within certain practices. Because of the focus on practice, the basis of my research is a theoretically oriented discussion and analysis that draws on empirical findings and examples. The methods used, as well as the general subject of the dissertation, could easily be (mis)understood to lie mainly within the field of educational psychology. Indeed, there would be several shared points of interest; however, I would like to make explicit that although my research could perhaps have value within this field, that it is not the aim of the research. The main purpose of these investigations is not simply to survey the educational situation, but rather to use the specific case of the educational situation to work on the development of the paradigmatic analysis framework, as well as to better understand the relationship between thinking and drawing in architecture. The dissertation takes up both historical and contemporary inquiries, but in order to limit the scope only in a time spanning ca. 1900 to the present day. As the Aarhus School was established only in 1966, because of this time span in its interest in architecture education, the focus of this dissertation is on the Copenhagen School. The differences in the approaches to education between the two schools are numerous, but remain beyond the scope of my research. Rather than a focus on purely contemporary practice, the historical approach was selected as a way of opening up contemporary practice. If I am interested in historical practices, it is chiefly in order to find the traces of them that live on in contemporary practices. To understand how what we might perceive as something fixed and stable once came to be in a complex matrix, might help destabilize the matter-of-factness with which those practices are treated, and help to engage in a critical examination of them. Some practices and artefacts that are long gone still have an

[53] Robbins, *Why Architects Draw*; Cuff, *Architecture: The Story of Practice*; Yaneva, *Mapping Controversies in Architecture*.

affective presence in the Copenhagen school, either in the form of being carried out, or as a negative avoidance of practices long severed from the contemporary, but still vehemently hated. The aim of the investigations is therefore more like an attempt at a genealogy of design pedagogy and of drawing epistemology. It is also an attempt to reach beyond the purely stylistic expressions, inspired by Raymond William's "structures of feelings", of which he explains: "Methodologically, then, a 'structure of feeling' is a cultural hypothesis, actually derived from attempts to understand such elements and their connections in a generation or a period."[54] In other words, it is not so much the work or the drawing itself, but the thought patterns behind the drawings, situated in their context of education, that are of interest. The aim of the work with the paradigms, as the next chapter will demonstrate, is exactly to tease out such patterns. These pattern form a backdrop from which a clearer understanding of architecture education might emerge.

[54] Williams, *Marxism and Literature,* 132.

- PART I -

FRAMEWORK:

GENEALOGY OF ARCHITECTURE EDUCATION

CHAPTER 2:
THREE PARADIGMS IN ARCHITECTURE EDUCATION

The tradition of Danish architecture education differs from those of many foreign architecture schools. Danish architecture education follows an academy tradition, in that it is linked to an art academy rather than a university. This difference is mentioned by both the 2006 report on the internationalization of the school in Copenhagen[1] and the book *A Beaux-Arts Education for the 21st Century,* which describes the changes in the first year curriculum at the architecture school in Aarhus during the 2009–2010 academic year.[2] An academy tradition is somewhat synonymous with a Beaux-Arts tradition. Sadly, however, neither the report nor the book seem to reflect much on what exactly is meant by an academy tradition or a Beaux-Arts education. To shed more light on how Danish architectural education is practiced necessitates a framework for understanding key structures within architectural education in more general terms. I will here attempt to give an outline of some important aspects of such a framework, although the key structures are impossible to map fully.

As mentioned in the introduction, this framework consists of differentiating among three different paradigms: the Beaux-Arts, the polytechnic, and what I call the reflective practitioner paradigm.[5] While there are of course numerous ways in which one can classify approaches to architecture education, the Beaux-Arts, the polytechnic and the practitioner paradigms have been selected here on the basis that these paradigms are closely associated with architectural education, rather than with general architectural theory or art history. To exemplify this, one could highlight Jacques Lucan, who differentiates in his book *Composition, Non-composition* between what he calls “open order” and “closed order” compositions. As Lucan shows, this distinctionis highly relevant to composition principles in architecture, and can arguably also be linked to educational traditions.[6] Nonetheless, the distinction between open and closed order fails to grasp some of the nuances in an educational perspective – e.g. drawing media, influences from other students, etc. –

[1] The Danish Evaluation Institute, *Transforming Tradition,* 15.
[2] Reinmuth et al*, A Beaux-Arts Education for the 21st Century.*
[5] Focusing on these three paradigms is no doubt an abstraction of a complex backdrop of interwoven practices and specific school traditions. (I do not discuss in great detail for instance the famous Bauhaus School in Weimar, which in the art history of the 20th century is considered very influential, see for instance Giedion, *Space Time and Architecture*). However, if the structure of the three paradigms does sacrifice some complexity it also provides a better overview and a framework from which one can discuss architecture education.
[6] Lucan, *Composition, Non-composition.*

because, as is Lucan's aim, it is more directed toward an art-historical view of the architectural oeuvre and the overarching theory.

The selection and differentiation between Beaux-Arts and the polytechnic paradigm derives in part from the book *Architecture School*, edited by Joan Ockman.[7] This volume, which claims to be the first comprehensive work on North American architectural education, differentiates between the Beaux-Arts and the polytechnic model in institutions of architectural education at the end of the 19th century and at the beginning of the 20th century. In the scholarly literature in English on the history of architecture education, there seems to be a relative consensus that the Beaux-Arts tradition originated in the French academy, and the polytechnic tradition was linked to a Germanic tradition.[8] The two traditions, as Ockman calls them, arose as part of the rationalisation of knowledge brought on by the Enlightenment in the end of the 18th century.[9] In the divide between the Beaux-Arts and the polytechnic we can also see the dawning of the schism between the technical and the artistic, which still exists in architecture. Not only is this divide influential in architectural thinking, but each major shift in the approach to architecture education seems to involve a renegotiation between the technical and the artistic aspects.

The polytechnic and the Beaux-Arts paradigms can be seen to have opposing valuations of the artistic and the technical. The practitioner paradigm, on the other hand, is an attempt to bridge the types of thinking that the two other paradigms bring with them. All three paradigms are, nonetheless, methods rather than styles. The practitioner paradigm is not a formalised tradition, like the other paradigms that I outline, but is constructed upon the practice epistemology laid out by the philosopher Donald Schön. Schön's impact in design pedagogy has been notable, as Danish professor Finn Thorbjørn Hansen of Aalborg University has remarked:

> "*Schön, in other words, did groundbreaking work that cannot be underrated. It has shifted our view from what was – before Schön – an all-dominant technical-rational, "objective," and theory-based epistemological and empirical tradition to a constructivist, pragmatic and praxis epistemological and experience-based thinking*."[11]

Schön's work is not only ground-breaking in design research, but also discloses a method or approach used by the reflective practitioner in an educational setting, which as such is comparable with the Beaux-Arts and polytechnic paradigms. In the following, I will outline important characteristics of the three.

[7] Ockman (ed), *Architecture School*.
[8] As examples see Simon, "Design Pedagogy in *Architecture School,"* Neveau, "The Indole of Education," Schneider, "Disegno," and Alexander, "Neo-Naturalism."
[9] Ockman, "Introduction: The Turn of Education,"12. And Pfammatter, *The Making of the Modern Architect and Engineer, 8-9.*
[11] Hansen, *Kan man under sig uden ord?*, 102. Own translation from Danish.

2.1: THE BEAUX ARTS PARADIGM

2.1.1: FOUNDATIONS OF THE ACADEMIES

To begin with the roots, professional architecture education is considered to have been first organised at the *Accademia di san Luca* in Rome in 1593.[12] The *Accademia di san Luca* was a coalition between painters, sculptors and architects and became the model for the French Académie Royale d'Architecture, established in 1671 under the reign of Louis XIV.[13] The French academy is without doubt one of the most influential institutions in establishing the organisation of architectural education.[14] In 1795, in the aftermath of the French Revolution, which had formally closed the academy for a brief period, the architectural academy in Paris was merged with the academies for music, painting, and sculpture. In 1819, the school in Paris was reorganised and given the name *École Nationale Supérieure des Beaux-Arts* (hereafter École), which has given the name to the Beaux-Arts paradigm. It is worth mentioning, however, that the Danish Academy originally established in 1754 was reorganized and named *Det Kongelige Academie for de skjønne Kunster* (The Royal Academy of the "Beaux-Arts") already in 1814[15] – a good five years before the École added Beaux-Arts to its name. This indicates that at the beginning of the 19th century, Beaux-Arts was being used as a general term, and that it is only in the second half of the century that the term became firmly attached to the teaching systems and the style of the École.

In the following, I shall focus on the Beaux-Arts tradition in general in order to define its characteristics and establish part of the analytical framework of the three paradigms. The elements of the Beaux-Arts method as found in France and the U.S. will enable an understanding of the key features of what I call the Beaux-Arts paradigm. I base my studies of the Beaux-Arts system on the French and American traditions, first because the French tradition, in particular, was the origin of the system, and second because these two traditions are the best documented, with reasonably good descriptions of drawing and educational practices. By giving these two traditions pre-eminence, I do not wish to undermine the importance of influences from the *Bauakademi* in Berlin and the teachings of Schinkel, for example. I also do not spend much time on British educational practice, mainly because British architecture education in the 19th century was still largely vocational, and not institutionalised as in the French manner. I will not deny that each of these perspectives could provide interesting discussions and inspiration for Danish educational practice; but this will have to be postponed to further research beyond this dissertation.

[12] Knoll, "The Project Method."
[13] Knoll, "The Project Method." Chafee, "The Teaching of Architecture at the École de Beaux-Arts." Harbeson, *The Study of Architectural Design.*
[14] Drexler, *The Architecture of the École des Beaux-Arts.* Ockman (ed), *Architecture School*. Harbeson, *The Study of Architectural Design.*
[15] Fuchs and Salling (eds.), *Kunstakademiet 1754-2004 vol III*. The original name of the Danish Academy was: "Det Kongelige Danske Skildre- Bildhugger- og Bygnings- Academie." *See* Salling and Smidt,"Fundamentet," 26-29.

2.1.2: THE TRIPARTITION OF BEAUX-ARTS

Although Beaux-Arts, for many, is synonymous with a building style, I propose to view Beaux-Arts as three separate parts. First, it refers to the Beaux-Arts institutions (for instance the Beaux-Arts academy in Paris) and their function as arbiters of aesthetic standards; second, it refers to a specific style in art and architecture; and last, though most important in the frame of this investigation, it refers to a method for teaching art and architecture. These three functions are of course interconnected, but regarding them as separate will clarify the system of Beaux-Arts and help establish it as distinct from the other paradigms. Comprehensively describing the history of the Beaux-Arts institutions or Beaux-Arts as building style is not within the scope of this project,[16] but before focusing on the methodology and aesthetics of Beaux-Arts, I will nonetheless briefly draw up some main lines.

The Beaux-Arts style in architecture is usually heavily ornamented, with at times opulent décor, such as Garnier's Opera building in Paris. The Beaux-Arts style itself underwent a gradual transformation during the 19th century. In the beginning of the century, the teachings of architecture at the École centred on classical architecture and on the five orders as described by Giacomo Vignola.[17] Ancient Greek architecture, for example, was seen a step toward the ultimate development of ideal architectural beauty, culminating in classical Roman buildings.[18] The unified view of Roman architecture as ideal architectural beauty, however, was challenged in a controversy instigated by Henri Labrouste, a young Prix de Rome laureate.[19] The controversy ended in the creation of three main schools of style within Beaux-Arts: Néo-Grec, Gothic and Classical.[20] This move away from a singular doctrine on architectural beauty opened up to an eclectic use of architectural elements, and Beaux-Arts as style became a somewhat vague label for compositions using historical styles either in their pure form, or by combining historical elements – in other words, historicism.

An integral part of the French Beaux-Arts tradition was that at the school, academicians governed the so-called *concours* – the tasks given to the students – evaluating and passing judgement on them. In this way, the institution of the Beaux-Arts functioned as the arbiter of "good taste". As becoming an academician

[16] For an in-depth description of the Beaux-Arts institution and the style of Beaux-Arts, including many school drawings, see Drexler, *The Architecture of the École des Beaux-Arts.*
[17] Tuscan, Doric, Ionic, Corinthian, and Composite. Vignole, *Études des Cinq Ordres*, 1, PLATE I.
[18] Levine, "The Romantic Idea of Architectural Legibility," 359.
[19] Neil Levine in detail describes the controversy brought on by Henri Labrouste's envois from Rome, which ultimately formed a whole new school of thought, the *Néo-Grec*, within the Beaux-Arts institution. In his deliveries to the Academy from Rome, which he made according to the rules of the Prix de Rome stipend, Labrouste measured Greek architecture instead of Roman. His thorough measurements and studies led him to challenge the view of the monochrome character of the classical buildings, as well as their precise symmetry and idealised composition. But more importantly and much more provocatively, Labrouste also argued that ancient Greek architecture had a "system" of its own, perfected in its own era, and could not be seen merely as an evolutionary step on the way toward Roman architecture. See Levine, "The Romantic Idea of Architectural Legibility," 369. Along with the Gothic revival of the mid-19th century, advocated for by for instance Viollet-le-Duc, the Néo-Grec brought about a shift towards the eclectic in the architectural thinking at the École.
[20] Néo-Grec, Gothic, and Classical became the three main schools of thought, as demonstrated by the selection of the three patrons of the *Ateliers Officiels* in the 1863 reform of École. See Chafee, "The Teaching of Architecture at the École de Beaux-Arts,"103.

required a demonstration of excellence, and because there were only eight lifetime seats on the academy, it would commonly take on very conservative attitudes. With this very rough sketch of the institution and style of the Beaux-Arts, I shall now turn the attention to its defining method of teaching .

2.1.3 THE ELEMENTS OF BEAUX-ARTS EDUCATION

The following section will centre on the elements of the Beaux-Arts method through 1) a reading of John Harbeson's book *The Study of Architectural Design – with special reference to the Program of the Beaux-Arts institute of Design*; 2) relevant sections of Jacques Lucan's book, *Composition non-composition*; and 3) Richard Chafee's essay "The Teaching of Architecture at the École de Beaux-Arts." These three have been selected because they are some of the most complete and comprehensive descriptions of the Beaux-Arts teaching system. Harbeson was a student of Phillipe Cret, who was a graduate from the École de Beaux-Arts.[21] Harbeson's book is a guide intended to help students as well as teachers better understand the methodology of Beaux-Arts teachings. Although Harbeson warns against believing in a fixed method, it is clear that he considers the most important part of the Beaux-Arts system to be design training, as something more than drawing proficiency and a talent for ornamentation:

> "*Any one problem [design task] must be considered not as an end in itself, but as part of a well mapped-out training in design – and design is not concerned primarily with ornamentation or detail, but with making an arrangement that will satisfy the practical requirements, with the composition of elements, with the proportion of masses, with the arrangement and disposition of opening, etc., and with producing a building of pleasing appearance*."[22]

Harbeson distinguishes five basic elements of the Beaux-Arts method:

1. The division of students into ateliers run by practicing architects;
2. The tradition of older students helping the younger;
3. The teaching of design by practicing architects;
4. Starting design work as soon as the student enters the atelier;
5. The system of the esquisse, or preliminary design sketch, as the core of the design process. [23]

[21] In the years 1880-1920, there was a widespread exchange between many American universities and architecture schools and the Ecolé. Subsequently, Beaux-Arts as both style and teaching system arrived in the U.S. not only in the form of inspiration and student exchange, but spectacularly also in the form of prominent students from the École, who were brought to the U.S. to teach. Among these was Paul Phillipe Cret, who had won the highest recognition of the French academy, the Grand Prix de Rome. Cret not only brought the system of the Beaux-Arts school with him to the University of Pennsylvania, where he taught, but one of Cret's students, John Harbeson, who himself became a teacher at the University of Pennsylvania, published what is probably the best and most comprehensive source to the Beaux-Arts teaching method in 1926. See Blattau, and Tatman. "John F. Harbeson: Teacher, Architect and Champion of the Classical Ideal."

[22] Harbeson, *The Study of Architectural Design*, 2.

[23] Harbeson, *The Study of Architectural Design*, 2.

These five elements are valuable as a tool for understanding self-reflection of the Beaux-Arts methodology. The first three elements all refer to the organisation of the Beaux-Arts institutes and schools, whereas the two last ones are more directly related to drawing practice. From an organisational point of view, the Beaux-Arts tradition centres around two core entities: the *ateliers* and the *concours*.

The *Concours* – a Jousting Ring for Academic Architects

The École in Paris was free for all to attend, and accepted candidates between the ages of 15-30 who passed the admissions test regardless of their other qualifications. Lectures and classes were not mandatory, and the only requirements seem to have been that students should partake in at least two competitions a year and leave the school at the latest at the age of 30.[24] The competitions known as the *concours* could be for the monthly *Prix d'Emulation*.[25] The most famous and prestigious of the *concours* was for the *Prix de Rome*, seen as the culmination of architectural academia. Winners of the *Prix de Rome* were awarded a stipend at the Institute Français in Rome, but only a fraction of the students at the École would earn a *Prix de Rome*, let alone compete for it. The education at the École was split into two classes, and students who gained enough credits in the form of *mentions* or medals would advance from *deuxieme classe* to *premiere classe* – or from *novice* to *ancien*. The American system functioned similarly, but the two classes were called Class B and Class A. Lucan describes how the transition from one class to another was granted to students based on a credit system – the so called *valeurs. Valeurs* were given to students not just for taking part in a competition, but if they received a *mention* – an honourable mention.[26]

The Beaux-Arts program was not a regimented program, but a very free form of education. There was no official title given to candidates who moved from the second to the first class, and there was no fixed amount of time a student had to spend in either class, nor indeed any restriction, apart from the age limit, on how long a student could stay in a class. Up until 1867, there were no diplomas for an education at the École; being an *ancien élève* – a former student – was enough of a stamp of approval, and not even all students got into the first class before they drifted away into private practice permanently. Chafee argues that even after the diploma was introduced, it held no importance for the first two decades.[27] It was only after the French government in June 1887 awarded the diploma to all living winners of the *Prix de Rome* that it became desirable, and by the mid 1890s, the diploma had become the aim of the studies. Students would stay in school to gain the title of "Architecte D.P.L.G." (Architecte diplômee par le gouvernement).[28] Literally

[24] Chafee, "The Teaching of Architecture at the École de Beaux-Arts," 85.
[25] Knoll, "The Project Method." Lucan, *Composition non-composition*, 118. Chafee, "The Teaching of Architecture at the École de Beaux-Arts," 85.
[26] Lucan, *Composition non-composition*, 118. See Appendix 2 for a schematics of the *valeur* system.
[27] Chafee, "The Teaching of Architecture at the École de Beaux-Arts," 105.
[28] Chafee, "The Teaching of Architecture at the École de Beaux-Arts," 106.

all of the design training at the École took place in *ateliers*, which up until the reform in 1863 were completely private entities outside of the school. Only lectures and the *concours* were held at the École, which can be seen as more of an evaluative institution than an educational one. Lucan cites an architect who in 1881 described the École as "… an artistic gymnasium where wrestlers trained on the outside come to face off with each other."[29] The comment was a sarcastic critique of the internalized *ateliers officiels*, and of stylistic preferences held by members of the Academy; but to a certain extent, the image of the École's primary function as a jousting ring for skills learned outside of school is apt, and only augments the importance of the *atelier* in Beaux-Arts education.

Ateliers – the organizational cornerstone of Beaux-Arts teaching

Lucan sees the *concours* and the *ateliers* as the two pillars of the Beaux-Arts tradition without which the Beaux-Arts would collapse. He befittingly quotes the influential theorist and Professor Julian Guadet:

> "*The École could vanish, at least its teaching side, and we would find a way to make things work; but if the personal instruction provided by masters –what we call patrons – in their respective ateliers were to come to an end, if the involvement of these teachers with the concours were to be discontinued, there would be nothing left, nothing but a few classes given to empty rooms*."[30]

The *atelier* is also number one on Harbeson's list of elements of the Beaux-Arts, and as such deserves some attention. The *atelier* model, although the origin of the modern studio,[31] meant that students were mostly attending design school after work. The *ateliers* were set up in the evenings, so that the student could work during the day (usually as a draughtsman in an architecture office). A *patron* – the name for the master or teacher – ran an atelier and taught students at all levels. The Parisian ateliers, as Chafee describes them, were private entities, and they secured whatever dynamic structure the early École can have been said to have.[32] Students were free to choose whom to teach them, although as is the case with Henri Labrouste, *patrons* who had opinions diverging from those popularly held at the academy would have difficulty having their pupils win the competitions. The *atelier* tradition seems to have existed in both Paris and the U.S., but although Harbeson favours the *atelier*-man, he is conscious of the fact that not all architecture students have the opportunity to join an *atelier*, indicating that there probably were not *ateliers* connected to all American architecture schools.[33] The *ateliers* are at the core of the three organizational characteristics that Harbeson

[29] "…un gymnase artistique où viennent se rencontrer le lutteurs prepares au dehors," Lucan, *Composition non-composition*, 110.
[30] Lucan Quotes Guadet "l'Enseignement de l'architecture en France," 136. "L'Ecole pourrait dispaître au moins dans son enseignement, on y suppléerait au besoin; mais si l'enseignement personnel des maître ou comme on dit des patrons chacun dans son atelier venait á se tarir; si le rapprochement de ces enseignements dans les concours communs était supprimé, il ne resterait rien, rien que quelques cours sans auditeurs." Lucan, *Composition non-composition*, 115.
[31] Cennamo, "What is Studio?," 249.
[32] Chafee, "The Teaching of Architecture at the École de Beaux-Arts," 89.
[33] Harbeson, *The Study of Architectural Design*, 3.

provides for Beaux-Arts education (see the list above). Concerning the second characteristic, that the older students helped the younger, the patron of an *atelier* would sometimes only actually teach the older students, or at least would spend more time with the older students, and generally not explain trivial matters to younger students. That task fell to the *anciens*: the older students who took the younger pupils under their wings. This was of course made possible because students at all levels would work in the same *atelier* rather than in classes.[34] Harbeson describes at length the responsibilities of the "Class A Man," the American equivalent to the *ancien.*[35] According to Harbeson, a core responsibility is to assist the less experienced students; this is beneficial not only for the younger student, but even more so for the older student, because it forces him to reflect on his methodology.[36]

The *patron* in most cases was a practicing architect who supplemented his income by teaching at the studio, either on his own initiative or at the wish of a group of students. In this way, the Beaux-Arts tradition thus actually worked very close to practice, even though it has been seen as removed from practicality in architecture: not necessarily practice at the École itself, but through the *ateliers*. Harbeson describes the competitions as simulated practice, and the limitations of the program as substitutes for the real limitations such as site, budget, etc. in real life.[37] The Beaux-Arts method thus does not point unambiguously towards *l'art pour l'art*, but the link to practice demonstrates a desire to do practical work, though always with an emphasis on the aesthetic rather than just the useful.

2.1.4: DRAWING PRACTICE IN THE BEAUX-ARTS TRADITION

The Beaux-Arts architects from around the turn of the 19th century were formidable draughtsmen, as is demonstrated through the drawings presented in Harbeson, and in the beautiful colour plates in Drexler.[38] Harbeson also devotes lengthy passages to passing on technical drawing advice, such as how to render shadows.[39] The drawings were typically pencil drawings, pen, charcoal, watercolour or india ink.[40] Craftsmanship of drawing played a central role, and was systematised in the classic Beaux-Arts method.

The system of the esquisse

[34] Harbeson, *The Study of Architectural Design*, 3.
[35] See for instance Harbeson, *The Study of Architectural Design*, 182.
[36] Harbeson, *The Study of Architectural Design*, 182-183.
[37] Harbeson, *The Study of Architectural Design*, 72.
[38] See Harbeson, *The Study of Architectural Design*, and Drexler, ed. *The Architecture of the École des Beaux-Arts.*
[39] Harbeson, *The Study of Architectural Design*, 66-67. And fig 91, 92 and 99.
[40] India ink, as it is known in the U.S. (although it originally derived from China), is a black ink specially used for drawing. It can be applied in different shades, but because of a binder (such as shellac), it dries into a permanent water-resistant line or colour patch. India ink is considered more difficult to use by Harbeson, as fields that has become too strong cannot be washed out. Harbeson, *The Study of Architectural Design*, 13.

The system of the *esquisse* is the fifth of Harbeson's essentials for the Beaux-Arts method. *Esquisse* is French for sketch; but in the Beaux-Arts system, the *esquisse* was not just a sketch, but also a special system and an integral part in the design education process. A project started with an *esquisse*. The *esquisse,* Harbeson informs, is usually done *en loge* – which means that the student makes the *esquisse* without help from books, other students or a teacher. The exercise of the *esquisse* thus trains the individual student to quickly outline a solution to a problem. Harbeson stresses that the *esquisse* is done quickly – though "quickly" here usually means 9 hours.[41] And so there is a difference to the way we might think of as a sketch today, namely, as a drawing more quickly jotted down.

An *esquisse* in the Beaux-Arts sense is an outline showing the general idea of the plan: the so-called *parti*. The "sketchiness" of the *esquisse* does not mean that it is not a deliberate and carefully thought out drawing; it only means that it is not a detailed drawing. It is still quite open or abstract. Harbeson is adamant in underlining that it is only with regard to detailing and proportions, etc., that the *esquisse* is not precise. It is part of the exercise that the *esquisse* should clearly outline the idea of the project – otherwise students were disqualified from the competition. The work with the *esquisse* is closely linked to the Beaux-Arts' methodical approach to generating design solutions. Harbeson's advice is to sketch as many different solutions as one can think of. After the different solutions are sketched up, the student should select the best or most suitable by eliminating the ones that are less interesting or satisfying.[42] Harbeson stresses that this sort of self-evaluation becomes increasingly important the more difficult the task is.[43]

Once it was completed, the *equisse* was not altered. In Paris, the original *esquisse* was handed in after the session, and in the U.S. it was sent to the judging committee; the student would keep a tracing of the *esquisse* to discuss with his teacher and use to develop his project further. The *projet rendu* or finished project was to adhere to the ideas laid out in the *equisse* – otherwise the student was considered to be *hors de concours* [disqualified].[44] The point of remaining faithful to the original *esquisse*, in Harbeson's view, is to work with limitations.[45] The *esquisse* limits the student's possible choices just as, in real practice, the architect is limited to demands of funds, time, and wishes from the developer. Another exercise, called the *esquisse-equisse*, did not culminate in a *projet rendu*, but simply a sketched project.[46] The idea with the *esquisse-esquisse* was training the ability to come up rapidly with a viable *parti*, in other words, the creative

[41] Harbeson, *The Study of Architectural Design*, 7.
[42] Harbeson, *The Study of Architectural Design*, 8 fig 4 and p. 11.
[43] Harbeson, *The Study of Architectural Design*, 175, 291.
[44] Pai, *The Portfolio and the Diagram,* 45. Harbeson, *The Study of Architectural Design*, 7-8, 72. Chafee, "The Teaching of Architecture at the École de Beaux-Arts,"87.
[45] Harbeson, *The Study of Architectural Design*, 72.
[46] Harbeson, *The Study of Architectural Design*, 245.

conception of an idea. The work with the *esquisse* and the *esquisse-esquisse* thus shows a balance between working with techniques for creative ingenuity and preparing for the limitations of real practice.

From Element to Large Scale Composition: The Analytique, Class B and Class A problems

In the traditional American and French Beaux-Arts education, three different levels of student tasks – or "problems" – were given: the Analytique, the Class B (*seconde classe*) and the Class A problem (*prémiere classe*).[47] It is proper to regard these as levels rather than different problem types, as there is a progression in their complexity and scale reflective of the skill level of the student. The complexity increases from the *analytique* to the Class B problem, and again to the Class A problem. Since the difference between Class B and Class A is largely a complexity brought on by the scale of the program, I will consider those two problems together and compare them. The *analytique* is different: it deals only with simple composition, mostly with the elements of architecture.

The Analytique

"*The analytique is a study in proportion, and in the elements of architecture*,"[48] writes Harbeson. In other words, it is a study of details rather than of a whole – or of an entire composition. Harbeson goes on to specify that this would mean the treatment of walls, doorways, windows, arcades, etc. The *analytique* is drawn to scale; and despite the primary attention given to element and details, *analytiques* can include plan, section, and elevation in very small scale. A general characteristic of *analytiques* is the relatively simple nature of the problem. This simplicity is on compositional terms, and not with regard to detailing or elaborateness of ornamentation. The type of drawing therefore served the dual purpose of training draughtsmanship and increasing knowledge of architectural elements while also letting the architecture student start to deal with composition and proportions. Harbeson gives four examples of *analytiques*: a doorway, a pavilion, and a central motif for a garden wall and a temple of love.[49] The four *analytiques* are very densely composed on a single sheet; indeed, part of the compositional exercise of the *analytique* seems to be the compostion of the sheet. Harbeson elaborates on this:

> "*…there are several well-known types of compositions. Perhaps the simplest is where the principal drawing at a small scale is completely framed by an arrangement of the details at a larger scale, and in this frame are frequently incorporated panels containing the small scale plan or section*."[50]

[47] Harbeson, *The Study of Architectural Design*, "The Analytique" 7-67, "The Class B Problem" 69-146, and "The Class A Problem" 179-243.
[48] Harbeson, *The Study of Architectural Design*, 7.
[49] Harbeson, *The Study of Architectural Design*, fig 7-10, p. 10 and 12.
[50] Harbeson, *The Study of Architectural Design*, 39.

Although Harbeson points out a couple of common compositional ”mistakes” on the sheet, it is worth noticing that there is no set rule for a correct composition. What Harbeson draws attention to is the ”frequently used” and ”well-known”.[51] Lucan shows how the Beaux-Arts system, although vehemently against a rational system of composition, does not reject knowledge of types and programmes either.[52] In *Éléments et théorie de l'architecture*, the book that made Julian Guadet famous, he writes:

> *“ … nothing would be more profoundly contrary to every feeling for art than the formulaic, didactic teaching of composition. I know that in other schools the types of certain programs are taught; students are shown the accepted layout for a barracks or a railway station. But these schools do not train artists … Dwelling, through all the variety of its programs, will always have the same goal; it can dispose of its elements as differently as it likes, it will still be with these elements that it must compose. And these elements – what I have called the Élements de la compostion – will steer clear of extravagance; they will be grounded above all in reason.”* [53]

To a certain extent, the *analytique* can be said to deal with the elements of architecture – such as those described by Guadet. Because the *analytique* focuses the design task on the elements, Pai regards the *esquisse* and the *analytique* as one another's opposites, with the *esquisse* working with a whole and the *analytique* with parts or fragments.[54] This is only somewhat correct, however, as according to Harbeson, the *equisse* is equally integral to the process of the *analytique* and that of the class A and B problems.

Class B and Class A problems

At the École, the two types of tasks were given with intermittent intervals.[56] The reason for spreading out the deadlines, apart from the obvious practicalities related to judging the student work, was that it supported the structure where the younger students helped the older students and vice-versa. The problems posed in 1897, as described by Lucan, illustrate the difference between the Class B and Class A problems:

Seconde classe:	A lockkeeper's cottage, a parliament building staircase, a large hospital's mortuary, a small municipal museum, a restaurant in the Paris area, and a large, public front porch staircase.
Premiere classe:	A pantheon, a big seminary, a city hall, a zoological museum, a theatre and a *hôtel particulier* (Mansion).[57]

[51] Harbeson, *The Study of Architectural Design*, 39.
[52] Lucan, *Composition non-composition*, 168.
[53] Guadet. *Elements Vol II book VI*, 204-206. Quoted from Lucan, *Composition non-composition*, 168.
[54] Pai, *The Portfolio and the Diagram,* 45.
[56] Lucan demonstrates this for the year 1897, where Julian Guadet, as professor of theory, was drawing up programs for the monthly assignments, the *concours d'emulation*. For the *seconde classe*, this consisted of six *analytiques* and six *projet rendu.* They were to be handed in on February 27, May 1, July 3, July 31, October 30, and December 30. According to Lucan, the *analytique* problem was assigned two days before the *projet rendu*, so that students could be *en loge* for both. For the *premiere classe* in 1897, there were also six assignments, due on April 3, May 29, July 17, October 9, December 4, and January 29, 1898. Lucan, *Composition non-composition*, 119.
[57] Lucan, *Composition non-composition*, 119.

First, it should be noted that in the *seconde classe*, three of the problems are actually parts of a larger program (parliament staircase, public front porch staircase, and mortuary). The only "independent" programs are of small scale and not excessively complex. Also noteworthy is the interest in representative buildings. Most of the programs are for representative architecture, which indicates a preoccupation with the decorative. The lockkeeper's cottage is an exception, but even here, the fact that the program calls for a lockkeeper's cottage, probably aims at imaginative decoration rather than a thorough analysis of the specific functionalities for a lockkeeper. The mere fact that the majority of the programs are the transport sections or transport-heavy programs also suggests an interest in decoration.

In his writings about the dwelling, Guadet distinguishes between two different types of spaces. "In every program, if it is a complex one, there are two distinct parts: the first I will call useful spaces, the other the necessary connections."[58] Lucan, in his analysis of Guadet's theory, suggests that it is in the "necessary connections" that the architect is less bound by functionality, and therefore has the best chance to show artistic talent.[59] This indicates that the skills that were primarily trained in the programs drawn up for the *seconde classe* were indeed the artistic ones. Meanwhile, if we look at the programs for the *première classe* the same year, they are complex. These programs, although they are well-known types of buildings, contain many different functions and sub-programs. Furthermore, the complete lack of specific sites is surprising to the modern eye. The sites are ideal sites, although there may be certain conditions included in the program, such as "on the side of a hill" or "facing a view" as Harbeson also mention.[60] Again this indicates an interest in the decorative or artistic rather than the functional aspects of architecture, where the drawing in itself plays a key role.

In keeping with the attention paid to the decorative as the narrative vehicle in the drawing, Harbeson describes two aspects of the drawing that seem to be particular to the Beaux-Arts tradition: *mosaic* and *entourage*. A general feature of the Beaux-Arts drawings are that they are often very detailed; this is true for both plan and sections, but most especially so for elevations and perspectives. The very detailed large-scale elevation drawing is somewhat characteristic for Beaux-Arts projects. The drawings also tend to include a lot of the surroundings, and the so-called *entourage* and elaborate ornaments on the buildings depicted gives the works a filigree-like character. Compared to modern visualisations, they are also largely unpopulated, and if populated it is mostly by silhouettes. In this way, the silhouette population of the drawings add to the filigree rather than serving as conveyors of meaning, sentiment, and character, as is

[58] Guadet, "Principes generaux", 117-118. Quoted from Lucan, *Composition non-composition*, 166.
[59] Lucan, *Composition non-composition*, 166-167.
[60] Harbeson, *The Study of Architectural Design*, 76.

often the case with today's visualisations crowded with happy skateboarders or diverse populations of users.

FIGURE 2.1; 2.2 & 2.3: Paul Bigot: "Plan des thermes et du casino implantés au bord de l'eau." 1st price, Prix de Rome, 1900. https://commons.wikimedia.org

Detail showing the mosaique work with 'poché' in the plan. For more examples see Harbeson, *The Study of Architectural Design,* 120, 122-123, 125-127.

Detail showing work with entourage in the plan. For more examples see Harbeson, *The Study of Architectural Design,* 128-132.

Mosaic was mostly known by contemporary architecture students as the garnishing of a plan, or as a means to effectively (and decoratively, one might add) bring out the *parti* – the idea of the project. Mosaic is in reality, says Harbeson, composition "composing with whites and blacks, and various intermediate grays."[61] And here Harbeson underlines the creative value that the drawing in itself has for the Beaux-Arts architect. *Mosaic* and *entourage*, as well as the attention to composition of the sheet in the *analytique*, indicates that in a Beaux-Arts school, architectural design is not just a composition of rooms, their proportioning, and their positions. Rather, the architectural design is also a drawing composed by black and white fields. The drawing is not just a visualisation, but ia also a composition in itself. This has a profound impact on the view on creativity within the Beaux-Arts paradigm. Yet before addressing creativity in the Beaux-Arts approach, a final important element to consider here is the Beaux-Arts attention to precedence or tradition, through what Harbeson calls the study of documents.

Composing with Tradition – the Use of Documents in Design

The use of documents in the study of design is not included in Harbeson's five elements of the Beaux-Arts method. Nevertheless, he emphasises its importance throughout his book, and devotes his entire Chapter IV to the subject. The use of documents, or attention to precedence in architectural history, is probably a key feature in the Beaux-Arts training. Harbeson might omit this element simply because, for him, it would have been unthinkable to develop architecture in any other way. The importance of the use of precedence should not be taken as simple imitation. Harbeson points out how simply copying previous examples will not ensure quality. The "documents" that Harbeson refers to are usually drawings, and they were not only examined but traced over, and buildings were measured up or sketched in free hand.[68] This indicates that knowledge

[61] Harbeson, *The Study of Architectural Design*, 121.
[68] Harbeson, *The Study of Architectural Design*, 29.

of the compositions was gained through the act of drawing. The acquisition of knowledge through drawing of compositions other than one's own does not, however, explain the dominance of classical sources in such work. In the beginning of his chapter on use of documents, Harbeson explains why this is so vital to design practice:

> "*The one-man 'original' styles – such as the Sullivan style – have not made headway because they cannot find an audience, the forms being strange to the average beholder, who does not take kindly to them because they are strange – queer – to him. Therefore, the study of design – of proportion – resolves itself into a study of tradition; the study, in essence, of the worthy efforts of the past, the unworthy being passed by where there is such a quantity of material. To this the designer has added his contribution when his design is made to suit new conditions, new methods of construction, new aesthetic requirement*."[69]

There are many points to be drawn out of the above quote, but firstly it is an excellent illustration of how complex the view on originality and tradition in composition was. On the one hand, Harbeson disdains the originality of the Sullivan style – little knowing how influential this style will become – but on the other hand, he encourages the designers to suit their designs not only to new conditions and methods of construction, but also to new aesthetics! This, then, is not a call for traditional form to stifle originality; it is rather a call for originality to be born out of necessity. Harbeson has a problem with the originality of the Sullivan style simply because he sees it as 'one-man originality'. What Harbeson rather sarcastically calls "one-man 'original' styles" is when the singular originality of an architect such as Sullivan circumvents tradition entirely. In doing so, Sullivan becomes, in Harbeson's view, illegible to ordinary people.

In Harbeson's view, the idea of following tradition in architecture is almost a sort of democratization of aesthetics: architects should work with the forms and proportions that the common person has learned to know and love. Harbeson puts *Eléments et Théorie de l'Architecture* by Guadet at the top of his shortlist of indispensable documents, and Guadet is likely also the inspiration for him to call the knowledge acquired through the study of documents a "vocabulary". In so doing, Harbeson establishes an interesting link between the pre-eminence of tradition and a language metaphor. What Guadet would call the *elements of architecture* forms the vocabulary with which the architect can form a statement. Much like in Harbeson's argument about the Sullivan style, tradition is necessary for "language" to be understandable – without pre-existing knowledge of the tradition (one might say "language skills"), a statement is devoid of meaning. A theorist like Guadet might even have fancied architecture an academic art insofar as the architect should come up with an original composition – or original statement – based on familiar elements. The academic architect might construct a building like an argument, much as an original written academic argument is built

[69] Harbeson, *The Study of Architectural Design*, 27.

upon open citation of previous research. The architectural statement would contain original interpretations as well as new data-input; but it would always "cite" tradition, i.e., knowledge of the elements of architecture. This leads to a further investigation into the view of originality and composition in the Beaux-Arts paradigm – in short, its view of creativity.

2.1.5: ORIGINALITY, COMPOSTION, VARIATION, AND ELEMENTS

A building cannot be erected without adhering to physical laws, and would not be useful without taking practicalities into the layout of the plan. It does not become architecture, however, until it touches the sensibilities of the user. That is more or less the view of 19th century art and architecture theorist John Ruskin, who writes provocatively in his influential book *The Seven Lamps of Architecture* that there are only two true forms of art, sculpture and painting; and architecture is the unison between the two in masses – otherwise it is "mere building."[70] Ruskin's book is a good basis for understanding the Beaux-Arts pattern of thought, because it offers a widely reflected basis for the historicist styles that have become synonymous with the Beaux-Arts school. Ruskin focuses on the Gothic style, but also represents a move away from the neoclassicism that had dominated the first half of the 19th century. Additionally, Ruskin is interesting because he links his arguments with a broader national and cultural understanding, as well as with an ever-present religious motivation that is easily forgotten in our more secular times. Thus Ruskin comes close to expressing a *structure of feeling* for his time, as mentioned earlier.

The buildings that Ruskin analyses in his book are almost without exception older pieces; but the book is written with the purpose of bettering future architecture through reflections over past examples. As with Harbeson, learning through examples or through history is one of Ruskin's core points. In the "Lamp of Obedience," Ruskin writes:

> "*When we begin to teach children writing, we force them to absolute copyism, and require absolute accuracy in the formation of the letters; as they obtain command of the received modes of literal expression, we cannot prevent their falling into such variations as are consistent with their feeling, their circumstances, or their characters*."[71]

The comparison to writing is interesting insofar as it creates an almost direct parallel to the drawing practice of the Beaux-Arts schools, where students in their first years were meant to copy the work of masterpieces. Ruskin far from advocates for a stiff, impersonal style. Composition as a mindless copy of the past would be what he considers *mechanical*. Humans can be mechanical, and the mechanical is here marked by indifference, or being without feeling or life. Ruskin is much more lenient on the work of dilettantes or

[70] Ruskin, *Works of John Ruskin,*"Preface to the Second Edition",§7, 11. Ruskin, *Arkitekturens Syv Lamper,* 31. References are to the Danish translation of *The Seven Lamps of Architecture*. Quotes are from the English version.
[71] Ruskin, *Works of John Ruskin,* "VII Lamp of Obedience," §7, 257.

dabblers – who do not design skilfully, but whose craft still contains a full expression – than he is with the manufacturer of the correct but lifeless ornament.[72] Ruskin wants a living architectural tradition, and he compares it with language that might change gradually, but never completely and suddenly.

Accordingly, and in a similar vein to Harbeson, Ruskin disdains the search for new styles and originality as unnatural.[73] Changes should be the gradual shifts that will happen inevitably over time, but in Ruskin's eyes they cannot be forced – they are steps, not leaps. Artistic genius is thus shown by developing the traditional styles, not breaking with them. For Ruskin, form does not follow function. This does not mean that form contradicts or inhibits functionality, but just that form is not derived from the function. Form emerges from knowledge of previous solutions as well as a pre-eminence to the "story" of the building. The building is a mise-en-scene, rather than a functional production plant.

The ideal is to shape the outside world according to our lives, and not to lead a life shaped by the outer circumstances surrounding life. This seems to be in line with a classical mimetic concept of beauty. Things are beautiful when they imitate nature.[74] For Ruskin, beauty is God's creation, which man can imitate and thereby create beauty himself. It is thus beyond human capability to create beauty independently.[75] Ruskin does allow, however, that imitation can be abstract. Hence non-organic ornaments like geometrical patterns can also be beautiful. To Ruskin, all art is abstract in a sense.[76] The primary task for an artistic endeavour is "*… not to represent the things it imitates, but to gather out of them those arrangements of form which shall be pleasing to the eye in their intended places*."[77] Here we touch upon what could be seen as the ideal of creativity in that era. Originality is found in compositions made with already-known parts. There is no perceived need to invent a new system of elements for each composition. That would be superfluous, because the genius of the composer lies in the composition of the already-known elements, giving a freshness and life to something already known. This can be a variation of a pattern, but the pattern must be recognized if the ingenuity of the variation is to be appreciated. And for the Beaux-Arts paradigm, tradition and originality are not opposed, but are inseparable in creative practice.

The focus on the Beaux-Arts method in its classic or original form teases out certain key features that can distinguish it from other approaches to teaching architecture. To briefly summarize the findings about the characteristics of Beaux-Arts at a methodological level:

- When regarding Beaux-Arts as a method, it becomes evident that the movement was based on the use of historical documents to give a more scientific and methodical approach to architecture. This does not detract from its highly aesthetic and non-utilitarian point of departure.

[72] Ruskin, *Arkitekturens Syv Lamper,* 168.
[73] Ruskin, *Arkitekturens Syv Lamper,* 232.
[74] Ruskin, *Arkitekturens Syv Lamper,* 135.
[75] Ruskin, *Arkitekturens Syv Lamper,* 138.
[76] Ruskin, *Arkitekturens Syv Lamper,* 162.
[77] Ruskin, Works of John Ruskin, "IV Lamp of Beauty," §31, 171.

- Design tasks were organised so that they rose in complexity from elements and composition focus to small programs (Class B) and ultimately to more complex programs (Class A).
- Creativity was viewed as something best achieved through the composition of already-known elements. This underlines the need for and interest in extensive historical knowledge in the Beaux-Arts tradition.
- The arrangement of the school with painters and sculptors shows that there was a deeper perceived link to the aesthetic dimension of building.
- The organisation of the schools in ateliers supported one-on-one learning or a sort of vocational training, not just between the student and the patron, but between students.

The focus on the beaux-arts method in its classic or original form teases out certain key features that can distinguish it from other approaches to teaching architecture. The composition strategies and the view of creativity, for example, are very different from the basis of the polytechnic paradigm. We shall return to this in section 2.4 of this chapter, after both the polytechnic paradigm and the practitioner paradigm has been presented.

2.2: THE POLYTECHNIC PARADIGM

In the literature on architectural education, the polytechnic tradition is often held up as a counterpart to the Beaux-Arts tradition. Neveretheless, it is frequently described less thoroughly than the Beaux-Arts tradition – as Michael J. Lewis, for instance, argues in his article on polytechnic and Beaux-Arts influences on American architectural education.[78] An exception to this is Ulrik Pfammatter's careful treatment of the origins and pedagogy of what he calls a "scientific and industrially oriented"[79] tradition of architecture education in his monograph *The Making of the Modern Architect and Engineer*. Whereas it is seemingly common to link the Beaux-Arts model to France and the polytechnic model to Germany,[81] Pfammatter demonstrates how the polytechnic tradition derives from Enlightenment thinking in France in the years just after the French Revolution.[82] The following section of the dissertation is built largely on Pfammatter's description of the early polytechnic model, and aims at outlining the polytechnic approach to teaching architecture so that its contrasts to the Beaux-Arts and the practitioner paradigms can be established.

[78] Lewis, "The Battle between Polytechnic and Beaux-Arts in the American University," 68.
[79] Pfammatter, *Making of the Modern Architect Engineer*, front cover.
[81] See for instance Ockman (ed), *Architecture School*, 12. Cennamo, "What is Studio?", 249.
[82] Pfammatter, *Making of the Modern Architect Engineer*, 17.

2.2.1 THE ARCHITECT-ENGINEER: POLYTECHNIC BEGINNINGS

The architect-engineer is educated within the polytechnic tradition of architecture education. Pfammatter connects the origins of the architect-engineer to two Parisian institutions: the École Polytechnique and the École Centrale des Arts et Manufactures. The École Polytechnique was established in Paris in the aftermath of the French revolution, and admitted its first 400 students on April 1, 1795.[83] Gaspard Monge, a founder of the school, wished to channel students from theoretical speculation to real engineering problems.[84] The École Centrale was established in 1829, and whereas the École Polytechnique had at the time become somewhat elitist and also more directed towards theory, the École Centrale, according to Pfammatter, took a robustly societal and applied-sciences stance. The two schools shared much of their educational foundation, however, and the École Centrale was accordingly often able to pick up students who had not gained admission to the slightly more prestigious École Polytechnique.[85] Gustave Eiffel, who had unsuccessfully applied at the École Polytechnique, is a famous example of this.[86]

The *Modèle Polytechnique*, that is, the central ideas behind the teaching and curriculum in the polytechnical schools, spread throughout Europe and the USA, and became influential at the beginning of the 19th century. As mentioned before, the polytechnic is often associated with Germany, and the polytechnic model did indeed also establish prominent schools in Germany, which might in turn have overshadowed the original Paris schools. An example of this is the famous Karlsruhe Polytechnikum, which was founded in 1825,[87] but soon thereafter was modelled on the École Centrale.[88] Pfammatter charts the inspiration for the German version of the polytechnic system to be multiple visits to Paris by prominent German architects. Influential German architects, such as Leo von Klenze and Friedrich Weinbrenner, were deeply marked by their stays in Paris, although they did not take full degrees.[89] Leo von Klenze, who is considered to be the most prominent German architect after Karl Friedrich Schinkel, worked in Percier and Fontaine's office in Paris. Additionally, Klenze also attended lessons at École Polytechnique, and was familiar with the drawing approach of the *systéme quadillage*, which was taught there.[90] Klenze's later student Edouard Metzger became professor of architecture in the Munich Polytechnikum in 1833.[91]

In similar ways, the teachings of the original Paris schools spread into the German tradition. The architecture program at Karlsruhe Polytechnikum had a forerunner in the German architect Friedrich

[83] Pfammatter, *Making of the Modern Architect Engineer*, 30.
[84] Picon, "From 'Poetry of Art' to Method," 27.
[85] Pfammatter, *Making of the Modern Architect Engineer*, 103.
[86] Pfammatter, *Making of the Modern Architect Engineer*, 160.
[87] Pfammatter, *Making of the Modern Architect Engineer*, 235.
[88] Pfammatter, *Making of the Modern Architect Engineer*, 166.
[89] Pfammatter, *Making of the Modern Architect Engineer*, 74.
[90] Picon, "From 'Poetry of Art' to Method," 7.
[91] Malgrave, *Modern Architectural Theory,* 109.

Weinbrenner's *Bauschule*, and Weinbrenner became the first professor of architecture at Karlsruhe Polytechnikum.[92] It was also a Weinbrenner student, Heinrich Hübsch, who designed the building for Karlsruhe Polytechnikum (1833-35). Later, Hübsch succeeded Weinbrenner as the professor of architecture there. I will leave the complex history of the origin of the polytechnic tradition with this sketch, in order to turn the focus to the method of architectural education in the polytechnic paradigm. Among architectural historians and theorists, there seem to be a consensus that the origins of the polytechnic system with respect to architecture can be traced back to one of the first teachers at the École Polytechnique: Jean-Nicolas-Louis Durand and his classic work from 1802–1805, *Précis des leçons d'architecture données à l'École Polytechnique* (hereafter *Précis*).[93]

2.2.2: ARCHITECTURE AS SCIENCE: UTILITY, METHOD, AND TYPOLOGY

Jean-Nicolas-Louis Durand (1760-1834)[94] is portrayed by Pfammatter as one of the most influential and pivotal figures in early architectural design pedagogy. Durand was a student of Boullée, and trained in classical architecture at the Academie d'Architecture (which later became the École des Beaux-Arts).[95] In his introduction to a recent English translation of the *Précis*, Antoine Picon asserts that Durand's thoughts have had a lasting ability to stir up architectural debate because Durand attempted to give architecture a place within a field of scientific rationality.[96] With the limited time Durand had available, and the number of students he had to teach at the *École Polytechnique*, Durand invented a structured curriculum comprised of lectures, drawing exercises, and exams. As Pérez-Gómez has pointed out, it is important to remember that the *Précis* is a textbook,[97] and as such its generalisations might also seem a little less radical and more pedagogical. This was possibly Durand's own intention, since he writes: "…it has been necessary to make their study of architecture, although extremely brief, nonetheless fruitful."[98]

Durand had a formalist and methodological approach to teaching architecture. He taught architecture through typologies of buildings i.e. practical typology that covers functional buildings.[99] Pfammatter points to Durand's teachings as an early form of functionalism. They are, he writes, a joining of:

[92] Pfammatter, *Making of the Modern Architect Engineer*, 230.
[93] Picon, "From 'Poetry of Art' to Method," 1-2. Pfammatter, *Making of the Modern Architect Engineer, 8*.
[94] For more in-depth description and analysis of the life and oeuvre of Durand, see Szambien, *J-N-L Durand*.
[95] Pfammatter, *Making of the Modern Architect Engineer*, 53.
[96] Picon, "From 'Poetry of Art' to Method," 3.
[97] Pérez-Gómez, "Review of J. N. L. Durand 1760-1834, De l'imitation à la norme," 420.
[98] Durand, *Precis*, 73.
[99] See Pfammatter, *Making of the Modern Architect Engineer*, 61.

> *"…a deductive method of teaching with an inductive order of learning into a complementary and synthetic procedure, in a sense developing further the 'Cartesian process of knowledge' into an 'architectonic process of knowledge'."* [100]

Pfammatter argues that the didactic measures and programmes of Durand at École Polytechnique and those of Durand's student Charles-Louis Mary, who taught at École Centrale, were especially foundational in the shift from style to method schools, and shaped teaching models that are still in place to day.[101] The difference between the "school of style" and the "school of method" compares roughly to the differences between the Beaux-Arts and the polytechnic paradigms, even though the two systems lived alongside each other, and even though the shift that Pfammatter describes took place early in the 19th century. Durand's *Précis* also has ties with the Beaux-Arts tradition, and was read very widely in the early 19th century.[103] The clearest distinction between the "school of style" and the "school of method" is likely between their views on utility.

In the *Précis*, utility is first announced by Durand to be the core principle of architecture. He states it simply: "Public and private utility, the happiness and the protection of individuals and of society: such is the aim of architecture."[104] Meanwhile, as Picon has also pointed out, the utility Durand aims at is not a dull, machine-like concept, but related to the pleasure, goodness, and comfort of man and society.[105] Durand argues that architecture can only give pleasure by abandoning what he regarded as the misguided and futile pleasure principle of decoration:

> *"So far from denying that architecture can give pleasure, we maintain that it cannot but give pleasure, where it is treated in accordance with its true principles. Has not nature associated pleasure with the satisfaction of our needs, and are not our keenest pleasures the satisfactions of our most pressing needs?"* [106]

Following the doctrine of utility, Durand introduces the principles of fitness and economy. For a building to be fit for its purpose, in Durand's thinking, it must be solid, salubrious, and commodious. Whereas solidity has to do with the durability of the construction, its materials, and its load-bearing capability, salubrity has to do with the circulation of air and protection from weather, humidity, and light. Finally, commodity is the fitness of room size, the placement of rooms, etc., and thus a building's fitness for the given purpose. Durand's principle of economy prescribes that a building must be as symmetrical, regular and simple as possible.[107] For Durand, these requirements and principles serve not only financial but also aesthetic purposes.

[100] Pfammatter, *Making of the Modern Architect Engineer*, 67
[101] Pfammatter, *Making of the Modern Architect Engineer*, 10-11
[103] Pérez-Gómez, "Review of J. N. L. Durand 1760-1834, De l'imitation à la norme," 419. Picon, "From 'Poetry of Art' to Method," 1.
[104] Durand, *Précis*, 84.
[105] Picon, "From 'Poetry of Art' to Method," 18-19, 32, 53.
[106] Durand, *Précis*, 85.
[107] Durand, *Précis*, 84 and 187.

> "*When the composition of a building incorporates all that is necessary and nothing but what is necessary, and when those necessities are disposed in the simplest arrangement, it is impossible for it to lack the kind and degree of beauty that it requires*." [108]

Durand shifts focus from the doctrine of imitation to the more calculable qualities of which solidity, salubrity, and the symmetrical are all examples. Additionally, and as can be seen in the above quote, at the core of Durand's writings lies an aesthetic thinking with an inbuilt proto-functionalist view on style, form, and creativity. All the same, the underlying aesthetic in Durand's *Précis* and the architectural schools that took inspiration from him is not necessarily as positivist as it may seem. Picon sees, instead, a rather utopian project in the *Précis*, based on its relatively loose coverage of actual technical elements.

> " *…though the Précis purports to be positivist, it actually inclines toward the very opposite, namely, utopianism. It is Utopian to seek to free architecture from technical and economic constraints while simultaneously proclaiming their pre-eminence. After Durand, many other architects were to succumb to the same temptation, including the principal representatives of the modern movement, from Walter Gropius to Le Corbusier*." [109]

In Picon's view, Durand in the *Précis* allows architecture to shape the concept of utility, rather than be shaped by utility. Durand does this by turning utility into certain more or less aestheticized architectural forms. For Durand, beauty is generated through fitness, which means, in other words, that he proposes a relational concept of beauty, rather than an entirely static concept. One might even go so far as to say that the universal, for Durand, is the connection between utility and beauty, and that each instance takes on a specific formation of this. What is noticeable is that *form is generated out of the concerns for fitness and economy as well as materials*. This is also detected in Durand's *Précis*, where Part One is launched by a diligent description of materials. Durand argues that materials give form, and so one ought to understand that one should first spend time understanding the materials and their abilities, and then select carefully among the materials, rather than consider form as an independent question:

> "*…the union of these materials naturally gives rise to forms and proportions: nor could this be otherwise, seeing that matter necessarily possesses forms and that forms have their inherent relations and proportions*." [110]

This stance comes close to central issues in the German debate about style in the mid-19th century, where Heinrich Hübsch and Eduard Metzger – both of whom, as mentioned, ran polytechnic schools – played prominent roles. Starting with Hübsch's essay *In welches Style sollen wir Bauen?*, the German architectural community hotly debated not just what style to build in, but what the foundations and concept of style were in relation to architecture and science. Metzger, in the course of the debate, stated that there cannot be a

[108] Durand, *Précis*, 188.
[109] Picon, "From 'Poetry of Art' to Method," 34-35.
[110] Durand, *Précis*, 108.

new style without a new material to depose the existing styles.[111] The point was perhaps put even more concisely by Johann Andreas Romberger, an architect who had graduated from the Hamburg Polytechnic School: "*only those forms that are rooted in construction are considered to be beautiful*."[112] These loftier ideas of style and aesthetics in the polytechnic tradition can also be traced to a more practical shift in drawing practices.

2.2.3: DESCRIPTIVE GEOMETRY AND SYSTÉME QUADRILLAGE: POLYTECHNIC DRAWING PRAXIS

The mathematician Gaspard Monge, who was a co-founder of the polytechnic school in Paris, is also famous for his *Géométrie Descriptive.* The first objective of *Géométrie Descriptive* is to devise a method based on mathematics and geometry with which three-dimensional solids can be rigorously and precisely described through projection on a two-dimensional plane – essentially a science of drawing. The second objective in the *Géométrie Descriptive* is to deduce all of the elements of a geometry that necessarily follow. In this way, as Monge says, one can move from the unknown to the known with descriptive geometry as a "*means to research the truth*."[114] Descriptive geometry, in other words, is conceived as a thinking tool with which to gain knowledge and solve problems:

> "*Modern engineers use the science of Géométrie descriptive not only as an instrument of communication but also in order to solve the most different assignments demanded by the time, and that as a consequence it has developed into a kind of modern language with which also less comprehensible problems could be mastered*."[115]

The special drawing practice of descriptive geometry works as a Cartesian framing of complex and dynamic problems. Through descriptive geometry, these "problems" can be represented and worked out. Descriptive geometry therefore also represents the birth of the cross-field of architecture and engineering. Pfammatter counts descriptive geometry as a core characteristic of the polytechnic system, and this would indeed be supported by the relatively high amount of hours spent on the subject.[116] Picon, by contrast, interjects that descriptive geometry actually had very little practical influence, and as early on as in Durand's *Précis* had become obsolete.[117] In either case, Monge's descriptive geometry is undoubtedly a geometrisation of the world in a positivist tradition, and what Durand takes from it and transfers to the architectural course is perhaps simply the systematic approach and a more general idea of abstraction. Durand did not, in any case,

[111] Herrmann, "Introduction," 9.
[112] Herrmann, "Introduction," 8.
[114] Monge, *Géométrie Descriptive*, xvj. (page 22 of PDF) Own translation.
[115] Pfammatter quotes Monge from 1794. Pfammatter, *Making of the Modern Architect Engineer*, 41.
[116] At the École Polytechnique in 1799, students spent 126 out of 333 hours on descriptive geometry, while at the École centrale in 1830-31 this was 70 out of 280. Pfammatter, *Making of the Modern Architect Engineer*, 118.
[117] Picon, "From 'Poetry of Art' to Method," 27.

consider drawing the basis for architecture.[118] For Durand there are three types of drawing: croquis, sketches, and working drawings – of which only the croquis is without scale or rule and done completely freehand.[119] Durand has an expressed distrust against what he calls the charm of the drawing:

> "*…in the attempt to produce an effect in the geometric elevation, the designer will add unnecessary parts and sometimes remove necessary ones. If anyone is so then unfortunate as to be misled by the charm of the drawing, the refinement of the line, or the purity of the tints into executing such a design, then not only does the mind of a rational observer remain unsatisfied but the architect's own eye is offended by effects and masses totally different from those that he expected*." [121]

To avoid the lure of drawing, Durand makes his *Précis* in a simple – almost an abstracting mathematical – line. He avoids washes, and only uses minimal amount of shading. The drawing is seen to play very little role in the creative development of a design: the design idea is conceived and then represented on paper, where it is judged.[122] For facility, Durand teaches his students to use the so-called *système quadrillage*, which was a standardised form of drawing paper with a square structural grid of 4 cm and divided into 4 parts.[123] Durand includes in his *Précis* guidelines for how to position drawings in a grid so that lines can be transferred from one drawing to the other.

> "*…drawn one above the other on a single sheet of paper, much time will be gained, as all the vertical lines are common to all and may be ruled at the same time. At all events, begin by drawing a line in the center of the paper; intersect it at right angles with another; on either side, parallel to those two principal axes, draw the axial lines of the walls, with half the thickness of the wall on either side; similarly, half of each opening will be on either side of its axial line*." [124]

The *Précis* does not leave the matter at handy drawing advice, but goes on to make rather sweeping statements of general methods with which any project can be designed as in the "*Marche a suivre dans la Composition d'un Projet quelconque*" from the 1813 edition of the *Précis*.[125] Here Durand shows his method in five "simple" steps: 1) determine the number and position of primary parts; 2) determine the number and position of secondary parts; 3) draw the walls; 4) draw the columns; and 5) design the project.[126] What is revealing here is, first, the underlying principle of utility: the number and position of the primary and secondary parts must be understood as determined by the principle of utility, which is subdivided into the concerns of fitness (which in turn would condition a building to be solid, salubrious, and commodious) and

[118] Durand, *Précis*, 74.
[119] Durand, *Précis*, 188.
[121] Durand, *Précis*, 75.
[122] Durand, *Précis*, 195.
[123] Pfammatter, *Making of the Modern Architect Engineer*, 60. For examples, see figures 106-107 and 111-113 in Szambien, *J-N-L Durand,* 262 and 264.
[124] Durand, *Précis*, 188.
[125] Figure 126 in Szambien, *J-N-L Durand,* 270.
[126] Szambien, *J-N-L Durand,* 270-271. Own translation.

economy (which dictates the structure to be symmetrical, regular, and simple).[127] Durand's method thereby gives the design process a squarely functionalist point of departure. A second remarkable point in Durand's method is the primacy of plan drawing. Perhaps inspired by the second objective of Monge's descriptive geometry, which included an interest in the position of objects in space, Durand insists on the primacy of the plan drawing. He sees a sort of cause and effect in the sequencing of the drawing practice, and advises to always begin with the plan, then proceed to the section, and finally undertake the elevation, but never to do the elevation first:

> *"…to begin with the elevation, as some architects do, and then subordinate the section and the plan to it, would be to deduce the cause from the effect, a notion whose absurdity speaks for itself."* [128]

Durand's conception of architecture here is as space rather than image. Durand focuses on the spatial function of the plan solution rather than aesthetic effect of a façade. The common denominator between descriptive geometry and Durand's grids is that they both do not care for the rendering of the drawing or the atmosphere. In Durand's case, this turns pleasure into something entirely utilitarian, as discussed in section 2.2.2.

In Durand's system, architectural drawing is syntax and typology, which opens it to a rationalisation but at the same time also makes it more abstract, and thereby removes it from the sensory, the empirical, and the image. This lack of feeling is what causes some architectural theorists even today to criticise Durand. As Pérez-Gómez writes about Durand's gridded drawing practice:

> *"… the implications of Durand's grid, as an "ideologic system of production" (p. 90), were very different from those of previous uses of the grid in design. I would add that the very nature of architectural drawing was thus transformed from a symbolic operation to a means without implicit values, and that its sole purpose became the reduction of architecture to idealized building and its precise representation."* [129]

Without venturing too far into this debate, there is – at least as shown in the above – a distinct difference between the drawing practices found in the Beaux-Arts tradition and those found in the polytechnic. I will now briefly shed some light on the more pedagogical elements of the polytechnic paradigm, which also mark differences from the Beaux-Arts paradigm.

[127] See Szambien, *J-N-L Durand,* 81, for a graphic depiction of the principle of utility.
[128] Durand, *Précis*, 139.
[129] Pérez-Gómez, "Review of J. N. L. Durand 1760-1834, De l'imitation à la norme," 420.

2.2.4: POLYTECHNIC PRINCIPLES: PEDAGOGY AND POLYSCIENCE

There is no list of main characteristics of the polytechnic paradigm like the one Harbeson made for the Beaux-Arts. However, to distil a few of Pfammatter's insights in a similar manner, the polytechnic paradigm may be characterised by:

1. being methodical or a "school of method."
2. "Encouragement pedagogy," which is important in the novel model of teaching.
3. Utility as a governing principle, not only in construction, but also in the choice of assignments: more frequently buildings for new governmental institutions and new societal life instead of elaborate edifices.
4. Using the *systéme quadrillage* and other means to facilitate and rationalise the process of drawing.

Whereas the previous sections have touched upon the use of the *systéme quadrillage* and the concept of utility, this section will briefly describe the polytechnic paradigm as a school of method and its encouragement pedagogy in relation to the curriculum. The classic polytechnic education was built up as a scientific education. A wide range of technical disciplines – physics, chemistry, and geometry as well as architecture and drawing – are at the heart of the polytechnic tradition, as the name implies.[130]

The polytechnic model innovated the educational system by dividing students into classes (a cohort that is maintained throughout a year and for any subject) and introducing class instruction.[131] The class model is different from the *atelier* model, as it does not mix students of different levels. Accordingly, all students work on the same assignments. Instruction at the polytechnic schools was based on scientific knowledge in a combination of theory and practice. Design work was predominantly done in the form of exercises, rather than in a freer project approach. On the whole, according to Pfammatter, there was a systematic approach to teaching and methodology with attention to practical application.[132]

To take the architecture program in Karlsruhe as an example: it spanned 5 years, where the first two years were spent learning mainly mathematics, physics, and technical drawing. Genuine design work was only gradually introduced to the students and only in the second and third year. The second and third year were still highly technical, with courses in geology and chemistry but also ethics and life drawing.[133] After

[130] See Appendix 2 for an example of classes at the École Polytechnique in 1799. See also, for instance, the diagram from Diderot and d'Alambert's enclyclopedia in Pfammatter, *Making of the Modern Architect Engineer*, 26.
[131] Pfammatter, *Making of the Modern Architect Engineer*, 50.
[132] Pfammatter, *Making of the Modern Architect Engineer*, 230.
[133] Lewis, "The Battle between Polytechnic and Beaux-Arts in the American University," 68. Lewis refers to a 1892 *Festschrift* for Friedrich von Baden.

completing the first three years of basic education, students could choose between the school of engineering or the architecture program at the *Bauschule*, which was led until 1826 by Weinbrenner and from 1832–1854 by Heinrich Hübsch, both mentioned earlier in this chapter.[134] As for the architecture curriculum specifically, Pfammatter has no detailed information available from Karlsruhe, but Durand, in the *Précis*, describes his course as divided into three parts: Part 1 deals with materials and the elements of buildings (doors, windows, arches, columns, floors, etc.); Part 2 deals with composition of elements at the scale of a single building; and finally Part 3 is concerned with composition at the scale of a city, square, street, etc. (in other words, urban planning).[135]

The pedagogical activities at École Polytechnique were varied. From a 1818 plan printed in Szambien's book on Durand, we can surmise that there were lectures (*leçon*), excercises (*études*), tests (*interrogation*), drawing (*dessin*) and research (*études libres*), as well as recreational activities, library visits, and presumably exams, although these are not mentioned on the plan.[136] The plan from 1818, furthermore, gives an impression of a rather militaristic regime that was run on a schedule from 5:30 AM to 9 PM seven days a week. Nevertheless, for Pfammatter, the didactic model in place at École Polytechnique did aim at different strategies of learning, much as it was also supposed to encourage interest in the studies through the various pedagogical activities.[137]

Pfammatter characterises the entire polytechnic model by a sort of "encouragement pedagogy," which relied not only on a varied curriculum, but also the personal ability of teachers to engage with their students.[138] The entire approach to education is a pedagogical rationalisation of subjects – or as Pfammatter puts it, citing a formulation from 1794, an "Elucidation of Instruction," a clarification of the professional methods.[139] The change Pfammatter mentions from a *school of style* to a *school of method* is also expressed by Durand, who sees the methodical approach as the only feasible one. Students and architects should concern themselves with the principles rather than the particularities of a design; accordingly, their studies should be based on instruction rather than learning from practice. As Durand argues:

> *"… there is a near-infinite variety of classes of building; […] to seek to learn architecture by successively studying all classes of building in all the circumstances that can modify them would be an impossibility; […] if – instead of*

[134] Pfammatter, *Making of the Modern Architect Engineer*, 232 and 236. The School for engineering was led by Johann Gottfried Tulla, and the architecture program at the *Bauschule* was led until 1826 by Weinbrenner, and from 1832–1854 by Heinrich Hübsch. Both Weibrenner and Hübsch were introduced earlier in this chapter.
[135] Durand, *Précis*, 132.
[136] Szambien, *J-N-L Durand,* 258. This corresponds reasonably well to how Pfammatter separates the activities into lectures (*cours*), exams (*concours*), practical excercises (*travaux*), research (*operations*), experiments (*manipulations*), and concrete experience (*visites et excursion*). See Pfammatter, *Making of the Modern Architect Engineer*, 46.
[137] Pfammatter, *Making of the Modern Architect Engineer*, 45-46.
[138] Pfammatter, *Making of the Modern Architect Engineer*, 9 and 49. See also Lewis, who highlights that the German polytechnicians, who emigrated to the U.S. had a very different and positive attitude, when teaching, than their American colleagues. Lewis,"The Battle between Polytechnic and Beaux-Arts in the American University," 69.
[139] Pfammatter, *Making of the Modern Architect Engineer*, 45.

> *devoting one's time to the production of designs – one were to first look at the principles of the art, and then familiarize oneself with the mechanism of composition, it would be possible to execute with facility, and even with success, the design of any building*." [140]

The peculiarity in Durand's argument is that the need to approach architecture through universal principles and knowledge of the general *mechanism of composition* seems to stem from a realisation of the "near infinite variety" of buildings. It cannot be demanded of the individual student that he or she find these principles through practice, for which reason they must be instructed and methodically trained to reach a desirable result. The study of individual cases is harmful, in Durand's view, as it could lead to the development of a personal "taste" or preference:

> " *… as all buildings differ in their uses, the more precise the ideas derived from the design of any one, the less applicable they would be to another; and that, consequently, every new design would demand a new study. Such a manner of studying architecture is not only unprofitable and arduous but harmful, whatever view we may take of that art: after studying a number of projects, one would infallibly be lulled by indolence or by vanity into certain associations of ideas that would then reproduce themselves in all of one's subsequent projects, even where least appropriate*." [141]

Due to this conception of architectural design, all interest in the study of architectural history was largely expelled from the polytechnic curriculum. This stance toward precedence or architectural history marks one of its profound differences from both to the Beaux-Arts and the practitioner paradigms. Yet although the polytechnic paradigm aims at a more rationalist approach to architecture education, it is not entirely disentangled from artistic practice. In the mid-20th century, the polytechnic educational approach became very influential through its influence on the functionalist movement and the Bauhaus school.

2.2.5: BAUHAUS AND THE POLYTECHNIC TRADITION

The Bauhaus system and the polytechnic tradition have their differences but also their affinities. While the following subsection by no mean purports to be an in-depth analysis of their intricate connection, it is nonetheless important to sketch how modernist architecture is largely founded in the polytechnic tradition. Bauhaus is, of course, only one instance of educational practice and not synonymous with modernist architecture. Yet it is almost impossible to overestimate the influence of Bauhaus in 20th century architecture. There is a clear link between the emphasis on structure, materiality, and utility in the polytechnic tradition and the functionalist architecture of the 20th century. With reference to this, Pfammatter even writes that "*the basic principles of 'functional building' were anticipated a half century before 'Modernism' came into being*." [142]

[140] Durand, *Précis*, 140.
[141] Durand, *Précis*, 140.
[142] Pfammatter, *Making of the Modern Architect Engineer*, 133.

Moreover, Sigfried Giedion, in his classic book *Space, Time and Architecture* from 1941, also traces the beginnings of the modernist movement and the Bauhaus school to the early 19th century, particularly the material inventions and the rise of the polytechnic system.[143] Giedion's main project is to show how there is a link between the artistic and scientific developments of a time – an inseverable connection of feeling and thought. Giedion accordingly admires the early polytechnic education for its intention to merge science and everyday life.[144] If the polytechnic school was dedicated to the fusion of everyday life and science, then the Bauhaus school, according to Giedion, was intended to fuse art and industry, or art and everyday life.[145] There is certainly a strong inspiration from the polytechnic schools in the Bauhaus, but rather than a poly-science, its aim was rather a poly-art – or so Giedion hints, quoting a 1923 Bauhaus publication: "The guiding principle of the Bauhaus was the idea of creating a new unity of the welding together of many 'arts' and movements."[146] Indeed, Madelin Simon, in the entry on pedagogy in *Architecture School*, writes that the Bauhaus pedagogy had a functionalist structure but also differed in many ways from the polytechnic tradition.[147] One is tempted to suggest that the Bauhaus functionalism was an aestheticized functionalism. At first glance, this seems far from the polytechnic principles; but it is nonetheless not too dissimilar to the utopian utility by which Picon characterises Durand.[148]

The emphasis on method as the basis of education is, however, indisputably common ground for the Bauhaus school and the polytechnic model. Walter Gropius, who was headhunted to chair the department of architecture at Harvard in 1937,[149] and from there widened his sphere of influence and put a lasting Bauhaus inspiration in architecture education, stated at the 6th CIAM conference:

> "*In architectural education the teaching of a method of approach is much more important than the teaching of skills…The integration of the whole range of knowledge and experience is of the greatest importance right from the start; only then will the totality of aspects make sense in the student's mind… Such an educational approach would draw the student into a creative effort to integrate simultaneously design, construction, and economy of any given task with its social ends*."[150]

The words of Gropius strongly echo Durand´s early principles, particularly with regard to the integration of design, construction, economy, and the social. They also underline the connection between modernist architecture and the ambitions of the early École Polytechnique.

[143] Giedion, *Space, Time and Architecture*, 211-213.
[144] Giedion, *Space, Time and Architecture*, 213.
[145] Giedion, *Space, Time and Architecture*, 489.
[146] Giedion, *Space, Time and Architecture*, 511. Giedion quotes from the 1923 publication *Staatliches Bauhaus in Weimar 1919-1923.*
[147] Simon, "Design Pedagogy in *Architecture School*," 278-279.
[148] Picon, "From 'Poetry of Art' to Method," 34.
[149] For more on the Bauhaus influence on American architecture education, see for instance Simon, "Design Pedagogy in *Architecture School*," 278-279, and Alofsin, "American Modernism's Challenge to the Beaux-Arts," 117.
[150] Giedion, *Space Time and Architecture*, 512. Giedion quotes Walter Gropius speaking at the Sixth CIAM congress, autumn 1947.

As with the Beaux-Arts paradigm, it is possible to extract and summarize some of key features of the polytechnic tradition that characterise it and mark its differences from other approaches to architecture education. Based on the above, these are:

- There is a clear focus on building as utility, which in turn means that drawing is regarded preferably as abstracted and "mathematical." To project a building is considered a type of problem solving.
- The design problem is perceived as singular, and therefore it is necessary to study more universal principles, such as the mechanism of composition, to prepare for design work. In line with this view studying previous examples is futile or directly damaging, because it conditions architects to reproduce already known solutions, even when these are not appropriate for new contexts.
- Architectural history is not considered a vital element of architectural education.
- The polytechnic paradigm favours exercises, class-instruction, and general education in related subjects. Design work is introduced late.
- Form is generated – and so, to a large extent, form grows out of materials (and cultural needs). Accordingly, there is a great need to research materials and material capabilities.

The polytechnic and Beaux-Arts paradigms are influential in architecture education, but cannot alone describe the didactic practices in modern architecture education. I therefore propose to include the practitioner paradigm as distinct from the two.

3.3: PRACTITIONER PARADIGM

The Beaux-Arts and polytechnic paradigms can be seen as in contradiction to one other, because of their different ways of valuing and including technical and artistic elements of architectural thinking and education. Nevertheless, both models have since been challenged by another "practice focused" approach,[151] perhaps simply because it is difficult to understand modern architecture education purely from the perspective of either the Beaux-Arts or the polytechnic. In his influential books *The Reflective Practitioner* and *Educating the Reflective Practitioner*, Donald Schön highlighted and theorised the turn towards practice. Unlike the theory explored in relation to the two other paradigms, Schön's theory is not directed solely at architecture education. It is intended instead as an analysis of ways of thinking in professional practice in general. However, the theories of Schön apply well to architectural education not least because Schön, who was a philosopher by training, had taught for years at MIT in Urban Studies and Education, and knew the practices of architecture education well. In the practices of architectural education, Schön saw something that he thought would be useful in other fields:

[151] See for instance Webster, "Architectural Education after Schön," 64-65. Webster states that Schön's ideas have become the dominant theory of practice and are widely employed in professional schools, not least in architecture schools.

> *"… architectural designing is a prototype of the kind of artistry that other professionals need most to acquire; and the design studio, with its characteristic pattern of learning by doing and coaching, exemplifies the predicaments inherent in any reflective practicum and the conditions and processes essential to its success*." [152]

Schön's concepts are perhaps the closest one can come to a consistently treated epistemology in architecture education, and Schön's ideas have left lasting traces in the literature and practices concerning architectural education.[153] All in all, Schön's influence on higher education should not be underestimated, as Roland Barnett rather grandiosely states*:* "We are all reflective practitioners now."[154]

Whereas the polytechnic and Beaux-Arts paradigms are relatively common points of reference in the research literature on architecture education, theories of the reflective practitioner, although they are widely read and referred to, are not usually taken to represent a distinct approach to architecture education. I believe that adding the practice-focused approach as a third paradigm in architecture education is paramount for understanding present day practices.

3.3.1: REFLECTION-IN-ACTION AS A PARADIGM FOR MODERN ARCHITECTURAL EPISTEMOLOGY

In the following section, I will first portray what I have called the *practitioner paradigm*, and then showcase how, in many ways, it circumvents the chasm between the thinking in the polytechnic paradigm and that in the Beaux-Arts. In his preface to *The Reflective Practitioner*, Schön opens with a critique of academia. Academia has, he writes, a "particular epistemology" that fosters inattention to practical competencies and the work of an artist or artisan.[159] Schön then describes how practitioners have responded to their academic colleagues that their kind of knowledge should be respected, but that what they do is indescribable and therefore unattainable, inaccessible for either understanding or critique by those who are uninitiated.[160] Instead of this unproductive situation, Schön proposes research into an *epistemology of practice*,[161] which he claims happens as *reflection-in-action*. Schön highlights that in many fields, professionals have questioned the adequacy of professional knowledge, and it seems that the concern for many is to manage complexity.[162] Confidence in the "technological fix," on Schön's account, had already disappeared by the beginning of the 1980s[163] (although today it may seem that it has been reinvigorated, given some of the demands being put on institutions of higher education, and especially creative higher education).

[152] Schön, *Educating the Reflective Practitioner,* 18.
[153] Webster, "Architectural Education after Schön," 72. Barnett, "We're all reflective practitioners now," 185.
[154] Barnett, *Higher Education: A Critical Business*, 39.
[159] Schön, *The Reflective Practitioner,* vii.
[160] Schön, *The Reflective Practitioner,* viii.
[161] Schön, *The Reflective Practitioner,* viii.
[162] Schön, *The Reflective Practitioner,* 14.
[163] Schön, *The Reflective Practitioner,* 10.

Schön's reflections are valuable because, despite being 30 years old, they seem readily applicable to the contemporary debate about tangible, objective measurements for quality in education – or what in Schön's terms one might call professional technical rationality. When he describes the many demands in education, Schön could be writing today:

> "*Teachers are faced with pressures for increased efficiency in the context of contracting budgets, demands that they rigorously 'teach the basics,' exhortations to encourage creativity, build citizenship, help students to examine their values*."[164]

Schön's *epistemology of practice* is necessary, in his view, because without it we are bound to a model that that in his words "can't explain, or even describe, the competences to which we now give overriding importance".[165] In short – and in the context of architectural education – if we want to understand what goes on in the complex situation of design-making, we cannot rely on a technical procedural description:

> "*If it is true that there is an irreducible element of art in professional practice, it is also true that gifted engineers, teachers, scientists, architects, and managers sometimes display artistry in their day-to-day practice. If the art is not invariant, known, and teachable, it appears nonetheless, at least for some individuals to be learnable*."[166]

In his book *Design Thinking*, Peter Rowe seems to be in line with this argument when he criticises the polytechnic and Beaux-Arts models for offering only a stage-based process of design, which is limited to shedding light only on certain low-level features of a creative design process.[167] Rowe suggests that it would be more interesting to try and discover the mechanisms through which an architect or architecture student can pass from analysis to synthesis, and why a unique solution can come from standard procedures.[168] According to some, answers to such questions can be sought in a scientific and objective approach to design,[169] but for Schön, they are only answered through an investigation of the epistemology of artistry in practice.

2.3.2: QUIST AND PETRA

Schön's notion of reflection-in-action – what practitioners do when they practice their art – does not recognise the dichotomy between knowing and doing. Reflection-in-action intertwines the related concepts of commonplace "know-how," Polanyi's *tacit knowledge*,[170] and the type of "thinking on your feet" actions that allow jazz musicians, for example, to improvise.[171] Schön extracts the concept of *reflection-in-action*

[164] Schön, *The Reflective Practitioner,* 17.
[165] Schön, *The Reflective Practitioner,* 20.
[166] Schön, *The Reflective Practitioner,* 18.
[167] Rowe, *Design Thinking,* 46.
[168] Rowe, *Design Thinking,* 51.
[169] Rowe, *Design Thinking,* 49.
[170] Schön, *The Reflective Practitioner,* 52.
[171] Schön, *The Reflective Practitioner,* 54-55. For a description of *reflection-in action*, *knowing-in-action* and *reflection-on-action*, see also Schön, *Educating the Reflective Practitioner,* 26-31.

from two examples, one from a review session between "Quist" and "Petra" in an architecture education setting, and the other from a psychotherapy supervisory session. To unfold Schön's practice epistemology in the context of architecture school, the Quist and Petra example will be examined in this section. The Quist and Petra protocol is used as a basis in both *The Reflective Practitioner* and *Educating the Reflective Practitioner*, but in the latter it is also contrasted with other design studio situations.

The setting of the Quist and Petra protocol is a studio where students are tasked with solving a design problem over the course of a semester. Throughout the semester, students get guidance from their teacher in design reviews or so-called *desk crits.* The Quist and Petra protocol documents such a desk crit. Petra, the architecture student, is stuck, and Quist, her teacher, tries to help her move on. Schön highlights two important but perhaps also commonplace aspects of the protocol: The session works with design as a *parallel process of drawing and talking*, which, however, sometimes halts to let Quist talk *about design*.[174] Schön divides the design review up into several phases: 1) Petra's presentation, 2) Quist reframing the problem, 3) Quist's demonstration, 4) intermediate reflections, 5) next steps, and 6) a coda of reflection.[175] Instead of focusing on the chronology of the protocol, I shall here centre on three of the main points that describe characteristics of reflection-in-action: reframing, backtalk, and repertoire.

Reframing

The task is a design for a school at a given site that slopes. Petra has been trying to fit classroom blocks into the slope, but remains unsatisfied, and therefore has difficulties moving on. Quist, the architectural educator, circumvents her problem of fitting the blocks into the slope, and instead, in the protocol, suggests that perhaps the site is too "screwy" to work on a solution like that. As an alternative, he proposes the introduction of a geometry that will discipline the site.[176] In so doing, Quist performs what Schön calls a reframing of a problem. Reframing enables experimentation with the situation and, of course, a way around the obstacle that has stopped fruitful experimentation. In the protocol that Schön examines, Quist's reframing is a way out; but theoretically it could lead to another dead end at a later stage, where another reframing would be necessary. Therefore, the ability to reframe a problem becomes vital for a reflective practitioner. The reframing is an abductive move. The invention of a hypothesis – in this case the possible satisfactory solution of a disciplining geometry – starts an inquiry. After reframing the situation, Quist tests the consequences, implications, and new possibilities that the reframing brings through the so-called *backtalk* of the situation.[177]

[174] Schön, *Educating the Reflective Practitioner,* 45.
[175] Schön, *Educating the Reflective Practitioner,* 46-56.
[176] Schön, *The Reflective Practitioner,* 84-85.
[177] Schön, *The Reflective Practitioner,* 131.

Back talk

Schön describes the process of design as a conversation with the situation. The reflective practitioner "shapes the situation, in accordance with his initial appreciation of it, the situation 'talks back,' and he responds to the situation's back talk."[178] Back-talk is the reason for part of the reflective element in *reflection-in-action*, or rather it is how action can be deemed reflective, without being what Schön calls *reflection-on-action*. The *back-talk* of the situation allows Quist to discover the implications of his reframing of the problem.[179] The feedback from the situation can be foreseeable or unforeseeable, desirable or undesirable, which allows Quist to guide further moves and make judgements on the overall quality of the reframing proposal.[180] Quist begins with a "what if", but he then differentiates the consequences that ensue between what "must" and what "might" happen - each of which have further implications, and so on.[181]

Schön proposes that design is built, in this way, on a logical structure of "if-then."[182] Schön considers drawing a virtual world, and sees drawing as playing an important mediating role in the architectural process of *reflection-in-action:* "Because the drawing reveals qualities and relations unimagined beforehand, moves can function as experiments."[183] It is, in other words, because of the ability to "talk-back" that the operation of drawing produces knowledge. Furthermore, the interaction with *back talk* could be seen as a guarantee of rigour, which I shall expand on later. *Back talk* would seem to indicate a very open and almost entirely unforeseeable situation, but a skilled architect can *reframe* – or begin experiments – without being completely in the dark, thanks to what Schön calls the *repertoire*.

Repertoire

In the Quist and Petra protocol, Petra is stuck, but Quist is able to engage with the problem in a productive way. Schön believes that this is due to Quist's *repertoire*, which consists of prior "examples, images, understandings, and actions."[184] Quist sees the present problem as something already in his repertoire. This might seem like a categorisation of the problem into familiar categories, but Schön is adamant that it is not. Quist, Schön insists, is only comparing the new problem with other more familiar ones from his repertoire. He still sees the problem as a unique situation:

[178] Schön, *The Reflective Practitioner,* 79.
[179] This is a general point for Schön, but see for instance Schön, *The Reflective Practitioner,* 94.
[180] Schön, *The Reflective Practitioner, 153.*
[181] Schön, *The Reflective Practitioner,* 101.
[182] Schön, *The Reflective Practitioner,* 99.
[183] Schön, *Educating the Reflective Practitioner,* 75.
[184] Schön, *The Reflective Practitioner,* 138. Schön sees this as similar to Thomas Kuhn's notion of the exemplar in relation to scientific problem solving.

> *"…when a practitioner makes sense of a situation he perceives to be unique, he sees it as something already present in his repertoire. To see this site as that one is not to subsume the first under a familiar category or rule. It is, rather, to see the unfamiliar, unique situation as both similar to and different from the familiar one, without at first being able to say similar or different with respect to what."* [185]

The comparison – what Schön calls *seeing-as* and *doing-as* – is what enables the architect and architecture student to make sense of and act in complex, unique situations using their experience or *repertoire*.[186] *Repertoire* therefore becomes the foundation of the artistry of the practitioner.

2.3.3: EXPERIENCE, RIGOR, AND EXPERIMENT

Schön's practice epistemology is concerned with answering two main questions: First, if a problem is singular and not part of a category or type, then how is past experience or *repertoire* useful? Secondly, how can such a practice be rigorous, when it does not seem to fit normal standards for scientific rigour?[188] Both the problem of repertoire and the problem of rigour are something that the Beaux-Arts and polytechnic paradigms answer differently to the practitioner paradigm, which shall be highlighted in section 2.4.

With regard to the problem of repertoire, being able to use experience is, to state the obvious, crucial to learning. If you do not gain useful experience from your endeavours in architectural design, then you begin each new project as a complete novice. If there is any point in architecture education this cannot be the case. It also does not seem to reflect reality: senior architecture students seem more capable than the juniors. Nonetheless, the problem is intricate with regards to creative architectural development: for how does the architecture student avoid learning a standard approach to a problem type? Part of Durand's criticism of the Beaux-Arts tradition was that the study of previous examples risked blinding architects to the particularities of new design tasks.[193] Durand's answer, as one might recall, was a search for the universals or general functions of an architecture beyond style. However, Durand's universals would be exactly the type of technical rationality that Schön criticises. Instead, Schön leans on Kuhn's notion of the exemplar, and argues that experience is used in an experimental *as-if* manner, which he refers to as *seeing-as* and *doing-as.*[194] The difference here to what happens in technical rationality, according to Schön, is that in the educational setting, the focus becomes the differences and similarities between the two situations.[195]

Quist, as a trained architect, has an extensive repertoire of architectural experience. This gives him the capacity to see Petra's site as "too screwy," and the necessity for "imposing a discipline," as Schön

[185] Schön, *The Reflective Practitioner,* 138.
[186] Schön, *The Reflective Practitioner,* 140.
[188] Schön, *Educating the Reflective Practitioner,* 65-66.
[193] Durand, *Précis*, 136, 140.
[194] Schön, *The Reflective Practitioner,* 139.
[195] Schön, *The Reflective Practitioner,* 139.

explains.[196] This capacity allows Quist to test the site, in an experimental manner, against the perhaps tacit knowledge of his repertoire. By these means, Quist gains particular knowledge of the uniqueness of the site and the design problem.[197] Here the problem of repertoire feeds into the problem of rigour. Schön first compares the experimenting of the reflective practitioner with John Stuart Mill's three types of experimental method and Karl Popper's ideas on competing hypotheses.[198] However, the experiment that Quist sets up is not a classic hypothesis-testing experiment. Schön concludes that the practice situation is unlike the scientific experiment because it is "often uncertain, in the sense that one doesn't know what the variables are."[199]

Furthermore, *reflection-in-action* does not uphold what Schön lists as the three core dichotomies of positivist epistemology: separation of means from ends, separation of research from practice, and separation of knowing from doing.[200] These three dichotomies can be equated with technical rationality, and therefore, Schön argues, *reflection-in-action* is not really a scientific experiment. *Reflection-in-action* must draw on other means to demonstrate rigour.[201] In *reflection-in-action*, there seem to be several types of experimentation, which all occur at the same time.[202] Schön calls these 1) exploratory experiment, 2) move-testing experiment, and 3) hypothesis-testing experiment. In the exploratory experiment, one does not have any expectations as to the result:

> "*Exploratory experiment is the probing, playful activity by which we get a feel for things. It succeeds when it leads to the discovery of something there*."[203]

According to Schön, the characteristic of "experimenting in practice" is that all of these three forms of experiment happen simultaneously.[204] The move-testing experiment is characterised by acting to produce an intended change. Moves can either be affirmed or negated, when the action does or does not produce the intended outcome.

Schön also highlights that in more complex cases, the focus is on whether the result is desirable or not, rather than whether or not the solution turned out as intended.[205] The hypothesis-testing experiment, cf. Popper, sets out to test the strength of a hypothesis by attempting to refute it.[206] In the practice situation, argues Schön, this is different. The practitioner does not try to refute his theory, because as opposed to the

[196] Schön, *Educating the Reflective Practitioner,* 67.
[197] Schön, *Educating the Reflective Practitioner,* 68, and Schön, *The Reflective Practitioner,* 140.
[198] Schön, *The Reflective Practitioner,* 142-143.
[199] Schön, *The Reflective Practitioner,* 144.
[200] Schön, *The Reflective Practitioner,* 165.
[201] Schön, *The Reflective Practitioner,* 145.
[202] Schön, *The Reflective Practitioner*, 145.
[203] Schön, *The Reflective Practitioner,* 145.
[204] Schön, *The Reflective Practitioner,* 147.
[205] Schön, *The Reflective Practitioner,* 146.
[206] Schön, *The Reflective Practitioner,* 141, 146-147.

researcher he is not disinterested in change.[207] The practitioner makes his hypothesis come true.[208] He shapes the situation as if it was true, and, says Schön, evaluates the desirability of the outcome. For Schön, such an approach is still rigorous because the hypothesis *is* being tested:

> "*Their hypothesis-testing experiment is a game with the situation. They seek to make the situation conform to their hypothesis but remain open to the possibility that it will not*."[209]

"Conforming" to the hypothesis here means that it gives desirable results. The experimentation stops when a desirable solution has been found, not when all possible solutions have been tested.[210] This, as Schön points out, is of course very different from Popper's hypothesis-testing. Scientific experiments are interested in testing a theory and therefore adhere to a *logic of confirmation*. By contrast, in the practice-based epistemology "*priority is placed on the interest in change and therefore on the logic of affirmation*."[211] This *logic of affirmation* means that even if the hypothesis or understanding of cause and effect in the given situation can be refuted, the result can still be desirable.

The *back talk* of the situation is important, because it stops the different sorts of experiments with the situation from becoming mere self-fulfilling prophecies.[212]

> "*He experiments rigorously when he strives to make the situation conform to his view of it while remaining open to evidence of his failure to do so*."[213]

The practitioner can create unintended changes through her moves, and whether desirable or undesirable, the situation's resistance or compliance in the attempt to change it contributes to a better understanding of it.[214] Schön lists four possible outcomes of the experimentation:

1: surprising outcome with undesirable effects
2: surprising outcome with desirable or neutral effects
3: unsurprising outcome with desirable or neutral effect
4: unsurprising outcome with undesirable effect.[215]

Whereas technical rationality only works with the "foreseeable desirable," *reflection-in-action* epistemology allows the practitioner to work with the unforeseeable and complex. The repertoire helps to steer the practitioner away from the unsurprising undesirable outcomes. All of this hinges on an analysis of desirability.

[207] Schön, *The Reflective Practitioner,* 147.
[208] Schön, *The Reflective Practitioner,* 149.
[209] Schön, *The Reflective Practitioner,* 150.
[210] Schön, *The Reflective Practitioner,* 151.
[211] Schön, *The Reflective Practitioner,* 155.
[212] Schön, *The Reflective Practitioner,* 153.
[213] Schön, *Educating the Reflective Practitioner,* 74.
[214] Schön, *The Reflective Practitioner,* 131-132.
[215] Schön, *The Reflective Practitioner,* 153.

However, the criteria for such an analysis seem a little opaque because of the uniqueness of the problem, as will be discussed further in the next section.

2.3.4: PROBLEM WITH THE PROBLEM: WICKED PROBLEMS AND DESIGN AS SOLUTION-BASED

The disillusion of modernity, prevalent in the 1970s, and the foundations of the beginning of the postmodern movement lay at the core of the paradigmatic shift away from what Schön calls technical rationality. What this meant for architecture on a stylistic plane is well-described in the literature,[216] but the disillusionment also had ramifications on a more methodological and epistemological level. In the 1970s and early 1980s, new thoughts arose on the nature of design problems. This happened against the backdrop of growing scholarly interest in the field of design, as well as a reaction to attempts to formulate "scientific design methods," like the models of the *Hochschule für Gestaltung* at Ulm.[217]

In 1973, a much-quoted and seminal article "Dilemmas in the General Theory of Planning" was published by design theorists Horst Rittel and Melvin Webber. The common reference to design and architecture problems as *wicked* stems from the Rittel and Webber article. Unfortunately, the wicked character of design problem is often referred to in a rather superficial manner. I would therefore like to unfold the issue a little in relation to Schön's practice epistemology. Rittel and Webber formulate an critique of technical rationality that in many ways is parallel to and earlier than Schön's. In their article, Rittel and Webber, like Schön, critique an approach to planning that has missed the complexity of the task. Rittel and Webber accordingly differentiate between "tame" and "wicked" problems – or, rather, between defined and ill-defined problems, some of which they term "wicked."[218] A wicked problem, according to Rittel and Webber, has at least 10 characteristics:

> *(1) Wicked problems have no definitive formulation, but every formulation of a wicked problem corresponds to the formulation of a solution.*
> *(2) Wicked problems have no stopping rules.*
> *(3) Solutions to wicked problems cannot be true or false, only good or bad.*
> *(4) In solving wicked problems there is no exhaustive list of admissible operations.*
> *(5) For every wicked problem there is always more than one possible explanation, with explanations depending on the Weltanschauung of the designer.*
> *(6) Every wicked problem is a symptom of another, "higher level," problem."*
> *(7) No formulation and solution of a wicked problem has a definitive test.*
> *(8) Solving a wicked problem is a "one shot" operation, with no room for trial and error.*
> *(9) Every wicked problem is unique.*

[216] See for instance Venturi, *Learning from Las Vegas*, and Foster (ed.), *The Anti-Aesthetic.*
[217] See Rowe, *Design Thinking,* 48-49.
[218] Rittel and Webber, "Dilemmas in a General Theory of Planning," 160. In his later book, Rowe separates these out into three types of problems: well defined, ill-defined, and wicked. Rowe, *Design Thinking,* 40-41.

> *(10) The wicked problem solver has no right to be wrong-they are fully responsible for their actions.*[219]

To underline that design problems are wicked problems, Rittel and Webber's characteristics of wicked problems can be compared to the six main characteristics of design problems in practice found by Dana Cuff in *Architecture: The Story of Practice*:

A) Design in the balance,
B) Countless voices,
C) Professional uncertainty,
D) Perpetual discovery,
E) Surprise endings,
F) A matter of consequence.[220]

Design in the balance (A) is the attempt in architecture to reconcile artistic and business interests, and is perhaps implicitly part of the reason why 3) the solution for the design problem cannot be true or false. The fact that B) every project has multiple participants speaks to both 4) and 5), as there would always be many slightly or perhaps fundamentally different approaches to the problem depending on each participant. Professional uncertainty (C) is reflected in 5), 7), and 9). Furthermore, perpetual discovery (D) is reflected in 2), 4), and 6), all of which express the non-foundational character of design problems. Finally, what Cuff calls a *matter of consequence* (F) is very similar to 8) and 10) in highlighting the gravity and real consequences of the design choices.

It could be argued that architecture school problems are never really wicked because they are set in a relatively "benign" educational and virtual space, as they are only very seldom actually executed. Nevertheless, design problems in architecture school are intended to teach future architects to handle the "real wicked" problems of their future career, and they are generally not taken lightly or treated with less solemnity than the real-world problems would be. Nevertheless, some of the ten characteristics do seem to matter more in a professional practice than in an educational setting: and so 8) and 10) do not apply with the same gravity. On the other hand, other characteristics, such as 3), are perhaps even more difficult to handle in an educational setting because it is removed from the pragmatic effects of on-site conditions, economic constraints, etc. At the same time, Rittel and Webber's characteristics for wicked problems pose difficulties when teaching students how to work with design problems: how do you teach a student to approach a

[219] Rittel and Webber, "Dilemmas in a General Theory of Planning," 161-167. For a discussion of this list and of wicked problems in relation to design thinking, see Buchanan, "Wicked Problems in Design Thinking," 16.
[220] Cuff, *Architecture: The Story of Practice,* 62.

unique problem? Rittel and Webber have no specific proposals for how to work with wicked problems; but Schön by contrast, in his pragmatic fashion, offers a tangible approach.

While Schön does not refer to problems as wicked, he also regards problems not as given, but as approached by the practitioner as something unique.[221] In the Quist and Petra protocol, Quist sets himself a problem that he can solve, whereas Petra is stuck.[222] In Schön's terminology, Quist reframes the problem. Schön also does not state explicitly that design practice is solution-based rather than problem-based. For later design scholars such as Bryan Lawson and Nigel Cross, this marks a defining and important epistemological difference between design and scientific disciplines.[224] Even if it is still implicit that design practice is solution-based, this is nonetheless in line with Schön's argumentation:

> "*Although a problem-setting experiment cannot be judged in the terms of its effectiveness, the practitioner tries nevertheless to set a problem he can solve*." [225]

Because design is not a problem-based but solution-based practice, what is important for the practitioner is not whether or not the theory is right, but whether or not the solution is desirable. This is in line with Rittel and Webber's characteristic 3). The next step to determine, therefore, becomes the evaluation of the desirability of the outcome. And here there is a slight discrepancy between Schön's understanding of a problem and "wicked problems." For Rittel and Webber, wicked problems have no stopping rule (characteristic 2). Schön, on the other hand, pragmatically proposes that the practitioners should stop when a desirable situation has arisen, but he is vague as to what constitutes desirability.[226] The reflective practitioner judges a problem-setting, Schön says, by the quality of the backtalk.[227] This Schön structures in five questions to answer from the situation:

1) Can I solve the problem I have set?
2) Do I like what I get when I solve this problem?
3) Have I made the situation coherent?
4) Have I made it congruent with my fundamental values and theories?
5) Have I kept inquiry moving?[228]

The five questions cover roughly three criteria that one might call: subjective desirability, coherence and operationality. Schön's questions 1) and 5) concern continuing work, and assessing whether the path chosen leads to a dead-end. In other words, whether it allows for further action and further discovery, and whether it addresses the operationality of the work. Questions 2) and 4) have to do with the subjective desirability of

[221] Schön, *The Reflective Practitioner,* 129.
[222] Schön, *The Reflective Practitioner,* 134.
[224] Cross, *Designerly Ways of Knowing*, 18, and Lawson, *How Designers Think*, 295.
[225] Schön, *The Reflective Practitioner,* 134.
[226] Schön, *The Reflective Practitioner*, 74.
[227] Schön, *The Reflective Practitioner,* 135.
[228] Schön, *The Reflective Practitioner,* 133.

the situation. This desirability could be aesthetic, social, theoretical, etc.; but there is an emphasis on its being desirable on the basis of a subjective judgement, rather than a universal standard. There seems to be, additionally, an implicit assumption that knowledge of "good solutions" is negotiated as an alignment between the interests of the individual and a practice community.

Question 3) and, to a certain degree, question 4) involve a coherence criterion for the situation. These questions search for an inner logic, a composition strategy, or a set of rules, although they might be completely unique, site-specific, and complex.[229] Both the coherence criterion and the subjective desirability criterion are in accordance with what David Shaffer found in his 2007 study of the Oxford Studio.[230] This suggests that the practitioner paradigm is not exclusive to Schön's writings, but that it is embedded in a variety of educational practices.

As with the Beaux-Arts and the polytechnic traditions, this sketch of the practitioner paradigm could be more elaborated, but will suffice in the current form. Before summarising the characteristic elements of the practitioner paradigm, I would like to address some points of criticism that have been raised against Schön's work, in order to mitigate their impact on the establishment of the practitioner paradigm.

2.3.5: LIMITATIONS OF THE PRACTITIONER

The basis of the practitioner paradigm leans heavily on Schön, but I do not equate the practitioner paradigm with Schön's theories, and therefore it is also important to consider the criticism that Schön has received. This criticism is here represented by Helena Webster and Finn Thorbjørn Hansen.[231] In an article, Helena Webster brings to attention what she believes are problematic features that have been overlooked in the otherwise generally positive reception and adaptation of Schön in architectural education:

> "*…whilst it has been expedient for architectural educators to adopt Schön's theories and the lineage of reflective theories that have followed (Moon, 1999; Brockbank and McGill, 2007), they have done so without sufficient understanding of their theoretical limitations and methodological errors: their 'cracks', 'boundaries' and 'blurs'.*"[232]

Webster's overall critique is that Schön writes at the impasse between behaviourist theories of learning to theories of learning as situated, and that some insights from situated learning are not entirely built into Schön's theories. As a result, in her view, Schön's workis limited in its account of architectural knowledge. And furthermore, it overlooks important aspects of architectural learning, both with regard to the dynamics

[229] For further reflections on judgement of drawings in architecture school, please see Chapter 6.
[230] Shaffer, "Learning in Design," 121.
[231] Hansen, *Kan man undre sig uden ord?* 100, and Webster, "Architectural Education after Schön."
[232] Webster, "Architectural Education after Schön," 65.

between student and teacher and by its focus on learning in a formal context.[233] Webster also questions the validity of the study, because the Quist-Petra protocol[234] is "second hand" and "un-triangulated" material.[235]

To address the latter objection first, I would suggest that this stems from different practice fields within the humanities. Schön, who was a philosopher, works theoretically, and the story of Quist and Petra serves as an example from which he extracts knowledge, rather than claiming empirical validity. Empirical validity seems to be what Webster calls for. The other parts of Webster's critique, however, are more serious.

Webster, I believe, somewhat misreads Schön with regards to the point of criticism that he doesn't address architecture as a contested field, and that the teacher corrects the student's work.[236] As elaborated in the previous section, when Schön suggests that the practitioner evaluates his work by asking, "Have I made it congruent with my fundamental values and theories?" it is implied that architecture is a contested field, and that there could be multiple theories, values, preferences, etc. For the practitioner paradigm, at least, it must be affirmed that there are no universal principles of architecture, but that each case is treated as unique. With regards to the "correction of student work," I would argue that Schön does not want to imply that Quist is mainly teaching Petra the "correct" solution to her design problem. The lesson is, instead, methodological: he attempts to demonstrate how "stuckness" can be overcome by a reframing of the problem; or how thinking can be tested and yield new results. Webster, however, undoubtedly has a point when she writes that:

> "*Schön puts forward design studio learning as a paradigm for liberal self-development. However, recent primary research on design studio learning has painted a picture of tight control, coercion and molding*."[237]

It should not be overlooked that there can be a gap between the ideals and the actual effects of a practice. Moreover, Webster also rightly indicates that architecture school consists of many more learning activities than the formal pedagogical structure of desk crits and jury critiques. These formative "micro-technologies," as Webster highlights, are under-researched and calls for more work.[238] Finally, Webster points to a "blur" when it comes to understanding creativity through Schön's theories. And here Schön can indeed be criticised for being vague at best.

How is it, then, that the architect learns to envision new solutions? Schön would probably say that the repertoire enables an architect to discover the differences and similarities of a particular situation in order to "get to know it." During experimentation with the design problem, new and unexpected solutions would arise from the *back talk* of the material in the virtual world of drawing. The problem here is that the

[233] For a list of issues see Webster, "Architectural Education after Schön," 71-72.
[234] See Schön, *The Reflective Practitioner,* chapter 3.
[235] Webster, "Architectural Education after Schön," 69.
[236] Webster, "Architectural Education after Schön," 68.
[237] Webster, "Architectural Education after Schön," 71.
[238] Webster, "Architectural Education after Schön," 66.

back talk, which is given overriding importance, becomes very vague – particularly because the drawings of the Quist-Petra protocol, which are supposedly the medium of the back talk, are very diagrammatic. The drawings are, I would guess, not the original drawings from the review session, but were constructed afterwards to demonstrate a point. They are, in other words, somewhat muted in the argument. Another problem in Schön's approach is the question of how to ensure that one stays open to the *back talk* of the material,[239] which is supposed to ensure the rigour of the approach and function as a creative motor.

Finn Thorbjørn Hansen mainly criticises the reflective practitioner for being focused solely on what *has been created* – using Deleuzian terms, he says the focus is on the *actual* instead of the *virtual*.[240] Hansen would prefer a *praxis ontology* rather than Schön's *practice epistemology*, because, as he argues:

> "*Schön's approach […] doesn't have an adequate language for and focus on the existential dimension, where it is not about solving problems or reflecting on problem premises, but rather making oneself open to meaning and meaning-fullness, or to the loss of meaning and meaningfulness in a moment of existential that-ness [atheds-mæssig] quality*."[241]

I believe there is a danger in the sort of 'remystifying' of design-practices suggested by Hansen here, not least in an educational setting. The "existential openness" not only could be difficult to "teach," but also would encroach crassly on the personal sphere of a student. The quality of Schön's theories is precisely its attempt at demystifying the largely tacit practice of a reflection process. To summarize the criticism, more work on important questions regarding the material processes of *back-talk*, as well as on questions about how to remain aware and responsive to *back-talk*, should certainly be carried out. With that said, before discussing the three paradigms in relation to one another in the next session, I will here sum up what I believe to be key features of the practitioner paradigm.

- Basic learning is learning by doing (in a studio setting or a reflective practicum), where the emphasis is on the student-teacher apprentice-model of the studio, but without taking into account various other activities, as mentioned by Webster.
- Studio is all-important, and there is no teaching there – only learning and coaching.
- There is a hidden normative assumption that a practice community negotiates a "good solution"; but there are (partly because Schön is not writing within architectural theory) no tangible hints as to what the requirements for a "good solution" would be.
- Virtual worlds are important, for instance drawing as it enables experiments. Schön does not take into account different media or virtual worlds that would yield different experiences – for example, the difference between building a house at 1:1 and drawing it.

[239] Cf. Schön, *Educating the Reflective Practitioner,* 74-75.
[240] Hansen, *Kan man undre sig uden ord?,* 101.
[241] Hansen, *Kan man undre sig uden ord?,* 107. Own translation.

- *Repertoire* or using experience is possible even though each problem is unique.
- Rigour is seen as experimentation in order to change the situation to desirable, but also to remain open to evidence of failure. How this openness is achieved is unclear.

2.4: BETWEEN THE ARTISTIC AND THE TECHNICAL

> *"Emotion or feeling enters into all our affairs – speculation is never completely "pure," just as action is never entirely practical."*[242]

This outline of the characteristics of the Beaux-Arts, the polytechnic, and the practitioner paradigms has likely resulted in simplifications, but the three paradigms do form good basic structures against which a more detailed analysis of actual practices is possible. The three paradigms are deliberately only "pure" in theory. In practice – in different schools, programs and studios – they function more as tonalities that can be more or less pronounced and interwoven. This is especially visible through analysis of institutional changes and over time, as will be elaborated in Chapter 8. I use the word paradigm as a loose reference to Thomas Kuhn and his *Structure of Scientific Revolutions.* There is something of a leap between the Kuhnian notion of paradigm and an application of the concept of paradigms to the field of architecture education, particularly since Kuhn's work is directed at the natural sciences. Architectural education paradigms do not have quite the same revolutionary tendencies as do Kuhn's paradigms, inasmuch as they interweave more complex and "impure" structures, disappear, reappear, and coexist. Though it must be remembered that Kuhn also remarks that normal science is not a "monolithic and unified enterprise," and that different fields and specialities do adopt different paradigms.[243] This is undeniably the case for architecture, as Hyungmin Pai argues*:*

> "*If the Beaux-Arts System was the last instance of widely shared conventions holding a discipline together, then it is clear that we cannot assume a singular discipline of modern architecture but must speak of it in the plural*." [244]

The notion of paradigm is apt, as it points to how a cohesive community is created and includes certain views, truths and methods: "*Men whose research is based on shared paradigms are committed to the same rules and standards for scientific practice*."[245] Paradigm, in this respect, points to a slightly more reflected and less habitual approach than the notion of tradition does. Furthermore, I do not argue that the three paradigms treated here form an exclusive list. For instance, there might already be a new algorithmic/digital

[242] Giedion, *Space Time and Architecture*, 430.
[243] Kuhn, *The Structure of Scientific Revolutions*, 49.
[244] Hyungmin Pai, *The Portfolio and the Diagram,* 6.
[245] Kuhn, *The Structure of Scientific Revolutions*, 11.

paradigm on its way.[246] I argue only that the paradigms are central to understanding different approaches to architectural education in the 20th and 21st centuries. Likewise, the intent behind outlining the paradigms is not to make crass categorisations. It is an attempt to approach the sometimes loose attachment of traditional labels on educational practices in a more systematic manner. Even more important, the three paradigms are intended to work as an analytical framework that can draw attention to comparable parts of architecture education. It is, in a manner of speaking, the making of a framework with the intent of breaking it again, through more detailed analysis, but then – hopefully – becoming wiser from the process.

The Beaux-Arts and polytechnic paradigms seem to mark-up architecture as either predominantly an artistic, symbolic field, or conversely, a technical, material field. Indeed, the dispute between the two approaches is still prevalent in architectural discourse. The practitioner paradigm no doubt needs some elaboration as a system to be as comprehensive as the two other described paradigms. Nevertheless, it should have been made sufficiently clear that the practitioner paradigm offers a different and independent approach to architecture education than do the Beaux-Arts and polytechnic paradigms, respectively. At this point, a short comparison of the three paradigms might be in order. In order to make this comparison systematic, I consider the analytic categories 1) surface structures, 2) pedagogical activities, and 3) epistemology from Shaffer's MIT study mentioned in the introduction. Because of this project's particular interest in drawing, I have included drawing in the schema below, as well as the categories of ontology and creativity. When drawn up in such a manner, the underlying differences in the paradigms emerge clearly:

	BEAUX-ARTS	POLYTECHNIC	REFLECTIVE PRACTITIONER
SURFACE STRUCTURES	Ateliers	Classes	Studio
PEDAGOIC ACTIIVITIES	*Concours* system, desk crits, system of the *esquisse*	Lectures, studio courses with exercises, projects and testing	Emphasis on the desk crit, perpetual iteration
EPISTEMOLOGY	Knowledge comes from history (experience)	Knowledge comes through technical understanding (Science)	Knowledge comes from hypothesis testing moves (Situational)
ONTOLOGY	Essentialist Strive for the true style	Essentialist Strive for universal typologies	Relational Recognition of complexity of problems and that the solution is singular

[246] As heralded in professional practice and in theory by Patrick Schumacher. Schumacher, *The Autopoiesis of Architecture.*

CREATIVITY	Compositional creativity Form is constructed using elements (almost semiotic)	Generative creativity Form is generated from function or the material	Dialogical creativity Form comes from the backtalk of the material
DRAWING	Drawing as image – emphasis on the aesthetics of drawing	Drawing as line and functionalist diagram – distrust in drawing	Drawing as virtual world – it is a thinking tool

There are obvious differences pertaining to surface structures and pedagogical activities. These have been covered in some detail in previous sections, however, and will be expanded on in a Danish context in Chapter 4, 5, and 8. I shall instead here compare the paradigms more carefully in two cross-fields: 1) epistemology and creativity and 2) ontology and drawing.

2.4.1: EPISTEMOLOGY AND CREATIVITY

The Beaux-Arts paradigm rests, as shown in section 2.1.4, rests on the production of knowledge through experience from architectural history. The link between creativity and precedence is remarkable here. The Beaux-Arts paradigm holds a firm belief that creativity involves working with a kind of pre-existing alphabet of elements of architecture, which is derived especially from the study of architectural history, but could also come from contemporary pieces. The polytechnic and Beaux-Arts paradigms thus have very different approaches to creativity. As a simplification, one might say that Beaux-Arts is concerned with architectural style as well as an almost semiotic composition strategy on the basis of architectural elements (c.f. Guadet's *Elements et theorie d'architecture* from 1901).[251] The polytechnic paradigm, on the other hand, follows the famous "form follows function" strategy, which was first put into words by Louis Sullivan in 1896.[252] With regard to the practitioner paradigm, there seems to be a link between the Beaux-Arts attention to tradition and exemplary buildings and what Schön calls *repertoire*, although repertoire does not focus on architectural history, but more broadly scopes architectural experience. One could say that both the Beaux-Arts and the practitioner paradigms value a kind of empirical background – although this has not necessarily been researched systematically, at least in the case of the practitioner paradigm.

As a contrast to this, one might recall Durand's mockery of and warning against such empirical approaches.[253] To summarize briefly, Durand's argument is that because every building works in a unique way – with regard, for instance, to its site and its function – it would be futile and misplaced to seek to borrow

[251] Guadet, *Elements et theorie d'architecture.*
[252] Sullivan, "The Tall Office Building Artistically Considered," 408.
[253] See Chapter 3 (3.2.4).

inspiration from other buildings. The danger is that the architect will be blind to the particularities of the project, and therefore design it inappropriately in accordance with personal tastes. Durand advises instead that the architect focus on the universal principles behind the building. For Durand, in other words, it is the singular nature of each building that calls for universal approaches. As we saw in Harbeson, for the Beaux-Arts paradigm "one-man original styles" are to be avoided precisely because of their singular nature.[254]

Nonetheless, both sides of this dispute do in many ways attempt to solve the same problem, namely, how to ensure that the architecture that is built is not just in the personal taste of the architect, but has a broader appeal. The Beaux-Arts paradigm seeks to achieve this by means of convention – that is, by imitation of what has previously been accepted publicly, or by imitation of nature. Therefore, in the Beaux-Arts approach, incremental change is the creative strategy. By contrast, the polytechnic paradigm seeks to solve the problem by finding and adhering to universal rules. The knowledge of universal rules comes from scientific research, particularly into the technical capabilities of materials, as well as from the functions of buildings. Unlike the styles that are the focus of the Beaux-Arts, the focus of the polytechnic is therefore on typologies. Form, in this approach, is not derived from the composition of previously known elements, but is generated from the function of the building or material capabilities. In this way, the architect is not able to design solely from his own tastes, but must subject to the rules of function and materials. Schön's criticism of technical rationality targets exactly this rigid form of rule adherence.

The practitioner paradigm would, however, share with the polytechnic paradigm its view of the building as unique and the "problem" of its design as singular. Nevertheless, unlike in the polytechnic paradigm, the argument here would be that the singularity of the situation would require something more than standard rules. As mentioned earlier, the problem then becomes: what use, if any, does past experience have? Schön's answer to this conundrum is that

> "*It is our capacity to see unfamiliar situations as familiar ones, and to do in the former as we have done in the latter, that enables us to bring our past experience to bear on the unique case. It is our capacity to see-as and do-as that allows us to have a feel for problems that do not fit existing rules*."[255]

A critic might have difficulties spotting the difference between the *seeing-as* and fitting a problem to a rule; but this operation, if we follow Schön, is different from the polytechnic approach. The point is to test your assumptions about the situation against your experience from other, perhaps similar, situations. Following the practitioner paradigm, no rule exists that can universally guide us in how to fit buildings on a slope. But the experience of how other buildings have been fitted into slopes, can be used to test how this particular

[254] See Chapter 3 (3.1.4).
[255] Schön, *Educating the Reflective Practitioner,* 68.

site and this particular building are different. Knowledge in the practitioner paradigm comes from this type of hypothesis testing, and is situational. There are no universal rules.

One might say that the practitioner architecture student is therefore freer to shape the building are than both the Beaux-Arts and the polytechnic architecture student; but she is not completely unbound. The practitioner paradigm answers the problem of creation of a work solely to the designer's tastes with the concept of *back talk*. *Back talk* leads to a sort of dialogical creativity where form comes not as a dictate from the material, but as a material dialogue. Still, how can one actually ensure rigour in such a process? Furthermore, how would rigour be regarded differently in the paradigms? The next section will take up these questions in a discussion of the different ontological views implicit in the three paradigms and how they relate to drawing.

2.4.2: DRAWING AND ONTOLOGY

In many ways, the problem of ensuring that architects do not only design according to their own tastes is inextricably linked to the problem of rigour as well as that of evaluation. To work rigorously with the development of a project is to ensure that it works not just in the eyes of the maker, but more broadly as well. The Beaux-Arts and polytechnic paradigms both overcame this problem relatively easily, as rigour in the Beaux-Arts becomes adherence to rules of style, and in the polytechnic paradigm adherence to the rules of type (that is, use of the building, the capabilities of materials, etc.). In this way, both the Beaux-Arts and the polytechnic paradigm are ontologically essentialist, albeit with different aims. The Beaux-Arts strives for the true style, and the polytechnic strives for the universal principles. In basic terms, both paradigms believe in the existence – and, to a certain extent – the knowability of rules, whether they be scientific or artistic. The question of what *kind* of rules are adhered to, however, creates the split between art and science in architecture. As Pérez-Gómez writes:

> "*After Durand, the reconciliation between form and content became the paradigmatic problem for architects concerned with meaning. Absolute validity of any one style was questioned and architecture was reduced to its pragmatic function, that is, the making of material commodities. The architect was thus forced to choose between art and science, between the false extreme of an absolute objectivity (universal mathematical reason) or that of an absolute subjectivity (personal poetic myth).*"[256]

The divide here outlined as between absolute subjectivity and absolute objectivity is in part bridged by the practitioner paradigm, not because it compromises between the two *per se*, but because it rejects the idea of a "rule set" and regards problems as complex or wicked. The practitioner paradigm thus works with a relational ontology produced by the very wickedness of the problems. As seen in section 2.3.3, this makes

[256] Pérez-Gómez, *Drawing as Architecture*, 5.

the problem of rigour all the more problematic in the practitioner paradigm. The order that must be imposed on the situation can come from no other place than the uncertain foundation of the designer herself:

> "*…whatever their differences of languages, priorities, images, styles, and precedents, they are likely to find themselves, like Quist, in a situation of complexity and uncertainty which demands the imposition of an order*." [257]

However, Schön insists, these are not merely subjective solutions. Moreover, the process is a rigorous one if the architecture student remains open to the fact that the situation might not conform desirably to the order she attempts to impose. It is in highlighting this difference in approach that the merit of distinguishing the practitioner paradigm as something entirely independent from the Beaux-Arts and polytechnic paradigms becomes evident. The two other paradigms would not generate the levels of uncertainty and complexity that Schön describes the practitioner as facing. The three paradigms' different approaches to the rigour problem correspondingly influence evaluation practices differently. Before formulating the research questions that this chapter has raised, however, the differences among the paradigms' drawing practices will be outlined.

The view on drawing differs quite widely in the different paradigms. In the Beaux-Arts paradigm, the drawing is of paramount importance, and is treated as a composition in itself, that is to say, it does not simply point to a building. This is seen in the overriding importance that Harbeson assigns to composition, for instance, which is not just the composition of the architectural work, but also of the composition of the drawing in itself. The emphasis on the aesthetic and persuasive qualities of the Beaux-Arts drawing is what the polytechnic drawing overtly distrusts. Here, conversely, the calculable qualities and abstraction are accentuated. Polytechnic drawings are predominantly line drawings, and they function as representations. In the practitioner paradigm, the drawing is a virtual world – that is to say, something in between the two previously described views. The practitioner's drawing is a somewhat idealised or abstracted reality, because in it the problem is transported to a virtual world. It is also something in itself, which in part is what enables *back talk*; but it is also a representation of an idea.[258] These contrasting views of drawing raise questions not only about how drawing is used as a thinking tool in various ways, but also about how various drawing practices are taught. Furthermore, they underlines the importance of architectural drawing as part of architectural thinking, as will be discussed specifically in Chapter 7.

[257] Schön, *Educating the Reflective Practitioner,* 65.
[258] More on this in Chapter 7.

The theoretical reflections in this chapter have led to many questions, but with regard to main concerns of this dissertation, a few stand out. One issue is to address how Danish architectural education relates to the framework of the paradigms sketched here. The superficial labels sometimes attached to Danish architectural education are problematic, as remarked in the introduction, because they can pose difficulties when making comparisons to international schools. In a 2006 international report, for example, the expert panel of authors quickly establish that they are somewhat unfamiliar with the Danish tradition, and therefore are not entirely confident in speaking about the Danish system:

> *"…the expert-panel finds it important to assess the School of Architecture's own goals and their ability to reach these, instead of solely assessing the school with reference to the panel-members' home schools."* [259]

An interesting question to ask is therefore:

- How does the Danish architecture school in Copenhagen relate to the paradigms of Beaux-Arts, the polytechnic, and the practitioner?

Indications of what the answer to this question is might be linked to an examination of evaluation practices. How evaluation is handled could give important insights into how architecture is not only taught but also thought about, leading to a second research question:

- What evaluation practices and criteria are present in the Danish architecture school, and how are they established?

Furthermore, in order to answer a question like the first one, one must not simply look at the surface structures and the pedagogical activities on a more structural level, but as should have become apparent in these last sections, one must also examine the approach to drawing, and particularly how thinking and drawing are connected, and how these particular practices are taught:

- How is thinking through the act of drawing taught, and how is it carried out by the students in their drawing process?

With both the framework and the research questions thus explicated, I will now turn to Part II, which includes three empirical chapters, each of which examines architectural education and drawing practices at the Copenhagen school from a different angle. Together, the chapters in Part II are intended to form the basis for a discussion of paradigms in Danish architecture education with reference to drawing epistemology and evaluations – as will be elaborated in Part III.

[259] The Danish Evaluation Institute, *Transforming Tradition,* 2006.

- PART II -

CASES:

ARCHITECTURE EDUCATION IN COPENHAGEN

CHAPTER 3:
THREE MOMENTS OF DANISH ARCHITECTURE EDUCATION - A SKETCH

In this chapter, I offer a sketch of three moments in the history of Danish architecture education. The selected moments will leave rather wide gaps between them, and they may not be quite as embellished as one could wish for, but the intention is to give a structured description, which is as *thick*[1] as possible and can serve as a backdrop of the coming chapters. Each of the three sketches is roughly structured around the analytic framework introduced by David Shaffer, and accordingly differentiate among 1) surface structures, 2) pedagogical activities, and 3) epistemology.[2] This chapter has three motors: the aforementioned analytic categories; drawings, which are a focal point particularly for the first two sketches; and, finally, the structures of architecture education. In each structure or structural change reside agendas of governance, didactics, research, or tradition . Structure and the changes to them form key elements in the identities of schools, though these are often overlooked in the research field of architectural didactics.[3] The first sketch, which is set in the beginning of the 20th century, is more elaborated than the other two, because parts of their domain will also be covered later, in Chapters 4 and 5.

3.1. FIRST SKETCH – EARLY 20th CENTURY – DRAWING IN STYLE

By the beginning of the 20th century, the Architecture School in Copenhagen already had a long history behind it, as well as a trail of controversy and debates around matters of style and education. The Royal Danish Academy, of which the Architecture School was a part, celebrated its 150-year anniversary in 1904. At the time of this jubilee, the Architecture School was at a crossroads. Ferdinand Meldahl (1827-1908) was the professor of architecture, and is architecturally perhaps best known for finishing (and somewhat changing) Nicolas-Henri Jardin's (1720-1799) project for the so-called Marble Church in Copenhagen. At the turn of the century, Meldahl had run the architecture school with an iron fist and had been a very powerful director of the Academy for decades, but sedition was growing in the ranks. As an example of this, in 1902, dissatisfaction with the old-fashioned approach to architecture education had propelled some students to quit the Academy and start their own independent architecture school.[5] Meldahl's power was waning, and within a decade the architecture school would have two new professors and be well on its way towards a new approach to architecture, even if this was still not an entirely modern one.

[1] Thick descriptions c.f. Geetz – see Berg, *Qualitative Research Methods*, 190-191.
[2] Shaffer, "Learning in Design," 103. For a more detailed description, see Chapter 1 (1.2) .
[3] Berling Hyams, "Structures," 234.
[5] Smidt, "Fra Tempel til Boligblok," 322.

FIGURE 3.1: Gerhardt Poulsen, "A Belvedere." Student Work, Royal Academy of Arts, 1907

FIGURE 3.2: Gerhardt Poulsen, "A Glyptotheque." Student Work, Royal Academy of Arts, 1907

FIGURE 3.3: Gerhardt Poulsen, "A Guildhouse." Student Work, Royal Academy of Arts, 1906

3.1.1. DRAWINGS

In a beautifully executed project, a softly elegant Belvedere mirrors its rose sandstone in the still water of a pond. The year is 1907, and the Belvedere project has been made by Gerhardt Poulsen, who was then a student. It is drawn in the so-called *Renaissance style,* and along with a *Glyptotheque,* made earlier in 1907, and a *Guild House,* from Spring 1906, it meant that the young Poulsen had completed his studies of the three styles and could now attempt to achieve his *leaving certificate* (in Danish *Afgang*). The serene monochrome *Glyptotheque* is a *classicist* project, while the red brick *Guild House* adheres to what was then known at the Copenhagen School as *medieval style*. Behind Poulsen's talented designs and skilfully drawn projects, preserved at the Danish Art Library, lies a true tragedy of both personal and potentially architectural dimensions. After finishing technical school in his home town of Odense, Gerhardt Poulsen attended the Academy in Copenhagen from 1901-1908. This situation was typical. There were technical schools in the five major cities of Denmark, but before the establishment of the Aarhus school in 1966 all aspiring architects had to undergo education in Copenhagen. After his graduation from the Danish Architecture School, Poulsen attended École Francaise in Athens from 1908-1911, as the first Danish stipendee there. Poulsen was so liked that the stipend was extended, and afterwards became a tradition.[6] After a short return to Denmark, Poulsen stayed in Paris from 1912-1914, following which he returned to work at the Danish architecture school. Between 1911-1912 and again from 1914-1917, Gerhardt Poulsen was an assistant to professor Hack Kampmann. This fact, combined with his experience from the École Francaise in Athens, suggests that he was most likely teaching in the so-called *Temple class*.

[6] For more on this tradition, see Hallager and Mulliez, *The French Connection*.

FIGURE 3.4: Ferdnand Courby, "L'École française à Délos." Poulsen sitting on the ground in the front, ca. 1909.

FIGURE 3.5: Gerhardt Poulsen, "Capital, Nike Temple" Student Work, "The Commons" Royal Academy of Arts, ca 1902

FIGURE 3.6: Gerhardt Poulsen, "Detail from Parthenon" Student Work, "Temple Class" Royal Academy of Arts, ca 1904

In 1917, Poulsen returned to Odense with his wife and two children and set up architectural office. But less than a year later, on October 26, tragedy struck, and he died of the Spanish flu at the age of 35. Poulsen's premature death might have played a part in the preservation of his school drawing portfolio, which is extensive, perhaps even complete. Poulsen's student portfolio provides a very good overview of the types of exercises and projects undertaken in the early 20th century.[7] To begin at the end, Poulsen's final project is included, along with the sketch exercises completed for it. The final project was a "Seaside Resort for both sexes" carried out in classical style. The three large projects – in classical, medieval and renaissance styles – are all carried out in watercolour and ink: *A Belvedere*, *A Glyptotheque* and *A Guild House*. One can also see that apart from such large projects, the students also did quite a few sketch assignments of a varied character. Examples from Poulsen's portfolio include *A Music Pavilion*, 1905 and *A Smallholding*, 1906. Drawings from Poulsen's early years at the Architecture School reflect the drawings typical of the various classes that students had to attend: for instance, the detailed line drawings of the *Temple of Illissus*, 1904; *A Lionhead Water Drain*, 1902; and *A Column Capital of the Corinthian Order*, no date. The latter drawings, in particular, reveal a dominant interest in facades or the "look of a building". Generally, both the front and side elevations, as well as the detailed elevations of interiors in the section drawings, are quite elaborate. The plan drawings, on the other hand, are rarely very detailed, even if they are often – at least for Poulsen – set into the context of a garden or courtyard. Another clue that supports this is the complete absence of construction in the sections, as for instance in *A Belvedere*. Poulsen, who was a fully trained carpenter, was fully capable of doing technical drawings. He also demonstrates this in the constructive details of sections in his earlier work in the *Temple Class*. The lack of a technical element must therefore have been elective.

[7] For an overview of Gerhardt Poulsen's school projects in the Architectural Class, see Appendix 4.

FIGURE 3.7: Gerhardt Poulsen,
"A Belvedere."
Sketches, eleva

Student Work,
Royal Academy of Arts, 1907

Poulsen's Belvedere project is signed with a curvy M.N., which is typical of Martin Nyrop, Professor of Architecture and known as the "father of Scandinavian National Romanticism" in architecture,[9] as well as the architect of the Copenhagen City Hall.

Nyrop was appointed to one of the two professorships in architecture at the Royal Danish Academy in 1905. This was seen as something of a final victory of the *National movement* over the *European movement* at the Academy. Meldahl, whose position Nyrop took over, was so-called *European*-minded, as opposed to the *Danes* such as Hans J. Holm, who was a professor from 1883 and had engaged in the surveying and drawing of old Danish architecture.[10] In 1908, Holm was succeeded by his son-in law Hack Kampmann. Kampmann split up a two-year course in monumental architecture nicknamed *The Temple Class* into two sections, and added the so-called *Danish Class.*[11] The *Danish Class* was significant because it was the first time Danish architecture students were taught to design "ordinary" buildings such as a worker's home, a small farmhouse in the countryside or even multi-storey housing units (projects earlier considered too mundane for architectural consideration). Before Kampmann, the architecture studied at the Copenhagen school had been predominantly large public structures, classical buildings or stately homes and houses, as Poulsen's projects attest. The relatively simple curricular changes symbolize a watershed in architectural thinking: everyday life had entered into architecture school. Nevertheless, Nyrop's professorship marks a tendency toward less historicist and more utilitarian architecture.

The ideas of national romanticism were institutionalized at the Academy during Nyrop's professorship. This took place first and foremost through a more pronounced individualism and a softening of the stylistic demands for student projects.[12] An example of this is evident in the protocol of final assignments. After students had completed their three styled mandatory projects, two sketch exercises and a final assignments were given to the students. The final project were to be created in a prescribed style. However, after Nyrop, the stylistic requirement seems to have become less rigid. He generally used phrases such as "based on" a certain style, or required the styles to be "fitted to a local setting". An example from 1907 is the sketch assignment of an orphanage, which was to be "carried out using Renaissance motifs suitably adapted to Danish conditions". One of the students to complete this sketch assignment was Gerhardt Poulsen, whose project exhibits a telling mixture of individualistic detailing and simplicity, which is

[9] See, for instance, "Martin Nyrop" in *Oxford Companion to Architecture*.
[10] Kryger, "'Græsk stil' eller alle fortidens stilarter," 238 and 244. Kryger argues, however, that the labels of Danes and Europeans are misleading, as the so-called Danes had international interests as well.
[11] Smidt, "Fra Tempel til Boligblok," 328. Millech, "Arkitekturskolens historie efter 1904," 402-403.
[12] Smidt, "Fra Tempel til Boligblok," 325-326. Millech, "Arkitekturskolens historie efter 1904," 399.

typical of Nyrop's brand of national romanticism.[13] From 1916 on, the stylistic requirement for the assignments disappeared and never returned.[14]

3.1.2. STRUCTURE, CLASSES AND ACTIVITIES

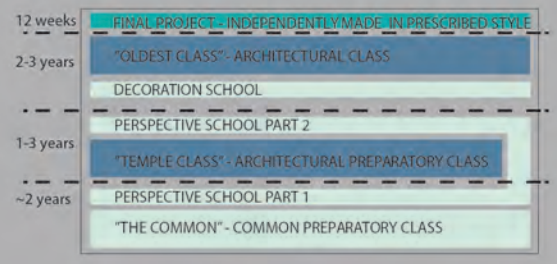


FIGURE 3.8: The structure of the education at the Copenhagen Architecture School in the years 1904-1908. The absence of parallel *ateliers* with a progression of unified classes, gives the structure a horisontal characteristic. "The Common" is followed by the "Temple Class", in turn followed by the "Oldest Class". Apart from the classes the architectural studetn had to pass the two parts of the perspective school and the decoration school. The final project is made independently without supervision from the teachers.

There is a distinct scarcity of descriptions of educational practices at the Copenhagen Architecture School. The best overall sources are the three histories of the Academy, written respectively in 1904, 1954 and 2004 in celebration of school jubilees. Throughout the history of the Building School (as the Architecture School is referred to at that point in time), there have been many structural reforms, which in some cases simply amounted to putting into writing what had already become pedagogical reality.[15]

In 1904, P. Johansen and Meldahl wrote a history of the Academy. There were by this point several "schools" within the Academy, and the education of architects was entangled, to a greater or lesser degree, with that of decorators, painters, and sculptors. The architecture school itself was separated into two main classes: the Architectural Preparatory Class, or "Temple Class", and the Architectural Class, nicknamed "Oldest Class." To gain access to the Architectural Preparatory Class, students first had to attend the Common Preparatory Class – "The Common" – together with painters and decorators.

"The Common" consisted of daytime and evening classes, where students would draw from plaster casts of architectural fragments, ornaments, or human or animal figures. Already by the early 20th century, "The Common" was dreaded and criticised by progressive students as an antiquated, disempowering and demotivating exterminator of creative energy.[16] Apart from "the Common", aspiring architects furthermore had to pass the first part of the perspective school before moving up to the Architectural Preparatory Class.[17] The Architectural Preparatory Class became known as "Temple Class" because it was almost completely

[13] See figure 2: Gerhardt Poulsen's sketch assignments 1907.
[14] Protocol of final assignments at The Royal Danish Academy, Architecture School: see Appendix 3.
[15] Millech, "Arkitekturskolens historie efter 1904," 402, 419.
[16] Millech, "Arkitekturskolens historie efter 1904," 384. Quotes "S.R". from the magazine Arkitekten January 1904.
[17] Millech, "Arkitekturskolens historie efter 1904," 382.

dominated by classical architecture. This too was harshly criticised, and in 1903 a teacher formulated the critique in a demeaning characterisation of the content of the "Temple Class":

> "*The student draws his three orders of columns and some sketches from the Royal Cast Collection […] and with these light prerequisites, he enters the oldest class, where he will soon feel how bereft he is of any real notion of architecture*."[19]

Nonetheless, the Architectural Preparatory Class under the guidance of H.J. Holm was also the hearth of the architectural surveying techniques that not only gathered students in the extremely active and influential Society of the 3rd of December,[20] but which also laid the foundations for the tradition of the Danish stipends at the École Francaise in Athens, starting with Poulsen.

The perspective school was put in place to teach both budding painters and architects the rules and craft of perspective and shadow drawing techniques. This was achieved through lectures and exercises. The first part of the curriculum aimed to give students full knowledge of linear perspective. As a final test, the student handed in a drawing of a building showing all of its details, made without guidance from the teacher, in order to demonstrate capability in linear perspective. The second part of the perspective school covered shadow perspective drawing; here, too, the final test was done without supervision and had to be approved for the student to enter The Architectural Class. Students who could demonstrate these capabilities independently did not have to attend the lessons of the perspective school.

In The Architectural Class, the emphasis was finally on the design of projects, as well as on studies of buildings in classical, medieval, and Renaissance styles.[21] To complete the class, the student had to design three projects in each of the main styles – classical, medieval, and Renaissance – as seen with Gerhardt Poulsen's projects. Before the final assignment could be attempted, the student also had to provide proof of studies done at the decoration school. Apart from the three style projects, the Architectural Class was structured around sketch exercises, study trips, and lectures.[22] Poulsen attended the Royal Academy from 1901–1908, and from his drawings one can surmise that he probably began his studies in The Architectural Class in 1904, and that it took him around four years to complete it.[23] Before that, Poulsen likely studied in "The Common" for around a year. By 1903, he had at least begun the Architectural Preparatory Class, as his

[19] Millech, "Arkitekturskolens historie efter 1904," 385.
[20] Smidt, "Fra Tempel til Boligblok," 375.
[21] Kryger, "'Græsk stil' eller alle fortidens stilarter," 192. Millech, "Arkitekturskolens historie efter 1904," 385.
[22] Millech, "Arkitekturskolens historie efter 1904," 385.
[23] There are both line drawings of classical temples and small projects from spring 1904, so this is uncertain; but from 1905 onwards, there are no examples of the line drawings of classical architecture typical of the "Temple Class".

drawings are meticulous line drawings of classic architecture. Millech, in the 1954 history of the Academy, writes that the average student usually took seven years to complete the studies, but he also states that the schoolwork was often supplemented by concomitant employment in architectural offices, which provided an entirely necessary practical education as a counterpoint to the "unilaterally artistic" teachings at the architecture school.[24] While Millech's point is not unfair, it is likely accentuated by the fact that he was writing in 1954, by which point the artistic had been downplayed greatly and more functionalist approaches to architecture were in vogue. However, one quite literal sign of how far removed the teaching and assignments had come from 'real world' problems is that it is only from 1922 that the final assignments were appointed a specific site.[25]

FIGURE 3.9: Gerhardt Poulsen, "An Orphanage."
Final Sketch assignments
Student Work, Royal Academy of Arts, 1907

FIGURE 3.10: Gerhardt Poulsen, "A Kiosk"
Final Sketch assignments
Student Work, Royal Academy of Arts, 1907

The leaving certificate from the Academy was rather difficult to obtain. Millech mentions a complaint from the winter of 1906, when eleven students had failed.[26] While this may not sound like a large number, the entirety of the two architectural classes at the time was between 50 and 60 students.[27] Millech also highlights that in 1913, new regulations decreased the number of permitted attempts from six to four.[28] Although four is still a considerable number, six indicates a real necessity to be able to take the test many times before succeeding. To be permitted to sit their final exam, students had to complete two sketch-problems, a practical and an artistic.[29] In Poulsen's case, the practical assignment would have been the orphanage, and the artistic assignment was the kiosk. With Nyrop and Holm in charge, the practical assignments were sometimes downright mundane – as in 1910, when the students were asked to design a

[24] Millech, "Arkitekturskolens historie efter 1904," 387.
[25] Millech, "Arkitekturskolens historie efter 1904," 394 and 427.
[26] Millech, "Arkitekturskolens historie efter 1904," 379.
[27] Millech, "Arkitekturskolens historie efter 1904," 393.
[28] Millech, "Arkitekturskolens historie efter 1904," 419.
[29] Millech, "Arkitekturskolens historie efter 1904," 386.

henhouse.[30] The sketch assignments were carried out in one day at the school under supervision, but without guidance.[31] In his description of the final sketch assignments, Meldahl writes that they must be carried out "en loge", which demonstrates knowledge of the French practices at the École des Beaux-Arts. Nonetheless, the sketch practice at the Danish school otherwise seems very far away from the Beaux-Arts system of the *esquisse*. As is demonstrated in the case of Poulsen, the final sketch assignments are not related to the final project, but might have functioned as a safeguard against cheating. The sketches were likely posted along with the final project, which was completed outside of the Academy, and compared in order to check that the final project had indeed been carried out by the students themselves.

The structure of the architectural curriculum closely follows the progression that Meldahl has expressed his belief in:

> "*At the Architecture School, in my opinion, one should first copy the proper styles, then encourage to composition and through free sketch assignments guide the talented students to absorb designs, which they can later be made to carry out, when they show aptitude*."[32]

That is to say, roughly: first you copy and study, then you sketch and compose, then you refine and render. This pedagogical approach is dissimilar to the Beaux-Arts pedagogy, as will be discussed further in chapter 8. At the beginning of the 20th century, the architect was viewed as a gentleman; apart from knowing his own subject, he had to demonstrate and provide proof that he had become acquainted with two secondary languages, as well as history and Danish literature.[33] The language requirement indicates an international ambition, of which Kampmann, Poulsen, and the other Danish stipendees are good examples – although this was likely somewhat rare to achieve in fact. According to Meldahl, the budding architect's knowledge and general level of education were supported by lectures at the Academy in Art history, Mythology, Architectural History, Anatomy, Perspective, Decorative Art and Cultural History. On the other hand, the technical capabilities, apart from perspective drawing, were relatively absent from the curriculum until 1908. The students, however, would have gotten some of the technical skills from classes at the technical schools they attended before the architecture school.

1908 brought many changes to the architecture school. First, women were admitted to the Academy for the first time,[34] and second, from 1908 the Academy established its own version of the technical curriculum.[35] This meant that students could choose to attend the building technical school at the Academy

[30] Protocol of final assignments at The Royal Danish Academy, Architecture School see appendix 3.
[31] Millech, "Arkitekturskolens historie efter 1904," 386.
[32] Stemann, *Meldahl og hans venner*, VI, 188. Own translation quoted from Millech, "Arkitekturskolens historie efter 1904," 398.
[33] Meldahl og Johansen, *Det kongelige Akademi for de skjønne Kunster 1700-1904*, CXV.
[34] Millech, "Arkitekturskolens historie efter 1904," 411.
[35] Until 1913, it was still possible to access the Academy from a technical school. Between 1913 and 1918, only the academy's own technical school provided access to the Architecture School. See Millech, "Arkitekturskolens historie efter 1904," 411 and 422.

instead of taking classes at The Technical School. Although one might think that this would draw the technical subjects closer to the Academy, it is probably more accurate to assume that it deepened the difference between the architects and the bricklayers, carpenters, and other builders who had attended the same classes at the technical schools during the period from 1857 to 1908. To move on, an analysis of a final project might shed light on the particular brand of drawing epistemology at play in the Copenhagen School in the beginning of the 20th century.

3.1.3. OLD WORLD REQUIREMENTS BUT HINTS OF MODERN LIFE

By way of comparison to Poulsen's drawings, I have also studied the school drawings of Kaj Gottlob,[37] which are also kept at the Danish Art Library. The two students were not chosen because they are particularly well known; in fact, I have deliberately avoided working with the school drawings of very famous architects. Nonetheless, Gottlob and Poulsen were most definitely *good students*. Gottlob won the large gold medal from the Academy in 1915, Poulsen won the small gold medal in 1916, and both were selected to be sent to École Francaise d'Athènes to assist with measuring and drawing of classical architecture. Neither of them was an average student. However, the fact that they have been singled out as *good students* by the Academy does mean that one can view their schoolwork as *good work*, and therefore as good models for the type of work that the architecture school sought after at the time.

Among the school drawings by Gottlob – of which there are many from his studies at the technical school and his perspective class, though the three fully rendered projects in the three styles are lacking – I will focus on his final project: *A House in the Capital for a Wealthy Landowner*, where he was required to use "Renaissance motifs". An analysis of Gottlob's final project reveals interesting clues about epistemology in the Copenhagen school around the turn of the century. The assignment was given on September 30, 1913. The house is withdrawn from the street and is to be a comfortable home for a family, with the necessary ballrooms and guest bedrooms. It is required that the kitchen is to be placed by a small kitchen yard, and there must be a gatekeeper's house. In many ways, the house signals Old World values, but room for automobiles instead of horses heralds that a brave new world is moving in.

[37] The Danish architect and later professor at the academy Kaj Gottlob (1887-1976) studied at the Technical School in Copenhagen from 1905-1907. Following this, he became a student at the Danish Academy and finished his studies in 1914. In 1912 he was the Danish stipendee at École Francaise d'Athènes, and assisted with archaeological measurements at Delphi. In addition, he was in the employ of Professor Hack Kampmann from 1908-1920, where among other things he did work on the Courthouse of Frederiksberg. In 1920 Gottlob opened his own office, and alongside his practice as architect taught first at the Technical School 1915-1917 and thereafter as an assistant at the Academy of Fine Arts, until he became a full professor there from 1924-1938. Gottlob received his large gold medal for a light house project for Skagen in 1915. "Kaj Gottlob", Weilbachs kunstnerleksikon, Accessed May 27th https://www.kulturarv.dk/kid/VisWeilbachRefresh.do?kunstnerId=6860&wsektion=alle

FIGURE 3.11: K A House in the Capital for a Wealthy Landowner"
Final project. Eleva oyal Academy of Arts, 1913

The required drawings were a main plan, a main façade, and a section in 1:100, along with other plans, sections, and facades in 1:200. Furthermore, the project was to include a detail drawing [*oplysende enkelthed*] in 1:20 and a perspective drawing, where the nearest corner was 1:100.[38]

The south elevation in 1:100 is a beautiful watercolour and ink drawing, with careful shadowing and a very sensuous rendering of the sandstone colour and texture. The façade is symmetrical apart from a chimney on the small wing house. The windows on the ground floor are as numerous and wide as the upstairs windows but twice as tall, which gives the facade an expression of grandeur. At the top of each gable there is a small statue, but otherwise the house is not elaborately decorated, and gives off an air of restricted elegance. The exterior is relatively simple and restrained: the most outwardly decorative elements are two Dutch gables facing the garden. A similar gable located centrally on the north façade can only be seen on the section, as there is no north elevation. Similarly lacking are sections of the servant's houses facing the street. The main house has a simple cornice and almost disproportionately tall chimneys. The façade remains relatively ungarnished, except for the gables, each of which has a sculpture balanced on its top, as well as decorative brickwork patterns are indicated in the gables and the chimneys.

Due to the scale of the drawing, the sculptures are only roughly sketched; another reason, as Gottlob describes in his notes, is that the sculptures are supposed to relate to the business of the owner. What this business is is left open, but this statement does indicate a belief in the symbolic meaning of architecture. The roof is made in red tiles, and together with the predominantly red brick masses of the project it gives off a nationalistic feel to it, blended in with the Dutch Renaissance style. Although the main house has more of an international air, the little houses that surround the buildings could hardly be found anywhere but Denmark. Two small annexes with colonnades connecting them to the front houses are at either wing of the house.

From the Gottlob project we can also learn that the final assignments were defended at an oral examination – something that is not very clearly described in the regulations for graduation. Among Gottlob's papers is a summons for his defence at the Ballroom in Charlottenborg, on Monday, January 5, 1914, as well as Gottlob's notes for his defence. The notes provide a truly rare insight into what his thoughts about the project were. Most of these thoughts seem to have been of a rather practical nature. Gottlob was

[38] There are a couple of drawings missing in the Gottlob folder. There is no perspective, and no other plans or sections or elevations. It is impossible to guess whether these drawings were ever included in the folder, or whether they were kept privately when the other drawings were donated to the library. While the perspective drawing might have made a pretty picture and been kept as a keepsake, I find it unlikely that all of the remaining smaller drawings would have been preserved while the larger, more detailed and laboriously made ones were kept. What we do know is that Gottlob passed his exam, so either the drawings were not missing or his project was accepted with the present drawings. It will remain pure speculation, but my assumption would be that there never were any other plans, sections of elevations handed in with the project.

concerned with how the layout of the house creates smaller outdoor spaces shielded from wind, and how the house is open towards the garden to the South and has a closed character towards the road and the North. This was intended to make the garden function as a haven in the urban setting, protected and facing away from the noise and bustle from the street and from the curious eyes of neighbours and passers-by. While Gottlob's own notes tell a story of a rather pragmatic approach to architectural design that is not as stylistically interested as the project might appear, there are a few more points of the design epistemology that might be discerned from the project. One is related to proportioning, and the other to the status of line drawing.

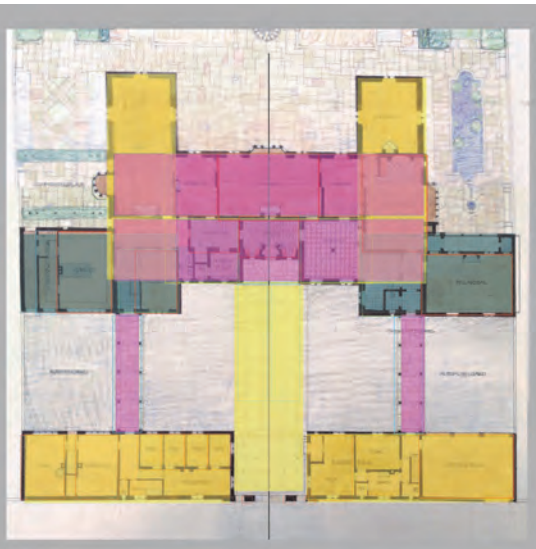


FIGURE 3.12: Analysis of Proportions in Kaj Gottlob's final project. Yellow is 1:3; pink is 1:5 and green is 1:2.

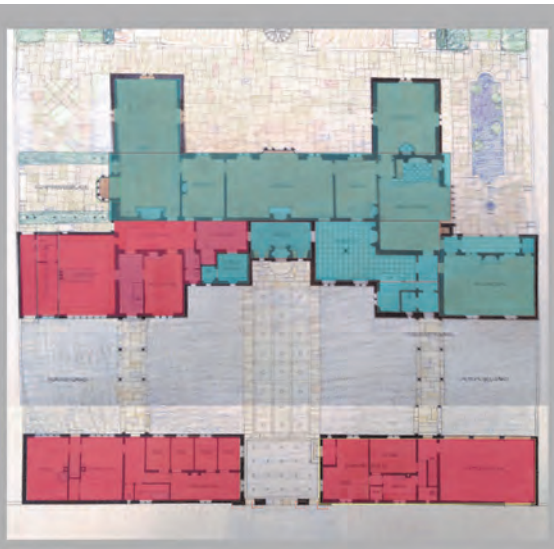


FIGURE 3.13: Analysis of masters' and servant's' quarters in Kaj Gottlob's final project: Red is servants'; Green Masters'.

A study of proportions and composition of the project indicates that the basic compositional strategy is symmetrical, and consists of three different proportions intersecting and locking into each other. Sketches, mostly done on tracing paper that has remained with the project, provide an indication about Gottlob's first steps and inspiration for his final project. One of these sketches is a trace of the plan drawings of the Rosenborg Castle in Copenhagen. The tracing of this plan is made from *The Danish Vitruvius*, a richly illustrated architectural work published in two volumes in 1746-1749 by Lauritz de Thurah, showing Danish monumental architecture. The traced drawing is an important clue to how students used historical material, that is, they drew it and did not simply look at it. Gottlob also made sketches of the surrounding gardens, sculptural detail, and garden plan, so we know that Gottlob was interested in Rosenborg.

Stylistically, Gottlob's villa is an example of the so-called *Rosenborg style,* a turn-of-the-century variation on Dutch Renaissance, but beneath this style, at the level of proportions in the plan, there is also a

deep influence. The castle is basically a rectangular structure of the proportion 1:5. Gottlob took the same proportion and doubled it (see fig 3.12 – the purple elements) to create the main body of the house. He then crosses the body with two rectangular bodies (fig 3.12 – the yellow surface). The two rectangular bodies are the same as the two lengths used to make up the forecourt with the servants buildings. Those volumes are 1:3. Finally, the forecourt is closed off and anchored to the wing volumes with the proportion 1:2, and connections between the servants' quarters and the main house are established by repeating the 1:5 proportion in two slender covered passageways. The access way along the main axis corresponds with the yellow surface proportions.

This proportion analysis does not explain all design decisions, but demonstrates that proportions and composition of volumes was likely important for Gottlob in the conception of his project. The house has a basic symmetry around a central axis, which extends into the garden. This is a clear Renaissance reference, and thus corresponds well with the style requirements. Finally, and most importantly, though all this signals that style did not merely involve pasting the exterior with surface references, but was used in compositional thinking as well. Interestingly, however, the symmetry is not all pervasive, but is pragmatised highly by the functionality of the house.

In the plan drawing of the individual rooms, the symmetry ceases and is replaced by a more functional organisation, with only a lingering symmetry in the most "presentable" parts of the house. Thus, for example, the dining room and cabinet on either side of the central garden hall are of the same size. The vaulted ceilings in the entrance hall and the antechamber are a slightly odd design feature, but no doubt are meant to impress. Although cross vaults were frequently used in Renaissance building, the heaviness and simplicity of this instance, as indicated on the section, seem almost medieval, and could be read as another indicator that stylistic requirements did not stifle creative conceptions for spatial and atmospheric agents in the projects. The different renderings of the floors in the house and the garden, although the garden seems hastily drawn up and coloured in with crayon instead of water colour, are similar to what Harbeson described as *mosaic*.[39] I think it is safe to assume that the detailing of the floors and garden tiles are not purely functional, but do indeed work as *mosaic* in the Beaux-Arts sense – meaning that they help to form an atmosphere in the drawing. They create the atmosphere and indicate the function of a space.

What is more, the squared surfaces in the house seem to indicate that it is primarily a passage, whereas brown has been used for floors in both the sitting room and kitchen. Unfortunately, only the

[39] See Chapter 2 (2.1.4).

ground-floor plan and a few sections are available, and this makes it somewhat difficult to envisage the house in its entirety. The upstairs must predominantly contain the bedrooms for the family, and thus the upstairs seems to signal the private sphere, typical for great houses.[40] One point easily missed from the plan drawing is that the two volumes or wings courting off the house and garden are only one story high, which might be taken to indicate that they are service areas. However, the division of the house into servants' quarters and masters' quarters is not as straightforward, but is highly practical and pragmatic. It would of course be impractical to have the kitchen in a separate house from the dining room, and so the kitchen together with the larder occupies the small house on the east. Between the kitchen and the dining room there is a relatively spacious butler's pantry, through which there is access to the wardrobe. The wardrobe is a "shared space" used by the staff to hang up coats from both guests and occupants, and it is also the passage to the main downstairs bathroom. A separate bathroom for servants is also accessed from the butler's pantry. It is not surprising that the butler's pantry or the wardrobe are in the actual house; what is intriguing is that the servant's hall occupies a corner of the main building volume, whereas a billiard hall occupies the one story house on the west wing. This is an example of how symmetry is both prioritised and pragmatised as the two small housing structures complete the symmetry around the courtyard.

The large section is made exactly in the middle of the building, cutting off the western section of the building and depicting the eastern part. In this section there is a bit of *entourage*[41] in the shape of threes on the boulevard, a couple in what appear to be their Sunday finest, with top hat and cane; there is also a detailed depiction of the garden, with several sculptures and a small pavilion. The detail drawing is cleverly made to show a section through one part of the building and an elevation of another part. On the elevation, the brick construction is rendered by drawing lines to show the bands of bricks without drawing individual stones. The interior is likewise rich in detail and quite opulent, with large wooden panels and heavy wooden frames around the windows on the ground floor. On the first floor, the interior is much simpler, almost light in comparison. The window frames are sandstone. The horizontal division of the glass is accentuated in the drawing by the lines crossing the outer frame. This might seem sloppy, but is characteristic of Gottlob's drawing style.

On the detail drawing, the frame around the windows at first glance has a sketch-like character – lines cross over each other – and how the lintel and frame meet is not clearly expressed. Still, the purposely vague drawing has something very expressive to it. It is as if Gottlob points to the lines as lines, and thus that the image they create is a construction. This is unlikely to be conscious, but it does seem to indicate an

[40] Howard, *The Building of Elizabethan and Jacobean England,* 38.
[41] See Chapter 2 (2.1.4).

important reflection on drawing. The constructed character of the lines destabilise the image quality of the drawing and pulls it slightly in the direction of abstraction. It echoes perhaps a distrust in drawing that was also shared by Nyrop, who is said to have favoured the students who struggled with their work, and was inherently suspicious of those whose excellent draughtsmanship, he felt, made things too easy for them.[42]

There are two ways to interpret this. On one interpretation, the struggle with the drawing was valued because it was a sign that the student was using the drawing to think, whereas the superb draughtsman could disguise issues under the lustre of the persuasive drawing aesthetics. This would indicate that Nyrop as a teacher was less interested in the technical accomplishment of his students, but wanted them to advance their architectural thinking. Alternatively, the constructedness of the *intersecting lines characteristic* could also echo a distrust in the atmospheric and less tangible elements of drawing, and point to a much more technical outlook. In fact, one does find the *intersecting lines characteristic* as a drawing technique in later functionalist projects and as such, there seems to be something almost modern at play in Gottlob's lines, hidden beneath the old-worldliness of the project. Stylistically of course, Gottlob's project and the projects drawn in the *Danish Class* were far from functionalist. Yet as Millech enigmatically states, but never elaborates:

> "*It later became apparent that there was a line to the so-called domestic functionalism from Nyrop's reflections on the artisan foundation of form and his care for materiality and sensuous qualities – in particular with regard to Danish building materials*."[43]

Indeed, in Barbara Miller Lane's book *National Romanticism and Modern Architecture in Germany and the Scandinavian Countries*, Lane argues that especially with the emphasis on home design and the home as a work of art, the individualism of National Romanticism fed into the social democratic ideals of the later Scandinavian functionalists.[44] The central belief shared by the National Romanticists and the functionalists was that architectural excellence did not necessarily need great scale or refined and expensive materials, but could be built by local craftsmen in simple shapes suited to the landscape as modest homes to serve a democratic purpose. And so we can perhaps draw a flighty line to the next sketch, which is set in the middle of the 20th century.

[42] Millech, "Arkitekturskolens historie efter 1904," 400.
[43] Millech, "Arkitekturskolens historie efter 1904," 401. Own translation.
[44] This is the central argument in Lane, *National Romanticism and Modern Architecture in Germany and the Scandinavian Countries.* I discuss the link between the teachings of Nyrop and Holm and the later Danish functionalist tradition in Berling Hyams, "Danish Vernacular."

3.2. SECOND SKETCH: MID 20TH CENTURY - TECHNICAL AND ATMOSPHERIC

The architecture school in Copenhagen in the middle of the 20th century was radically different to the school that Gottlob and Poulsen had attended. A momentous reform carried out in 1924 (followed up by smaller new regulations in 1926 and 1937) had changed the school structure, influenced the teaching style, and converted the school from free day and evening classes to being strictly a day school. Programs were, nonetheless, set in place to catch students who would otherwise have fallen between the cracks.[45] Millech describes the change as:

> "*the transition from a one-sidedly artistic and emotional student guidance, which pushed away the technical education and so to speak knew nothing of social perspectives, to a reality based education of an artistic, technical and social kind*."[46]

Millech, writing in 1954, is here perhaps marked by the architectural ideologies of his time, and the new school that he describes is conceivably somewhat aspirational. Nevertheless, there is no doubt that sweeping changes had been made. The Copenhagen school, which in the mid-20th century was the only Danish architecture school, was at the time seen to be ideally organised as a "unity school."[47] A *unity school* is the antithesis of a studio structure. In a *unity school*, students would receive a standardised and complete architectural education, but on the other hand they would have only a very limited ability to choose specialities and follow particular artistic interests. A *unity school* was possible at the time, as the architecture school only accepted 40 students each year. The focus of architecture education had made a turn in a more social and technical direction in order to better comply with contemporary demands for the architecture profession. As described in a note for the 1937 regulations:

> "*When in the later years architectural education has emphasised the practical, that is the technical, financial and organisational side of the profession, this happens in natural accordance with the development that has led to that architects in the last decades have taken over also ordinary private building*."[48]

The stylistic requirements had been completely dropped, and the turn towards a more technical approach to architecture now marked the curriculum and tasks. Yet drawing, rather than calculation, was still the focus of the education.

[45] Millech, "Arkitekturskolens historie efter 1904," 339-440.
[46] Millech, "Arkitekturskolens historie efter 1904," 435.
[47] *Betænkning afgivet af den af undervisningsministeriet den 13. marts 1943 nedsatte arkitektuddannelses kommission,* 20.
[48] Millech, "Arkitekturskolens historie efter 1904", 435.

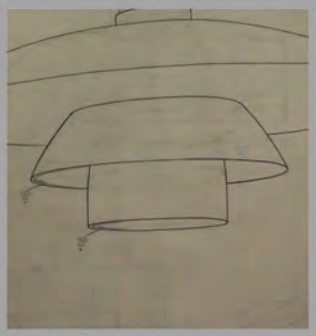


FIGURE 3.14: Teit Weylandt "PH Lamp" Student Work, Royal Academy of Arts, 1960ies

FIGURE 3.15: Teit Weylandt Shadow study, Student Work, Royal Academy of Arts, 1960ies

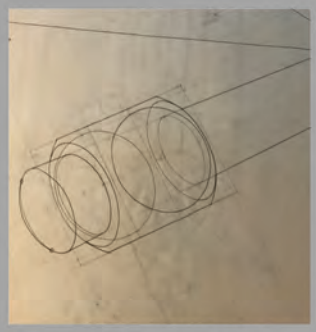


FIGURE 3.16: Charlotte Buhl Technical drawing, Student Work, Royal Academy of Arts, 1960ies

3.2.1. A TECHNICAL PREPARATORY SCHOOL

The basic structure of the architecture education was an architectural *preparatory school* [*Forskolen*] consisting of two consecutive classes of each a year (normally referred to as A and B class). Upon application and approval, entrance was granted to a *main school* [*Hovedskolen*], which had a three-year curriculum (the classes H1, H2 and H3). The preparatory school classes were quite technical, at least on paper,[49] and only dealt with small architectural design tasks. Charlotte Buhl, who attended the preparatory school between '56 and '58, clearly recalls the first year's activities as training in a wide variety of disciplines:

> "*In the preparatory school, you did all branches of the subject [of Architecture]. You did statics, you did engineering [subjects], you did materials science, and then you did architecture studies, that is architectural surveying, where you went out and, for instance, registered bricks and painted the colour of them and the like. Then you did watercolours and you were taught perspective drawing. And you learnt projective drawing by drawing different timber construction details. Then in addition to that, which was purely academic, you also did different sketch assignments and larger, longer assignments, which grew in size [as one progressed]*."[50]

As can also be deduced from the quote, the pedagogical activities too were diverse, ranging from classroom education, independent study, outings, lectures, and most predominantly *desk crit* education. In the preparatory school, apart from doing some regular projects of an increasing complexity as the students progressed, students had lectures in the technical subjects as well as exercises where, for instance, they drew timber constructions and brick bonding, as another student in the fifties, Lis Park, has related.[51]

[49] *Betænkning afgivet af den af undervisningsministeriet den 13. Marts 1943 nedsatte arkitektuddannelses commission,* 20.
[50] Charlotte Buhl # 7:58,5 - 9:05,1. These activities correspond well with the list that Millech provides. Millech, "Arkitekturskolens historie efter 1904," 441.
[51] Lis park # 16:48,0 - 17:25,5.

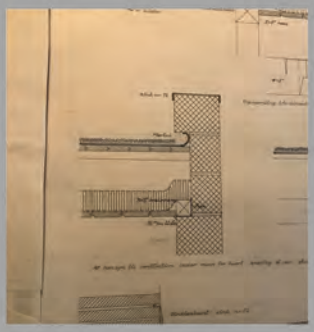


FIGURE 3.17: Charlotte Buhl
"Single family unit" B2, Student Work
Royal Academy of Arts ca 1959

FIGURE 3.18 Charlotte Buhl
"Thinking House," H1, Student Work
Royal Academy of Arts ca 1959

FIGURE 3.19: Charlotte Buhl
"Architectural Office" H2, Student Work
Royal Academy of Arts ca 1960

As is clear from both Park's and Buhl's accounts, much of the work was based on drawing, also in the technical subjects. This does seem to involve a softening of the technical subjects, which is also supported by Millech. He writes that the preparatory school, rather than focusing purely academically on the disciplines, was intended to give students who had no practical experience an understanding of the practice field.[52] The approximately 40 students in the preparatory school were split into two classes, with each class having a teacher attached, but under the common leadership of Professor Poul Kjærgård.[53] Kjærgård had an approach described by Millech, where he attempted to teach the specialised subjects through the design of a small house[54] – yet another example of the ambition to connect the technical disciplines tightly to the practical design work. This focus away from academia is evidenced by Lise Sass Clemmesen, who described that she only used one book*: "we only had one real book, 'the building book' it was called."*[55] "The building book" was first published in 1948, and was produced at the initiative of Kjærgaard, who served as its editor until 1972. It was a technical encyclopaedia, portraying solutions and standards related to building technology and engineering.

The image painted by some participants in the historical interviews would certainly lead one to think of the school in the fifties and early sixties as rather technical, or at least as focused away from the academic and to a certain extent the artistic. Nevertheless, the large amounts of freehand drawing and evocative and skilfully made watercolours without question underline the still highly artistic vein of the architecture school, especially when this is connected to the tasks and curriculum of the later *main school*. Carsten Hoff, a student at the academy from 1960-63, even recounts how "*to an increasing degree, I came to miss the direct*

[52] Millech, "Arkitekturskolens historie efter 1904," 441-442.
[53] Millech, "Arkitekturskolens historie efter 1904," 441.
[54] Millech, "Arkitekturskolens historie efter 1904," 442.
[55] Lise Sass Clemmesen # 16:42,3 - 17:36,0.

connection – that hands-on, how you do things. It could become quite airy."[57] Hoff is an example of a student who first got a construction degree and then got into architecture school.

In the mid-20th century, there were two roads into the architecture school: either through the two years of preparatory school, or directly into the main school, albeit in a separate class (H1, for those who had a 4-year degree in construction from a technical school).[58] Both applicants to the preparatory school and applicants with a construction degree had to pass a one-month *acceptance course [optagelses kursus]*. The course is not well-described in the literature, but is mentioned by Millech.[59] It was nevertheless often thoroughly described and vividly remembered by the architects that I interviewed who went through it, probably not least as they had been among the fortunate 40 out of more than 100 applicants who got in.[60] Whether the student had gone through preparatory school or had a construction degree and skipped preparatory school, H1 was the entrance to the main school.

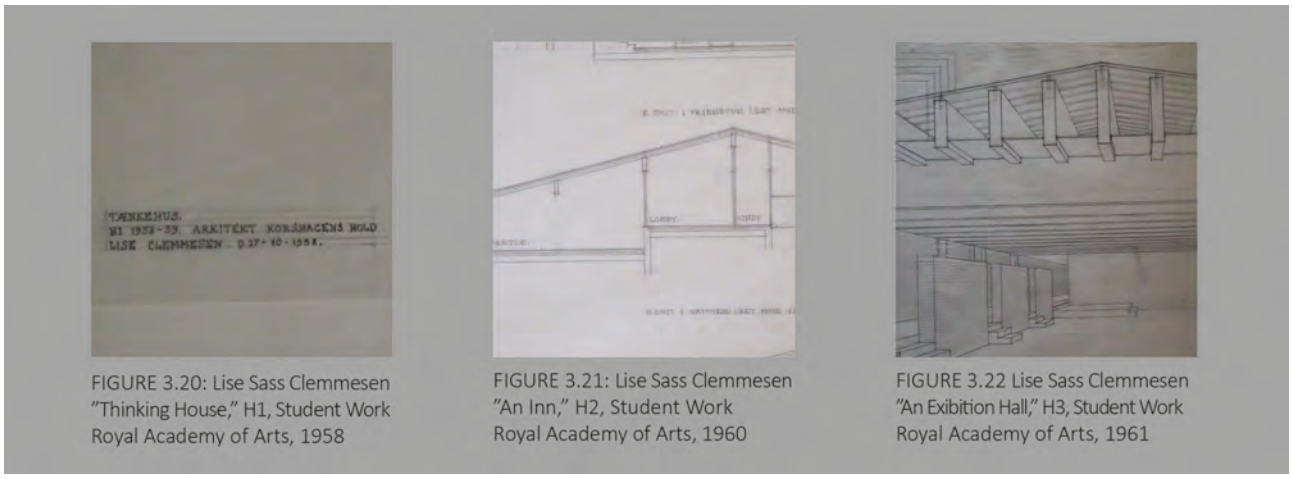


FIGURE 3.20: Lise Sass Clemmesen "Thinking House," H1, Student Work Royal Academy of Arts, 1958

FIGURE 3.21: Lise Sass Clemmesen "An Inn," H2, Student Work Royal Academy of Arts, 1960

FIGURE 3.22 Lise Sass Clemmesen "An Exibition Hall," H3, Student Work Royal Academy of Arts, 1961

3.2.2. THE MAIN SCHOOL, TASKS, STRUCTURE AND SPECIALISATION

The curriculum and education of the main school were organised very differently from those of preparatory school. In the main school, the focus was largely on actual design work in the form of sketch assignments and larger assignments. According to Millech, these were two fixed assignments, a smaller assignment, a single family residence and a larger building complex (the main assignment).[61] The organisation of H1 was,

[57] Carsten Hoff # 27:41,4 - 29:05,6.
[58] The possibility of admittance from a technical school had been reestablished in 1918 after having been broken off since 1913. Millech, "Arkitekturskolens historie efter 1904," 411 and 422.
[59] Millech, "Arkitekturskolens historie efter 1904," 440-441.
[60] Teit Weylandt # 3:47,1 - 4:03,3. Charlotte Buhl # 2:23,6 - 3:11,7.
[61] Millech, "Arkitekturskolens historie efter 1904," 444.

according to Millech, the work of Professor Kay Fisker,[62] who was extremely influential in Danish architecture education in his time. Fisker's projects can be labelled as *national functionalism*, and his best-known work is perhaps the campus of Aarhus University. In H1, the technical side of the studies was still prevalent, but was completely integrated in the design work, which was supplemented with lectures on residential architecture and architectural history, followed also by students of H2 and H3.[63] In many ways, H1 followed the principle of incremental complexity that was found in the preparatory school. Hoff recounts: *"I can remember that the first year we wisely began with some manageable assignments"*[64]

The student portfolio of Lise Sass Clemmesen would seem to support this. "A Thinking House" from October '58 is a modest program and simpler than *An Inn* from H2 and *An Art Museum in Lyngby* from H3.[65] Both the Sass portfolio and that of Charlotte Buhl are brimming with sketch assignments of a varied character: a transformer station, a sculpture exhibition, a music pavilion, a pedestrian bridge, and a tennis club, for example.[66] These were made alongside the semester projects, as for instance Lise Sass Clemmesen's project for *An Inn*, which was given in October and handed in on January 5, 1960. Whereas projects were done individually, the preparatory work for the larger projects was often carried out as group work.[67]

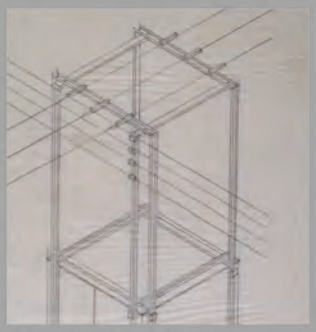


FIGURE 3.23: Lise Sass Clemmesen "Electrical Substation" H2, Student Work Royal Academy of Arts, 1960

FIGURE 3.24: Lise Sass Clemmesen "Sculpture Exibition," H1, Student Work Royal Academy of Arts, 1959

FIGURE 3.25: Charlotte Buhl "Pedestrian Bridge," H1, Student Work Royal Academy of Arts, ca 1959

During the 1959–1960 academic year, the *unity school* was destabilised and silos appeared, where students followed the same teacher in H2 and H3.[68] The structure thus became more like a studio structure.

[62] Millech, "Arkitekturskolens historie efter 1904," 443.
[63] Millech, "Arkitekturskolens historie efter 1904," 446.
[64] Carsten Hoff # 19:08,5 - 19:56,3.
[65] Drawings of Lise Sass Clemmesen, see Appendix 6.
[66] Drawings of Lise Sass Clemmesen and Charlotte Buhl, see Appendix 6.
[67] Millech, "Arkitekturskolens historie efter 1904," 447.
[68] Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 98.

One of the participants in the historical interviews, Charlotte Buhl, recounted that she and 9 other classmates wanted to remain a class and move up to H2 and H3 together with their teacher, Henning Larsen. They were first refused this request to form an "elite class", but ultimately they succeeded because one of the professors had had no applicants, and they all were allowed to move up together.[69] This was the beginning of a whole new structure, which came into effect during the 1962–1963 academic year. The new model still contained a 2+3 structure, where the first years followed a (more or less) common curriculum, but the second part of the education was split into different "lines of study" or departments, allowing for greater specialisation[70]: "*…and then the last two years [H2 and H3] you could specialize your training. There were different departments like agricultural architecture and cityplanning*."[71] Teit Weylandt, who reported this in the historical interviews, must have been one of the first students to be allowed to specialise, which he did in the department for Industrial Design, headed up by Erik Herløw. Erik Herløw was professor of industrial Design 1959-1979, and instrumental in the wave of popularity of Danish Design, among other things as the designer of the U.S. travelling exhibition *Scandinavian Design*.[72]

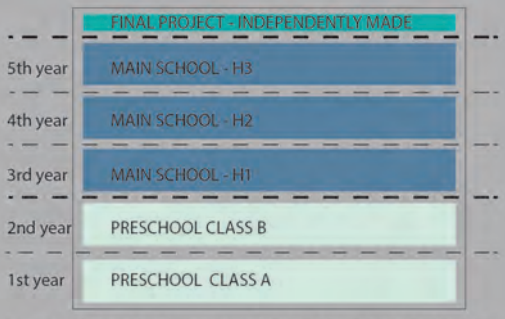


FIGURE 3.26: The structure the scholastic year 1959/1960, where the horizontal structure is clear.

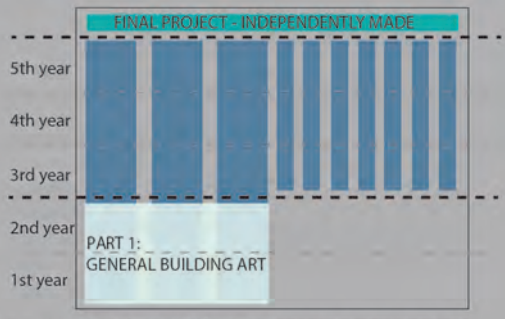


FIGURE 3.27: The 1962/1963 presents a new vertical organisation of the school.

Both before and after the 1962–1963 reform, the final project was produced entirely independently and outside the school, without assistance from teachers, as Weylandt confirms.[73] The last project made with guidance at the school was the so-called *nomination for finals* [Indstilling til afgang]. The program for the final project was still set by the school, and students had three months from being given the assignment to having to hand it in. For the final project in 1962, the assignment was given on February 1 and had to be

[69] Charlotte Buhl # 10:44,8 - 12:39,4.
[70] Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 109.
[71] Teit Weitlandt # 4:25,2 - 4:50,6.
[72] "Erik Herløw," Weilbachs Kunstnerleksion, Accessed May 29th, 2019. https://www.kulturarv.dk/kid/VisWeilbach.do?kunstnerId=7266&wsektion=alle
[73] Weylandt # 6:16,8 - 6:30,1.

handed in May 1.[74] The plan also reveals that the participants in the competition (such is the wording) should defend and account for their project on May 10 or 11, and that the evaluation committee would finish its judgements on May 16. All projects were then exhibited from May 17–27, and questions concerning the evaluation could be asked at a session on May 25. The architectural program of the final project calls for "Co-Housing for the Elderly", and specifies the number of small private flats, one-room accommodation, and bed wards along with different functions required to be integrated in the project. The program also comes with a site plan and list of required drawings, including an aerial or isometric view of the entire complex, with one unit drawn through in 1:20, accounting for furniture, materiality, light, and colour. Furthermore, projects were to include a plan with furniture, a section with construction details, and an elevation with coloured facades – all in 1:100. As such, the program is an excellent example of the values of architecture education in the mid-20th century: social awareness, detailed construction knowledge, and a high sensitivity towards the atmospheric aspects of the building, as seen in the requirement for coloured facades and detailed furniture views. Nevertheless, not all of the final assignments have the same social ring to them. Just one year later, in 1963, the final assignment called for a private residence and public museum of an art collector.

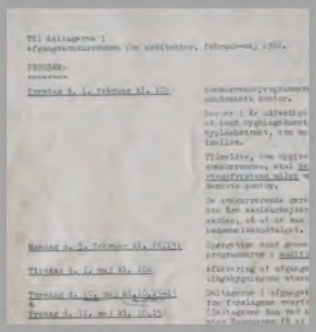


FIGURE 3.28: Assignment for final project"Co-housing for the Elderly" Royal Academy of Arts, 1962

FIGURE 3.29: Lise Sass Clemmesen "Co-housing for the Elderly", final project Royal Academy of Arts, 1962

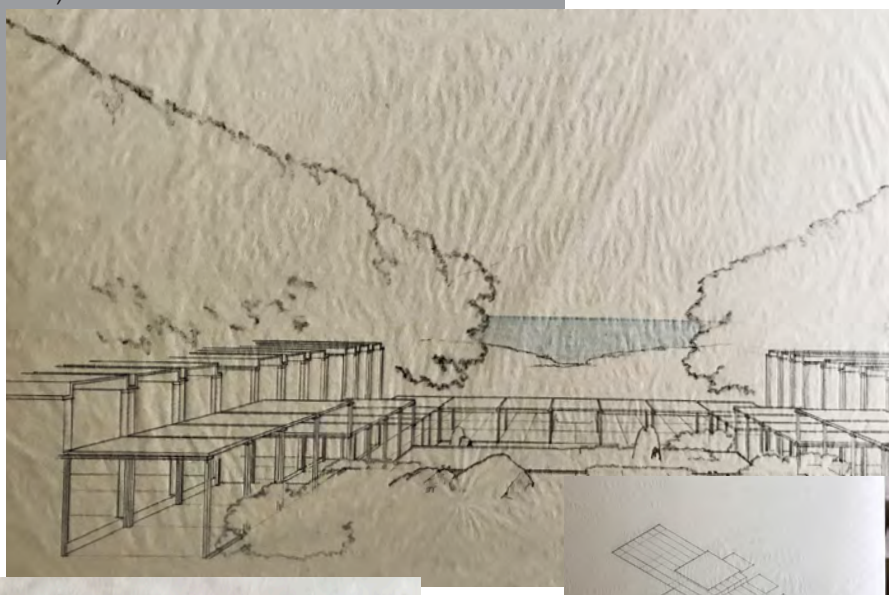
FIGURE 3.30: Lise Sass Clemmesen "Co-housing for the Elderly" final project Royal Academy of Arts, 1962

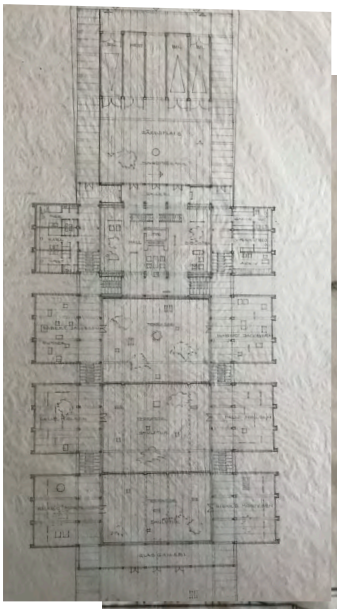
3.2.3. CLEAN LINES AND SOFT WATERCOLOURS – THE TRAINING OF DRAWING SENSIBILITIES

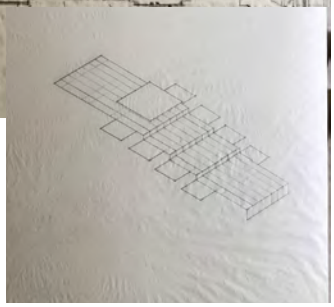
A calm light blue centres the sharply drawn stringent black lines that form the modular structure, resembling a large staircase, which has cut through the wood and overlooks Øresund. The tracing paper over the white cardboard is crinkled from damp and age, but the lines on it still confidently portray the final project of Charlotte Buhl from 1963. The project is a proposal for a museum and residence for an art collector, situated

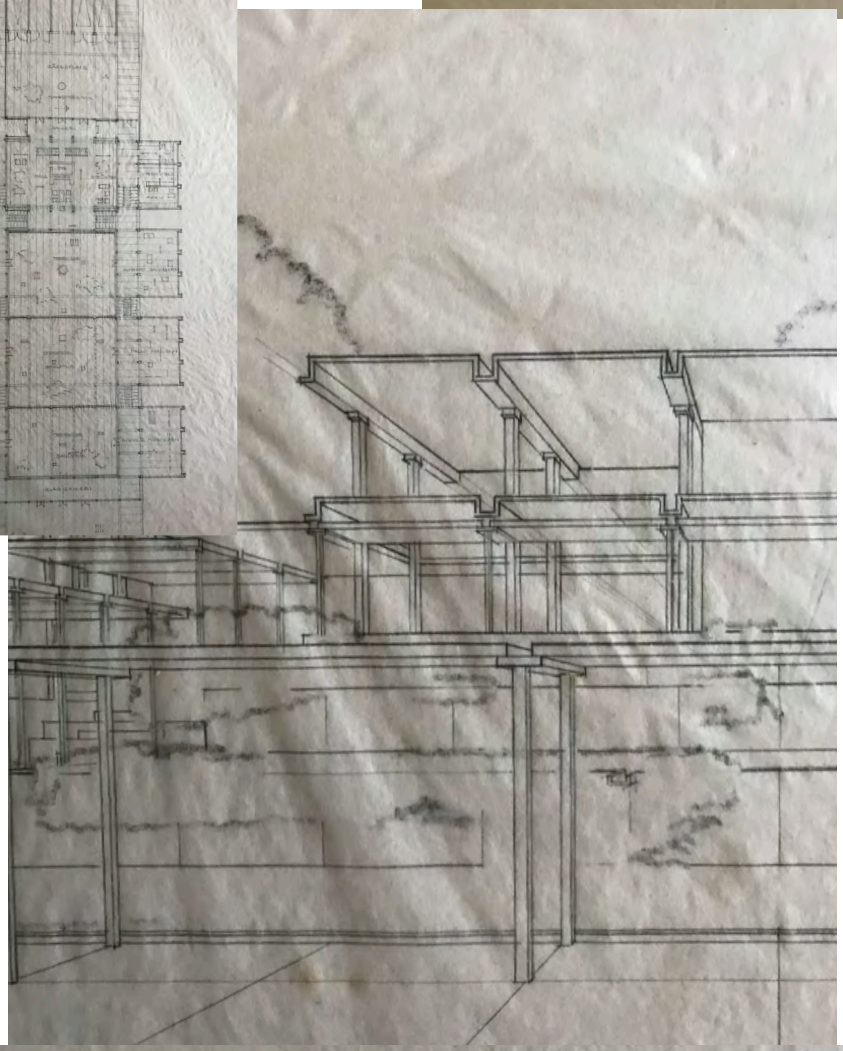
[74] All of the information on the final assignment in 1962 comes from the papers of Lise Sass Clemmesen, and is documented in Appendix 6.

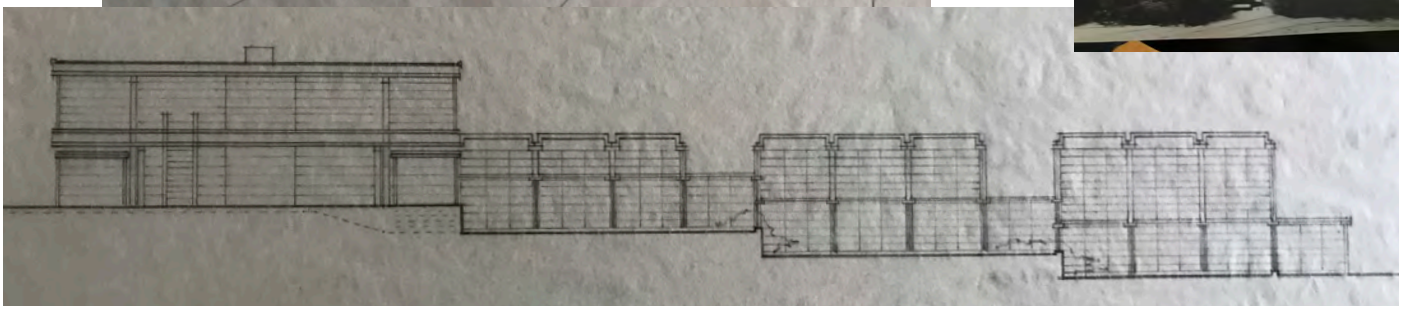
Figur e Buhl
”Museum and Residence for an Art Collector near Kokkedal” Final Project,
Royal Academy of Arts, Architecture School, 1963











near Kokkedal, in a site that borders up to the water, but where the ocean view is restricted by a small forest. The task was given by Jørgen Bo, professor of Architecture at the Copenhagen School from 1960–1989, and who is probably best known for the Art Museum Louisiana north of Copenhagen, designed with Vilhelm Wohlert.[75] The project utilises a few rather simple but strong strategies: the wood has been cut through, creating a long slender view of the ocean. The building itself follows the sloping landscape toward the sea, so that the residence is two storeys at the top of the site, whereas the galleries maintain the same roof plane and thereby, because of the sloping landscape, become progressively higher-ceilinged. This gives the spaces uniformity and difference at the same time. The structure is built on a grid consisting of concrete pillars, as the accompanying text informs. The roof is planned to be copper.

This clear strategic approach is underscored by a few analytical drawings, such as one where an isometric view of the ground plane explains how "the staircase" is laid out. Yet despite the stringent lines, the project is highly poetic. There is a strong symmetry in the project around the central axis, which ends in a sculpture in the sea. The symmetry and monumental features point back in time, and contrast with the otherwise definitely modernist character of the project. Buhl's project, as described here, is a good example of the strong artistic foundation that the otherwise seemingly rather technically-oriented education in the mid-20th century still had. When drawings from the period are examined, they bear witness to this tendency.

FIGURE 3.32: Charlotte Buhl "Music pavillon" B1, Student Work, Royal Academy of Arts, ca 1958

FIGURE 3.33: Charlotte Buhl "Herløw Cutlery," A1, Student Work, Royal Academy of Arts, 1957.

FIGURE 3.34: Lise Sass Clemmesen "House for a Forester," B2, Student Work Royal Academy of Arts, 1958.

The preparatory school drawings examined here include straightforward technical drawings of constructive details or joints; but despite the technical-sounding curriculum, there were also plenty of smaller design sketch tasks found in Buhl's portfolio. From the second year of the preparatory school, we find a sports cabin, a holiday home, a lifeguard tower,[76] but notably also a furnishing sketch assignment for a single family unit, with fabric and colour samples as well as watercolour perspectives and sections. These

[75] "Jørgen Bo," Weilbachs Kunsterleksikon. Accessed May 29th, 2019 https://www.kulturarv.dk/kid/VisWeilbach.do?kunstnerId=8537&wsektion=alle

[76] Drawings of Charlotte Buhl see Appendix 6.

indicate an interest not primarily in the functional scheme of the interior, but rather in its atmospheric qualities.[77]

On the other hand, Lise Sass Clemmesen's *House for a Forester*, also from the B class, is somewhat more restrained and functionalist.[78] In Buhl's *Music Pavilion*, a rather playful formal idiom and constructive detail coexist, as do the sobriety and precision of measurement with the aesthetics of the graphic skill in her *Measuring and Drawing of Herløw Cutlery* from the first year of preparatory school. In the *main school,* the projects as well as the drawings become more elaborate, but the same mix of the technical and the more evocative persists, particularly in Buhl's works.

FIGURE 3.35: Teit Weylandt
Croquis, Student Work,
Royal Academy of Arts, 1960ies

FIGURE 3.36: Carsten Hoff
Freehand drawing, Student Work,
Royal Academy of Arts, 1960ies

FIGURE 3.37: Teit Weylandt
Freehand drawing, Student Work,
Royal Academy of Arts, 1960ies

There is no doubt that work with architectural surveying played a significant part in the education in the mid-20th century. All of the participants in the historical interviews either mention it directly, or have drawings from it in their portfolios.[79] The tradition of architectural surveying that was instituted by Holm around the turn of the century lived on through Gottlob and Professor Mogens Koch.[80] Although Carsten Hoff followed in the footsteps of Poulsen and Gottlob, and was in Athens surveying classic architecture following his graduation from architecture school. Hoff, however, does not remember firm instructions on surveying techniques, but instead that they invented much of their approach themselves.[81] The tradition of architectural surveying was retained, and demonstrates how the knowledge of architectural heritage – a construct of National Romanticism – still prevailed in the Copenhagen school even in thoroughly modernist

[77] C.f. Böhme, "Atmosphere as the Fundamental Concept of a New Aesthetics."
[78] Drawings of Lise Sass Clemmesen, see Appendix 6.
[79] Carsten Hoff # 19:08,5 - 19:56,3.. Lise Sass Clemmesen # 16:42,3 - 17:36,0 og # 23:24,1 - 24:39,8. Charlotte Buhl # 7:58,5 - 9:05,1. Millech, "Arkitekturskolens historie efter 1904,"479.
[80] Millech, "Arkitekturskolens historie efter 1904," 479-481.
[81] Carsten Hoff # 20:02,9 - 22:17,0.

and technical times. As I have argued in the article "Danish Vernacular", this is exactly the flighty line between Nyrop's school and the new functionalism, hinted at by Millech. What persisted, however, was only architectural surveying, but also a strong tradition for freehand drawing; and these were perhaps even strengthened, as many of the participants' portfolios demonstrate.[82] Lise Sass Clemmesen indicates that freehand drawing along with architectural surveying (or measuring of smaller objects, like chairs and cutlery) could serve as a training for the eye – a sensitisation of vision, as the foundation of artistic labour. [83] This view is still present in the Copenhagen architecture education of today, as I shall argue in Chapter 5.

In an article in the magazine *Arkitekten* in 1964, Kay Fisker assessed Danish architecture and concluded that Denmark had not had as many geniuses as neighbouring Sweden, but added with a sense of satisfaction that the level of average Danish architecture was much higher.[84] Fisker was undoubtedly satisfied because he perceived that there was more value in designing the framework of "the good life" than in individualistic and exceptional masterpieces. The sensibilities that had been trained through the architectural surveying exercises, freehand drawing, and the materials understanding in the Danish education, among other things, seem a likely foundation for (if we take Fisker's word for it) the high average quality of Danish architecture.[85] This demonstrates yet again, as will be elaborated in Chapter 8, the solid artistic foundation underlying a seemingly highly technical school program. What Fisker probably did not realize was that the school was about to change radically, in the mid- to late 1960s, breaking with the highly structured approach to meet the demands of the new period. But here we shall skip even further forward to the 21st century, and to yet another restructuring and new demands for architecture education.

3.3. THIRD SKETCH: 2014/2015 - NEW DEMANDS – NEW STRUCTURE[86]

The third sketch selected is contemporary, and is set in 2014–2015 where the fieldwork presented in Chapter 5 took place. This was an interesting and formative, if slightly chaotic, time for the Copenhagen Architecture School (now KADK), as it underwent structural change in 2014. The change affected organisation and curriculum at both the bachelor's and master's level; but the following concerns predominantly the first two years of the architecture student's bachelor education at KADK, which relate to the field studies carried out at KADK.

[82] See appendix 6 for examples.
[83] Lise Sass Clemmesen # 32:29,2 - 34:05,5
[84] Fisker, "Persondyrkelse eller anonymitet."
[85] I have made this point also in Berling Hyams, "Danish Vernacular."
[86] The following section is a slight rewriting of research also published as Berling Hyams, "Structures."

3.3.1. RESTRUCTURING AT KADK IN 2014

Since 2014, the educational structure at KADK has been divided into six-week and twelve-week blocks. The changes to this block structure happened against the backdrop of a structure that had been in place since 1999–2000. Here a plethora of labs, institutes and sub-departments had been reorganised into 11 study departments and 4 institutes.

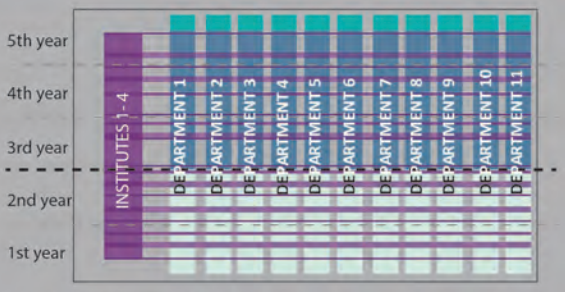


FIGURE 3.38: The 1999/2000 structure depicted with the four institites and eleven study departments.

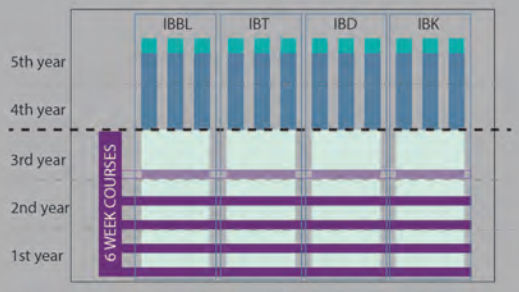


FIGURE 3.39: The 2014/2015 structure depicted with the four institutes: IBBL, IBT, IBD and IBK.

The institutes offered courses for students, but were also the basis for the affiliation of the researchers employed at the school. The institutes nonetheless did not have any students connected to them; rather, it was the study departments that were responsible for giving the students a comprehensive education that took into account each department's speciality.[87] Departments had various approaches to architecture, and some had a long lineage of tracing back their particular approaches to notable old professors such as Knud Holscher or Palle Suenson.[88] Departments in the old structure functioned mainly as studio programs. Departments had students at all levels, but the levels were separated and had different teachers and assignments. Along with their studio program, students would attend courses, some of which were mandatory for all students at a certain level across particular departments. Although it was planned to follow the progression of the semester, the mandatory course work was not always in direct connection with the semester assignment. Furthermore, although researchers were affiliated with the various institutes, they also sometimes taught at different departments. The structure of the curriculum meant that students would "take time out" from their semester assignment and what ensued was often a competition between departments and institutes over students' time and attention.[89]

[87] For more on this period see Oxvig, "Rummets tid."
[88] Interview with Kathrine Lotz, # 34:59,4 - 36:52,6.
[89] Interview Kathrine Lotz # 34:59,4 - 36:52,6.

Kathrine Lotz, Head of the Institute for Architecture Urbanism and Landscape, has commented that an important impetus for the new structure was to integrate teaching and research better, ensuring a research-based education for all students:

> "*With the new structure we integrated teaching and research and simply ask that the programs account for how they are research based. And that has been a giant step forward.*"[90]

The 2014 structure arranged the Architecture School into four institutes functioning as silos for the overall direction of education. Each institute contains a BA program and three MA programmes (although this is expected to be cut to two), allowing for greater specialisation along with a reasonably broad general education. The four institutes, IBBL, IBT, IBD and IBK (with the exception of IBD that also have two design programs) only have one BA program per institute. The BA programs at the institutes are *Architecture and Design – Whole and Part* at IBD (Architecture and Design); *Complexity Handling in Practice* at IBBL (Architecture Urbanism and Landscape); *Taking Place* at IBK (Architecture and Culture); and *Architecture's Anatomy and Fabrication* at IBT (Architecture and Technology). The bachelor programs run the twelve-week blocks. The numbers alone (previously eleven departments and now four BA programmes) would indicate a larger generalisation and perhaps also a sharper positioning, but each of the four programmes would also seem to weave in a plethora of different aspects of the field of architecture and render such generalisations simplifications.

Thematically, as their names would suggest, there seem to be differences between the programmes – in terms of scale: landscape, design, and building; in terms of epistemology: technical science and experience-based phenomenological research etc. Structurally, however, the programmes might be more similar, but because only one BA-program was studied extensively, a detailed analysis of the differences and similarities between the programs cannot be provided here. The 2014 structural change is also noteworthy for introducing a block structure, which was intended to carve out a good amount of time for the courses without students doing simultaneous work on their semester projects.[91] It should be noted that the block structure seems to aim at achieving a relatively smooth transition from general education to specialisation, although it might also uphold the previously existing difference between course work and project work. What is common for the twelve-week blocks would be that they are studio-based learning containing mainly design-oriented project work. This is in contrast to the six-week blocks that conduct teaching for a whole year simultaneously. In Chapter 5, one twelve-week block will be more closely examined in the analysis of the first semester at *Taking Place*; but for now the focus will be on the six-week blocks, with particular emphasis on the teaching of drawing in the first block observed during the fall of 2014–2015.

[90] Interview Kathrine Lotz # 36:52,6 - 38:19,2. Own Translation
[91] Interview Kjeld Vindum, Mette Jerl #1:36,8 - 2:31,9.

3.3.2. THE SIX-WEEK BLOCK STRUCTURE[92]

The image of weaving is both evocative and ubiquitous, both for the way that the six-week blocks are intended to function structurally with the twelve-week blocks, but certainly also for how they organise different architectural specialities thematically.[93] The intention of integrating the two different didactic forms in a progressive thematic[94] means that each semester of the bachelor's programme has an overall theme that is common for the six-week block[95] and twelve-week block. The semesters thus cover: 1: habitation; 2: organisation; 3: materials; 4: aesthetics; and 5: forms of practice. Kjeld Vindum, associate professor, KADK, who together with Mette Jerl, assistant professor, KADK, organise the six-week blocks explain:

> "*It's fundamental that we've had a vertical or vertically dominated structure, and we then insisted on that there has to be an intersection [..] that is not to say that the vertical can't be there, but rather that there are two identities […] the vertical – institutes and programs […] and then a school identity […which] ensures that there is a language and a frame of reference*."[97]

To ensure that there is a connection between the two types of blocks, teachers from the programmes supervise students and partake in the six-week blocks.[98] Each block seeks to include many different teaching forms. For example, the first block "habitation" consists of morning assemblies, lectures, workshops, study groups, performance experiences, and discussions (after lectures),[99] which again underline a pluralist approach that recognises the many diverse practice forms for architecture.

On the surface level, there are major differences between the smaller forums of the programmes' studio based teachings and the "mass education" of the six-week blocks. But an even more profound difference is that in the six-week block, students do not work through design proposal drafting.[100] Mette Jerl recounts:

> "*Among the students there has been a tendency to perceive the semester assignments [the design projects made in the institutes/programs] as the prestigious ones, because, in their view, the semester assignment at the institute is where you have a chance to unfold your creativity. However, gradually [in*

[92] The following section is also published in the article Berling Hyams, "Structures." It is based on a qualitative semi-structured research interview with Kjeld Vindum and Mette Jerl conducted in June 2018, as well as document analysis of the compendia pertaining to the five six-week blocks and the book *Inhabitation 2016/2017*.

[93] Interview Kjeld Vindum, Mette Jerl #25:52,4 - 26:17,2; #21:15,3 -21:53,9; And #41:23,9 - 41:42,3.

[94] Interview Kjeld Vindum, Mette Jerl #47:35,3-47:59,0.

[95] In effect, the six-week blocks are only five weeks long, as it proved practically impossible to integrate the IT labs in the block as they only have capacity of 90 students, and not for the full 180 students that make up a year's student cohort. Interview Kjeld Vindum, Mette Jerl #58:56,3-59:52,7.

[97] Kjeld Vindum, KADK, Interview Kjeld Vindum, Mette Jerl #21:15,3 -21:53,9 Own translation. Translation edited and approved by MJ.

[98] Interview Kjeld Vindum, Mette Jerl #18.48,1-20:04,5.

[99] See *Bosætning - compendium for 4 weeks crossdiciplinary education*

[100] Interview Kjeld Vindum, Mette Jerl #10:38,0-11:13,0.

> *the six-week blocks] the students begin to see the importance of knowledge as a foundation of their creative work. We stand on the shoulders of a greater knowledge and that is what they need in their works."*[101]

While the students might not do design proposals, that does not preclude creative work or project work from the six-week blocks, where students in groups of 4-5 for instance do *palimpsest drawings* of a place in Copenhagen or produce a movie. The didactics are necessarily different between the block types but students are still assessed individually, which is made possible through individual logbooks of their contributions to the group's project work.[102] The aim of the inclusion of these more creative group assignments, along with the interwoven mix of technical, historical and aesthetic components is "*to open the profession [of architecture] in all of its aspects*"[103]; and therein also lies an insistence on a conception of architecture that might be typical of the Copenhagen school, even in a historical outlook.

3.3.3. SIX WEEK BLOCK 1ST SEMESTER - 2014[104]

The very first six-week block that I observed had a separate theme or task for each of the six weeks that were nonetheless connected, more or less, to the tasks in the other weeks. For Jacob Bang, who was responsible for the entirety of the six-week block, it was important that the first six-week block not only introduced specific tools, but also represented, in a rather introductory and abstract manner, the entire span of architecture from design to landscape.[105] I made observations in weeks 3 to 6, and followed week 3 more closely because it focused on drawing.

FIGURE 3.40: Week 1
"Set of Blocks"
Student Work, KADK, 2014

FIGURE 3.41: Week 2
"Blocks in landscape 1:100",
Student Work, KADK, 2014

FIGURE 3.42: Week 3
"From 100 sketches to 1 drawing"
Student Work, KADK, 2014

[101] Mette Jerl, KADK. Interview Kjeld Vindum, Mette Jerl #10:38,0 - 11:13,0 Own translation. Translation edited and approved by MJ.
[102] Interview Kjeld Vindum, Mette Jerl #11:13,0 -15:36,4.
[103] Kjeld Vindum, KADK. Interview Kjeld Vindum, Mette Jerl #41:55,2 - 42:29,2. Own translation. Translation edited and approved by MJ.
[104] The section is based on field observations made between September 15 and October 10, 2014, as well as an interview with Jacob Bang, who was responsible for the first six-week block; see Chapter 1 for method.
[105] Jacob Bang # 15:44,0 - 16:13,8.

In Week 1, the students measured their own home (or room) and drew a plan and section of it. They also made a set of four wooden blocks (an L, an X; a square with a hole and an organic shape – all within 10 cm x 10 cm), which introduced them to the tools of the wood workshop, and subsequently drew the blocks in multi-view projections. In Week 2, the task centred on habitation. Here the students were to place their blocks in a 1:100 landscape model with a lake and a hill, and discuss in groups what kind of spaces the blocks created between them.[106] Week 3 centred on drawing and sketching, and had the students do 100 sketches on the first day and then use the rest of the week to select and refine them, ultimately developing one of them into an imprint-like character. In Week 4, the students made a mock-up structure in 1:1. In Week 5, they wrote an essay,[107] and finally in week 6, based on the previous exercises, they built a model for a piece of white painted, wooden furniture in 1:5. In the final week, the students also had an introductory IT course, which gave them the basic abilities for making a logbook. The logbook was the basis of their evaluation. All of their works were exhibited at the architecture school on the evening of October 10 as part of the Copenhagen-wide Culture Night event.

FIGURE 3.43: Week 4
"1:1 Mock-up community"
Student Work, KADK, 2014

FIGURE 3.44: Week 6
"A piece of furniture 1:5 "
Student Work, KADK, 2014

FIGURE 3.45: Week 6
"Exibition for culture night"
Student Work, KADK, 2014

3.3.4. FROM SKETCH TO "INKED" DRAWING

As described briefly above, the third week challenged the students to work from a random sketch up to a carefully planned drawing. The first part of the exercise had the students quickly draw a hundred sketches from images on a projected slide show. Each motif was only shown for a minute, forcing the students to draw swiftly. The sketches were drawn on small sheets of parchment paper – meant for food wrapping – and the 100 quick sketches were separated into sets of 25 that each required a different drawing technique and drawing tool. The first 25 sketches were drawn in black china marker, and were supposed to depict the

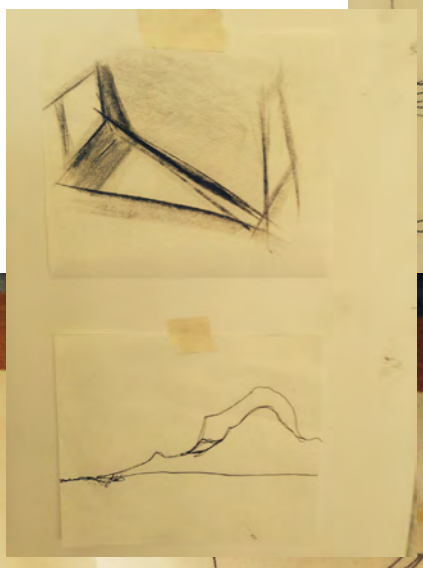
[106] Jacob Bang # 8:42,1 - 9:24,3.
[107] Jacob Bang # 12:28,8 - 12:58,4.

negative space in the motifs shown. After the 25 first sketches, there was a break for lunch. The next sketching session was carried out in black Filia oil crayon, and the students were asked to use the two different ways of drawing that a broken crayon can produce (a thin dense black line and a broad lighter-coloured surface). The third set of sketches was again in china marker, and the students were asked to build up the form using shade. The fourth and final session was carried out in 0.3 black liner. Here the students were told to look only at the motif, not at the sketch, nor to lift the pen, so that the drawing became a sort of diagram of how the eyes scanned the motif using points and lines. Between each of the last sessions, there was a ten-minute break.

The students were extremely focused on the assignment, but a general observation made was that many of them spent approximately 2 seconds looking at the motif for every 5-10 seconds they spent looking at their own drawing.[108] Not only did this not give them long to actually observe what they were trying to capture, but it also indicated that they were attempting to control the drawing; more experienced sketch artists would likely have administered their time in a different way. In a similar vein, many of the students also did not use the flat side of the crayon in the second session, but only the conventional pointy side. As one of the teachers at the session told me, these exercises, both with the time pressure and their different materials and approaches, were designed to result in a breakdown of a direct or habitual approach to drawing for the students, so that they had to *construct* the drawing.[109] If the breakdown had been only with regard to approach and materials, it would have probably resulted in a reflection on the effect of the materiality or approach; but with the time pressure built into the exercise, the aim is somewhat different. The students were forced to act, not to think. They were forced to throw themselves into a situation where the material takes some of the control (although this was evidently still difficult for many – as observed).

In this there seem to be two underlying beliefs about drawing that are interlinked: the material must be given space to "act", and there is therefore a production imperative. Why, one might ask, is it necessary to create 100 sketches per student, if most of them are likely to have been carried out so quickly that they are not much good? Would it not have been better to make 10 "good" sketches? The answer, at least from the point of view of this exercise, would be that there is no way of ensuring that you make 10 good sketches, if you do not produce many more than that. The next step of the exercise was for the students to examine their drawings and select, not from the criterion of whether or not they resembled their initial motif, but whether they were in some way interesting as form. The process was started by selecting only four out of the 100 sketches, and then combining them or their qualities into one final drawing, which was "inked" so that it gained an imprint-like character.

[108] Fieldnotes #15/9-2014 – after lunch.
[109] Fieldnotes # 15/9-2014 – after lunch.



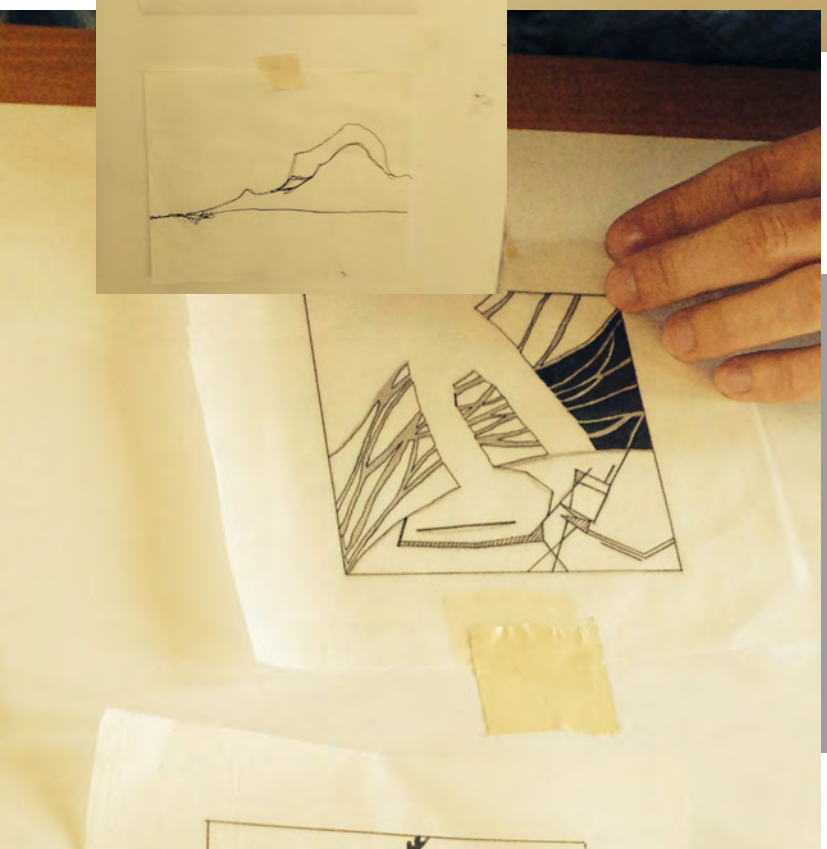


FIGURE 3.46: Week 3
”From 100 sketches to 1 drawing.” Student Work, KADK, 2014.

The sketches in this process were severed from their original motifs, and the students were asked to see new meanings in them. This seems related to the concept of *multistability* from postphenomenological theory. Multistability is a concept brought forth by Don Ihde, first in *Experimental Phenomenology*, based on drawings that can appear in different ways[110] akin to the duck-rabbit figure popularized through Wittgenstein's *Philosophische Untersuchungen*.[111] *Multistability*, in short, entails that technologies are not and cannot be viewed as simple instruments; they do have conventionalized stabilities (uses), but cannot be reduced to them. The students were asked to look for *multistabilites* in their sketches – to open them up, so to speak, and then elect the ones they found most interesting. In the combination of the four elected sketches, this *multistability* survey was undertaken once again, but in a slightly different manner. The *multistability* of the sketch allows the student to view and use it in ways that are different, but of course also restricted, ways. It is no easy task to do so, and many of the students struggled with the assignment; these were helped by teachers, who were either accessible in a corner of the large ballroom, or passing in between the working students, encouraging them. One teacher in particular was observed to sit down with students and spend a long time with them pushing the drawings on top and below each other and turning them, which because of the transparent paper gave different shapes: "*try to see if you can see positive and negative spaces*."[112]

The aim of the exercise was to train what can be termed a general drawing sensitivity, both with respect to its *multistability,* but also, following Schön, the *back talk* of the drawing, which is connected with the *multistability* precisely insofar as the drawing has *stabilities*, i.e., some things that it cannot do or mean. The training of the sensitivity towards the *back talk* of the drawing is training that would ensure that the student does not "*fall into a self-fulfilling prophecy*."[113] And it underlines again the importance of the materiality of the drawing, as will be unfolded further in Chapter 7. In the end of the exercise, the "imprint" drawing was mounted on white cardboard with a passe-partout frame around it, set in a wooden box. The drawing or the characteristics of the drawing were used to form the point of departure for the small piece of furniture designed in Week 6. The final exhibition in many ways underlines the beliefs central to the organization of the exercises. Whereas one student project would probably not attract much interest, collectively the works appear much stronger, depicting almost a variational analysis of the assignments.

The six-week/twelve-week block structure was contested and questioned by many when it was introduced, not least when, as was the case with the six-week block observed in 2014, it integrated actual

[110] Ihde, *Experimental Phenomenology*, 45-54.
[111] Wittgenstein, "Philosophie der Psychologie - Ein Fragment xi, 118," 204.
[112] Fieldnotes # 18/9-2014 – morning.
[113] Schön, *Educationg the Reflective Practitioner,* 74.

design work and did not simply teach students technical or academic skills. A discussion of this fact, as well as of the three other selected moments, particularly in relation to the framework of the three paradigms, will be taken up in Chapter 8. We shall also follow some of the students' route from the six-week block and into the BA program *Taking Place*. But first, in Chapter 4, we will skip backward, and I will present a cross-section of the experiences of practice at the Copenhagen Architecture School.

CHAPTER 4:

THE ARCHITECTURE SCHOOL IN COPENHAGEN: A CROSS-SECTION

INTRODUCTION: CHANGEABLE STRUCTURES – AND DAILY LIFE

Glimpses of the practices at different times the architecture school in Copenhagen emerge through the histories written about it, but the image remains a little unclear. What were the different school practices like, what activities and beliefs about drawing adhered to them? In 2017 I carried out an interview study with 17 graduates from the Copenhagen Architecture School. The study was planned mainly for the purpose of bringing forth knowledge of daily life and experiences at the school. The aim of this chapter is to peep through a window into The Academy and extract descriptions of the changing practices, through the memories and narratives of former students - some more recent some more distant. The study selected a broad range of architects, where the oldest had entered the academy in 1951, and the newest had graduated in 2005.[1] As all of the participants have graduated and found their way into architectural practice in different capacities, they are able to reflect on their education from a different point of view than are students and teachers still involved with the school. Their viewpoints are often marked by this position, and they more or less all reflect on how their schooling helped, or in some cases fell short of preparing them for their later work. One participant even recounts in retrospect how as a student and new graduate, he was very critical of the education he had gotten, but now well into his career he sees the quality.[2]

This study, which brought forth a much larger and richer material than can be covered here, in some cases included a viewing of school drawings (mainly from the 1960s), which were documented in photographs. Some of the interviews and drawings from the mid-20th century have already been referred to in the previous chapter. The interviews all started with participants explaining the structure of their education as well as what an ordinary day at the architecture school was like. These two questions, along with the questions 2 and 6 from the drawing practice section of the interview guide, form the basis of the investigations of this chapter, rather than the entirety of the interviews.[3] This approach was selected because of the focus on drawings, structure and pedagogical activities. Even in this limited cross-section of the interviews, interesting themes emerge, as admissions procedures (also described in Chapter 3), the culture of evaluation practices, and the relationship between the practical and theoretical sides of architecture. Although the period covered in the interviews involved dramatic changes in the practices at the

[1] See Appendix 6 for a list of the participating architects and their graduation years.
[2] Thomas Ringhoff # 0:33,0 - 0:54,5 and # 12:40,8 - 13:29,5.
[3] Q2: "What kind of drawing did you do? And did you draw different drawings at different times in a project?" Q6: "What role did drawing play in architecture education for you?" See the interview guide in Appendix 1.

architecture school, certain elements also seems almost oddly stable, as the general description of an ordinary day. "CNL", who started her studies in 1986, recounts:

> *"When you were at the department, working on your project, then you arrived [in the morning] and sat at you drawing table. And you were seated in a group, so you had others around […] We had our own place […] a table of approximately 1m x 1,4m, and then some storage next to it and a bulletin board for putting up drawings*."[4]

This general setup does not seem to have changed much over the years, as almost the exact same is recounted by Per Graham, a student in the mid-1960s,[5] as well as Jeanette Frisk, a graduate from 2005, who also remembers some of her classmates almost taking up residence at the school.[6] For the most part, work was carried out at the school – or the Academy, which is the name the older participants use to refer to it – and even in the times of a freer structure, most participants remember being at the school almost daily from the morning on. In the 1950s and early 1960s, attendance had been compulsory.[7] Carsten Hoff, a student in the 1960s, remembers a more diligent attendance policy during his student years than when he himself later became a teacher.

> *"I actually think we were at the school a lot. Later I myself taught there in empty rooms, but I think we benefitted from all being there. And I won't say that you couldn't miss a day, but generally there was a school atmosphere or architectural office atmosphere or what you'd call it. And dialogue and exchange and lunch at Mrs. Svenson's in the basement*."[8]

The social element from Hoff's account also marks the days spent at school. Steen Holmgren for instance remembers his group as going by the name of the *Danish Pastry Group* because they frequently started their days with a Danish Pastry breakfast.[9] Only one participant did not use the school as her main place of work, and another, who lived far away for a time, was only able to get there three times a week.[10] Whereas there seems to be a certain stability in the pattern of how a normal day was spent, several participants express that the days were varied:

> *"They were not the same, the days. If you were doing a project in a group, then we met up in the morning and discussed where we were and how to move forward, if we needed help from someone. […] but then sometimes you needed to go out and do research, collect different information and then we usually ended the day drawing and moving on with the project*."[11]

The group work described here by Kirsten Sander was largely an product of the major changes to the school's structure that occurred in the late 1960s: changes so significant that one might distinguish three entirely different "schools".

[4] "CNL" # 9:33,1 - 10:15,7.
[5] Per Graham # 13:53,1 - 15:02,3.
[6] Jeanette Frisk # 25:10,8 - 25:58,8.
[7] Charlotte Buhl # 13:03,3 - 13:59,7.
[8] Carsten Hoff # # 25:58,3 - 26:48,9.
[9] Steen Holmgren # 9:32,5 - 10:47,7.
[10] "ELB" # 16:40,2 - 16:57,0. Niels Vagn Pedersen # 28:41,2 - 29:05,8.
[11] Kirsten Sander # 22:13,8 - 23:57,4.

4.1: THE BLACK, THE RED, AND THE SCHOOL THAT FOLLOWED

Of course, there was only ever one architecture school in Copenhagen. Yet far-reaching changes meant that for students at the school, it would be experienced in quite different ways. The school that students attended up until 1968 was sometimes referred to by participants as *the black school*,[12] which is a common Danish expression for a strict school, with very little freedom for students. Furthermore, the phrase *black school* emphasizes rote learning rather than more modern learning approaches. A highly structured study environment marks almost all of the narratives of the students from the 1960s, whereas that changes radically in between the years of 1968 and 1972. There is, however, no doubt that the architecture school in Copenhagen never actually was a *black school*, not even at its most organized and strictest. Nevertheless, the label is evocative as the contrast for *the red school*, that is, the school characterized by strong influences of the 1968 student rebellion and Marxist and socialist ideologies, which emerged in the last years of the 1960s. What is more, the notion of the *red school* must be tempered, as it was not all departments that were affected to the same degree and some carried on largely with business as usual.[13] Nevertheless, the system at the school as well as its admissions policies, etc., changed radically. After a little over a decade of *the red school*, structures again were tightened slightly – not to a degree that saw a return of the *black school*, but rather a negotiation between the two models. To a certain extent, this negotiation is what has continued up to the present day restructurings at KADK, and furthermore has links to the three paradigms of Beaux-Arts, polytechnic and practitioner, as will be expanded on in Chapter 8. The following will provide a brief introduction to each of these three stages in the school's history, based largely on the accounts of the participants in the survey.

4.1.1. THE BLACK SCHOOL

The stringently planned and orchestrated structures of the school in the early 1960s is a sharp contrast for the later free and almost structure-less school, where subjects were electives or at least largely electives. The school that Lise Sass Clemmesen attented in the 1960s ran a stringent regime of subjects from building law to statics, with morning classes and the possibility of failing a class[14] – something that later is not mentioned by the participants.

> "*It was a very stringent school, you wouldn't believe it. We started at eight and we had statics and perspective and we also had a lot of freehand drawing […] and when our drawings were judged then you could get a red for good, blue for less good and yellow for poor – that is we got stickers on them. […] projection drawing was a really important field*."[15]

[12] Steen Holmgren # 5:27,5 - 5:59,6, Charlotte Weile # 12:22,6 - 13:49,6.
[13] As is portrayed by Steen Holmgren # 27:08,5 - 28:40,2.
[14] Lise Sass Clemmesen # 14:14,2 - 14:56,2.
[15] Lise Sass Clemmesen # 10:59,2 - 10:59,3.

What Lise Sass Clemmesen describes here is, first of all, the *preschool* of the architecture education and as discussed in the previous chapter, there is no doubt that the very tightly arranged schedule loosened up a little in the *main school*. It is likewise noticeable that along with the subjects of statics, perspective and projection drawing, freehand drawing played a prominent role – a subjectthat must be said to not exactly lend itself to rote learning. As described in the previous chapter, students at the Academy had to go through a lengthy and rigorous admittance course, which set the foundations for the school's practices. In *the black school*, teachers organized the project work and students had no influence on what tasks they wanted to work on or, indeed, what courses they wanted to attend. Most projects were also carried out individually and not in groups, although group work was practiced.[16] *The black school* irrefutably had elements where a stringent discipline was rehearsed. Teit Weylandt recounts:

> "*You were given an assignment […] I remember them as rather short exercises. […] And then there were these special disciplines fitted in with perspective drawing and construction technology and building law, where you had to sit exams, to check if you had listened and studied. You had to know the Copenhagen building code and such."*[17]

Weylandt also recounts that he preferred the actual design tasks, which is perhaps not surprising. But although many of the participants talked about the strictness of the system in their schooling, none of them seemed to actually criticise the model. Indeed, some of the students, who attended *the black school* might have even preferred this model as is the case with Per Graham, who graduated in 1969. He got his nomination for finals in 1968 and so, as he expresses it, *"got out just in time."*[18] Nevertheless, Graham himself also does display some of the revolutionary tendencies of his times, as he himself attests: for example, he at first attempted to make a final project as group work in spite of the regulations. This was not accepted by the academy, and he ultimately graduated after working individually on the next final assignment: student dorms at Christianshavn.[19] Just one year later, the school structure had changed radically, and the system had become unrecognisable to those who had attended it previously.

4.1.2. THE RED SCHOOL

The red school was characterised first and foremost by a very loose structure with regards to subjects, tasks and admissions. Charlotte Weile, who started at the Academy in 1970, told me:

> "*You didn't apply, you just started at the architecture school in 1970. It was right after the revolution. Like in France they had been on the barricades and locked the teachers out of the school and so there was nothing – no structures*." [20]

[16] Lis Park # 30:52,5 - 31:01,3.
[17] Teit Weylandt # 16:06,7 - 17:09,6.
[18] Per Graham # 34:05,2 - 35:34,8.
[19] Per Graham # 31:05,0 - 33:19,4.
[20] Charlotte Weile # 12:22,6 - 13:01,1.

When she was asked again about the admissions process, Weile did remember filling out a few forms with her dad, but the contrast to for instance the admittance course of the late 1950s could not be starker.[21] In the history of the Academy, Jørgen Hegner recounts that in the fall of 1968, 80 students had been rejected after the admittance course, but instead of accepting it, they complained to the newly formed student council and simply showed up for lessons anyway.[22] In the spring of 1969, the Teacher's Council actually removed the admission restrictions, and was granted permission to admit everyone freely as a test for the 1969/1970 school year.[23] In fact, the free admissions policy was retained until 1977,[24] resulting in an enormous surge in admittances: around 540 in 1969, 613 in 1971, and 250 in 1976.[25] The new high number of students put pressure on the school, which was also felt by students. Weile, for instance, recounted that many came just to test out the education, but ended up taking up a lot of space.[26] Nevertheless, the new structure, which was formally based on new sets of regulations in 1971 and 1974,[27] offered large degrees of freedom for the students, who were now allowed to select the courses they wanted, pick the lectures that interested them, and largely work on the projects that they themselves chose – that is, the tasks were largely self-programmed. Only a few departments maintained practices that were close to before.

This enormous freedom, however, came at a price, and some students struggled to navigate the waters. Holmgren relays the view of a Swedish architect, he met at a symposium at the time, who described the Copenhagen school as a menu for building a sandwich, with a great selection but also no guidance, so that one might build a sandwich with fiber bread, paté, jam, eggs and pastry on top,[28] The idea being that not having a very sure idea of what you wanted could result not just in narrow or incomplete combinations, but also plainly absurd mixtures. Weile believes that the high drop-out rate was particularly related to the fact that the architecture school had become so difficult to navigate, and demanded such a highly self-driven approach, that it was simply challenging for many with a regular school background.[29]

The contents of the courses also changed in a highly social and political direction, even for students, who were still interested in other, more classically architectural subjects. Steen Holmgren, who in many ways welcomed the change at the school, is likely to reflect the attitude of many at the time when stating that he still saw architectural competencies as more important than the political education:

[21] Charlotte Weile # 24:04,3 - 24:43,8
[22] Hegner Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 115-116.
[23] Hegner Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?", 119.
[24] Hegner Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 137.
[25] Hegner Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 120 and 136.
[26] Charlotte Weile # 20:03,3 - 20:48,9.
[27] Hegner Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 124 and 132.
[28] The example Holmgren uses is different but untranslatable to English, so I have made a similar, but more internationally recognizable version. Steen Holmgren # 29:01,2 - 30:23,4.
[29] Charlotte Weile # 20:03,3 - 20:48,9

> "*I at least reacted against those who said that firstly you had to be red, then architect – that is, that you needed a political education first. We did also have classes in political economy and different sorts of lectures on society*."[30]

The political turn of the architecture school also at times was rather intolerant of different or even indifferent political attitudes: one participant even remembers being forcibly thrown out of a lecture because she had not read Marx, and did not really intend to either.[31] At the end of the 1970s and early 1980s, the structure of the architecture school was still rather free, but many of the most radical changes had been abandoned, like free admissions, leaving a school that was neither red nor black.

4.1.3. THE SCHOOL THAT FOLLOWED

The *red school* or *free school,* as it is also sometimes referred to, definitively ended in the mid-1990s as a result of both new academic regulations and, more broadly, a new administrative act.[32] This is the view of Ebbe Meldgaard, who had taught at the architecture school since 1970 and later served as rector of the school.[33] In 2005, he wrote an account of the development in the architecture school in Copenhagen since the 1970s, where the changes from the *red school* are critically examined. As mentioned briefly in the previous section, many of the radical changes after the 1968 rebellion were rolled back already in the 1970s. Nevertheless, by all accounts, the school of the 1980s was still a very loose affair. Several of the students from the 1980s report that they lacked structure in their studies.[34] Thomas Ringhoff explained how even the years after the *red school* were difficult to navigate: "*I started architecture school in 1982 […] It was still the aftermath of the '68 spirit there. It was a very free school, which at the time I simply could not handle*."[35]"CNL" described the school that she started at in 1986 as a place that had just steered away from completely free forms and wanted to give students more structure. Nevertheless, at her first department she still experienced very little structure, and found that the student democracy took up much time.[36] Even after the implementation of the new department structure in 1999, Jeanette Frisk, in her interview, recounts how she lacked structure in the approach to architecture and a more methodical approach, as well as the necessary knowledge of the building code, etc.[37] This indicates that even in the aftermath of the *red school*,

[30] Steen Holmgren # 12:36,4 - 13:19,2. He is referring here particularly to a controversy spun over the study plan for Henning Larsen's department in 1971/1972, headlined "First red, then specialist." See Hegner Christiansen, "Arkitekten i Velfærdssamfundet – kunstner eller tekniker?" 126.
[31] "ELB" # 10:45,5 - 11:28,9.
[32] Meldgaard, *Den Europæiske arkitektuddannelse – og den danske*, 20
[33] "Ebbe Meldgaard", Weilbachs Kunstnerleksikon, Accessed May 29th 2019, https://www.kulturarv.dk/kid/VisWeilbach.do?kunstnerId=9368&wsektion=alle
[34] "JNLD" # 10:32,6 - 11:33,8. "CNL" # 13:31,6 - 14:25,2.
[35] Thomas Ringhoff # 0:33,0 - 0:54,5.
[36] "CNL" # 6:09,9 - 6:49,1.
[37] Jeanette Frisk # 5:34,1 - 6:28,0, and # 23:25,9 - 23:40,6.

the architecture school did not return to the regimented curriculum of the *black school*. Whereas part of the move toward an ever more structured school can perhaps be seen as simply being in step with changing times, the internationalization of education also played a role. An example of this is the implementation of the Bologna model, which calls for a three-year bachelor and two-year masters education, implemented from 2002.[38] Thomas Ringhoff, reflecting on the recent changes in educational politics, has changed his original view on the unstructured school that he attended:

> "*I can see that education generally is being tightened up, the demands become very rigid, which on the one hand perhaps is OK, but on the other hand and that is what weighs heaviest is what a wonderful school I went to. The personal freedom allowed there! So it has dawned on me, in relation to the political development since*."[39]

As Ringhoff's reflections demonstrate, there were definite advantages to the *red school*, which have also not gone unnoticed by Meldgaard, particularly as he accentuates that the loose structure enabled a high agility, which in turn meant that the architecture school was profoundly engaged in contemporary issues, such as housing shortages and urban renewal projects. These interests, in Meldgaard's view, have since been neglected, at least in the school's engagement in public debate.[40] Frisk noted and criticized a similar tendency when describing how her architectural office has engaged with contemporary students at KADK working on

> "*very real problems – not a refuge in Bornholm, like everyone did back then [when she was a student] or an art museum in Norway, but a real societal issue. A problem that demands a solution in our field, but also one where in the course of working on it, you discover that there are other and many more structural influences on how we handle such problems*."[41]

In Meldgaard's view, there is a danger that the school that followed *the red school* did dispense with the Marxist naiveties, but simply replaced them with equally naïve and unquestioned attention to issues like management and branding. He finishes by calling for an invigorated focus on strengthening the abilities in design proposals, through a *desk crit pedagogy* that straddles both theoretical and concrete architectural practice.

4.2: ASSIGNMENT TYPES, PRACTICE AND THEORY

During the interviews, two subjects stand out in particular concerning the structure of the participants' studies: first, how practice and theory wove together; and second, how the semester was structured and set up through assignments. Students always followed courses (whether mandatory or voluntary), and while the content of those courses changed significantly over the half century covered in the interviews, it is even

[38] Meldgaard, *Den Europæiske arkitektuddannelse – og den danske,* 30. See pages 29-34 for reflections on the Bologna declaration.
[39] Thomas Ringhoff # 12:40,8 - 13:29,5.
[40] Meldgaard, *Den Europæiske arkitektuddannelse – og den danske,* 43-44.
[41] Jeanette Frisk # 23:58,1 - 24:57,5.

more enlightening how the projects were carried out in the departments, which organised the mainstay of the education, and how relatively little this structure changed. The practical and practice elements of the architecture school were particularly emphasized in the interviews with regards to internship and, in *the black school*, summer apprenticeships in the building industry.

4.2.1. PRACTICAL MATTERS

The theme of practice weaves into almost all of the participants' narratives in different forms. For some in the form of building practice and know-how from summer apprenticeships, and for others in the form of experience from regular internships. Historically, the Danish architecture education had close ties with craftsmanship and building practice, as all who attended architecture school between the years of 1857 and 1908 had to be trained craftsmen or construction managers (with degrees from technical schools).[42] Additionally, it was very common for architecture students in the first half of the 20th century to be engaged in actual architectural practice as assistants. The late 1960s mark two significant shifts in this respect: first, the fact that the number of architecture students suddenly exploded after 1968 meant that for the majority of students, there simply were no longer positions in architectural offices; and second, the fact that before the 191970s, students in the first years had to do obligatory training as craftsmen, typically as bricklayers or carpenters. This practical training was placed during the Academy's long summer holiday, and of course was not required for students who already were trained craftsmen, or had a construction degree, and who therefore started in the *main school*.

For some, the learning of actual craftsmanship during the apprentice periods was limited, whereas others drew important experience from it. Both Lise Sass Clemmesen and Charlotte Buhl, who had very different experiences, recognise the apprenticeships as the foundation for gaining extremely important insight into work on a building site, as well as knowledge of and respect for the work of craftsmen.[43] Also the teachers' attachment to practice has changed somewhat. Carsten Hoff, who studied in the 1960s does not remember having teachers, who did not have either their own practice or worked in practice alongside their teaching.[44] This is partly a contrast to the contemporary situation, brought on by a heightened focus on research in the 1980s, where although many teachers still have practices, it is equally normal that teachers are primarily teachers and researchers and as such practitioners, but not always knee-deep in building practice. In contemporary architecture education, internships are the most typical form of attachment to practice. The potential importance of internships or assistant positions in practice is underlined by the story

[42] See Chapter 3 (3.1.2).
[43] Charlotte Buhl # 7:04,9 - 7:31,2. And Lise Sass Clemmesen # 9:49,7 - 10:11,5.
[44] Carsten Hoff # 26:57,7 - 27:41,4.

of one participant, Torben Baltsen. Baltsen recalls how an internship was a formative period in which he suddenly managed to arrive at realisations about architecture that had previously eluded him:

> "*When I came home from Columbia, I was employed as a fulltime student assistant. What I will call and always have advocated for – I got into a sort of apprenticeship [vocational training] […] It was Tivoli's architectural office and there was a couple of young architects who had been given the task of building the Tivoli museum […] They taught me a lot, also because it was practical and it was creative [formgivning]… there was a lot in it and I figured out what the profession of architecture was*."[45]

The internship came late in his studies, just a year before his final project, and of course raises the question of what it is that was missing from so many years of schooling that suddenly fell into place during the internship. Jeanette Frisk recounts a similar story about a feeling of learning more during the first year she worked in practice, than during the five years that she had spent in architecture school.[46] A non-curricular but simple element in the difference that Baltsen brings up is encouragement:

> "*…and then I got praise, I actually got praise […] At the Academy, I had gotten pummelled and then it had become a bit better and I got lukewarm criticism. And there [at the architectural office] I was told that "Gee-whiz, you have skills" […] That was very important*."[47]

Baltsen's story brings to mind the *encouragement pedagogy* that Pfammatter connected with the polytechnic tradition.[48] And it would seem straightforward to assume that a sort of apprenticeship would be in line with some of the characteristics of the practitioner paradigm. But the mere fact that students sought these elements outside of the school does not mean that the practices at the Copenhagen School did not in other ways resemble the polytechnic or the practitioner paradigm. This will be discussed further in Chapter 8. The relationship with architectural practice and craftsmanship in Danish architecture education would deserve much greater attention than the brief and limited sketch offered here, not in the least in light of new demands for a strengthened connection between school and practice,[49] but this must be postponed to later investigations.

4.2.2. SKETCH ASSIGNMENTS AND SEMESTER ASSIGNMENTS

Generally, participants, as for instance "JNLD" quoted below, described two different types of assignments: sketch assignments and semester assignments.

> "*It was typically the case that we had six months for a semester assignment, additionally we then of course had other assignments as well - shorter assignments*."[50]

[45] Torben Baltsen # 9:28,0 - 10:23,3.
[46] Jeanette Frisk # 22:08,8-23:23,8.
[47] Torben Baltsen # 11:05,2 - 11:32,7.
[48] Pfammatter, *The Making of the Modern Architect and Engineer,* 9-10. See also Chapter 2.2.4. and furthermore Millech on Ivar Bentsen's teaching style: Millech, *The Making of the Modern Architect and Engineer,* 429.
[49] See 2015 report recommendations: Udvalget til fremtidssikring af de videregående kunstneriske uddannelser. *Fremtiden for arkitektur og design.*
[50] "JNLD" # 10:32,6 - 11:33,8.

Claus Tversted described how his first years at the school at Mogens Breyen's department were based on one larger semester assignment followed by roughly three minor sketch assignments. The sketch assignments were of approximately a week's duration, which served the purpose of forcing the student to think up a solution rapidly. Tversted emphasizes that he saw the sketch assignments as good training because although quickly done, one should not be in such hurry that the proposal brought forward was either inconsistent, e.g., with doors leading nowhere, or too banal: where one thought one had drawn architecture it was really "*just a house*."[51] Lis Park, studying in the 1950s, likewise looks back on the sketch assignments as challenging but educational.[52] And Kirsten Sander describes her education as largely project-oriented.

> "*It was very project oriented, larger projects that we did. And then as mentioned we had these small simple assignments sometimes too. For instance a pedestrian bridge, can't remember where it was, Farum perhaps, but some specific place. And we all rather speedily had to come up with a proposal for such a pedestrian bridge, what it should look like and how to construct it*."[53]

In the above, Sander indicates how the sketch assignments, in contrast to the more holistic semester assignments, could have a more specific and guided focus, as for instance on construction technology.

The sketch assignments preserved by Lise Sass Clemmesen can form a further basis for this hypothesis. Clemmesen's portfolio contains not only her project drawings, but also the original assignment briefs, which are otherwise hard to come by. In the brief for a sketch assignment for an electrical substation, there is a combined focus on landscape qualities and industrial production feasibility, whereas in the brief for a sculpture exhibition, the focus must be said to be on the creation of performative space. In the assignment brief for a pedestrian bridge, the assignment text is short, but it does specify when engineers will be available; when combined with the unembellished project proposed by Clemmesen, this suggests that the focus was construction. Further, an assignment brief for a house for a writer draws particular attention to the connection between the design and how it is placed in a landscape. Finally, the sketch assignment for a tennis club is more holistic in scope than some of the others; but through its call for parking facilities, tennis courts, and a club house, it demands a focus on landscape.[54] Because the body of evidence is sparse – particularly beyond the *black school,* where the sketch assignments of Lise Sass Clemmesen would have been situated, the hypothesis remains rather weakly founded; but it does nonetheless indicate the interesting possibility of guided learning within a project-oriented framework that is still focused on design proposals. This, combined with the speed demanded, would mark a clear difference between the sketch assignments and the semester assignments.

[51] Claus Tverstedt # 16:32,5 - 17:38,8.
[52] Lis Park # 29:26,6 - 29:50,3 and # 29:59,4 - 30:40,8.
[53] Kirsten Sander # 22:13,8 - 23:57,4.
[54] The drawings of Lise Sass Clemmesen, See Appendix 6.

"CNL" did not remember doing a semester assignment in her first semester, but remembers 3–4 smaller assignments instead.[55] These similarly orchestrated a sequence of learning.

> "*One of the first was about making a piece of furniture. Some sort of furnishing for where we lived. We did an architectural survey assignment, where we got a historic house that we made a model of and drew, so that we got through the modeling and drawing disciplines, once more, on something concrete, and then we made student dorms – an infill assignment*."[56]

The first assignment described by "CNL" is manageable in terms of scale, but difficult, as a design proposal is demanded. It rehearses both drawing and modelling disciplines. When the scale is increased in the second assignment, the design proposal element is eliminated in order to manage complexity; in the end, the infill assignment calls for both a regular architectural scale and a design proposal. While there certainly is a strong pedagogical point in this sort of complexity management and guided problem focus, the more holistic and open semester assignments are perhaps better suited to prepare students for independent complexity management, which must be regarded as an invaluable skill for architects. As an example of the more open and holistic approach in the semester assignments, consider – once again from Lise Sass Clemmesen's portfolio – this text from the semester assignment of an inn: "*Apart from the number of hotel rooms, residence etc., the client intends to allow the architect a rather free rein, also with respect to the program*."[57] This "free rein" is obviously an invitation for the students to independently asses and be creative, but it also leaves the field very open and suggests that it is precisely this ability to navigate a rather open field that is being trained here.

There were of course also differences in the approaches to assignments in the different departments. After three years' study, Niels Vagn Pedersen, who started studying in 1977, took a yearlong course at the restoration department because he wanted to try something new – and he found things to be very different.[58]

> "*We didn't start on October first, we started on September first – a month before everyone else because we were doing architectural surveying. We worked in Køge. […] a local merchant's shop […] It was very rigorous work. So we handed in those projects around Christmas, I think, and then all of the Spring - on the background of the architectural surveying - we had to make a project proposal*."[59]

What Pedersen describes here, apart from the increased rigor that he experienced, is that the project proposal was delayed until the second semester, and replaced with research in the first semester. Even where differences between departments were not this striking, several of the participants pointed to a difference between the assignments given by the departments. As an example, Lise Sass Clemmesen relayed, how she moved from Erik Christian Sørensen's department to Jørgen Bo's department because she

[55] "CNL" # 12:18,2 - 12:34,3.
[56] "CNL" # 12:38,3 - 13:29,2.
[57] The drawings of Lise Sass Clemmesen, see Appendix 6.
[58] Niels Vagn Pedersen # 19:09,3 - 21:13,4.
[59] Niels Vagn Pedersen # 21:10,4 - 23:29,9.

found the assignments from the first department, like the sculpture exhibition, too pretentious.[60] At Jørgen Bo's department, she found the assignments more to her liking and more practical, like the sketch assignments of an electrical substation or the semester assignment of an inn.[61] The more holistic assignments, in particular, presented students with a sometimes baffling and unpleasant discovery of the complexity of architecture. As Torben Baltsen recalled from his first assignment:

> *"…We went to Tygstrup-Bavelse to draw a cabin by a lake, and it's a beautiful place, where you can find really dramatic spots […] and then I drew some banal shack on a slope and really got pummelled […] that is basically when I had the realization that there is a lot more to this [architecture] than I had imagined."*[62]

Although the program of a cabin is manageable, it also treacherously entices the student to reproduce the conventional, as Baltsen discovered, and the assignment seems to have aimed for precisely this test of abilities. Whether it is throwing students in the deep end or gradually managing rising complexity, the interviews with the former students suggest that assignments were used (and can perhaps be used even more deliberately) to make students work with complexity management. The realisation that Baltsen made, that architecture reaches out beyond the conventional and representational, is hinged on drawing. The medium for the complex exercises is drawing – and so I shall now turn to summing up aspects of drawing practice that emerged in the interviews.

4.3: ASPECTS OF DRAWING PRACTICE

Whereas the previous sections have focused mainly on more structural elements of practices at the architecture school, this section will highlight drawing practices. Through the interviews, it became clear that there were several different approaches to drawing, and that each presented an insight into how drawing was being used not only as a means of communication, but also as a thinking tool. This did also, however, reveal a dark side of drawing, which instigated uncertainties not only for the students, but also concerning evaluation criteria for drawn work. Nevertheless, there seemed to be no question about the importance of drawing.

4.3.1. TO DRAW OR NOT TO DRAW – THERE IS NO QUESTION

The changing political image in the 20th century not only impacted the structure and the organization of architecture education at the Copenhagen school, but also – and quite directly –impacted drawing practices. Some departments took a theoretical turn; as one of the participants in the survey even described it, one

[60] Lise Sass Clemmesen # 13:19,9 - 14:14,2.
[61] Drawings of Lise Sass Clemmesen – See Appendix 6 and Chapter 3.2.2
[62] Torben Baltsen # 7:41,8 - 8:53,2.

prevalent attitude was in fact that drawing was a practical matter to be learned not in school, but in architectural offices after graduation.

> "*Many of those who made the rebellion in '68 were from the upper middle classes and had gotten a good education in what they called the black school. And, then they said that all of you others, who come in, you do not have to learn all of this drawing – you can learn it out in architectural practice, when you're done. That was one of the attitudes. Even though I was red too, I was still so practically oriented that I wanted an education and I wanted to learn the trade*."[63]

Holmgren in the above also captures, what he perceived to be the hypocrisy of some students, who had already had extensive training in the craftsmanship of drawing, downplaying its importance for others. As his account is attests, this attitude was not shared by all, and none of the participants in the study actually assigned less than pivotal importance to the role of drawing in architecture education. There seems to be no real question about whether drawing is important in architecture education or not. The role of drawing was described as a "*core competence*,"[64] "*very important*,"[65] "*completely indispensable*,"[66] and the "*be-all and end-all*,"[67] just to name a few.

Yet while the participants seem completely in line on the importance of drawing, there are differences in how its purpose – and particularly its most important purpose – was viewed. Drawing does not just serve one purpose and what and how that purpose is viewed differs a little, from leaning more on the communicative to more on the idea generative, as is noticeable in a quote from "CNL": "*[Drawing played a] really really gigantic role, more so even than models. It was the primary sense-making tool, creativity tool and communication tool*."[68] Whereas several of the participants like "CNL" highlight the multimodality of drawing, some put more emphasis on one of the aspects.[69] Holmgren and Frisk, for instance, both put an emphasis on the communicative aspect.[70] Jeanette Frisk points to drawing as both an idea generative tool and a means of communication, but finds the latter part especially important, so that the architect may serve as a medium for a more public discussion.[71] Lis Park, Per Graham, and Carsten Hoff are examples of emphasizing the idea-generative potential of drawing.[72] Kirsten Sander, who finds drawing to be crucially important also brings to attention that it is the sheer ability to draw, and not necessarily the ability to draw beautifully, that is important.[73] Furthermore, several of the participants point to what they perceive as an especially important ability to draw by hand, which for some, even though they have extensive digital

[63] Steen Holmgren # 13:19,2 - 13:51,7.
[64] Steen Holmgren # 38:16,0 - 39:10,3.
[65] Per Graham # 36:55,9 - 37:07,6.
[66] Lis Park # 54:10,6 - 55:53,7.
[67] In Danish: "et og alt" Thomas Ringhoff # 28:07,7 - 30:15,0.
[68] "CNL" # 46:06,8 - 47:30,4.
[69] See also Thomas Ringhoff # 28:07,7 - 30:15,0
[70] Steen Holmgren #38:16,0 - 39:10,3. And Jeanette Frisk #39:04,0 - 39:32,8.
[71] Jeanette Frisk # 39:04,0 - 39:32,8.
[72] Lis Park # 54:10,6 - 55:53,7. Per Graham # 37:07,6 - 38:16,0. And Carsten Hoff # 49:01,1 - 50:04,6.
[73] Kirsten Sander # 46:56,1 - 47:26,9.

drawing experience, still constitute a primary skill, which enables certain qualities, attentions, and operations in the projects.[74] These accounts serve as examples that although a weight was put on drawing generally, the more detailed approaches to drawing could be very varied.

4.3.2. APPROACHES TO DRAWING

The topic of approaches to drawing is in many ways synonymous with that of drawing practices, and the reason that they are worth studying is that they each reveal bits of the drawing epistemology behind them. Rather than studying drawing epistemology from a purely theoretical point of view, the concrete practices give a much more varied and, I would argue, realistic image of how drawing is used in a thought process. In this section, I will highlight a few of the approaches that emerged through the historic interviews.

First several of the participants recounted that they (also in their school years) started from a plan drawing.[75] There are a handful of interesting aspects here. To begin with, this indicates an architectural thinking that is based on space rather than image. The plan suggests movement through space, whereas the elevation, for instance, underlines the visual impression. The plan approach, as will be expanded on in Chapter 8, also has functionalist links, tying it to the polytechnic paradigm or at least to Durand's prescription of always starting with the plan as a sort of cause-and-effect explanation.[76] The thinking behind this is brought into clear view if one considers it in contrast to what Per Graham remembers about one of his friends and fellow student's approach. Namely, Per Graham counters his own approach of plan drawing, with that of one of his friends, who always started by drawing people, and then in the background, slowly, parts of a building would emerge.[77] One reading of this would be the rather obvious fact that the focus is shifted from the functionality of the space to the human experience of it: the human literally comes first. The approach is not too dissimilar to a type of drawing that Thomas Ringhoff remembers using in school alongside plan, section, and elevation, a type that was then called *human situations:*

> "*It has an essential influence for the design of the architecture, as it is a person whose eyes are at around 175 cm of height, who sees into the space and is there. It is not a space for a giant, or a theoretical space. It is a space that I am in…me, and that is actually essential.*" [78]

As described in the quote, there is a marked difference between thinking a design from the point of view of plan and then thinking it from the point of view of a *human situation*, or what one might call *lived space.* In

[74] See for instance "JNLD" # 38:16,8 - 39:29,5, who believes that she can detect the ability to draw by hand as an almost indefinable quality in projects she reviews. Or Thomas Ringhoff # 28:07,7 - 30:15,0, who despite what he describes as an entirely digital practice, would not be able to imagine not sketching by hand in generative phases. Or Kirsten Sander # 13:29,2 - 13:52,3, who considers the extra care and thoughtfulness that the cumbersome process of making analogue drawings produced in her student time more valuable than the digital ability to try different things, perhaps too quickly.
[75] For example Torben Baltsen # 25:39,5 - 26:27,5. Steen Holmgren # 22:05,6 - 22:43,2. Lis Park # 45:13,4 - 45:49,4. And Per graham # 23:20,4 - 24:09,3.
[76] See Chapter 2 (2.2.3).
[77] Per Graham # 23:20,4 - 24:09,3.
[78] Thomas Ringhoff # 18:41,9 - 19:46,8.

most cases, just as Ringhoff did, the two approaches would of course be intertwined, and the project would include both plan drawings and *human situations* (perspectives). Nonetheless, it might be valuable to reflect on what the two approaches offer and how to use them as drawing tactics to develop certain qualities. Other drawing approaches treat the three-dimensionality of a space in drawing without focusing on *lived space*. Steen Holmgren recalled using axonometric drawing often in his student years, an approach in which the measurable overshadows the experiential element:

> "*We also used axonometric drawings, where you look down over it [the project/the building] to understand the spaces, and where it is a measurable drawing but still three[-dimensional]. I almost always used it*."[79]

Holmgren's technique of using axonometric drawings is similar to one described by Carsten Hoff, who recounts that although he did not do it a lot in school, he later developed a fondness of isometric drawing, in order to *look around the corners*. Interestingly Hoff attributes the focus on the interest of *getting around corners* to Steen Eiler Rasmussen.[80]

> "*I very much developed it since the school, it wasn't so used at the time – it was more what you today would call renderings, where you can look down the street […] the isometric view is a way of unraveling a problem […] you get all the way around the house*."[81]

If axonometric drawings are not examples of thinking architecture from the perspective of *lived space*, both are still concerned with space, rather than image. The axonometric drawings are likewise focused on architecture as mass, and on revealing holistic qualities of the building mass that would not be possible to grasp from a realistically situated point of view. As such, and like plan and sections, they reveal unseen connections in a sort of spatial analysis. Drawing what is unseen is a key element in a drawing approach described by Steen Holmgren as *analytic freehand drawing*, where, as he explained,

> "*you draw to see how things are connected. If you draw a chair, then you draw the joints as well. Those parts that you can't see to understand [how it's put together]*."[82]

Holmgren learned this approach from a course, and still recalled having used it often. The *analytic freehand drawing* combines the experiential with the theoretical, by uncovering the unseen.

Still other drawing approaches described were founded instead on more technical motions, concerning scale. "CNL", who took a one-year course in the landscape department, experienced how deliberately working in a particular sequence of different scales brought out new sides of the design problem:

[79] Steen Holmgreen # 26:40,6 - 27:03,3.
[80] Carsten Hoff # 51:41,7 - 53:01,6.
[81] Carsten Hoff # 53:14,5 - 53:51,2.
[82] Steen Holmgreen # 8:46,2 - 9:12,7.

> "*There were long assignments, but also some shorter ones, and then there was the change of scale. You started out in a large scale, then you handed it in and then you were forced down into a medium scale and then into a small scale*." [83]

The sheer change of scale reveals a new dimension of the problem, which in turn necessitates new and more detailed solutions. The change in scale is therefore used as a device to get the student to reflect on the problem in a new light. Namely, a student might be prompted by such an assignment to reflect on what scale different aspects of a problem should be approached in, as different features are highlighted and hidden at different scales – and in consequence become familiar with drawing as a mediating device, laden with certain narratives.

Another participant, "JNLD", who had spent time studying at a department focused on building technology, remembered how what she perceived as deeper work on building was often founded on drawing sections in 1:20, where constructive details would be the main story. [84] This countered her experience from previous departments, where material choices and construction details had been given little consideration:

> "*…a department where it [the project] ends with the shaping of the building, and then in the end the teacher asks what the materials are. And you sit there and think Christ! Materials! Well, then it's probably concrete. […] but actually the construction technology is incredibly important for the form of the building*." [85]

As she expresses it here, "JNLD" ultimately came to see the material and constructive detailing as generative, or at least influential, for the shape of the building; her work with the 1:20 cross-sections in this instance reveals that attitude.

Although brief, the examples here suffice to depict how the material practices of drawing are connected with specific attentions or ways of thinking an architectural design.

4.3.3. THE DARK SIDE OF DRAWING

The examples of the approaches to drawing highlighted in the previous section represent down/to/earth, practicable ways to address both different purposes of drawing, but also discuss how different types of drawing affect what can be "thought" through them, and how this affects the process of doing project work. Although the participants interviewed were highly reflective about their drawing practice and able to connect it with particular foci, they are first of all experienced architects, and not students still trying to make sense of the practices and absorb the skills. Secondly, it was typical that they highlighted one or two

[83] "CNL" # 14:30,9 - 15:53,3.
[84] "JNLD" # 7:45,8 - 8:41,9.
[85] "JNLD" # 7:45,8 - 8:41,9.

approaches as their own, rather than a whole toolbox of them. This could indicate that there is not a strong (or at least not outspokenly strong) tradition of discussing such matters, which might stem from the student years. There is a tendency that at least students educated in the red and black schools experienced that they were not very thoroughly instructed on how to approach drawing, and were left – at least to a degree – to figure out things by themselves. Torben Baltsen recounts how standard drawing conventions, such as how to draw a section, etc., were not really taught by the teachers, but were rather something one soaked up from looking at older students' drawings.[86]

While the independent practice learning described by Baltsen can certainly have advantages –build maturity and independence in learning, among other things – it seems equally to have a dark side that fosters insecurity and bewilderment. Only one participant, Jeanette Frisk, overtly linked the feeling of insecurity around drawing abilities[87] with a lack of systematic and thorough drawing courses.

> "*I wish that [we had had] – again simply some basic stuff – "now we have a drawing workshop for a few days". Where we draw what we say, or "now we have to draw a thought" and then talk about how the drawings were different or what they can be used for […] so that you don't just think that you have to be a natural to be able to work with drawing*." [88]

What Frisk calls for here seems precisely to be instruction in and discussion of drawing approaches like the ones described in the previous section. While Frisk is the only one to call for this so overtly, numerous other participants addressed difficulties with what they experienced as an unstructured schooling, difficulties that might include some of the same insecurities. Moreover, an apparent lack of structure or open discussions regarding topics like this can be expected to create non-transparent and, at worst, arbitrary systems of evaluation. And this represents another shade in the dark side of drawing practices. Some of the architects interviewed, particularly among the younger ones, tell of harsh pin-ups where projects were criticised unproductively, if perhaps fairly.[89] One student from the 1970s even recounts how, blinded by rage and frustration over a professor's unfounded and offensive remarks, she thumped him on the head with a drawing tube during a critique.[90] I will leave this story unverified; in this context, it simply serves to portray the frustrations that the pin-up or critique situations are sometimes reported to have caused because of their non-transparent nature. This topic will be discussed more closely in Chapter 6; but what is in some cases apparent from the interviews is that students could experience critique of their or others' work as unfounded simply because of a lack of open discussion of drawing, drawing aesthetics, drawing

[86] Torben Baltsen #26:47,9 - 27:27,4.
[87] Jeanette Frisk # 32:24,3 - 33:16,2.
[88] Jeanette Frisk # 35:06,5- 36:15,0.
[89] Torben Baltsen # 6:11,8 - 6:55,8. And Jeanette Frisk # 16:14,5 - 17:21,9.
[90] Because of the nature of this particular account, I will not reveal either the student's or the professor's name, particularly as their identities are not the point of the story; suffice it to say that they reconciled years later, with an apology from the professor.

epistemology and how these affect the architectural project both positively and negatively. In the words of "CNL":

> ""*If you have to be critical: there were also some, who were very good at drawing, but who I don't think had any particularly keen understanding of the spaces that they drew. They made insanely beautiful graphics, which couldn't help enthral all who saw it, and then in reality you didn't really look at what was behind it*."[91]

In the remark, there is more than a faint echo of Durand's warnings against the charms of drawing; but one does not have to possess a similar scepticism towards drawing or aesthetics to catch the imprudence of the situation described. Contrary to Durand's scepticism towards drawing, Torben Baltsen as a student experienced his teachers as sceptical of the abilities of students with construction management backgrounds. According to Baltsen, the teachers found it necessary to shake these students out of the comfort of their technical knowledge, which they saw as a hindrance to creative and artistic design work, by harshly critiquing their work.[92] The problems highlighted here as the dark side of drawing are close to the perspectives of the research questions posed in Chapter 2: "How are evaluation practices possible?" and "How do you teach the special kind of thinking that you practice through drawing?" The latter perspective, particularly, seems to be at play in Baltsen's narrative about the construction managers in architecture school. The teachers might not have been wrong or entirely unfair; more likely they lacked the capability to explain what it was they were looking for in the drawings, and how to steer students in those directions more directly.

4.3.4. THINKING HANDS, PENCILS AND THE IMAGE OF THOUGHT

What I have called the dark side of drawing is linked, in the narratives of some of the participants, to what is also referred to, at least by some, as the point of drawing, which again refers to the generative potential of the drawing or the ability to use it as a thinking tool. Jeanette Frisk recounts, not without frustration, how she used to watch her teachers think with their hands in drawing:

> "*Sometimes I just sat there and watched [the teacher drawing] and thought 'Wow' And then quickly you [the teacher] would just badabing [draw something out]. [And I thought] I'll do that as well, I can learn from that how to think with the hand*."[93]

Nevertheless, Frisk did not find that the close observation of a teacher drawing to a reasonable extent actually taught her how to do it herself – which is why she links this to a dark side of drawing. Of course there is not inherently something negative in a dark side. The reason that I find the notion of the dark side so apt is that it can also mean that things are simply obscured, difficult to see or grasp clearly. It is a process of

[91] "CNL" # 46:06,8 - 47:30,4.
[92] Torben Baltsens 36:38,4 - 37:39,1.
[93] Jeanette Frisk # 34:17,1 - 35:07,6.

uncertainty, and therefore, at its core, also difficult to teach. Carsten Hoff describes how, for him, drawing with respect to *form-giving* can be described as searching with a pencil.

> "*It's seeking and finding […] seeking with the pencil […] You develop this - what should one call it - unreflected connection between the brain and the hand. So you think with the pencil, […] there is just a direct connection between what you imagine and what you draw*." [94]

The participants' descriptions of thinking hands and the pencil's direct connection with the brain are not unconventional in architecture. The Finnish professor of architecture Juhani Pallasmaa, for instance, draws up this view in a book called *The Thinking Hand*. For Pallasmaa, "*It is often the act of drawing itself, the deep engagement in the act of unconscious thinking through making, that gives rise to an image or an idea*." [95] Pallasmaa's central argument in the book is how the hand – that is, the process of embodiment – is essential in the creative and material process of making architecture. According to Pallasmaa, and similar to Hoff's description, the process is an unreflected, open hunt for ideas. In one example, Pallasmaa refers to Finnish architect Reima Pietilä, who compared the design process with hunting and fishing – one is never certain when or if one will catch something, or indeed what.[96] What Pallasmaa emphasizes is the playful, open-ended character of *searching with a pencil,* which is certainly important, but also lays bare one of the problems with Pallasmaa's approach. It does not give much in the way of *how* these essential abilities are learned, however appealing it may be in all of its romantic artistry. On the contrary, there is almost an underlying view that expertise is an enemy of creative drawing skill, as Pallasmaa quotes poet and essayist Joseph Brodsky: "*experience and the accompanying expertise are the maker's worst enemies."*[97] And that approach risks leaving the student in a position like the one Frisk described, where learning becomes inaccessible to those students who do not magically or luckily grasp the trick by osmosis. As such, the approach is furthermore a peril for invigorating *the idea of the genius*, which must be said to be both exclusionary and harmful for the aims of education.

This does not have to be so, however. For even if one accepts the vague and undefinable nature of the ability to draw and design well, there is still –to return to the fishing metaphor -plenty to learn, and much that experience can teach you. There is the mastery of tools, the knowledge of what bait attracts what fish, experiences with patterns of seasonal behaviour, etc. And therefore, while methods or expertise might not be all that is required for creating good designs, they are likely to be a good foundation, particularly from a craft perspective. As Lis Park explained, drawings become images of one's thoughts, images that rely on the readiness-to-hand of the drawing tool. For her, drawing is important

[94] Carsten Hoff # 46:20,1 - 48:47,0.
[95] Pallasmaa, *The Thinking Hand*, 92.
[96] Pallasmaa, *The Thinking Hand*, 72-73.
[97] Pallasmaa, *The Thinking Hand*, 79-80.

> "*…so that you can bring your thoughts, your ideas, to life, make them into images […] It's like you are shaping it, right. That's what you do with drawing. Drawing is a tool for … visualising your thoughts and I don't think that you are able to draw that which doesn't exist before you are ready and have practiced drawing what does exist. The tool has to be present like the claviature is for a pianist*."[98]

Here Park is convinced that practice is not the enemy of creative ability, but is instead the foundation for it. It is the pianist's experience and skill with the piano that would enable not just playing from the leaf, but also improvisation. Assuredly, not all skilled pianists are brilliant at improvisation; but on the other hand, no one who is not a skilled pianist is so. This example cuts what is otherwise a profoundly interesting question a little too roughly, and needs much further elaboration, as will be provided at least somewhat in Chapter 7. What the empirical examples from this chapter may provide, particularly the approaches to drawing in section 4.3.2, are recollections of practices and knowledge that could methodically form the basis for the creative leaps. Before moving on to discuss and analyse some of those questions arising on the basis of this material, I will now present the final empirical chapter, that is not as wide as the two previous ones, but which seeks to dive even deeper into the practice of first-semester students in a contemporary context.

[98] Lis Park # 54:10,6 - 55:53,7.

CHAPTER 5:
ARCHITECTURAL BEGINNINGS - *TAKING PLACE*

In the fall semester of 2014, I did ethnographic fieldwork at a first year program at The Danish Royal Academy of Arts, Architecture School (KADK). The fieldwork was exploratory in nature, but had two particular points of interest. First, and as mentioned in Chapter 2, the Architecture School had changed its organization and curriculum quite radically by the fall of 2014, and had just introduced a new teaching structure. Second, I was especially interested in the first-semester students, as I hoped to gain a better understanding of drawing epistemology at its very beginnings. First-semester students are transitioning into the practice field of architecture, and for many of them, they are facing the question of what it means to do what architects do, and learning how to think through drawing, for the very first time. Although first-semester students are just learning the ropes, so to speak, and might be ignorant and unskilled in many of the practices of architecture, they also can offer valuable insights from the threshold of architecture. In their transitory state, they are perhaps more keenly aware of aspects of practice that soon become, even after only a short period of schooling, so "natural" that they are easily missed. As mentioned previously, this case study uses Shaffer's three analytical distinctions between 1) surface structures, 2) pedagogical activities and finally 3) epistemology to structure its analysis.[1]

Following the 2014 reform, as described in Chapter 2, all students entering the architecture school in Copenhagen must first follow a six-week course, following which they choose their BA program. For my fieldwork, I followed the BA program *Taking Place*, held under the institute IBK – Architecture and Culture. According to the description from the IBK website, *Taking Place* "*provides a fundamental insight into architecture as a culturally creative and socially relevant discipline.*"[2] I did in-depth interviews with six students from *Taking Place*, interviewing each twice; I also conducted interviews with their teachers and the program leader, and observed their critiques, desk crits, and general work. Before my fieldwork at *Taking Place*, I had also followed the introductory six-week course not only in order to observe the entirety of the first-semester curriculum, but also for the practical reason that as the students had not yet chosen their program, I could not follow specific students through the six-week course. For this reason, the structure, didactics, and content of the six-week course are mainly discussed in Chapter 2.

The BA program *Taking Place* was also referred to as BBK (*Bachelorprogram i Bygningskunst og Kultur*, "BA Program in Architecture and Culture"). During the first four semesters, the students were divided into two classes per year, which in the first semester were labelled BBK1A and BBK1B. The six interviewed

[1] Shaffer, "Learning in Design", 103.
[2] "Taking Place", KADK, Accessed May 27, 2019, https://kadk.dk/en/programme/taking-place

students were distributed evenly between these two classes, and were evenly distributed in regard to gender as well. Their identities have been anonymised (though they were made aware that their identities might be deduced, for instance from the drawings, which the majority wished reproduced with their real name). In this chapter and for subsequent reference, however, the students are given pseudonyms in order to preserve their identities as persons. Mark, Diana, and Leo attended BBK1A, and Miriam, Jane and Lukas attended BBK1B. Leo had completed a Bachelor's degree of Architectural Technology and Construction Management before beginning his architecture studies; Jane, Lukas, and Miriam all had studied at universities before starting their architecture degrees.

I interviewed Anne Romme, who was both the *Taking Place* program leader and a teacher in BBK1A, and Tine Bernstorff Aagaard, who was a teacher at BBK1B. Apart from these interviews, I carried out observations on October 13, which marked the beginning of the semester, and then again on October 15 and 20, November 4 and 13, and December 10 and 12.[3] In addition, I attended and carried out observations at the first pin-up on October 31, as well as at the final pin-up on January 26, 2015 – both for BBK1A.

5.1: SPACE, TIME, AND PROJECTS - *TAKING PLACE* SURFACE STRUCTURES

5.1.1 SPACE

The BA program *Taking Place* resides in a converted seaplane hangar. It is a large, striking building with a characteristic barrel-shaped roof and large windows with white painted transoms. It is situated around a kilometre or 15 minutes' walk away from the rest of the Architecture School's buildings. From the very beginning, even though it was the first semester it was running, *Taking Place* housed 1st, 2nd, and 3rd year classes, with the 1st and 2nd year groups subdivided into two units each. The hangar was a large open space with little glass cubes, or rather towers, holding offices and a couple of smaller rooms. On either flank of the building, there were offices for researchers as well as some toilet facilities. The space was otherwise almost entirely open-plan, equipped with large white curtains as room dividers.

Space was relatively tight in the new setup, and the open plan setting provided some challenges. Thomas Bo Jensen, who was the vice head of IBK in 2014, in the common introduction to the students humorously launched the "slippers-rule", which banned hard soled shoes, especially stilettos, the slamming of doors, and prescribed a *culture of quietness* and the wearing of slippers![4] As you entered the building through the rather industrial-looking door, there was a secretary's office in the "glass tower" in front of you, just a few steps down. Above the secretary's office and overlooking the space was the office of Anne Romme,

[3] See Appendix 7 (In Danish) for all referenced interview transcripts, fieldnotes, images and drawings.
[4] Fieldnotes, 13th October 2014.

FIGURE 5.1: Getting Started.
Images fr notes Oct 9th-20th
Taking Place, KADK, 2014.

head of the *Taking Place* program. Behind yet another glass tower, there was a very long lunch table, and modest kitchen facilities to the right of the room. The relatively large space suffered from a lack of wall space or space for exhibition, particularly for pin-ups, as Anne Romme had hoped to have enough room to put up all of a class' projects beside each other.[5]

The enormously high-ceilinged open space had been split into smaller sections using large wooden bulletin boards. The first-year students were placed in rows to the right of the entrance, shielded slightly by the large wooden boards. Each had an assigned desk, a small cupboard under the desk, a chair, and a lamp. That students are each assigned a desk and the kitchen facilities in the hangar is common at KADK, and supports the culture in which students spend long hours at the school rather than working from home, as is usual in many other forms of higher education.

5.1.2 TIME

The long study hours do provide a difficulty for some of the students. Generally students are expected to work from 9-17 each day, but this is not easy to reconcile with a job, which for many is necessary as a supplement to their state-sponsored student stipend.[6] Most of the study time at the *Taking Place* was organized as individual work, with the characteristic desk crits a couple of times a week. As a supplement to the studio time, the BA program had created what they call salons and workshops.[7] The workshop for the first semester students centred on drawing, and took place on Friday mornings (BBK1A: 9-11 and BBK1B: 11-13). It was taught by Anne Romme. Every second Thursday, from 15-17, the program organized so-called "Salons", which for the first and second semester had the theme Architecture and Language. These were less formal lectures on a variety of topics, followed by a discussion among the students and the lecturer. Following each Salon, the students wrote a short text discussing or accounting for a theme or aspect of the topic that they found interesting. At the end of the semester, these texts were gathered and rewritten into a coherent essay.[8]

There were also activities involving the entire BA-program. All cohorts participated in a study trip to Venice from 25th to 28th of October (supplemented by trips to Vicenza and the Brion-Vega Cemetery for BBK1A and –B). Furthermore, on Tuesday afternoons there was a lecture series and film club. Prominent practicing architects, such as Jan Gehl (Gehl Architects), Lene Tranberg (Lundgaard and Tranberg) and Kim Herfort Nielsen (3XN) gave the lectures.[9] The aim was quite clearly to connect the beginner architects with

[5] Anne Romme #31:30,4 - 33:44,8.
[6] As recounted by Jane 1 #6:20,9 - 6:54,7
[7] Anne Romme # 5:15,0 - 6:13,8
[8] KADK. Taking Place, Årsplan [Year Plan], 25; Anne Romme # 9:26,6 - 10:04,4
[9] The full list was: Jan Gehl (Gehl architects), Lene Tranberg (Lundgaard og Tranberg), Louis Becker (Henning Larsen Architects), Jen Thomas Arnfred (Vandkunsten), Dan Stubbergaard (Cobe), Dorthe Mandrup (Dorthe Mandrup arkitekter), David Zahle (BIG), and Kim Herfort Nielsen (3XN) – Fieldnotes 13th October, 2014, Image 15.

actual architectural practice – although not in a practical sense. The film club held viewings of four movie classics: Woody Allen: *Interiors* (1978), Stanley Kubrick: *The Shining* (1980), Wong Kar-Wai: *Chungking Express* (1994); Peter Greenaway: *The Belly of an Architect* (1987). Noticeable is perhaps that these movies cover quite a slim period (from 1978–1994: not even 20 years), and that the newest is 30 years old! The aim seems to have been a cultural formation of students within the visual domain. It should be noted that, because of the six-week/twelve-week structure, the semester was relatively short: it started only on October 13, 2014, and ended on January 26, 2015.

5.1.3. PROJECTS

The first semester was structured as a series of connected yet separate tasks or prompts presented to the students. The structure of the curriculum combined links between assignments, adding a new element every time, with considerable focus on different material approaches: first plaster casts, then drawing, then wooden models, then digital models, etc. The two classes BBK1A and BBK1B followed approximately the same phases, but had different tasks underway.[10] The tasks or subprojects introduced the students to different media and tools, and were believed to do more than teach the new students a range of techniques that they could later on, perhaps, apply more freely in their individual project work; they also seem to have centred on a notion of material mediation, where each change of media gives something slightly different to the project, opening up certain possibilities and closing off others. This will be taken up in Chapter 7.

FIGURE 5.2: First phase. BBK1B
Image from fieldnotes Oct 20th
Taking Place, KADK, 2014.

FIGURE 5.3: First phase. BBK1A
Image from fieldnotes Oct 20th
Taking Place, KADK, 2014.

FIGURE 5.4 First phase. BBK1B
Image from fieldnotes Oct 20th
Taking Place, KADK, 2014.

For both BBK1A and BBK1B, the first phase was to make plaster casts. BBK1A worked with the Brion-Vega cemetery by Carlo Scarpa, first studying photos and drawings, and subsequently planning and constructing moulds and models. BBK1B, who worked with Palladio, studied ideal plans of several of his villas and

[10] Tine Bernstorff Aagaard # 12:29,2 - 13:06,9.

constructed their moulds and models from those. This phase ran from October 13 until the beginning of the study trip.

FIGURE 5.5: First phase.
Image from fieldnotes Oct 9th
Taking Place, KADK, 2014.

FIGURE 5.6: Second phase. BBK1A
Image from fieldnotes Oct 31st
Taking Place, KADK, 2014.

FIGURE 5.7: Second phase. BBK1A
Image from fieldnotes Oct 31st
Taking Place, KADK, 2014.

The second phase was the study trip. Here the students worked with large analogue drawings on 2m x 2m sheets of paper, which were used to "map," respectively, Palladio villas and architecture in Vicenza, Italy and the Brion-Vega Cementary in San Vito d'Altivole, Italy.[11] The large sheet of paper was folded into squares of 40 x 40cm, making it more portable. For the BBK1B class, there did not seem to have been much work done on the map after they returned home, whereas the BBK1A class added new layers to the map continuously. After adding a second layer consisting of an acetone print of their digital Rhino drawings, they finally worked the two layers into more of a whole.[12]

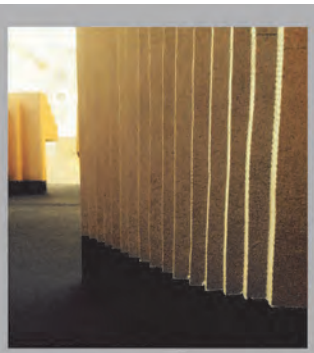


FIGURE 5.8: Fourth phase. BBK1A
Image from fieldnotes Nov 4th
Taking Place, KADK, 2014.

FIGURE 5.9:Third phase. BBK1B
Image from fieldnotes Nov 4th
Taking Place, KADK, 2014.

FIGURE 5.10: Third phase. BBK1A
Image from fieldnotes Nov 13th
Taking Place, KADK, 2014.

[11] See photos and a short blog post from the days at the cemetery at "Brion Vega Cemetery", KADK, Accessed May 27, 2019. https://kadk.dk/en/blog-programmet-finder-sted-taking-place/brion-vega-cemetery-carlo-scarpa
[12] Diana 2# 23.13,2-25.16,8.

In the third phase, BBK1A made wooden copies of their plaster models, which had to be contained within a 40 x 40 x 40 cm cube, whereas BBK1B made a second plaster cast, also 40 x 40 x 40 cm, based on a selected area or feature on their map. Some chose to make nearly exact copies of features measured on the trip, whereas others put different features together and abstracted from their maps.[13]

FIGURE 5.11: Fourth phase. BBK1A
Image from fieldnotes Nov 4th
Taking Place, KADK, 2014.

FIGURE 5.12: Fourth phase. BBK1A
Image from fieldnotes Nov 4th
Taking Place, KADK, 2014.

FIGURE 5.13: Fourth phase. BBK1A
Image from fieldnotes Nov 13th
Taking Place, KADK, 2014.

In the fourth phase, BBK1A students were asked to reshape their model using words or concepts. Mark, for example, was given the words “skidding” and “distortion”, while Leo worked with the concepts of “interconnection” and “breakage”.[14] BBK1B made their first axonometric drawings in 1:1 scale from their second plaster model.

FIGURE 5.14: Fifth phase.
Image from fieldnotes Dec 10th
Taking Place, KADK, 2014.

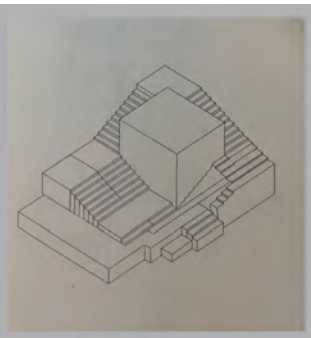


FIGURE 5.15: Marie Øst Vejbæk
”Digital Model ” Student work,
Taking Place, KADK , 2014.

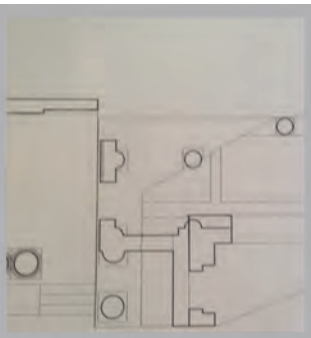


FIGURE 5.16: Josephine Saabye
”Detail of Plan.” Student Work.
Taking Place, KADK, 2014

[13] Tine Berstorff Aagaard # 19:07,1- 20:00,2
[14] Leo 2 # 50:36,6 - 51:01,1. Mark 2 # 57:05,0 - 57:29,7

In the fifth phase, both BBK1A and BBK1B had a three-week digital drawing course, which the teachers integrated into their project work by letting the students build their models in Rhino, following which they used both their own models and those of their classmates to create gridded city-combinations.[15]

FIGURE 5.17: Sixth phase.
Image from fieldnotes Dec 12th
Taking Place, KADK, 2014.

FIGURE 5.18: Marie Øst Vejbæk
"Photograph of model" Student work,
Taking Place, KADK , 2014.

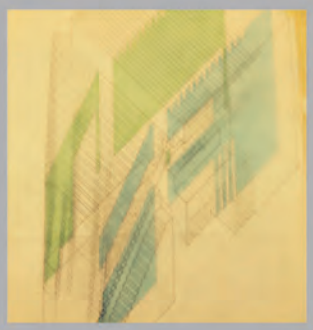


FIGURE 5.19: Sixth phase.
Image from fieldnotes Dec 12th
Taking Place, KADK, 2014.

For the sixth phase, the BBK1B students' task was to add a substantial wooden structure to their plaster model, so as to complement or challenge it. In BBK1A, students worked with their first axonometric drawing of their wooden model.

FIGURE 5.20: Final phase. BBK1A
Image from fieldnotes Jan 26th
Taking Place, KADK, 2015.

FIGURE 5.21:Final phase. BBK1A
Image from fieldnotes Jan 26th
Taking Place, KADK , 2015.

FIGURE 5.22: Final phase. BBK1B
Image from fieldnotes Jan 26th
Taking Place, KADK, 2015.

In the final phase before the final semester pin-up, students from BBK1A were given a scale of the model city 1:20 and an abstract program to think and draw into their project. Diana worked with creating a "city landmark", or tower, Leo with "seclusion", and Mark with "passage".[16] Students in BBK1B worked on a second axonometric, but Tine Berstorff Aagaard also recounts that they ended up letting the students do

[15] Tine Berstorff Aagaard # 20:01,4 - 21:14,3
[16] Fieldnotes 26th of January, 2015 and Leo 2 # 34:55,5 - 35:43,2.

what fit their individual projects most.[17] Jane, for instance, recounts how she got stuck in the final phase, and that it was only through working in Rhino that she resolved her problems.[18]

None of the phases was actually completed before the end of the semester, although the students reported different experiences of how much they continued to work on particular material. The BBK1A class students, for instance, were still altering the large map created in phase two in December, one month before the semester ended. The build-up in different phases is believed to scaffold the students' process by only opening a small new field at a time, but the tasks' open-endedness is said to dovetail with the students' ability to build up systems of reference and form-language across different media, as well as to distract the student from simply reproducing conventional building forms. In his first interview, Mark reflects on this, or at least on how the arrangement of tasks ended up steering his project to another end.

> *"… we have had our first semester project, where I think Anne and Maria have run a very particular structure of putting up one obstruction [task/problem, Danish: benspænd] at a time. Built up and built up. We started out doing plaster casts based on pictures from the Scarpa cemetery, where we had no clue what it would end out as. Then we visited it and drew it and came back and made it [the plaster model] in wood – made a copy in wood. And then we were given the task at we should implement some words into it, and reshape it, and then we made it in Rhino. We kept putting more and more on and so we added a program and so on and so on. But if we had been told from the beginning that now we have to make a plaster model which eventually will be the basis of a building in 1:20 in a "city" that we make using this grid – then we would have probably made it differently."*[19]

Apart from the structure of the semester project, the theme of the semester – the concrete and the abstract[20] – also plays into the strategy. The concrete refers to the concrete tasks or prompts, or the concrete techniques, arranged in such a way that they give room for a much more abstracted form-giving and creative process. Consider also the abstract nature of the programs given to students in BBK1A in the final phase of the project. None was asked to design a community center, a bank, or a residential structure; none of the programs given was functional, but was related mainly to form, or at least was only very abstractly functional. The structure of the semester projects alone thereby reveal a pedagogical strategy that aims at training the students' perceptual and creative abilities while simultaneously giving them concrete tool skills.

[17] Tine Bernstorff Aagaard # 22:06,8 - 22:43,8.
[18] Jane 1 # 25:27,6 - 26:24,5.
[19] Mark 1 # 3:18,3 - 4:36,8.
[20] KADK. Taking Place, Årsplan [Year Plan], 21

FIGURE 5.23: Daily life and desk crits. Images fr notes Dec 10th *Taking Place,* KADK, 2014.

5.2: DESK CRITS, PIN-UPS AND PEER LEARNING – PEDAGOGICAL ACTIVITIES

There were multiple pedagogical activities in the program studied, but three have been selected for study here because they were deemed not only generally well-established in architectural education, but more importantly *characteristic* of architectural education and therefore of particular interest. These are the desk crit, the pin-up and peer learning.

5.2.1. THE TECHNOLOGY OF THE 'DESK CRIT'

Desk crits, known in Danish as "tegnebordsundervisning", are seen as one of the hallmarks of architecture education. It might be argued that this pedagogical activity is the most differentiating factor between architectural education and other, more conventional types of education. The closest equivalent could be tutoring or supervision in universities; but that is most often carried out in groups, or just for the final project. The structure of the desk crit is reasonably simple: approximately once or twice a week, the teacher/teachers circulate among the students in the drawing studio and sit down and chat with them about the progress of their project.[21] The desk crit is described as both an event of positive revelation of new paths in the project and a frustrating endless series of questions and unproductive ambiguity:

> "*They ask a lot of questions about the choices you have made and why. It's a really good way of getting your own reflections thought through […] and sometimes it works. Sometimes it is really motivational and gives you a lot for the next step in the process, and at other times it can be insanely inhibitory and afterwards you just ask yourself: 'Well, what does that mean, and where do I go from here?'*" [22]

Teachers seem to be aware of this challenge. Indeed, the program leader spoke of the difficulty of having to structure the amount of time that could be spent on individual students' desk crits so as not to overwork the teaching staff or build up delays for waiting students, but at the same time ensuring that the participants did

not leave before there was a certain resonance for what had been discussed and a hint of optimism.[23] The length of the desk crits are reasonably short. Anne Romme did not wish to put a specific duration on it, but Tine Berstorff Aagaard, the interviewed teacher, discloses that she tries to keep it to a maximum of 20 minutes, because it is her experience that the high level of concentration that is required of the student will not stretch much further.[24] The desk crits at *Taking Place* were carried out in a dynamic fashion: the two teachers were not assigned to specific students, but shared the teaching responsibility, enabling the students

to receive different opinions and perspectives on their work.[25] The desk crits were sometimes organized according to a list, where the students could sign up if they wished to speak to teachers. However, only one

[21] Anne Romme # 26:53,5 - 28:39,0 and # 30:09,8 - 31:23,8. Diana #5:58,0 - 6:37,0. Leo 1# 9:23,7 - 9:50,3
[22] Jane 1 #14:41,7 - 16:36,5.
[23] Anne Romme #28:56,7 - 30:07,7.
[24] Tine Bernstorff Aagaard # 36:41,4 - 37:47,8. Anne Romme # 28:56,7 - 30:07,7.
[25] Anne Romme #30:09,8 - 31:23,8. Jane 1 # 14:41,7 - 16:36,5.

student mentioned that this was a regular occurrence[26]; others described the practice, conversely, as self-driven, in which the teachers would spot students who look like they need advice.[27] The self-driven character of the format also means that students could control how much they sought their teachers' advice.[28] One student claimed that she had only had a desk crit once or twice during the twelve weeks of her first semester; instead, she had leaned heavily on peer feedback.[29]

The dialogue that is the center of the desk crit takes place as the student presents his or her drawings or models, and usually centers around the work produced and what direction it is taking.[30] Anne Romme in this regard underlined that in her view, it is important that the discussion happen on the basis of a material production, and that the material should also "speak for itself".

> *"…on the other hand I don't have the patience for very long explanations that I can sense are mostly a type of "filler" […] it's my job to read it [the drawing] - of course I need to be cued in on what it is […] if I misunderstand it [the drawing] then it's actually in a way good or better to discover that I misunderstood it."*[31]

There are of course many different individual styles of educators. Some practice drawing on the students' drawings as an occasion to demonstrate certain strategies; other educators take a more academic or contextual interested, spurring the students to think about how their work positions itself within a tradition; still others favour a technical or practical approach. Some of these approaches are also utilised by the same educator in different desk crit situations.[32] Tine Berstorff Aagaard highlights that she is more practical in the first semesters, to help students to the production of the material that forms the basis of the guidance:

> "*In first year, I'm not particularly scared of having to sit with them […and] meet them in very down to earth practical matters. I think talking can become so airy. It can go totally over their heads. […] we can talk to the end of infinity, but if nothing gets down on the table [is produced] then it's really just talking.*"[33]

Whatever the approach of the educator, students' narratives indicate that they use the teachers to help them spot potentially new dialogues with their material.

> "*The last desk crit I had before the semester critique, there was a time where I had doubts about what to do and I had cut up some wood in the same thickness as the steps of my staircase, and just placed them a little randomly, because I actually needed them to fill up a volume, to build something else. And they came over and*

[26] Miriam 1 #11:25,4 - 11:59,5.
[27] Lukas 1 # 14:33,4 - 15:07,9. Mark 1 # 11:06,6 - 11:26,9.
[28] Tine Bernstorff Aagaard # 31:48,2 - 32:36,0.
[29] Diana # 9:14,1 - 9:39,0.
[30] Mark 1 # 11:26,9 - 12:30,5. Miriam 1 # 11:25,4 - 11:59,5. Anne Romme # 26:53,5 - 28:39,0.
[31] Anne Romme # 26:53,5 - 28:39,0.
[32] The two teachers interviewed both like to draw as they talk to students, but highlight that this approach is contested among colleagues. Tine Bernstorff Aagaard # 35:34,8 - 36:41,4. Anne Romme # 26:53,5 - 28:39,0. Anne speaks of the importance of referencing whereas Tine Bernstorff Aagaard recounts that she sometimes deems it necessary to take a very practical approach with particularly new students. Tine Bernstorff Aagaard #34:32,1 - 35:34,8. Anne # 28:39,0 - 28:55,7.
[33] Tine Bernstorff Aagaard # 34:32,1 - 35:34,8.

> *looked at it and said: 'this works pretty well, Miriam. And then you perhaps could do a little like this and this …' and then when we stood there with it together it became this weird ping-pong, where they say something and it opens up new things for me, so that I suddenly see something [else].*" [34]

Even as the opening of new paths is seen as positive and helpful, it also requires the students to be selective and determined in their choice of what interests to pursue in the material:

> "*You always have your project turned completely upside-down after you have had a desk crit […] so you get a bunch of paths, and there you have to be selective [… and] seek to stand by one's project, seek to control it a little.*" [35]

Some students point to that it is tempting, but not fruitful, to look for confirmations of your work and the way it is progressing from the desk crits:

> "*Sometimes you can look for confirmation that you are on the right path, but that sort of confirmation can also limit you. […] I don't think you should look for concrete answers from your desk crit. It's more getting some ideas that build on your own ideas. When that happens I think it's best.*" [36]

Again, a balance seems to be favoured between the teacher's helping to open up the dialogue with the material and letting that dialogue still be guided by the student's individual interest.

5.2.2. THE PIN-UP

The architecture school pin-up or jury critique is as infamous as it is a mainstay in architecture education. The practice at *Taking Place*, KADK, is no different. The pin-up can be more or less formal: sometimes it is simply the regular teachers attending, and at other times, typically at the end of a semester, guest jurors – usually esteemed teachers from other departments – are invited in to participate. What happens is that students first hang up their drawings, present what their thoughts and processes have been, and then receive comments from the invited jury members in front of the rest of the class. In theory, the rest of the class can participate and comment on the work as well, but that is unusual, at least for the more formal pin-ups.

> "*You put up this board and then you have to communicate your project very briefly, because it should also be able to speak for itself. So you tell about the process you've been through and then afterwards you are critiqued. That is, you are asked questions [about the project] and receive comments on what is working and what is not.*" [37]

As the student accounts for in the above, in the pin-up situation there is also an emphasis on the material. The material "should be able to speak for itself", that is, be comprehensible for an expert outsider without

[34] Miriam 1 #15:07,0 - 16:15,6.
[35] Mark 1 # 10:08,1 - 11:00,7.
[36] Diana 1 # 6:47,0 - 7:51,0.
[37] Lukas 1 #16:49,8 - 17:25,8.

too much explanation being needed. (This theme will the taken up in the epistemology section.) Interestingly, the student here also discloses that he views the pin-up as a simple judgement – is it working or not – a question that is likely to be much more nuanced and difficult to answer. (This, too, will be discussed further in Chapter 6.)

For Anne Romme, it is of value that all or as many drawings as possible are exhibited side-by-side so that connections, similarities, and differences between projects can be discussed, and the individual project is not presented in a vacuum.[38] Both she and one of the students recount how they use the room filled with drawings to select interesting drawings that attract attention and then discuss them first.[39] There seems to be an interesting collective pedagogical strategy behind this:

> "*It is so important that you can cross-reference all day, and scold those who need to be scolded. The work critiques itself, because you can see it, and you know.*"[40]

The account here suggests that in direct comparison with the projects of peers, the evaluation of them becomes more tangible, easier to grasp for the students, who are in turn believed to comprehend the evaluation better. It can also be seen as an establishment of a practice community among the students and their entry into it, in keeping with the findings of Lave and Wenger, and also Shaffer.[41] There are doubtless many good lessons to learn from such situations, which, as one student points out, do not seem far removed from the reality that awaits the students in real architectural practice, where projects must be presented for sale and will be compared directly to other projects in competitions. However, the pin-up does of course also present a rather vulnerable situation for the students:

> "*I've always enjoyed or actually thought it was fun to do presentations […] But you are incredibly vulnerable – very exposed. I think though that it's good practice for what you'd imagine comes after [architecture school]. When you have to present your projects, or all of a sudden persuade someone to actually build this house.*"[42]

The danger of a pin-up, apart from the sensitivities that their exposed structure can lay bare, is connected with the experience of subjective or unrelated evaluations in the situation. A student shares her experience from the final pin-up of the semester:

> "*The first juror was curious and positive about the assignment, whereas the last one was more sceptical towards the assignment. And that ended up being reflected in how all of the presentations and everything went. I actually thought it was a shame, because his scepticism meant that you never really got feedback on your work […] I think you can expect a bit of everything in such a pin-up. Because some out here are quite some characters, and it depends on what they think.*"[43]

[38] Anne Romme# 31:30,4 - 33:44,8.
[39] Anne Romme # 31:30,4 - 33:44,8. Mark 119:19,9 - 20:07,3.
[40] Anne Romme # 31:30,4 - 33:44,8.
[41] Cf. Lave and Wenger, *Situated Learning.* See also Shaffer, *Learning in Design*, 120.
[42] Jane 1 # 19:02,5 - 20:51,9.
[43] Diana 1 # 12:27,0 - 13:17,0.

Needless to say, the student quoted above did not have a positive experience at the pin-up. Her story indicates that she did not feel evaluated on the grounds of her project, but rather on the personal opinion of the juror on the merits of the task that the class had been given.

5.2.3. PEER LEARNING

Although it is not a pedagogical activity per se (at least not one visibly organised by the teachers), the deep influence of peer learning in the *Taking Place* program should not be overlooked. Peer learning supports a varied field of subjects, ranging from drawing aesthetics, technical issues, and creative process work all the way, as highlighted by one student, to the ability to communicate your project and your ideas: informal training not only for upcoming desk crits and pin-ups, but for communication in architectural practice.

> "*… using each other to explain about [the project], and that's what you have to be able to do – also in the end at your final pin-up. You have to be able to explain your project. And it has to be meaningful to others. So that's where you can really use each other, I think. Talking and pitching your projects to one another*."[44]

In *Taking Place*, peer learning is a rather self-organised activity, but it is supported by some of the surface structures as well as encouraged by the teachers. The fact that all students have a desk at the seaplane hangar, and that most students spend long hours every day in the studio, is the structural basis allowing peer learning to occur: "*I think we are good at using each other [as support], and it's also important, because we are here all the time and the teachers aren't here that often*."[45] A more organized element of peer learning is the open feedback in the pin-up situations, as mentioned in the above section. Even if all of the drawing material is not put up at the same time, there were always several projects displayed together, and the presentations, as well as the feedback from teachers and other jury members, are given in front of the entire class. Although it might in some cases have adverse effects – probably more so at the beginning of the students' education – the public form of feedback, which is very common in architectural education, supports the idea that the class is a group who support and learn from one other, which is what the teacher in the below account is seeking to mobilise.

> "*At a pin-up once, one of the students put up a piece of paper. A tiny A4 sheet. He was really good at talking about his project, but there was nothing there. So, I told him "This drawing is something that you did in 20 minutes – it cannot be that you haven't had time to do more. Where is the rest of you things?" Then, he breaks down, right, because there is this huge barrier. You can be afraid of showing your things, because there is a great expectation and you're completely new to the field of architecture and then there is an entire class there. But they are a team, right, and they are there for each other and new to this and there is room for that. There has to be room for taking these little steps and exploring in this forum. And so, I turn around to the other students to mobilise their support. To say "listen, we are here for you and this is a safe place." To mobilise the*

[44] Jane 1# 13:53,5 - 14:33,9.
[45] Miriam 1 # 20:03,4 - 20:14,5.

> *whole class so that they are not alone with their problems. And it's not just me and the student, but there is some sort of [collective] obligation*."[46]

The pin-ups ensure that the students are familiar with all of their classmates' work. And hearing the teachers and jury members' feedback, not just for their own project but for other projects as well, affords the students a progressive understanding of the norms in the practice community that they are entering. The work or interests of their peers might also simply inspire them, whether on a practical or technical level or on a more conceptual level. Outside of the pin-up situation, self-organised peer-learning is regarded as both a safe and a productive space, because the students engage with other students in the same situation, doing the same assignment as they are.[47] For some students, this leads them to feel open to discuss things with their peers that they would not discuss with teachers. Mark recounts how he differentiates between questions that he would ask peers and questions that he would ask teachers:

> *"[Getting help from fellow students]... with small practical matters: How to do something and whether something looks good, or if they think I should use the yellow or the orange coloured pencil. This is something I wouldn't waste time on asking in a desk crit, there it's more the big things and the concept*"[48]

This selectiveness is found not only between questions one would ask of students and those one would ask of teachers. Several students also indicate that, as they have gotten to know one another's strengths, they ask specific people about specific topics and exchange their fields of specific competencies:

> "*There are some that I ask about how to make a drawing look best; then there are others I ask about how to work with models, and others I ask whether it would be possible to build something in this way, and where to start. That would be one who has a degree in architectural technology – we have several different craftsmen here.*"[49]

The peer learning that was observed to be taking place along with the desk crits and pin-ups formed the foundation of the students' creative process – difficult and new to many of the students – of learning to *think through drawing* in their projects.

[46] Tine Bernstorff Aagaard # 40:58,5 - 42:21,3.
[47] Mark 1 15:18,8 - 16:56,3 og Diana 1 # 9:45,0 - 10:17,0.
[48] Mark 1 # 15:18,8 - 16:56,3.
[49] Miriam 1 # 19:20,9-19:58,3. Lukas 1 # 11:40,5 - 12:08,2 tells a similar story.

FIGURE 5.24: Josephine Saabye "Map." Student works *Taking Place*,KADK , 2014.

FIGURE 5.25: Josephine Saabye "Detail of Map." Student works, *Taking Place,* KADK , 2014.

FIGURE 5.26: "Diana" "Detail of Map." Student works, *Taking Place,* KADK , 2014.

5.3: DRAWING AND DRAWINGS

The *Taking Place* BA program largely emphasised analogue drawing on different types of paper, including transparent, plain, and large-scale sheets. In addition, all students did digital drawing in Rhino, which some transferred to their large maps using an acetone printing technique and thereby mixed the analogue and the digital. Others used the digital drawing as a way of getting "un-stuck" in their process.[50] Most drawings were carried out in pencil of various thicknesses, but particularly for some of the sections and the large maps in the Scarpa group, coloured pencils were also used. In this way, although the drawings were dominantly line drawings, some also worked with surfaces. All students went through similar tasks within the projections of plan, section, and elevation, as well as rather large-scale axonometric drawings.

> "*I'd say that largely what we draw is plan, elevation and section and then multiview projections […] and then you might also add some sort of axonometric drawing of it, to get a more spatial [representation], but we rarely use perspective drawing*."[51]

The drawing practices during the semester had different general approaches that intertwined in practice but could be separated out as construction and analysis, perception training, and ideational sketching.

[50] Jane 2 # 16:27,4 - 16:57,4
[51] Jane 2 #3:49,9 - 4:16,0. Lukas makes a similar statement - Lukas 2 # 7:27,5 - 8:42,0.

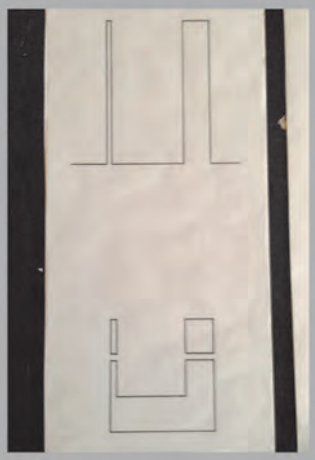


FIGURE 5.27: Lasse Rude Nord
"Section and Plan Series" Student Work
Taking Place, KADK, 2014

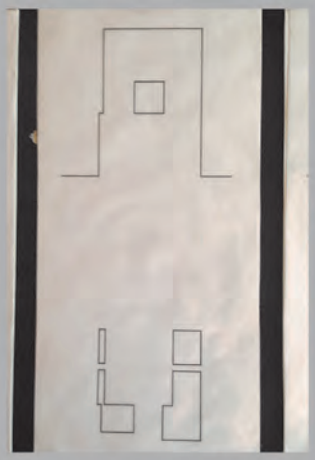


FIGURE 5.28: Lasse Rude Nord
"Section and Plan Series" Student Work
Taking Place, KADK, 2014

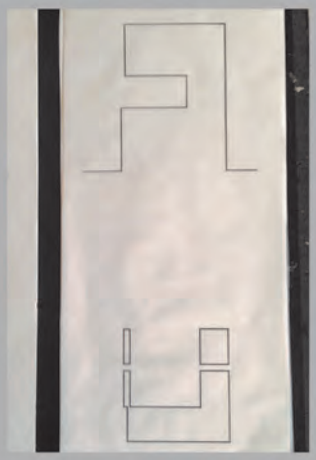


FIGURE 5.29: Lasse Rude Nord
"Section and Plan Series" Student Work
Taking Place, KADK, 2014

5.3.1 DRAWING AS TOOL: CONSTRUCTION, ANALYSIS, AND CONTROL

The semester curriculum had an emphasis on tools, and was designed to train the students' basic understanding and capability to operate and communicate with classic drawing projections. Plan and section, which can both be regarded as an imaginary cutting through of volumes in an either horizontal or vertical plane, was regarded by the department as the most important tool or approach for students to develop. As program head Anne Romme explained:

> "*One has the experience that for better or worse, the students live in a very three-dimensional world. If you hand a student a piece of sketching paper and ask, "draw your idea here", they almost always draw something axonometric or perspective-like […]. I try to teach them that this is a fine skill to have. That it is good that they have this three-dimensional, image-saturated way of seeing things, but that as architects we are obliged to cut through things and look at how they are constructed […]. Section is a particular way of seeing and more important than other [ways…]. Concretely on a presentation board, it is up to the individual whether you want to draw a section, but not whether you think in sections. That is crucial.*"[52]

To unpack this quote a little, the underlying demand is that the students begin not simply to experience the surface qualities of architecture – what Anne Romme calls the image-saturated experience – but that they analyse the spaces that they move through, admire, or seek to construct.

[52] Anne Romme #42:30,3 - 44:47,4. Support for this claim can be found in the interview with Mark, where he says he regards a plan mainly as something at the bottom of an axonometric drawing, or for drawing guides, when doing elevations. Mark 2 # 11:54,0 - 12:21,0. Lukas, in a similar vein, recounts that the teachers are not interested in seeing perspective drawings. Lukas 2 # 7:27,5 - 8:42,0.

The imaginary cutting operation of the plan or the section is as such an analytic approach: something that cannot be experienced directly, but only through drawings. This analysis, in the program's view, is taken as a prerequisite for being able to control the making of spaces oneself, and can be seen as part of the overall analytical approach to drawing as a tool. Because the approach differs from a standard or nonprofessional experience of spaces, it is also not surprising that students can struggle with learning the approach, as is evident in both the above quote and some of the students' stories.

> "*In the beginning of the six week block, we had to do these sections and I ended up just making elevations because I thought that was what it [a section] was. And then everybody who had done it really well showed theirs and you could tell that they were graphically pleasing to look at […] and you could see how the tall space was in relation to [the other] but from there and then to producing them myself. It took me a couple of months before I was OK at it.*"[53]

Although initial training in the techniques of technical drawing and, ultimately, a professionally analytical approach to the built environment (or simply surroundings) can take some time, some students express great joy in the technical approach, because they quickly see the results of their labours. Furthermore, the emphasis on the training of skills is tangible in relation to other capabilities that they seek to achieve:

> "*I remember right when we were introduced to multiview projection. I went home and grabbed my toolbox and drew it and it was so much fun, because all of a sudden I could do it […] I didn't have to draw shades like you might have to in some cases, but I could draw it!*"[54]

> "*It was my first epiphany at architecture school. When it dawned on me exactly how this multiview projection works […] with the 45 degrees you transport the line up and then in that way, you have a universal system, which enables you to transport the sides up from a plan and quickly draw an elevation […] I think it is a really nifty way of drawing.*"[55]

The tool oriented or analytical approach to drawing techniques is deemed to have worked well. Certainly all of the interviewed students, although they were only a semester into their studies and as such rather inexperienced, were quite aware of both how to work with different drawing projections and what the different drawing types would help them express.[56] The awareness that they expressed in the interviews

[53] Lukas 1# 9:40,3 -10:46,3.
[54] Jane # 2 3:03,6 - 3:35,6.
[55] Lukas 2 # 13:49,0-14:50,0.
[56] As for example Diana 2# 1:48,9 - 3:17,2 Leo 2 # 8:14,5- 8:46,5

gives ground to believe that they were also able to apply different drawing projections and use them for communication and analysis purposes.

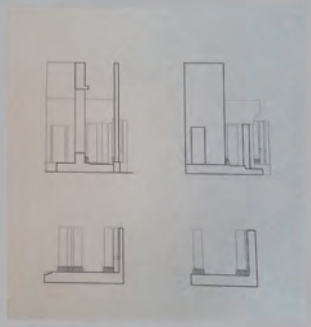


FIGURE 5.30: Josephine Saabye "Sections." Student Work. *Taking Place,* KADK, 2014

FIGURE 5.31: Mikkel Rostrup "Series of Sections." Student works *Taking Place*, KADK , 2014.

FIGURE 5.32: Marie Øst Vejbæk "City plan of models." Student works, *Taking Place,* KADK , 2014.

Many of the drawings presented by the students were meticulously executed analogue drawings, demonstrating familiarity with technical drawing techniques. They produced clean and highly legible drawings even when portraying a rather abstract material, using for instance different line weights, hatching of section surfaces, and dashed lines. The drawings in themselves also exhibited the analytic approach to architectural drawing, sometimes at multiple levels. Several students, for example, had worked with series of sections, which perhaps not only tell the specific story of their model and its spaces with but also seem to reveal the students' own working out of what sections actually are and what they can do. Consider the drawings above, where in the middle a model is cut through in sixteen sections "like a tomato", as the student told me.[57] Moreover, a similar reflection is at play in the simple series in figures 5.27-5.29, where the cutting point of both plan and section is moved, and the two are juxtaposed. Figure 5.30 is a digital version of the same strategy.

[57] Mark 2 # 1:02:12,9 - 1:03:09,4

FIGURE 5.33: Lars Bøgelund Sigersted "Detail of axonometric" Student work *Taking Place*, KADK , 2014.

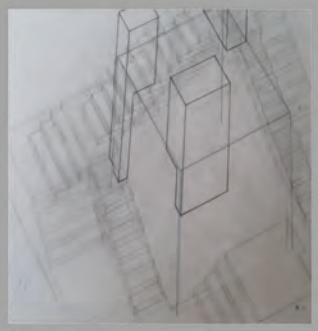


FIGURE 5.34: Marie Øst Vejbæk "Axonometric" Student work, *Taking Place,KADK* , 2014.

FIGURE 5.35: Josephine Saabye "Plan sketch." Student Work. *Taking Place,* KADK, 2014

5.3.2. DRAWING AND SEEING

The analytic approach to drawing that was observed in the first semester of *Taking Place* not only let the students practice different drawing projections and techniques, but also arranged the semester in a movement from the concrete to the abstract. This was observed by one student, who contrasted his experience of the semester with that of friends studying in other departments.

> "It *was precision that was the main target, because they had turned the project around. So, we started out being precise and concrete – working in an [near] dictatorial manner in Italy. And then only afterwards did the work or the assignment become more and more abstract. Those I know from for instance Design, they started out making a room of light. Crazy abstract. And then in the end they had to produce a summerhouse, where they were supposed account for wall thickness, load bearing walls in the construction and the like. So I could tell that it [what we did] was an opposite movement*."[58]

The progression from concrete to abstract was probably most pronounced in BBK1B, where Lukas was a student, but BBK1A made a similar journey, starting with measurement and drawing of concrete buildings and places and ending up with the rather abstract model of a city structure. In many ways, this route could be seen as contrary to the ordinary flow of an architectural project, which mostly starts out as something vague and then is progressively detailed and made concrete. There seems, however, to be a quite deliberate pedagogical strategy behind this reversal, which I believe can be verbalised as harnessing the activity of drawing in training a critical, heightened, and predominantly visual perceptiveness. Much as was seen in Anne Romme's comments about

[58] Lukas 2 # 7:27,5 - 8:42,0.

sections and plans, the tool is taught to the students in order to bring about certain ways of seeing and understanding things. This becomes clear in the description by Tine Berstorff Aagaard, one of the teachers, of the exercises conducted by BBK1B in Vicenza on the study trip to Italy

> "*And then they got to Vicenza, where they were grouped in teams of three, who then worked individually on the buildings in Vicenza. So it was an urban context, where they measured up and drew to scale 1:20 as a point of departure. And then suddenly they discovered that everything is very crooked – something you can't immediately see with the naked eye. Diving into the factual after the work with the ideal and the systems, and how all of this skewness had been worked in so you don't see it*."[59]

The skewness, as Tine explained, is not expected by the students and is only discovered through the activity of measuring. Accordingly, this activity does not simply take the form of dull, thoughtless work, but is rather seen as training the students in how to approach their immediate perceptions and assumptions. She continues:

> "*…there was an enormous development from day 1 to day 2, where they began to figure out how to measure up with triangles and diagonals and actually get a precise drawing. [The difference between] what you assume and what is actually measured. They would like to assume that everything is much simpler than it really is. But they realise that the brain is heavily involved, and reads between practically everything we perceive and [affects how we] understand our surroundings. One way to use these tools is to attempt to in a way write oneself out of the equation. You choose where you put your section or your plan, or what part you will work with, what scale and what precision, for how long, etc. But then you also just start like a kind of machine, and you watch what comes out of it. It's a sort of dialogue and it [those operations] should then give you something.*"[60]

In other parts of the student's curriculum, perception training through drawing was similarly undertaken, as in the so-called workshop class where Anne Romme worked with the students around freehand drawing techniques.

[59] Tine Bernstorff Aagaard # 15:08,5 - 15:52,5.
[60] Tine Bernstorff Aagaard # 15:57,1 - 17:00,5.

FIGURE 5.36: Lars Bøgelund Sigersted "Paperbag" Student works, *Taking Place,* KADK , 2014.

FIGURE 5.37: Lars Bøgelund Sigersted "Paperbag" Student works, *Taking Place,* KADK , 2014.

FIGURE 5.38: Lasse Rude Nord "Paperbag" Student works, *Taking Place,* KADK , 2014.

One example of the drawings undertaken are the paper bags above. Students experienced great progress in their drawing capabilities. Leo related how even in a span of a few weeks, his drawings of paper bags improved significantly.[61] The progress between the left and middle paper bag drawing is equally clear. The first paper bag (on the left), although shading is attempted, mainly captures the contours of the bag, leaving the impression of a nearly flat object, which without instruction would be difficult to identify as a paper bag. The second bag is clearly a somewhat scrunched up paper bag, complete with a sense of where the light source is, the inside or opening of the bag, as well as particular creases in it. The student probably did not see the bags in radically different ways the two times, nor is it simply a question of acquiring a drawing technique. If the student had been asked to trace over already existing drawings of paper bags instead of drawing them himself, the two drawings would have likely been much more similar. The hatching technique on the second drawing, for instance is slightly tighter and more controlled, but still far from perfect. What the two drawings give a good indication of is that Leo has become much more trained in translating his perceptions accurately to drawing, and through this is also acquiring a developing perceptiveness or consciousness of detail.

The freehand drawing lessons were not only a way of orchestrating that students work with their own perception consciousness through drawing, but seems also to have prompted students to practice other approaches to drawing:

> *"We've had this freehand drawing course, which was basically about telling a story through drawing […] I think you could emphasize what you wanted: graphic expression, examining something and*

[61] Leo 2 # 41:20,3 - 42:18,7

> *accentuating something – and also getting better at drawing and just "let go of your hand", or what you say*."[62]

"Letting go of your hand" seems to be a very different operation than the more technical or analytical approach to drawing explored in the previous section. It indicates that the drawing is being used for something more than a means of transparent communication.

5.3.3. SKETCHING: DRAWING AS IDEA DEVELOPMENT

Conventionally, drawing is seen as having at least two main, separate purposes: communication and development. Some students expressed this as well:

> *"Well, for me it [drawing] is both a tool that enables you to technically communicate some sort of a message and then it's in the early stages to be able to work with different processes that that might develop the project. So it's two different ways [of working]: One to develop something and the other to communicate something."*[63]

Development, of course, can occur on different levels: for instance, a more technical analytical level and a shape-giving or conceptual level. The technical and analytical level, as described in the sections above, gives the ability to test and explore particularities of an idea or design – "Will this fit here?"; "How can the two be connected?"; etc. – and it might even give rise to a critical approach to perception, as also noted in the section above. Nevertheless, the development mode of drawing could also be of a shape-giving or conceptual character, which is an important ability for some. To study this mode of drawing, the students interviewed were asked whether they got their ideas from drawing, or whether they drew their ideas. Contrary to what at least I expected, on the basis of a former study,[64] they almost all expressed, in one form or another, that they were not primarily generating ideas through the drawing process, but rather that they attempted to draw ideas. Both Lukas and Jane stated that they did not find it easy to get ideas from the drawings, but that they were consciously working on developing that ability.[65] Miriam answered that for her it was a mix, but also quite interestingly, she recounted that her ideas do not yet have shape ("it doesn't look like

[62] Diana 2 # 6:11,2 - 6:55,6.
[63] Leo 2 # 1:01,9 - 1:34,6.
[64] My 2011 study of diagrammatic drawing concluded that the students developed ideas through drawing. See Christensen-Dalsgaard, "Tegningstænkning, diagram og projektudvikling." As well as Berling Hyams, "Diagrammatic thinking."
[65] Jane 2# 46:46,1- 47:41,0. Lukas 2 # 33:47,7 - 34:13,0

anything"), so that drawing an idea does not mean drawing up an preconceived image, but rather finding a shape suitable for the vague idea:

> "*… you start somewhere, so I start by having an idea about something, but it doesn't look like anything. So there you have to draw things and see […] if in some way it matches, or illustrate the idea I have in my head. If it can visualize my ideas then I can see "yes, this is what I was thinking, and this is how it should look" then I move on*."[66]

In this case, it is debatable whether one can speak of "drawing an idea" when the idea has no shape. What many of the students are perhaps attempting to express is, instead, that there is an intention behind the drawing:

> *"I don't think you have a 100 percent control [over your drawing]. Maybe you use some sort of technique and that sets up a guiding framework. But it is rare that you know in advance exactly how it will turn out. So perhaps it has surprised me sometimes to see the course a drawing takes, but you do have an idea about what you want to do, so… "*[67]

Or as itwas put by Anne Romme, the much more experienced programme leader:

> *"It [the drawing] has to start with some sort of thought or intention […] but then it rapidly pushes back, one knows that. And you can be absolutely certain that even when you think you've completely imagined just how well it would work when you put these two things together, it never turns out quite that way when you draw it*."[68]

What Anne Romme expresses here, I believe, is that the drawing "back talks", and does not conform to an idea that one might have had. Of course, this does not mean that one did not attempt to draw an idea in the first place, and so the two different approaches cannot be seen necessarily to preclude one another. Another explanation for the interviewed students' somewhat surprising report that they were drawing ideas could also simply be they were still very inexperienced. As some students indicate, they are just in the process of learning the non-technical and esoteric sensitivity towards the drawing that enables them to "read it" in multifaceted ways.

> "*It's something I practice. Simply to look at something and then just feel what I see, so that it is more of an exchange between senses rather than a translation into words. I practice looking at something and drawing for something without the need to explain it to myself in my head. It's going to take some time, but I sense that this is critical also to understand what I'm being told [by my teachers]*."[69]

[66] Miriam 2 # 37:18,3 - 38:24,0.
[67] Diana 2 # 10:06,0 - 10:42,1.
[68] Anne Romme # 50:29,7 - 51:04,5.
[69] Lukas 1 # 6:54,0 - 8:41,9.

As expressed with remarkable candidness in the above quote, the ambiguity or openness of the desired ability gives it the character of feeling rather than a steady methodology. Consequently, it is not surprising that this ability, in its dawning state, needs scaffolding by experienced teachers. This was expressed by another student, who otherwise straightforwardly states that he does not experience new ideas suddenly appearing in his material:

> "*When I'm sketching, then it is things. I sketch ideas. It is not that I just sit there and leave the hand in control, and you suddenly go: "Uh, that's how I can do it". Because what comes from the hand is something I want to test, see how works or want to remember. But it can happen [that something new appears], but then I think it has to come from someone else, who can say: "Here you're on to something" and then I can see it: "Oh yeah, I am*."[70]

FIGURE 5.39: Josephine Saabye "Axonometric" Student works *Taking Place*,KADK , 2014.

FIGURE 5.40: Mikkel Rostrup "Photograph of model." Student works *Taking Place,* KADK , 2014.

FIGURE 3.41: Lasse Rude Nord "Detail of Axonometric." Student works *Taking Place,* KADK , 2014.

The theory that the ability to develop ideas through drawing is something that the students are in the process of learning is further supported by the account of a third student. Jane relates how, in her experience, the teachers would like them to develop the ability to discover and respond to the back talk or new ideas from the drawing:

> "*Our teachers try to make us, you know, not think our way to it, but really draw our way to it. And if you have to draw your way to it, then it means that you have to be surprised by your drawings. You have to reach that point where [you see] 'Oh, there was something there*.'"[71]

Whether it is with regard to the more technical and analytical modes of drawings – perhaps as a critical training of perception – or the ability, discussed above, to read and respond to the back talk of drawing sensitively, drawing (and indeed other materials, like models) is treated as the central

[70] Mark 2 # 37:42,0 -39:25,4.
[71] Jane 2 #18:48,5 - 19:38,7.

form of acquiring architectural knowledge, and the study found a pervasive belief in drawing (albeit in many different forms) at the first semester studio.

5.4: IN DRAWING WE TRUST - EPISTEMOLOGY

As shown in the previous section, there were several different approaches to drawing used in the process of developing the semester projects. This section will attempt to answer one of the research questions posed, namely, "How is thinking through the act of drawing (perhaps as reflection-in-action cognition) taught, and how is it carried out by the students in their drawing process?" In so doing, I will highlight two of the beliefs underlying these practices, and will attempt to draw out their epistemological connotations. I distinguish the two themes explored here as 1) material dialogues and 2) the paradoxical fact that the drawing is simultaneously considered never and always finished.

5.4.1. MATERIAL DIALOGUES

As became clear in the section on desk crits, the teachers at *Taking Place* strongly encourage that teacher-student sessions always happen against the backdrop of a material. Whether it be models or drawings, the material takes centre stage, as is also the case in the pin-up situation. This material basis is considered indispensable because it reveals or clarifies things that would not be seen – or indeed understood – without the material dimension, as is expressed by one student:

> "*Projects quickly become transparent when they are completely drawn up, if it's done correctly of course […] you might encounter some collisions in the projects - that there are things that collide or can't be put together or something like that, when you have the project drawn up in detail. Whereas sketching of course is freer, a bit more generous. It's only later, when it's more technical and concrete you see the collisions*."[72]

The student here highlights the back talk that technical drawings provide, whereas in his view sketches, which are freer, do not give the same sort of feedback. This again arguably exemplifies, as discussed above, the students' inexperience with the more diffuse and sensuous feedback given by drawing. In a similar vein, the focus on the material or production poses problems for some

[72] Leo 1 # 4:37,7 - 5:35,7. Diana similarly related that drawing for her was a means of expressing herself as well as an indispensable worktool. Diana 2# 0:20,8 - 0:42,6.

students, who based on their previous schooling are more used to expressing and developing ideas through language, much as Lukas expressed it in the quote in the previous section. Interestingly, Lukas explains his shift in approach as "looking at something and just feeling what I see."[73] This implies a different form of understanding than the one he is used to working with, one that does not have the structure of language, as expressed in the quote, but rather withholds complete explication for a greater openness that can be interpreted in multiple ways. As I will expand on in Chapter 7, the *multistability* of the drawing is being explored deliberately here. This approach, in turn, feeds a stance towards drawing where – at least when drawing is being used for idea development – there are very few rules:

> *"I think that it is characteristic [for this program] that they are open to everything here. You are allowed to work exactly how you see fit, as long as you do your things. They are open to that everyone does it in their way, so there is a great freedom in what you do. But I think I have heard them say several times the thing about 'just start'. 'Start and don't wait for the best idea to arrive. And then you build on that.' So it's about being productive*."[74]

As recounted above, however, there is also *the rule of productivity*: decisions can only be made on the basis of the material feedback of the drawing. Normativity, in other words, is highly situated in the drawing: what works in this situation is not necessarily something that works in general, and how a project should develop is dependent on how the specific drawing back talks. Lukas explains how "playing" with the drawing can reveal what actually works and what just seems interesting at first:

> *"... and then you can take these three things, because they were the best and continue working with them. And you throw the rest away, which only seemed interesting at the beginning. […] One shouldn't overestimate oneself, but not underestimate either. I think both play a part, when you just … simply play with it a bit. It's also the fear of really engaging, right?*"[75]

The line "only seemed interesting at the beginning" suggests that the process of drawing is used to help the student avoid jumping to conclusions, and instead to explore the foundation of "the interesting" in the drawing. This emphasises that the material dialogue is taken very seriously, as is also the case when students who are stuck use a change in media in order to reframe the problem, or to become more certain of their direction.

[73] Lukas 1 #6:54,0 - 8:41,9. Quoted in the above section.
[74] Diana 1 # 22:31,0-23:04,0.
[75] Lukas 1 # # 31:59,9 - 33:09,4.

> "*something like changing media – that can help sometimes [if you are stuck] because you sit there drawing and you don't understand it, and then you make a model. Or you are working on a model and you get tired of it looking insane, because you just quickly and shoddily made it, then you draw it […] if you have doubts whether it works in the one medium then you can try another medium. For example at the pin-up I realized that if I had changed medium to photo earlier in my process, then I might have opened up other things than those I ended out with. So in that way… I think it helps a lot to change media. If you don't have anyone to spar with*."[76]

In the above quote, the material almost explicitly becomes the substitute for a human sparring partner. In this way, Miriam also shows an awareness of the medium's non-neutrality. You will not necessarily get the same result in a different medium, for which reason exploring the differences between posing the same problem in two different media might be enlightening.

Furthermore, changing medium also seems like a concrete and very tangible approach to reframing the problem, as was discussed in relation to Donald Schön's reflective practitioner.[77] In Schön's example of reframing, Quist does not reframe the problem by setting the scene in a new material, but simply resets the scene. Nevertheless, it is easy to imagine how setting the scene in a new medium would necessarily also restage the problem, and thereby have the same effect. Furthermore, the media change is far more tangible and likely easier to do than reframing the problem in the same media – something that, in the Schön example, only the experienced teacher Quist was able to do.

Another way of enquiring into the feedback relationship that students might have with drawing is asking the students directly how they felt that they learned best about drawing. When asked this, most of the first-year students conceded that it was a mixture of working with drawing themselves (practice), lectures and inspiration from classmates (instruction), and desk crits (dialogues). Miriam recounted how, in her view, the different elements were intertwined, so that the initial inspiration and prompt could come from lectures, which provided the impetus for the concrete practice of drawing, and that desk crits with their dialogues (or instruction) could then help direct and guide the way forward with the drawing.[78] Whereas the instructive elements would involve classical education, both the practice and the dialogue elements point back to the material dialogues. The practice, apart from practicing the relevant physical skills, also engages the student in

[76] Miriam 1 # 27:46,4 - 29:23,8. Jane says something similar about changing media between analogue and digital drawing. Jane 2 # 16:27,4 - 16:57,4
[77] See Chapter 2.
[78] Miriam 1 # 26:35,8 - 27:32,8.

the working with the back-talk of the drawing, and the drawing dialogues with the teachers, as shown in the section on desk crits, often helps to open up the material in order for the student to see new possible directions to take or to respond to. For Lukas, the result is that he values working with his own drawings most:

> "*I think that I learn the most from my own drawings – if you have to make a sort of hierarchy. That is the way that my head in a manner is the filter, which all the information that I get from the outside through lectures, inspiration from my classmates and what I hear from the teachers, [goes through]. It's filtered through my brain and establishes itself in my body and then when I get something done after fifteen attempts – then something happens*."[79]

In this account, one gets the notion that for Lukas, at least, learning – that is, actually acquiring knowledge or skill – is experienced as a process of embodiment: it is through the practice of drawing that the different input and instructions (that are "filtered through his brain") become "established in his body" after much trial and error. This in turn highlights the drawing practice as a learning process, which again might refer to the *always finished – never finished* character of drawing often mentioned at *Taking Place*.

5.4.2. A DRAWING – BETWEEN NEVER ENDING – AND ALWAYS FINISHED

In the interviews with the students and teachers at *Taking Place*, a phrase about the drawing being at once always finished and at the same time never finished came up several times.[80] Though the sentence with its paradox is puzzling, it seemed deeply ingrained in the program's approach to drawing and how the students continued work on drawings, for example as Lukas explained:

> "*...nothing is set in stone, I've kept telling myself. There is nothing that mustn't be changed – that's also partly because we keep being told that nothing is ever finished because it's always finished. Everything is finished because it will never be finished. […] I lose nothing by trying something new […] and then producing much more instead of making one drawing because it looks good and there's a concept and I can defend it with arguments*."[81]

Again, the quote reveals an emphasis on production and testing rather than trying to think a way to a solution. Furthermore, for Lukas, understanding the drawing as never being finished seems to lead the way to continuous experiments: "I lose nothing by trying something new," he says, because the idea of the perfect drawing that is the finished drawing is not truly there. The

[79] Lukas 1 # 21:52,2 - 22:28,2.
[80] Mark 1 # 25:58,6 - 27:48,4. Lukas 1 # 30:35,2 - 31:35,7. Miriam 1 # 44:13,7 - 44:47,6.
[81] Lukas 1 # 30:35,2 - 31:35,7.

experimental approach to ever-better versions, and the view of work and learning as never finished is fundamental and common for studio-based learning (SBL), as education researchers Brocato and Brandt have both pointed out:

> "*Central to SBL [studio-based learning] is the positioning of work in a critique space that renders the work never complete, always on a pathway toward better iterations*."[82]

What is suggested in the above is that the studio structure, and accordingly SBL too, has epistemological implications, and that they induce the particular form of iterative thinking and learning. In *Taking Place*, however, it is not simply a case of an iterative focus on what is never quite complete. The drawing is a creative space that is always somewhat open, but is at the same time "perfect" at its present stage. The drawing will never attain the character of being perfectly finished, and therefore at any stage it is already "finished", although this does not preclude further work.

One might wonder why it is important to underline that the drawing is always finished, instead of simply saying that it is unfinishable. Perhaps this should be taken as indicating that drawings should always be taken seriously – for even loose sketches have materiality and certain stabilities: things that they point to, and other things that they do not. As seen in the section on the desk crit, both of the interviewed teachers prefer to talk to the students on the basis of a material, and not simply about explanations and ideas, because the material, despite its relative openness, is also concrete. As Anne Romme recounted, she prefers to get the misunderstandings caused by the material out in the open, rather than leaving them veiled behind long explanations.[83] The particular view on drawing put forward by Mark is linked to "drawing like architects", which entails regarding drawing in a more technical and analytical way, as was described in section 3.3.1:

> "*We've also worked with seeing it [drawing] as structures. She [Anne Romme] is all about that we have to understand and draw like architects – not like at the art academy. So, we shouldn't draw like artists and then you're always surprised at who gets praise and who is criticized. Because there are always some drawings where we go: 'Wow, that one is just really beautiful, right?' and then there are someone that are really, really good at shading and making everything a little diffuse [and nice looking] – but it's not always those ones that get praise, I find. There I think we've learned a lot. To see the paper as a site*."[84]

[82] Brocato, "Studio based learning," 142. Quoted from Brandt et al," A theoretical framework for the studio as a learning Environment," 331.
[83] Anne Romme # 26:53,5 - 28:39,0.
[84] Mark 1 # 23:46,3 - 24:45,5.

This approach, as is remarked on in the quote, means that it is not necessarily the "pretty" drawings that are praised most, but rather the ones that work with a problem and analyse it. In my view, therefore, seeing the paper as a site does not simply indicate certain norms for architectural drawing aesthetics, but that the drawing in itself is being taken seriously, and not as a mere representation. The stance is what prompts students to respond to the back-talk of the drawing. The material dialogue with the drawing helps in turn to ensure that developments in the drawing are based on more than purely subjective judgements of taste, as is also indicated in the above quote.

I will now turn from the general underlying stance towards drawing at *Taking Place* to the question of how this stance influences the program's pedagogy. One might expect that students would be advised on different approaches to how they think with drawing, how they open it up in continuous iterations, and how they sensitise themselves to its back-talk. Att this educational stage, however, this did not seem to be the case. When students were asked about whether they had learned different methods or approaches to drawing, most of them were not so sure.[85]

> *"Methods…? I don't really know what that is yet […] or I'd almost just say no, I think we work in a much more intuitive manner so far. I don't really think that we have learned any methods – well, maybe something about drawing, but I'd rather call that tools*."[86]

The tool-based approach detected here by Mark was also spoken of by Jane and Miriam when asked about methods.[87] First of all, there could once again be an indication here that the material dimensions take center stage to such a degree that different tools or different techniques are simply regarded as equivalent to different methods. Second, what Mark calls an "intuitive manner" could also indicate that drawing is viewed as so situated in a context that there is really no point in approaching it with generalized "methods", or indeed no possibility of doing so. Finally, it could also be an indication of a particular embodied style of teaching, as is portrayed by Lukas:

> "*There are some things where you can be like: 'But why didn't they just tell me that I had to make this drawing exactly in this way or that way for it to work, before I got to the pin-up and was told these things.' But it's because it is much more deep-seated. I have worked a lot on something that they might*

[85] Jane 1 # 32:47,8 - 33:46,4. Miriam thinks they have learned tools, but not methods, but interchanges the two. Miriam 1# 37:35,8 - 38:06,2. Leo, by contrast, finds that they have learnt methods and processes to a small extent. Leo 1 # 27:35,8 - 28:32,1. Lukas and Diana recount that what is most like a method is the very open "just begin", or "throw yourself into it" Lukas 1 # 38:46,4 - 39:13,9. Diana 1 # 22:48,0 - 23:04,0.
[86] Mark 1 # 37:28,7 - 38:13,2.
[87] Miriam 1# 37:35,8 - 38:06,2.

FIGURE 5.42: que and Cityscapes
Images fr notes Oct 31st and Jan 26th
Taking Place, KADK, 2014/2015

> *have known in advance wouldn't work, but I had to work with it … for a long time… so that I could see exactly what it is that doesn't work*."[88]

The experience that Lukas describes here is that he has sometimes felt that his teachers did not point him in the right direction as clearly as they could have, but let him work fruitlessly along certain paths that they knew were dead ends. Nevertheless, after reflecting on these initial frustrations, Lukas has discovered that there might be a purpose to this approach other than cruelty or ineptitude on the part of the teachers. Because he has not been instructed, but has reached discoveries independently, Lukas believes that he understands them better: "I could see exactly what it is that doesn't work." There must obviously be a balance between instructing and guiding just enough to ensure positive experiences in the end, on the one hand, and letting the students toil with their material in order ultimately and perhaps mainly to discover how it does *not* work, in a manner that becomes much more ingrained in them than any instruction could have been. The difficult task of how to "train" students for their future creative work is the theme of the last section of this chapter, and provides the lens through which I shall also attempt to sum up the findings of the study of BKK1.

5.5: TRAINING FOR CREATIVITY ?

> "*Learning a skill is not primarily founded on verbal teaching but rather on the transference of the skill from the muscles of the teacher directly to the muscles of the apprentice through the act of sensory perception and bodily mimesis*."[89]

Architectural drawing and architectural practice certainly involve many skills, but also more conventional knowledge (how tall are doors typically, what is a good relation between the riser and tread of a staircase, etc.) as well as something that can hardly be described as a skill, but perhaps as an ability, namely, creative project development. What the Finnish professor of architecture Juhani Pallasmaa describes in the above quote covers only the skill component of the students' education, which might rightly be described as embodied. However, in the architecture education observed at *Taking Place*, the vocational pedagogy that is described by Pallasmaa (seeing the master work, and then acquiring the skill through bodily mimesis) is not really present. Although both of the

[88] Lukas 1 # 17:57,9 - 19:00,5.
[89] Pallasmaa, *The Thinking Hand*, 15.

interviewed teachers related that they draw in their conversations with students, the students do not get to see them do "actual work". So even when the teachers do actually use means other than verbal instruction, guidance, and critique – which we are led to understand is slightly unusual – it would be difficult to understand it as vocational pedagogy *per se*: the materials shown to students are most often finished works, and therefore the students see very little professional work in progress. The acquisition of skills, however, is similar to vocational pedagogy insofar as it focuses on the students' own production of material. The knowledge that the students require is gained through lectures, desk crits, and work with their projects, but the third element – the creative ability – is perhaps not so easily trained. That the creative ability is important is supported both by KADK's own description of its approach to architecture[90] as well as the interviews from *Taking Place*. Lukas describes the teachers' input and assistance in facilitating the creative process as essential:

> "*It is really the essence of the quality that teachers can give you, because you learn to be independent in the production of work. But also, because it's creative, you have like writer's blocks or something… It could become that if there wasn't someone there to say: 'what if you did this?' or 'what about that?'*"[91]

Tine, one of the teachers interviewed, even states that she finds that her most important job is assisting the students in their creative process, and not specifically teaching them things linked to architecture:

> "*I'm here primarily because of the creative process and secondarily because of what has to do with architecture. Some [teachers] talk a lot more architecture than what I do. I talk a lot with them – or am very aware of – what it is like gluing two pieces of cardboard together, how important it is to pay attention to things like that. What it is that happens in them [the students] when they are afraid of starting [a project, a drawing, a model], what all of those mechanisms are*."[92]

These two statements are quite clear in their focus on learning to work creatively as the most important ability for the architecture students to acquire. And even though, as is apparent from these statements, this ability is tackled through decidedly practical approaches, such as taking seriously the gluing together of two pieces of cardboard, or suggesting new directions in a specific material, it is still important to ask how this ability can be learned if it is not taught directly.

[90] "The DNA of KADK," KADK. Accessed May 27, 2019. https://kadk.dk/en/dna-kadk
[91] Lukas 1 # 23:05,6 - 23:47,8.
[92] Tine Bernstorff Aagaard # 38:21,3 - 38:57,8.

The Danish professor of psychology Lene Tanggaard, who has specialized in creative learning environments, distinguishes between learning and training when it comes to creativity. For Tanggaard, creativity can be learned through activities in creative practice communities. Moreover, a sort of vocational training or pedagogy is a prerequisite for learning to be creative. For Tanggaard, vocational pedagogy involves being involved in a productive practice community, and its focus is on informal, subjective, and pragmatic judgements.[93] Accordingly, for Tanggaard learning is something far from linear and predictable; it has a "dark side", which is understood not only positively but also as a contrast to the explicit steps and goals of training.[94]

In relation to drawing practice, this would mean that precise methods or approaches would be ruled out, as indeed would seem to be supported by what some students describe as a "tool-based" rather than a method-based approach. The exchange with the drawing is thus a constant learning process and not "training", in Tanggaard's terminology; it cannot be predicted, since the material is shaped in a process in which even the master does not have control.[95] But what significance, then, does experience hold in this process? First, in this perspective learning is still linked to training, because learning happens through the material practices such as, for example, drawing. These material practices are closely linked with the mastery of the tools used to produce the material. Training and skills are thus connected to the use of tools, while learning and experience is connected to the singular material practice; but as such, they are also related to one another.

Second, and as discussed in relation to the practitioner paradigm in Chapter 2, experience is arguably the foundation for *seeing a situation as* something and thereby for analysing and reframing the problem. For Anne Romme, the best architecture teachers manage a "complex set of references" combined with technical knowledge. They are then able to read students' projects in an open manner, relating them to their own catalogue of references:

> "*For it [teaching architecture] to be qualified, the teacher has to be able to navigate the field and contribute with a very complex set of references – as you often call it – as well as knowledge, technical knowledge and the ability to freely associate and remember: 'Oh yeah, I've seen that somewhere before'.*"[96]

[93] Tanggard, *Kreativitet skal læres!*, 56.
[94] Tanggard, *Kreativitet skal læres!,* 96.
[95] Tanggard, *Kreativitet skal læres!,* 43.
[96] Anne Romme # 12:43,2 - 13:30,3.

Such free associations in combination with the "complex set of references" enable the teacher not to dictate, but see, and perhaps to enable the student to see new directions in the material. This seems similar to what Schön calls a repertoire, and as such enables the reframing of projects and design problems.

As many of the interviewed students described, they used their teachers actively to open up a view of new directions in the material. In this respect, one could say that the quality of teaching perhaps relies not so much on the accuracy of the suggestions but rather on their multitude. It is common to measure creativity in relation to *how many* different solutions a person can come up with rather than simply in terms of the novelty of a single solution.[97] Here the teacher's focus is likely not simply on directing the student, but in fact functions more like a form of vocational pedagogy after all, where what the student learns and observes is the teacher unfolding possibilities in the project in an exemplary manner. As discussed in Chapter 3, at least within the frame of the practitioner paradigm, the foundation of making a good design decision is maintaining an openness to the *back talk* of the material: an openness to deviating from the initial plan when better solutions emerge.

As seen above, there are relations between what I claim are the characteristics of the practitioner paradigm and the practices found at *Taking Place*; but as I shall show in Chapter 8, this does not rule out the influences of the other paradigms on the BA program's practices. First, however, the discussion opens the question of rigor and evaluation (see Chapter 2). How do open material practices avoid becoming purely subjective decisions based on personal taste, and how is it possible to guide students in such choices without dictating them? Put another way, the next question to take up here is: What do evaluation practices look like?

[97] Runco and Acar, "Divergent Thinking as an Indicator of Creative Potential," 67. Runco and Acar describe how divergent thinking tests that differentiate between fluency, originality, flexibility, and elaboration are often used to measure creativity, where fluency would cover the sheer number of ideas, originality their novelty, flexibility their span between different categories, and elaboration how detailed they are. Runco and Acar criticize divergent thinking tests as good measures of creativity, however – particularly those that focus only on fluency – but they do highlight how common they are.

- PART III -

REFLECTIONS:

DIAGRAM, JUDGEMENTS, PARADIGMS

CHAPTER 6:
AESTHETIC JUDGMENTS IN THE ARCHITECTURE SCHOOL CRITIQUE

In architecture school, at least in a Danish context, the aim is not simply to educate students in the technical sides of the subject. Rather, Danish architects have a reputation for harnessing an especially high level of artistry in a holistic approach to idea generation and project proposals. In an anecdote told by Ebbe Melgaard, for example, Danish architects employed in a German office are portrayed as inferior to their German colleagues in technical skills, but still capable of bringing projects much further because of their understanding of fundamental design ideas.[1] Whereas technical skills – and academic skills, for that matter – are more easily judged, the aesthetic and artistic sides of architectural work are much more difficult to evaluate, or at least to come up with justifications for particular judgments made.

In Chapter 2, consideration of how Danish architecture education relates to the Beaux-Arts, polytechnic, and practitioner paradigms gave rise to the research question: *What evaluation practices and criteria are present, and how are they established?* This question was not directed solely at investigating how students are evaluated – in other words, what qualities are looked at to determine whether something is a good project – but also points to the link between evaluation practices and the question of rigor. An examination of evaluation practices can shed light on how architecture is both thought and taught, which in turn relates to the paradigms framework, as explained in Chapter 2.4.2. That said, the examples examined in this chapter are from the fieldwork conducted at *Taking Place,* from the final pin-up, or the so-called semester critique, held on January 26, 2015. This provided rich first-hand data.

At the pin-up, the students were to be evaluated, as specified in the academic regulations of the Danish architecture school, on the learning objectives specified both there and in the teaching curriculum.[2] These learning objectives are specific for each semester, and as is customary in the Danish practice of using learning objectives, they include knowledge, skills, and competencies. They are described broadly for all bachelor students in the academic regulations, and more specifically for the programs in the teaching curriculum. For the first semester, the skills described in both documents mainly concern drawing skills and techniques. Here the knowledge requirement is evaluable, although broad and somewhat unspecific: "Knowledge and understanding of the architectural manifestation of lifeforms and their development and significance in architectural history, theory, and practice."[3] Whereas such skills and knowledge may seem no more troublesome to evaluate than the learning objectives in other programs of study, a different picture

[1] Melgaard, *Den Europæiske arkitektuddannelse – og den danske,* 27.
[2] KADK, *Studieordning for bacheloruddannelsen i arkitektur, Chapter 9,* § 17. And KADK, *Taking Place, Årsplan* [Year Plan
[3] KADK, *Studieordning for bacheloruddannelsen i arkitektur, Chapter 4,* § 5, part 4.1. Own translation from Danish.

emerges when we consider the competencies specified. According to the academic regulations, the competencies called for in the first semester are "competencies in the handling of simple investigations, programs and proposals"[4]; in the teaching curriculum, they are "competencies in the use of different representation forms and tools to illustrate certain relations."[5] In both of these cases, it would seem that some sort of aesthetic judgment is required. This makes the evaluation process much less straightforward, as indeed it must be, given that the academic regulations specify that "…work within the architectural field necessitates artistic command of phenomena as materiality, space, form, composition and scale as well as insight into user purposes, function, construction, materials, technology and other contexts relevant for architects."[6]

6. 1: THE PROBLEM: SUBJECTIVE TASTE, RULES, OR…

Let us shift focus away from the formal regulations to the practice of evaluations. In architecture school, an important part of the educational system is the regular critique or *pin-up*. As was also described in the previous chapter, the pin-up most often consists of a small panel of professors judging and commenting on the student's work, while the rest of the class observes. This chapter uses the situation of the *pin-up* as an example on the basis of which the broader topic of how to assess quality in architectural projects can be discussed.

Architecture largely frames our lives. Whether we have an interest in the topic or not, the physical structures of architecture are more or less forced upon us. The habituality with which we interact with architecture is perhaps what links it so strongly to personal worldviews and ways of organizing our private lives. And here a profound difference between architects and non-professionals sets in. Part of an architect's professional duty is to create structures not just to a personal taste, but for the betterment of society – or at least not for its detriment – through architecture.[7] Normally, an architect creates something that is for someone else; it cannot be satisfactory if it is agreeable only to the architect herself. What is more, although an architect is perhaps partly an artist, the architect is bound by practical and ethical matters that do not limit the artist. For example, it must be considered unethical except for in a very few cases – Libeskind's Jewish museum in Berlin, for instance – to strive to create spaces that would cause displeasure. In other

[4] KADK, *Studieordning for bacheloruddannelsen i arkitektur, Chapter 4,* § 5, part 4.1. Own translation from Danish.
[5] KADK, *Taking Place, Årsplan* [Year Plan], 21. Own translation from Danish.
[6] KADK, *Studieordning for bacheloruddannelsen i arkitektur, Chapter 3,* § 3, part 3. Own translation from Danish.
[7] As an example ,the Boyer and Mitgang report from 1996, which surveyed American architecture education, had among its recommendations "an enriched mission" in which they recommended that "schools of architecture should embrace, as their primary objectives, the education of future practitioners trained and dedicated to promoting the value of beauty in our society, the rebirth and preservation of our cities; the need to build for human needs and happiness; and the creation of a healthier more environmentally sustainable architecture that respects precious resources." Boyer and Mitgang, *Building Community*, 26-27.

words, the architect should, at least in theory, create spaces that would be pleasurable and interesting not just for herself, but also for another, for a set of sometimes undefined others, or simply for *everybody*. This is why, in architecture, questions about aesthetics and aesthetic judgment are not faint theoretical issues, but are vitally important problems for the architect and not least for the architectural educator.

In Chapter 2, I linked the problem of how to evaluate architectural school work with a question of rigor: how an educator can help students onto paths where they do not simply design to their own tastes (or to those of their educators), but attempt to ensure that the project has broader appeal. Accordingly, in architecture the famous Kantian distinction between the agreeable [*Angenehme*] and the beautiful [*Schöne*] becomes relevant. At its core, this distinction captures the difference between whether we judge something to be agreeable for ourselves alone, or whether we judge it to have extra-personal or universal value, i.e., to be beautiful: "...by the judgment of taste (upon the beautiful) the delight in an object is imputed to everyone."[8]

Roughly sketched, Kant's argument is that in judgments of taste, it is not reason we rely on, but imagination, and judgment is therefore aesthetic and subjectively based on a feeling of pleasure or displeasure as an effect of perception.[9] For something to be accepted as beautiful, the basis of the judgment must be disinterested, or indifferent.[10] If one is in any way partial, then according to Kant, the object one delights in cannot be beautiful, but merely appealing or good.[11] Inasmuch as judgment of the beautiful is not connected to any private interests, and although it is purely subjective, one assumes that the feeling of pleasure is not simply personal, but rather universal – without being connected to any qualities of the object: "Accordingly he will speak of the beautiful as if beauty was a feature of the object, and the judgment was logical (forming a cognition of the object by concepts of it)."[12] Or as Kant concludes, the definition of beautiful must be that it is "that which, apart from a concept, pleases universally."[13]

The agreeable, on the other hand, emerges where we are not disinterested in our judgments, and therefore must assume that we find pleasure in it because of our interest. The Kantian definition of beauty is relevant to architecture education because it can help guide judgments of the beautiful where there are *no rules* – i.e., there is no logical basis – for the judgment. This is the case particularly in a contemporary context. In previous systems, like the Beaux-Arts, there were to a much greater extent rules for what would

[8] Kant, *Critique of Judgment,* §8, 45. In German: "…das Geschmacksurteil (über das Schöne) das Wohlgefallen an einem Gegenstande jedermann ansinne," Kant, *Kritik der Urteilskraft.* §6, 48-49.
[9] Kant critique of judgment §1 – 203, 35.
[10] Kant, *Critique of Judgment,* §2,
[11] Kant, *Critique of Judgment,* §4 og §5
[12] Kant, *Critique of Judgment,* §6 - 211, 43. In German: "Er wird daher vom Schönen so sprechen, als ob Schönheit eine Beschaffenheit des Gegenstandes und das Urteil logisch (durch Begriffe vom Objekte eine Erkenntnis desselben ausmachend) ware" Kant, *Kritik der Urteilskraft.* §8, 51.
[13] Kant, *Critique of Judgment,* 51. In German: "Schön ist das, was ohne Begriff allgemein gefällt," Kant, *Kritik der Urteilskraft,* 58

be considered beautiful, or at least for what could *not* be considered beautiful. Similarly, the functionalist tradition must be said to have had a rather stringent framework for what could be considered good architecture. Today, however, and particularly in a postmodern context, such systems have largely been abandoned. This leaves students to grapple with the enormous problem of what beautiful architecture is. This became apparent, for instance, in the historical interviews, where some participants remembered high levels of insecurity around what was expected of them and how to produce it, and were critical of the evaluations that their work sometimes got from teachers.[14] One can of course argue that it is perfectly possible to build buildings without the slightest regard for aesthetics – or in Kantian terminology, to educate architects only in the parameters that can be argued for logically, like constructions and measurable qualities of the building. However, the Danish architectural tradition is linked tightly to the artistic sides of architecture, and therefore also to its aesthetic sides.

How, then, is it possible to educate students in taste without falling into what the philosopher David Berger, in his analysis of the agreeable and the beautiful, has called not the cultivation of an individual's taste, but its suppression? That would be the case in the Beaux-Arts system, and perhaps in functionalist architecture; but it is certainly also the case with arbitrary and incomprehensible judgments of taste from professors in general. Before moving to concrete examples, a proposed framework for evaluation practices is now considered.

6.2: AN EVALUATION PROCESS FRAMEWORK

An intensely debated subject within design pedagogy is the assessments of work, or frameworks for assessments of work in design studios.[15] The uptick in this type of literature perhaps points to the trending demand for justifying the practices and evaluations of design. Yeonjoo Oh, Suguru Ishizaki, Mark D. Gross, and Ellen Yi-Luen Do's 2012 study is typical of this – not least in its critique of instruction and critiquing practices. Oh et al. describe the problem as follows:

> "While practicing architects no doubt bring a great deal of experience to the studio, their teaching methods are often based only on their own learning experiences or on intuition (Grasha, 1996). They often cannot articulate what instructional method they are using, or is appropriate, for a specific condition."[16]

While the problem addressed above is the more general one of judgments made during the course of regular teaching, the pin-up situation frames the problem even more sharply. Some participants in both the *Taking Place* study and the historical interviews addressed issues around this. One student in *Taking Place*

[14] See Chapter 4.3.3.
[15] See, for example, Utaberta and Hassanpour, "Reconstructing a Framework for Criteria-based Assessment and Grading in Architecture Design Studio." And Oh et al., "A theoretical framework of design critiquing in architecture studios."
[16] Oh et al., "A theoretical framework of design critiquing in architecture studios," 303.

experienced that one of the jurors, in particular, never really critiqued her project, but simply did not like the general task her class had been given.[17] In an even more damaging account, Jeanette Frisk explained that even though her first years in the school were successful, she

> *"didn't really know what it was that I did correctly – Also because the criticism that I got on the projects […] sometimes there was wild disagreement between the teachers. Where it was all related to the power struggles between the seven or eight people who evaluated it all. The Black Wall. That's what I used to call it. Would it go through? Was there an opening? Or were they united in agreement? So much happened there that it as a student made you think 'This has got nothing to do with me, but it does heavily influence how I view my abilities.'"*[18]

To clarify and support the teachers' procedure when judging work, whether in a pin-up situation or at the desk-crit, Oh et al. propose a process model for reviewing in six steps: "*(1) observation; (2) noticing; (3) identification; (4) sequence; (5) delivery types and communication modalities; and (6) delivery.*"[19] Steps 4-6 relate to the rhetoric and communication of the judgment, and are not particularly relevant for this inquiry (though they are certainly important), whereas steps 1-3 have to do with the judgment itself. Oh et al. explain the first steps of the model as follows:

> "When a student explains his or her design work by showing the studio instructor drawings and physical models, the instructor listens and observes what the student has presented (observation). Upon noticing problematic and promising aspects of the student's work (noticing), the instructor must clearly identify the issues and why they are problematic or promising based on understanding the immediate learning goals (identification). We separated the identification step from the noticing step because identifying problematic or promising aspects of the student's work requires some deliberation, whereas noticing may be done intuitively."[20]

This model is not founded on any great amount of theoretical reflection on perception and judgments of taste. While the model seems adequate in some areas, in the aesthetic dimension, at least, the "identification" step seems problematic. For if one follows the Kantian line of argument, as introduced in the previous section, an aesthetic judgment is not founded on properties or issues at all. And this would render the model impracticable – at least for evaluating aesthetics.

The architecture school aims to train the students not only in the technical production of a structure, but also in the production of aesthetically pleasing architecture; accordingly, a revised model is needed. For clarification, I would like to rename the three steps so that the first step is *perception*, which is to be understood as a more open activity than observation, which is directed. Perception could also include more senses than the visual; its more open character would emphasize the possibility of noticing something one was not looking for. The next step, which would be the *judgment*, is arguably distinguished somewhat

[17] See chapter 5.2.2.
[18] Jeanette Frisk # 17:31,3 - 18:15,5.
[19] Oh et al., "A theoretical framework of design critiquing in architecture studios," 316.
[20] Oh et al., "A theoretical framework of design critiquing in architecture studios," 316-317.

artificially from the first, given that it has at least been argued that aesthetic judgment is instantaneous.[21] Nevertheless, the point of the separation would be to mark the difference between perception and judgment. Whether judgment is instantaneous or not, it is still based on and not exactly the same as perception. Furthermore, there are instances where it is not an aesthetic judgment, but a judgment based on properties, which would not really be a judgment but a deduction, and therefore not be instantaneous. What would determine this would be the third step, which I would like to call *justification*. This term indicates that there can be different types of justification, rather than the somewhat essentialist-sounding *identification*, which suggests that only one type of identification is possible.

This last point is not inconsequential. What Oh et al. do not discuss is what one might call the abilities and different perspectives that the critic or architectural educator relies on in the critique, such as both aesthetics and technical criteria. Because of architecture's syncretic nature, the critic must also review on different levels, as well as make a holistic review. Some of these levels are technical, and can be laid out relatively straightforwardly in normative terms; others are more academic, and are also subject to an argument, at least as a basis; yet a third level is aesthetic. The process framework that Oh et al. propose simply lacks these nuances, which could perhaps contribute to a more rounded and better-founded criticism. The problem thereby migrates from the theoretical space to the everyday work at the architecture school. Accordingly, after these more formal deliberations, I will now turn to the practical evaluation situation, where teachers have to assess students' work largely on an aesthetic basis. I will conclude by proposing a different model that attempts to incorporate these practical nuances; but before that, a look at examples of judgments at a pin-up will serve as the basis for arriving at a better understanding of some of these nuances.

FIGURE 6.1: Critique at *Taking Place*
Fieldnotes, October 31st
KADK, 2014

FIGURE 6.2: Critique at *Taking Place*
Fieldnotes, October 31st
KADK, 2014

FIGURE 6.3: Critique at *Taking Place*
Fieldnotes, October 31st
KADK, 2014

[21] Ngai, "Merely Interesting," 816.

6.3: EXAMPLES FROM A PIN-UP

The pin-up took place in a smaller section of a large open space created with wooden bulletin boards. On the boards surrounding the enclosure, a handful of students at a time put up their drawings, and a large cityscape model was placed in front of the small panel of professors. The panel present at the critique consisted of the three teachers in the studio and two external professors, one of whom was clearly of high rank in the school's system. Because the situation depicted here is intended to function as an example that enables a more general understanding, some empirical details have been removed from the description. For instance, the identity of the participating teachers as well as their statements have been condensed and reconstructed on the basis of my field notes, instead of using direct quotes.

Diana's project was a tower as a landmark of the city structure. Following a brief presentation of the project by Diana, the high-status external critic A, as is typical, gave the first response:

> ***A (external – high status):*** *I'm a little hesitant, you have very handsome photos, very beautiful drawings, but they are difficult to read, a peculiar and interesting setup. There is a principle of composition, but it is difficult to assess what that has to do with Scarpa or the city.*
> ***B (internal):*** *A fine drawing, but it could perhaps relate better to the model.*
> ***C (internal – high status):*** *I always sensed that your way of working was to let things grow out of the material.*
> ***B (internal)****: When I look at the big drawing, it makes me think of bizarre perspectives from the model.*
> ***D (internal):*** *Something that is strong is that you have placed yourself on top. Nice material that has ended up in a beautiful, sort of quirky spot.*
> ***Juror E (external - has just arrived)****: Now I've just plunged into it. There is something nice about the middle strip, maybe it would have worked better though with a frontal camera.*[22]

As remarked in Chapter 5.2.2, problems with pin-ups are usually connected to an experience of subjective or unfounded evaluations. Diana did not experience her critique positively, but was struck by the external juror's (Juror A) scepticism about the assignment in itself. Diana's experience was therefore that she did not really get feedback on her work.[23] Juror A's reservations about the assignment had been voiced in earlier critiques, and did not seem to influence the critique that Diana received directly, but rather formed its backdrop. Neither of the jurors are particularly clear in their feedback on what works or not, or how they saw it working. The most tangible remarks are those of jurors B, D, and E, though both B and E also gave mixed verdicts ("it's nice, but ..."), and neither the remark about the frontal camera nor that about the relation between the big drawing and the model was expanded upon. Juror A praises the beauty of the project, but only hesitantly, because he does not perceive a connection between the project's construction principle and the works of Scarpa or the rest of the model city. Juror C is not very specific, but does remark on and praise

[22] Fieldnotes 26th of January 2015 – after lunch.
[23] Diana 1 # 12:27,0 - 13:17,0. See full quote in Chapter 5.2.2.

the fact that the construction principle grows out of the project's own frame. Looking at the example more generally, there are many things to unpick, but I shall make do with just two.

First, in the critique the project is assessed solely on its visual qualities. The multisensory experience of the built work can only be imagined. The project is rather abstract, and definitely not yet at the level of technical drawing; nevertheless, all members of the jury comment on the material as objects, and do not actually comment on the kind of sensual experience that one might imagine having in such a space. There is a danger here that the architectural drawing, in particular, becomes a "painting" rather than architecture, and so is reviewed solely on the basis of its pictorial surface qualities.

Second, the pin-up is not simply an assessment, but is also intended to be a learning situation. This is not straightforwardly the case, however, because with regard to aesthetic judgment, at least in a Kantian sense, there would be no underlying cause, and no concept on which to found the judgment. One could argue that this is the reason why none of the jurors attempt to explain why they find parts of the project beautiful. It is perhaps true that we cannot compel others to have a similar aesthetic experience of an object as our own because the "beauty" is not a property of the object. But if this is so, then in "aesthetic education," what do you do? Perhaps it is so that one cannot logically prove that something has aesthetic value. Nevertheless, one can direct others' sensory attention: you can invite them to experience something just as you do. By directing others' attention to particularities, one can describe an experience in such a way that others come to imagine the experience themselves, and perhaps come to share it. Perhaps if such strategies were applied, rather than simple praise, the situation would be more educational.

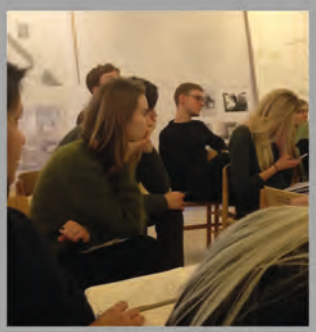


FIGURE 6.4: Critique at *Taking Place*
Fieldnotes, January 26th
KADK, 2015

FIGURE 6.5: Critique at *Taking Place*
Fieldnotes, January 26th
KADK, 2015

FIGURE 6.6: Critique at *Taking Place*
Fieldnotes, January 26th
KADK, 2015

If we turn to another example, still more perspectives will emerge. In his project, Mark worked with the program *passage* or *passageway*. Standing in front of his drawing material and a photo series, Mark began by explaining his work process, for instance, how he worked with the notions of *skidding* and *distortion*.

> ***Juror A (external – high status)***: *I don't really understand it. Those oblique angles, where do they come from?*
> *[Mark explains]*
> ***Juror A (external – high status)***: *The big drawing is very elegant. It is a field where everything is equal, and it relates to the plaster cast model and the other drawings, which seem much more composed.*
> ***Juror D (internal)***: *It is a little locked in its structure, but good that you have demanded answers from it so stubbornly.*
> ***Juror A (external – high status)***: *I like that it grabs hold of something outside the model.*
> ***Juror C (internal – high status)***: *Juror A gives a good reading, but it is also good to see the photo series, where you create a family of features. Maybe there is a lack of attunement to the big drawing, but I am crazy about the photo series.*
> ***A (external – high status)***: *The large map has some similarities and some differences. The question is how expressive it can be if it is still to fit into the frame of the city.*
> ***Juror D (internal)***: *In the map from Rhino, one has to find a geometric logic to build it.*
> ***Juror E (external)***: *It is a very good large drawing; I can find parallels in the model. It is working with the cube, it is working with lamination or steps. So, I don't understand it, when it becomes about its shape. I like the "family" and the series, where it starts working with the surface and its terraces [points to second row of photos], where you find logics in its way of working.*
> ***Juror D (internal)***: *It really is your own expression – it is good work. You have been stubborn and persistent and worked your way through things.*
> *[Jurors A+C has left the room during the last few remarks – juror C returns a little later.*][24]

The students in both of these examples got reasonably positive feedback from the jurors, even though Diana perhaps did not experience it as such. Moreover, in the example with Mark, the jurors are more specific: Juror E's remark, in particular, references and relates to specific *form-giving* strategies: *the cube*, *lamination* etc. Juror D evaluates mainly on the background of her knowledge of the process, a sort of work process evaluation. Juror C, apart from supporting the assessment of Juror A, although without any specifics, points especially to the photo series, which she finds "create a family of features." Juror A, as in the previous example, does give a few verdicts without substantiating them and without much elaboration, but in Mark's case also asks questions about the coherence of the project, such as where the oblique angles come from and how they relate to the rest of the project.

When looking at these examples, it is difficult to reconcile Oh et al.'s model – although it is of course intended as aspirational – with what was actually observed. The first two steps are naturally unobservable, but the identification step is also somewhat lacking, although more prevalent in the second example. The main problem with the model, as argued in the previous section, and which becomes clearer when considered in this empirical context, is that not all of the judgments are made on the same basis. In these two cases, some are aesthetic ("*The big drawing is very elegant*"), whereas others are based on internal coherence ("*it is also good to see the photo series where you create a family of features*").

In the first example, none of the jurors actually attempt to imagine what experiencing this space would be like, which is probably due in part, as mentioned before, to the abstract nature of the material. In

[24] Fieldnotes 26th of January 2,015 – after lunch.

the second example, Mark is asked about some of the reasoning in his project; yet the remarks and feedback are more specific than in the first example, which still underscores a belief that the material "should be able to speak for itself."[25] Drawing is used in two specific situations, which are both communicative: one is to communicate thoughts and ideas about something to another; the other is a sort of conversation with oneself, aimed at clarifying and developing one's own thoughts and ideas. Clearly, there are conventions in architectural drawing: a crossed-over space means that it is more than one story down, etc., and we furthermore rely to a certain degree of recognition of mimetic relations between a drawn world and the world we live in. Both the conventional and mimetic allows us to understand drawings – sometimes even without extensive training. However, drawings could additionally be understood not just as representations, but as producing sensory experiences that are singular to them. The comment from juror C to Diana about the material growing "out of itself" seems to indicate something like this, as do many of the remarks and questions around the internal coherence in Mark's case.

The focus on the material or the dialogue with the material in these instances are similar to what Schön, in the absence of belief in more universal technical systems, has proposed as a basis for judgment. The practitioner, Schön argues,

> "*judges a problem-setting by the quality and direction of the reflective conversation to which it leads. This judgment rests, at least in part, on his perception of potentials for coherence and congruence which he can realize through his further inquiry*."[26]

For Schön, here, the argument is directed mainly at self-evaluation. But the basis would be the same for a teacher evaluation, possibly with the difference that the criteria related to operationality, at least in the situation of the pin-up critique, are less important in a completed project. When transposed from the problem-setting situation to the evaluation on completion, the focus simply shifts from *the potential for coherence and congruence* to *an investigation of coherence and congruence*. Earlier in the same chapter, still concerning the problem-setting, Schön suggests asking five questions:

> "Can I solve the problem I have set?
> Do I like what I get when I solve this problem?
> Have I made the situation coherent?
> Have I made it congruent with my fundamental values and theories?
> Have I kept inquiry moving?"[27]

These five questions cover roughly three criteria, which one might call *subjective desirability* (Q2), *coherence* (Q3 and Q4), and *operationality* (Q1 and Q5). Whereas the two questions that address operationality are important when assessing one's own work, or for the teacher to assess whether the student's work is progressing in a promising manner, their value is likely more pedagogical, and not always relevant for the

[25] C.f. Lukas 1 #16:49,8 - 17:25,8. See also Chapter 5.2.2.
[26] Schön, *The Reflective Practitioner,* 135.
[27] Schön, *The Reflective Practitioner,* 133.

finished project. Question two, one might argue, is directed at the classic aesthetic judgment, the disinterested pleasure. Question three aims at a judgment that has no external criteria, but which cannot be called completely subjective either, because it looks at logics or criteria that are established only within the project itself. Question four, on the other hand seeks congruence with external criteria, and is as such more classically objective (if one must assign it a label). Observing these differences might form the basis for developing a more precise framework than Oh et al.'s for evaluating work in the architecture school context, which is the point of departure in the next section.

6.4. A MULTIMODAL EVALUATION FRAMEWORK

In section 6.2, I criticised Oh et al.'s process model for not taking into account different bases of evaluations: for not differentiating, for example, between aesthetic judgments and more technical judgments. In Oh et al.'s identification step, this difference can be exemplified by the difference between a teacher claiming, "I do not find this project promising because it is not attractive," or stating, "I do not find this project promising because the construction of it is impossible based on static principles." These two verdicts are not at the same level. They are different modalities, which can be equally important, but which are good to distinguish, perhaps especially in an educational situation. Furthermore, in section 6.2 I proposed that the steps be changed to 1) perception, 2) judgment, and 3) justification, recognising that some judgments would be unjustifiable (i.e., aesthetic; cf. section 6.1), and others still less intuitive and more analytic, therefore requiring an interchange of steps 2 and 3. In the examples in the previous section, there were two different types of judgments; in the model, I believe four should be included.

The first approach would be the classical one, leaning on Kantian theory, where beauty – though not founded on objective qualities – is experienced by a subject as universal. For lack of better terminology, I will call this universal beauty, as it is non-conceptual and non-qualitative, though experientially universal. This type of aesthetics, because it is *unfounded*, can result in justifications based on authority, as when professors act as superior judges of taste: "*It is beautiful because I say so and I am the professor*." This is obviously problematic in an educational situation, because there is no basis for the judgment that students can learn to understand. In the first example, for instance, Juror A can be said to make this type of authoritative judgment when he states *"Very beautiful drawings, but they are difficult to read"* without further elaboration or justification (not just because of my abbreviation of the argument). This can also be seen in a different student's pin-up, where he asks: *"What kind of a city is this? When I look at it, it reminds me of Dallas, where every man makes his own fortune*."[28]

[28] Fieldnotes 26th of January 2015 – after lunch.

A second type that is not represented in the two examples from the pin-up, but which should be considered anyway, establishes a judgment based on normative criteria. This kind of judgment is negotiated or socially constructed, and the criteria are assessed in accordance with professional standards, schools of style etc. In many ways the Beaux-Arts style would adhere to this type. There are rules or norms set up (for instance, particular styles: classical, Gothic, etc.), and the beauty of a building would be assessed by how well it conforms, for example, to classical standards of Roman architecture. An example of such a judgment could be of the type "I don't think this is how you would do it." An even clearer expression is found in an anecdote from the Danish architecture school in the nineteenth century, when Christian Hansen, a convinced neo-classicist, is reported to have criticised a student's work saying "*what is that excrescence?! Remove it! It is not beautiful. The Romans would never have done that*."[29] While I say that this form is founded on norms, these norms are socially negotiated, and are not necessarily stable; in that way, there are some connections to the first type of judgment. The problem with this type of aesthetics is of course that it is conservative. As we saw with Harbeson, it only has a capacity of recognising incremental change, whereas the radically new – like Sullivan's architecture – is incomprehensible.[30]

A third type of judgment that is also not represented in the examples from the critique focuses on the functional, where the judgment is actually justified by certain qualities possessed by the project. This is a technical judgment, where the object is assessed according to its function. Such a judgment is not a judgment of taste, but would perhaps be considered objective by some, reflecting the polytechnic paradigm's search for universal principles. However, scientific truths are paradigmatic, and so the basis of the technical judgment can change as the knowledge base that it is founded on changes. It could therefore be said to be the same type as type two. Yet because the outlook is different – technical rather than stylistic – I distinguish between the two.

Last, a fourth type is what I would call situated judgment, where something is assessed according to its coherence with itself. This is not, like the first type, completely unfounded; but it is founded only on rules, norms, and standards that are particular to the project, or singular. This type of judgment is found in both of the pin-up examples, and in those two examples, it is the one most used. Examples can be found in both Juror A's question about the oblique angles and Juror E's praise of the series for finding internal logics, as well as Juror C's comment to the effect that Diana's project grows out of its own premises. Situated judgments that refer to internal composition are negotiated incessantly, not simply in a social context but in a material dialogue within the project as well. The problem with this sort of judgment is, of course, that it is in danger of closing a project around itself, and does not necessarily ensure, in the case of architecture, that

[29] Kryger, "'Græsk stil' eller 'alle fortidens stilarter,'" 204. Own translation from Danish.
[30] See Chapter 2.1.4. And Harbeson, *The Study of Architectural Design*, 27.

the project's appeal extends further than the dialogue between the designer and the material. In a design education context, however, situated judgment is helpful because it focuses on the students' ability to detect the feedback from the material.

All four of these types of judgments can be related to three of the questions that Schön proposes the practitioner ask when evaluating his own work. Question two, "Do I like what I get when I solve this problem?" is, as argued, the classic aesthetic judgment, the disinterested pleasure, or the type one judgment. Question three, "Have I made the situation coherent?" is concerned, like the fourth type of judgment, with internal coherence. But question four, "Have I made it congruent with my fundamental values and theories?" searches for congruence with external criteria, and is associated both with judgment type two and three, which as mentioned are similar, albeit with different outlooks. Because all of the judgment types have weaknesses and strengths, it could be argued that criticism would be most rounded through the involvement of several types of judgment. This leads to the proposal for a multimodal model inspired by Oh et al.'s initial model that perhaps could serve as guide in evaluation of work in architecture school. The first step, perception, does not come with any prescriptions other than an open approach; whereas step 2, judgment, would be answering the question: Do I like this project, this proposal for how to solve this problem? Step 3, finally, would concern justification, and would answer the question:

Do I like the project because:

1. it is congruent with principles and values of a technical nature? For example: I know that this is a stable construction, etc. (The juror is looking for technical congruency)
2. it is congruent with standards, theories and values within the practice community? For example, red brick is widely used in Denmark, and the other houses in the street are also red brick, so it will fit well materially. (The juror is looking for relations to practices, including past practices)
3. The situation is congruent in itself, adheres to its own system? For example: The project sets up a system of twisting angles in a particular way, and this system is what shapes it. (The juror is looking for internal "logic")
4. For no discernible reason or quality that I can point to, but as I have no interests invested in liking it, it seems to me to have qualities that all should be able to perceive and appreciate. (The juror can find neither objective qualities, relations or internal logic – but still like it)

I will not pass judgment on whether the different types of judgments described here should be set in a hierarchy, but will merely say that creating awareness of a *system of justification* as such might both help jurors to form more well-founded criticisms. Furthermore, it might help students better understand the terms on which they are critiqued, which in turn would perhaps help them understand their work better in

the complex context that it engages in. Last but not least, awareness of a system of justification behind the judgments might help justify the process in itself, and thereby also justify including criteria other than, for instance, simply technical ones.

6.5: SUPPRESSIVE AESTHETICS IN ARCHITECTURE SCHOOL?

In this last section, as a sort of critical perspective on the framework developed in the previous section, I shall investigate two questions pertinent to evaluations in the aesthetic context of architecture school pin-ups. First, echoing Berger's remarks introduced in 6.1, is it possible to educate within aesthetics without suppression? Second, and a bit provocatively put: if aesthetics are so troublesome to both evaluate and teach, would we not simply be better off leaving aesthetics out of architecture education? Why do we need beautiful architecture?

Architecture school pin-ups are notoriously described as harsh and as a sensitive situation for students to be in. In her interview, architect Jeanette Frisk reflected uncandidly on why the architecture school pin-ups are far more sensitive than regular exam or evaluation situations:

> *"When the only point of departure is our own aesthetic deliberations, when it's the only thing we are trained in […] when I have not been taught to be out exploring a space outside of me […] that is, have done research. Then I can only base it [a project] on my own intuitive decisions. Then it is my lifeblood, my baby hanging there […] so when it receives a bad criticism… but it's also their way of doing it […] they were very harsh back then."*[31]

From Frisk's point of view, it is the sole reliance on aesthetics that creates the vulnerability, warranting the question why, if aesthetics deliberations so troublesome, do we want to include them in architectural education? Would it not perhaps be better and more contemporary to dispense with the old notion of the beautiful, instead of new categories – for example the interesting, along the lines of what philosopher Sienne Ngai has suggested? She explains:

> "it was Schlegel who first set the interesting, which he associated with the art of modernity, in explicit opposition to the beautiful classical poetry of the Greeks. While die schöne Poesie of antiquity is objectively rule-bound, universal, and disinterested (as befitting a culture in which, supposedly, no metaphysical gap exists between man and nature and no striving is therefore necessary to represent the ideal), die interessante Poesie is restlessly subjective and idiosyncratic,"[32]

While the interesting, rather than the beautiful, would certainly fit some works of architecture better, it is rather more uncertain whether it would truly be desirable to have an architecture that strives for the interesting rather than the ideal of the beautiful – and, following this, educating with an eye for the interesting rather than the beautiful. Ngai, after all, is writing based on art, not architecture, for which the

[31] Jeanette Frisk # 18:30,2 - 19:43,2.
[32] Ngai, *Merely interesting*, 782.

"restlessly subjective and idiosyncratic" is not problematic in the same way that it would be for architecture. On the very first pages of the book *Built Upon Love*, professor of architecture Alberto Pérez-Goméz writes:

> "Despite our suspicions, architecture has been and must continue to be built upon love […] this foundation possesses its own rationality, one that the built environment will not follow if it is based on premises drawn from normative disciplines or abstract logical systems."[33]

The lines contain a warning not to subjugate architecture to certain logical systems and norms, but advocates for, one is tempted to say, the irrational "qualities" of love – or beauty. Beauty, if we adhere to the Kantian definition, is irrational, subjective, and non-normative. But it also reaches out towards the collective, through the experience of the beautiful as universal. The category of beautiful undoubtedly has its pitfalls; yet nonetheless – and this is especially important in architecture – it at least aims to avoid the idiosyncratic. When working with form in architecture, beauty is indispensable, as it is what reaches out beyond the subjective taste of the architect. It is what reaches for the common through the subjective, and it can thus be seen, as argued in chapter 2.4.2, as part of rigorous work in architectural design. But as was also argued in that chapter, the polytechnic and Beaux-Arts paradigms largely avoid this problem of rigour due to rule adherence, though this raises the danger of suppression through norms, which in turn undermines the novelty and creativity so often sought in architecture. When Ngai recommends the category of the interesting rather than the beautiful, this is also part of her reasoning.

> "The interesting thus shows a way out of the deadlock between the old idea that the task of criticism is to produce verdicts of artistic greatness and mediocrity or of success and failure, and the more generally accepted idea that criticism should try to purge itself of aesthetic evaluation entirely (since, given its institutional context, it cannot help but tend to reproduce values already set in place)."[34]

The question, to repeat, is whether it is possible to educate in taste without falling into what David Berger, in his book on Kant's aesthetic theory, has called not the cultivation, but the suppression, of an individual's taste.[35] Berger argues that any attempt to connect cognitive and aesthetic normativity is perilous because cognitive and linguistic normativity operate in a shared social context; and taste, in his view, is and must remain robustly founded in the individual, or rather, in the Kantian terms explored previously, subjective and non-conceptual.[36] Berger's argument is partly reflected in what Jeanette Frisk too, with a hint of sarcasm, recounted about an uncanny regimentation of students' tastes, both in clothes and projects:

> "*Steadily after the second year we all dressed in black and drew things that were erect and very tall, or things that were horizontal and very long.*"[37]

[33] Pérez-Goméz, *Built upon Love*, 3-4.
[34] Ngai, "Merely interesting," 815.
[35] Berger, *Kant's Aesthetic Theory*, 22.
[36] Berger, *Kant's Aesthetic Theory*, 21.
[37] Jeanette Frisk # 15:23,4 - 16:14,5.

The challenge here, if one were to sketch it up rather simply, is how to train students to create architectural projects in which they establish their own language, their own aesthetic expression, or, in other words, the singular work. One of David Shaffer's key findings in his study of the Oxford design studio is that:

> "…the architectural idea is never right or wrong, but only more or less well-expressed as a solution to a particular design problem."[38]

Here the semester studio project becomes a highly individual shaping of identity in aligning individual and (professional) community perspectives.[39] Shaffer's analysis is apt because it captures the multimodality necessary to circumvent the suppression of the individual through rule-bound aesthetics, but at the same time allows for a certain alignment. What remains unanswered, however, is whether it is perhaps also possible to understand how we make sense of, and potentially share, aesthetic elements of drawing. For otherwise, and even with a multimodal evaluation framework at hand, we are left with a model that still offers us no way of explaining aesthetic elements, let alone teaching them. As argued in section 6.3, even if there is no way of justifying an aesthetic judgment, no properties or concepts to point to, then perhaps one can still direct the sensory attention of others – invite them to experience something the way that you do.

That is an artist's occupation. Yet by orchestrating sensory impressions, is it not possible to adequately convey an experience, to let others imagine the experience themselves, and perhaps come to share it? This demands artistry from architectural educators, but it need not be suppressive; rather, it could be opening. Another route might be a deeper investigation of how drawings work as communication. In language philosophy there are examples, such as Gricean implicature, of how one can attain implied meanings in sentences without either the actual semantic component or a convention present.[40] Perhaps indeterminacies in drawings can be understood in a similar way. In the absence of such investigations, a framework like the proposed multimodal one, though not without challenges, could still be useful, particularly given Frisk's account of her problematic experience of the pin-up, in which the sole focus on aesthetics was the root of the problem. The multimodal evaluation framework would mitigate against this; and in any case, aesthetics are indispensable, not only in the potential finished building, but also during the phases of project development and education, where thinking happens through drawing.

[38] Shaffer, "Learning in Design," 120.
[39] Shaffer, "Learning in Design," 121.
[40] Grice, "Logic and Conversation." Pfister,"What is implicated," 77-91. Neale, "Paul Grice and the Philosophy of Language."

CHAPTER 7:
THINKING THROUGH DRAWING

INTRODUCTION: DRAWING RELATIONS

> *"As an agenda and a mnemonic, a form of dialogue as well as a visual guideline, the drawing serves as both the subject of conversation and the object of our endeavors."*[1]

Drawing is, as Edward Robbins suggests in his book *Why architects draw*, not just a subject of conversation and an object to be worked on, but as is obvious in the English language, it is both an object: *a drawing*; and an action: *I am drawing*. Robbins is interested in how drawing is used in what he calls the social production of architecture, and how drawing bridges different aspects of architectural practice.[2] Architectural drawing is not simply a human activity but moreover a tool, and therefore the relation between the drawer and the drawing cannot be ignored. An architectural drawing only becomes a tool through the hands and heads of human beings. Yet it is not so much the subject behind the drawing who is of interest to this project, but rather what a drawing enables, along the lines of what Mark Hewitt has said:

> "It is clear that drawings represent more than their architectural subjects. They are key elements in the intellectual history of art as well as fascinating, if murky, windows to the imagination."[3]

To focus on architectural drawing as straightforward representations of architects' ideas would be as flawed as a sole focus on the relation between building and drawing. Philosopher Graham Harman reminds us that:

> "Works of art and architecture are misunderstood if we reduce them downward to their physical components or upward to their socio-political effects, despite the occasional attempts within those disciplines to do just that."[4]

Harman of course argues for an object-oriented philosophy, although such a radical proposal is not quite necessary here. I do not wish to reduce drawings to just physical components and their communicative effects - duomining in Harman's terms. A drawing is somehow more than what it consists of and how it is used. It cannot be separated from its context and it cannot be reduced to its material, physical components. Rather, to build on Hewitt's metaphor from before, the windows might be of interest. The windows are the inseparable connection between drawing, drawer, and world and the *murkiness* points to the fact that they do not perform this connection without interference: they mediate. The questions that arise are many: "how do they work?" "how are they made to work?" "how do they frame?" and particularly "how are they *murky*?" and "what does that *murkiness* do?"

[1] Robbins, *Why Architects Draw*, 3.
[2] Robbins, *Why Architects Draw*, 5.
[3] Hewitt, "Representational Forms and Modes of Conception", 9.
[4] Harman, *Immaterialism*, 12.

In Chapter 2.4.2. I posed the research question: *How is thinking through the act of drawing taught and how is it carried out by the students in their drawing process?* The question is equivalent to the questions asked with the murky windows metaphor, and is the main concern in this chapter. The question has also been addressed both in chapter 4 and 5 in relation to the empirical contexts, however this chapter collects those reflections and puts them into a proposed theoretical framework. I take as a point of departure three themes stemming from the empirical material regarding thinking and drawing. First, the theme that I have called *When Drawing Talks Back*, which addresses the dialogical exchange with the material. Second, the theme *Managing Mediation*, which concerns both how drawing mediates architectural thinking and how this mediation is operationalised. Finally, the theme *Knowledges in Architectural Drawing* where I argue that different types of knowledge are incorporated into architectural drawing. Although the three themes investigate what one could call stabilities in drawing, like the diagrammatic, mediation, and the dialogical, the themes also portray how drawing epistemologies are situated in particular drawing practices. In the final section, these reflections lead toward considering how the proposed framework of paradigms could relate to specific epistemologies.

7.1. WHEN DRAWING TALKS BACK

Drawing has a special role in design and architecture education, since much of the learning and transfer of knowledge passes through drawing rather than regular language. Drawing speaks, or at least communicates, to a degree where Corbusier, for example, is alleged to have said that he "*prefer[s] drawing to talking [because] it is faster and leaves less room for lies.*"[5] This intention of letting drawing speak – that it should be able to speak for itself seems a fundamental belief found in several instances of the empirical material.[6] It was detected in the paradox of *Taking Place,* where drawing was never completed, but always finished, which was understood to be, on the one hand, a sincere listening to what the drawings said – taking them seriously – and on the other hand, engaging in a continuous dialogue with them, believing that it would always be possible to extract more answers from them, more knowledge.[7] In chapter 4.3.4, the interviewed architects highlighted not only the function of drawing as communication, but also the function of drawing in a sort of self-communication capable of generating ideas, *making an image of your thoughts*, [8] or *seeking with a pencil*.[9] This relates to Juhani Pallasmaa's theory of unconscious thinking, from which ideas emerge

[5] Time Magazine. "Art: Corbu."
[6] See, for instance, Appendix 7, Lukas 1 #16:49,8 - 17:25,8.
[7] See Chapter 5 (5.4.2).
[8] Appendix 6 Lis Park # 54:10,6 - 55:53,7.
[9] Appendix 6 Carsten Hoff # 46:20,1 - 48:47,0.

through a process of embodiment in drawing.[10] I would like to propose, however, that some of these creative processes might be better understood through an investigation of how a subject relates to drawing not as embodiment, but as a dialogue partner. Drawing mediates between subject and world in different ways. In the words of Edward Robbins:

> *"Drawing, as idea and as act, embodies within itself the relation between society and culture, the relation between realization and imagination, and the relation between object and subject."*[11]

Understanding more specifically how drawing mediates between subject and world is the foundation for beginning to understand how and why drawing is practiced as a form of mediated thinking. It is also vital for asking how different drawing technologies might influence architectural thinking. A framework for structuring such inquiries may be found in the branch of philosophy of technology known as postphenomenology. Postphenomenology was conceived by technology philosopher Don Ihde, who took Heidegger's phenomenological interest in the human-world relation as a point of departure. For Ihde and in postphenomenology generally, the main interest is to investigate how the human-world relation is mediated through technology, which can be drawn up schematically:

I – technology – world[12]

In other words, postphenomenology investigates how technologies relate subject to world with the aim of looking critically at the development of knowledge, thereby examining both how we understand ourselves and the world and how technologies are co-constitutive of us and the world.[13] The analytical framework drawn up in postphenomenological theory is useful with regard to drawing in general, because drawing, as argued above, also involves a mediated human-world relation. When architects or architecture students draw, they explore, test, and form their ideas through drawing technologies and architectural thinking as mediated through drawing technologies – as we saw in Schön's ideas about virtual worlds.[14] The drawing establishes a new sensorial relation between the architect and the work in the making, and this sensorial relation is the foundation of new knowledge about the work. In a simple schematic it would appear as follows:

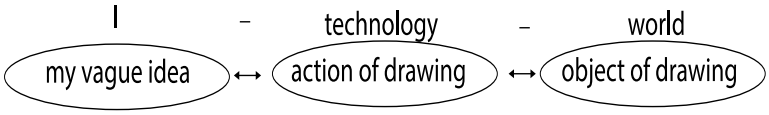


FIGURE 7.1: Technological mediation of drawing

However, drawing mediates between realization and imagination or between thought and world. As I

[10] Pallasmaa, *The Thinking Hand*, 92.
[11] Robbins, *Why Architects Draw*, 7.
[12] Ihde, *Technology and the Lifeworld*, 85.
[13] See, for instance, Rosenberger and Verbeek, "A Fieldguide to Postphenomenology," 31.
[14] See Chapter 2 (2.3.2).

have argued in the article "Thinking through the Screen," on a basic level there are two different types of drawings: ideational drawings and empirical drawings.[15] Empirical drawings represent some part of the world or reality, and are to a certain extent *d'après nature,* whether they resemble the objects they represent or not. Ideational drawings do not represent things or structures in the world, but derive from the imagination. In this light, the schema seems too vague because it does not capture the difference between empirical and ideational drawings.[16]

A postphenomenological framework becomes beneficial for investigations into architectural drawings particularly because it has a structured view on how technologies relate subjects to the world in different ways. Don Ihde has pointed to four different types of relations, each with its own characteristics and schematics: embodiment relations, hermeneutic relations, alterity relations, and background relations.[17] Drawing would seem to work through more than one of these relations simultaneously, as I have also argued elsewhere.[18] I do not wish to downplay the influence of what Ihde would call embodiment relations in architectural drawing, where the technology becomes like a part of the body working sometimes unnoticed, or with a high degree of *transparency*,[19] or hermeneutic relations where technology is used to read or interpret something about the world. Examples of the latter include reading the temperature off a thermometer,[20] or when an architecture student uses conventionalized drawing technology such as scale, perspective, and geometry as means to understand how her project will fit into a space. Nevertheless, the focus here will be on what Ihde calls alterity relations.[21]

Architectural drawing is a *mediation of thinking*, not just a representation of thought on paper or a screen. Architectural thinking is formed through the act of drawing, and drawing is thus not a neutral representation. When designers draw, they engage in a sort of dialogue with their drawing, exemplified for instance by Schön's notion of *back-talk.* As Schön has noticed, the practice can be described as a sort of dialogue. It should be noted that this is not only the case within the practitioner paradigm, as it also occurs for example in the polytechnic paradigm's attention to form generation from the material capabilities. Schön further embellishes the dialogue aspect when he describes how the practitioner, through the tool, asks a series of "What if" questions. I propose that this is what Ihde would call an alterity relation. In alterity relations, the subject interacts with the technology as if it were another. Ihde has exemplified this with computer interfaces that ask questions ("Do you want a

[15] Berling Hyams, "Thinking Through the Screen," 82.
[16] As argued in Berling Hyams, "Thinking Through the Screen,"83.
[17] Ihde, *Technology and the Lifeworld*, 72–123.
[18] Berling Hyams, "Thinking Through the Screen."
[19] For transparency see Ihde, *Technology and the Lifeworld*, 73-75. Rosenberger and Verbeek, "A Fieldguide to Postphenomenology," 14-15. For sedimentation see Rosenberger and Verbeek, "A Fieldguide to Postphenomenology," 25. Ihde, Experimental Phenomenology, 106-107.
[20] Ihde, *Technology and the Lifeworld, 84-85.*
[21] See Berling Hyams, "Alterity, Digital and Analogue," for more elaboration on the different relations.

receipt?") or robots. [22] It is the alterity relation of the mediation of drawing that, as shown in the Schön section, both enables and necessitates an architect to test a proposal through drawing. Ihde too has noticed the "independent-minded" plasticity of the material, though this, on the other hand, also casts off at times new and unforeseen but desirable results:

> "… one does not find anything like sheer plasticity of the material, over which the designer has anything like a transparency of control. Rather, one finds a process of interrogation of materiality and experimentation with it, which results – sometimes – in fortunate results."[23]

Ihde calls it a designer fallacy to believe that there is ever any real control over a material, or over the functions of a designed object. Postphenomenological theory is robustly neither technologically deterministic nor instrumentalist. Which in this case would mean that architectural drawing would never simply be an instrument or tool. And further, while there would always be a pushback from the drawing, this pushback would not amount to determinism, e.g., determining that digital drawing would necessarily result in less detailed, more boxy designs. The ontological core of this is the concept of multistability.[24] Multistability is a concept brought forth by Ihde, first in *Experimental Phenomenology*, based on drawings that can appear in different ways,[25] akin to the more famous duck-rabbit figure popularized through Wittgenstein's *Philosophische Untersuchungen*.[26] Multistability entails, in short, that technologies are not and cannot be viewed as simple instruments. They do have conventionalized stabilities (uses), but cannot be reduced to them.

Architectural drawing is a multistable technology on different levels, as it has different uses: idea development, communication, leisure, etc. It has different media: charcoal, fine line drawing, digital drawing, etc. Furthermore, drawing allows for a sort of imaginative multistability, as seen in Chapter 5 in the example of the student Lukas (section 5.4.1), who by *feeling*, rather than *explaining*, is practicing retaining a greater openness in his material, which can be interpreted in multiple ways. It may therefore be suggested that imaginative multistability in the idea development phase of architectural drawing is being deliberately used as the foundation of back-talk. Back-talk can only take place if there are some stabilities in the material, certain things that will not work; on the other hand, it also presupposes that the approach to the material be open enough that the student can see in new ways, i.e., that there are multiple stabilities in the material. Working with a conscious multistabilty approach to drawing is the basis for rigorous practice. The architectural drawing is multistable through its *thinness*, as I shall expand on in the next section. This *thinness* opens the drawing for multiple

[22] Rosenberger and Verbeek, "A Fieldguide to Postphenomenology," 18. Ihde, *Technology and the Lifeworld,* 98-100.
[23] Ihde, "The Designer Fallacy and Technological Imagination", 58.
[24] For a discussion of this see Rosenberger,"Husserl's Missing multistability." Or Ihde, *Postphenomenology and Technoscience*, 12, for his argument for multistabilities rather than Husserlian essences.
[25] Ihde, *Experimental Phenomenology*, 45-54.
[26] Wittgenstein, "Philosophie der Psychologie - Ein Fragment xi, 118," 204.

interpretations, and is linked to the drawing's diagrammatic function.

7.2: MEDIATION, DIAGRAMMATICS AND MATERIAL MANAGING

Both images and drawings are visualisations. Although we do distinguish regularly and definitely between drawing and image, it is rather a question of more and less. A particular drawing can be more drawing and less image. As Ulrik Schmidt and I have argued in the article "Drawing, Thinking, Making," drawing is always somewhat incomplete, or thin, whereas images strive for a quality of "fullness". [27]

FIGURE 7.2: The Drawing between thinness and fullness[28]

The architectural drawing has a recipe–like character. It holds multiple possible actualisations. I therefore claim that all architectural drawings are somewhat diagrammatic, insofar as they are not images but relate in a direct way to a piece of architecture whether built, not yet built, or entirely fictive. This indeterminacy could be seen as an abstraction, but the diagrammatic drawings are not entirely abstract but rather constructive: they do not really represent something, but rather produce it. As Deleuze and Guattari write:

> "The diagrammatic or abstract machine does not function to represent, even something real, but rather constructs a real that is yet to come." [29]

In this section, I shall explore the architectural drawing as diagrammatic, first by briefly sketching up the diagram theory as found in Frederik Stjernfelt's book *Diagrammatology*, inspired by the concept of diagram of American philosopher C.S. Peirce, and then expand it with the Deleuzian *logic of sensation*, which adds form-giving abilities to the diagram.[30] Although Stjernfelt does not approach diagrammatics from an architectural viewpoint, his reflections are applicable to the present investigation, as they are of a general nature. The diagram in Peircean semiotic theory is part of the system of signs – more precisely it is an icon. Icons are similar to their objects in a way that does not rest on them *seeming alike* but on their *behaving similarly*. Stjernfelt writes:

[27] Schmidt and Berling Hyams, "Tegning, Tænkning, Skabelse."
[28] Model translated from Schmidt and Berling Hyams, "Tegning, Tænkning, Skabelse."
[29] Deleuze and Guattari, *A Thousand Plateaus*, 157.
[30] To some extent, parts of this section are a condensation and slight rewriting of arguments made in Berling Hyams, "Diagrammatic thinking." The ideas around the diagrammatic were initially developed in my master's thesis. Christensen-Dalsgaard, "The Diagram – Thinking with Drawing in Architectural Education." See also Appendix 11, which contains Berling Hyams, "Diagramming the In-between" and Berling Hyams,"Diagrammatic thinking" where I have worked with the ideas on the diagrammatic in greater depth.

> ”it does not matter whether sign and object for a first (or second) glance seems or are experienced as similar; the decisive test for iconicity rests in whether it is possible to manipulate the sign so that new information as to its object appears.”[31]

In other words, a diagram and its object do not necessarily look alike, but act and react in comparable ways. A similar way of thinking seems to be deeply rooted in architectural drawing. The student can learn something about buildings by drawing them – and here what is important is not whether elements in the drawing look like the reality to which they point, but that they behave in similar ways. All diagrams are in this way *abstractions* that do not seek a mimetic relation to their object, but rather aim to sketch structural elements: hence their thinness. In this we find a general legitimization of drawing as an experiential tool. The reason that architectural drawing is important in the training of architects is because students gain experiences from the drawings that they then transfer not only to other drawings, but also, in the end, to buildings. Here one can, with Stjernfelt, lean on Husserl’s idea that through ideation, we can gain adequate experience even through free fantasy.[32] It is a sort of basic premise for drawing that the experiences made through the diagrammatic drawing are similar to those one could get from the object of the diagram. For architecture, this type of ideational experience is particularly necessary, as it would be practically impossible to get the same experiences from the objects of the diagram.[33] It would not be possible to build and rebuild entire cities, or even houses, merely to acquire experience or observe changes. This is of course especially true for architecture students, whose projects are seldom realized.

For Stjernfelt, the *operational likeness* of diagrams is closely connected to reasoning, because the similarity only can be grasped through deduction and not through pure perception.[34] The *operational likeness* between object and diagram points to the fact that their similarity should not be seen as a core around which changes occur, but rather as a pattern or structure that changes similarly under similar transformation rules. Because this similarity is operational and not visual, the relations that a diagram produces are understood through reasoning. Diagrammatic reasoning, however is a softening of deduction, because it is also dependent on observation of how a diagram works.[35] Nevertheless, a diagram demonstrates very tangibly an outcome of a scenario:

> ”It is, therefore, a very extraordinary feature of Diagrams that they show, - as literally show as a Percept shows the Perceptual Judgement to be true, - that a consequence does follow, and more marvelous yet, that it would follow under all varieties of circumstances accompanying the premises.”[36]

[31] Stjernfelt, *Diagrammatology*, 90.
[32] Stjernfelt, *Diagrammatology*, 185.
[33] Here I focus on drawings, but I would argue that the same is true for models, which would be diagrammatic too. There might, however, be different experiences available in the different media: models would lend themselves more to experiences of material, texture, light, etc.
[34] Stjernfelt, *Diagrammatology*, 102.
[35] See Berling Hyams,”Diagrammatic thinking – complexity handled between knowing and feeling,” 330-331, for more elaboration.
[36] Peirce quoted from Stjernfelt, *Diagrammatology*, 93.

As Peirce here notes, diagrammatic reasoning is not a laboured deduction, but something that comes almost as intuitively as our understanding of how percepts relate to the world around us. In this way, one can literally *see* the similarity with the object in the diagram.

However, all empirical visualisations – both images and drawings – are "thin" compared to what they relate to. A picture or drawing of a house only allows you to explore some visual qualities of the structure, not the feel of bricks or the smell of the wooden floors – although these would be normal sensory impressions from architecture in the real world. Visualisations are monosensory, and as such they can distort experience, or at least they tell only partial stories. Even though images strive towards "fullness", they too are monosensory and are never complete. For example, a thermograph of a house is a picture of a house, and not the house; the thermograph tells you one story about the house, and a photograph a different one. It is similar with different drawing technologies. For instance, a charcoal drawing of a street view lends itself to telling a story of light and shade, whereas a fine pen detail drawing of the same facade does not show light and shade, but shows instead, for example, the relation between different elements of the facade.[37] In this way, like other visualisations, drawings are narrative vehicles, and it is natural that their different narratives influence not only how we see the world, but also in the end ourselves. Because visualisations direct attention in a certain ways, they affect our perception of the world. Philosopher Peter Paul Verbeek calls the non-neutrality of technologies technological mediation, which results in a co-constitution between subject and world.[38] The *back-talk* of the drawing is dependent, on the one hand, on the drawing's sketch-like character that allows for multiple openings, and on the other hand on technological mediation and stabilities that pull investigations through a drawing in certain directions.

The particular material mediation of different drawing technologies, for example, seemed to be the aim of the way the assignments in *Taking Place* orchestrated a range of different techniques, as seen in Chapter 5 (section 5.3.3). The orchestration of the assignments allowed the architecture students to guide the *back-talk* from their projects within certain limits, and some of the participants in the *Taking Place* study already used different technologies' mediation to unravel a problem when they were stuck.[39] The different approaches to drawing found in Chapter 4 (section 4.3.2) further support this view. The participants here explained, for instance, how drawing 1:20 sections would lead to a greater attention to constructive detail, or how *human situations* drawn from the perspective of an imaginary but actual point of view in the room would steer attention toward human experience of the designed spaces. As such, different drawing technologies can be used as methods, particularly

[37] Also see Sheer, *The Death of Drawing*, 25.
[38] Rosenberger and Verbeek, "A Fieldguide to Postphenomenology," 12. Verbeek, "Materializing Morality," 365.
[39] See Chapter 5 (sections 5.1.3. and 5.4.1).

because of the material foundation of the *back-talk* of the drawing; these technologies can be split into the subcategories of drawing materials, projections, and practices. Although these elements can be learned as approaches, and through training can become ready-to-hand for the architecture student – like Lis Park's example with the claviature[40] – drawing technologies are multistable and do not determine outcomes. Stjernfelt's diagram theories, introduced earlier, are helpful in pointing out how the relations between the architectural drawing and the potential building can be understood. Moreover, the concept of technological mediation makes room for strategic approaches to engaging in drawing dialogues. Nevertheless, neither of these two concepts form the basis of the genuinely creative and artistic element of architectural drawing and idea development. The reason why drawing is an indispensable tool in architecture education is that it collects and builds on several forms of otherwise incongruent forms of knowledge.

7.3. KNOWLEDGES IN ARCHITECTURAL DRAWING AND REAL FICTION

As a point of departure, let us take the experiences of Baltsen and Tverstedt, also described in Chapter 4, where they both recount how in the beginning of their studies, had made projects that had received strong criticism for being too conventional, or in Tverstedt's words, "*just a house.*"[41] What has failed in the two stories is the struggle to break out of the naïve conventions of reproducing already known types of architecture and to generate something truly original. The difficulty is similar to the fight against the *givens* on the canvas that French philosopher Gilles Deleuze describes in his analysis of the painter Francis Bacon.[42] Deleuze sees the paintings of Francis Bacon as a particular form of diagram between abstraction and abstract expressionism, between code and sensation. Abstract painting codes the entire canvas, and abstract expressionism allows the sensory chaos to proliferate. The diagram that emerges from sensation is a catastrophe – irrational, free and non-representational, says Deleuze.[43] At the same time in Bacon's paintings, the coded or intellectually produced dimensions check the sensation – they challenge and inform each other.[44]

In *Francis Bacon: The Logic of Sensation*, the diagram is instead given an imprint of being *sensation strokes*. Yet this only strengthens the claim that Bacon's paintings are diagrammatic because they frame a meeting of code and sensation. Diagrammatic work, also in architecture,[45]

[40] See Chapter 4 (4.3.4).
[41] Appendix 6 Claus Tverstedt # 16:32,5 - 17:38,8. And Torben Baltsen # 6:11,8 - 6:55,8.
[42] Deleuze, *Francis Bacon*, 70.
[43] Deleuze, *Francis Bacon*, 71.
[44] Deleuze, *Francis Bacon*, 82 and 109.
[45] Both in the form of diagrammatic architecture – see, for instance, Vidler,"Diagrams of Diagrams"; Garcia, *The Diagrams of Architecture* – or the practice that I studied in 2011, Christensen-Dalsgaard, "The Diagram – Thinking with Drawing in Architectural Education."

should not be considered irrational (though it may sometimes seem wildly aesthetic), but simply a combination of reason and intuition. Those who draw may "feel" their way to aesthetic decisions in their drawings, rather than deductively reason their way there; but they build up their own internal logic, as seen in Chapter 6. Through drawing, an architecture student explores places in a sensitive way, and builds up her understanding of a project in a constructed material "self-dialogue" *(back-talk),* which enables her to utilize not only what she knows, but also what she feels. Canadian philosopher Jacub Zdebik, in his book *Deleuze and the Diagram*, writes that the diagram is

> "a critical mode of representation of an image that is not quite an image or, more precisely, the terrain between the visible and the articulable."[46]

For Zdebik, the diagram therefore mediates between intuition and knowledge.[47] Transposed to architectural drawing, this would similarly stress that the diagrammatic opens up a field of coexistence for the intellectual and the intuitive, for the artful and the calculable.

Drawings visualize *data* – for example, material structures or sensory impressions. Yet as also argued above, architectural drawings also frequently visualize *data* that is not derived from the empirical world, but is instead ideational. The architectural drawings of a work in progress are visualisations of a space that does not (yet) exist in the world, or as expressed by Robin Evans:

> "Drawing in architecture is not done after nature but prior to construction; it is not so much produced by reflection on the reality outside the drawing, as productive of a reality that will end up outside drawing".[48]

Accordingly, in ideational visualisations it is not so much the world that is mediated through a tool to a subject but the subject mediated through the tool to the world, and then perceived again by the subject in a reflective motion. Ideational visualisation is an exploratory journey of one's own ideas. In the drawing situation, it is problematic to say that all of the intentionality is directed towards the world because the "data" on the background of which the visualisation is being established as imaginary rather than real.

The weight placed on drawing as representation, as for instance in the Stjernfelt perspective or seeing drawing as visualisation, might result in a sudden uneasiness. Should we not do away with representation, as for instance Yaneva has argued?[49] In architectural drawing, however, we need representations. Without representation, the architectural drawing is muted and becomes an absurd artful practice severed from its function. To say with Yaneva that "A building is not a static entity composed of symbols, but a flow of trajectories"[50] is to undercut what a building *also* is. A building is

[46] Zdebik, *Deleuze and the Diagram,* 139.
[47] Zdebik, *Deleuze and the Diagram*, 125.
[48] Evans," Translations from Drawing." Quoted from Robbins, *Why Architects Draw*, 8.
[49] Yaneva, *Mapping Controversies in Architecture*.
[50] Yaneva, *Mapping Controversies in Architecture,* 20.

also an entity composed of symbols, just as it is composed of rooms, concrete, wood, ideas, compromises, flows, etc. The building is being recomposed perpetually at all levels, but the fact that it does not have a solid foundational essence does not mean that it does not have stability:

> "…a regular residential building does not become an aircraft hangar or a lecture hall. That is, some but not all reinscriptions are possible – technologies have stabilities that restrict their use – […] regular residential houses usually remain residential houses, or rather they have a dominant stability as a residential house, because despite such stability even a residential house might simultaneously be a home, a historic site, a building project, a crimescene etc."[51]

Architectural drawing usually occupies a middle field between the empirical and the imaginary. It is usually drawn neither as a mere representation of an empirical fact (an already existing building) nor is it usually completely abstract and unrelated to empirical reality. Zdebik suggests three different forms of diagrammatic drawings: plan, map, and graph – but these different forms seem to miss those crucial relational differences. There is a difference between diagramming a functioning machine and drawing the relations among still non-existent buildings.

Stjernfelt, on the other hand, differentiates between pure diagrams and empirical diagrams.[52] Pure diagrams refer to an idea or a concept, whereas empirical diagrams refer to an empirical symbol in an actual or at least possible reality. There are, however, two kinds of empirical diagrams: those that refer to a material existence that does not actually exist (fiction) and those that refer to a material reality. To capture these relational differences, I suggest instead that diagrams, including architectural drawings, be viewed as abstract, referential, or fictive. The referential diagram always points to something else in a direct manner, as it is intended for reading and communication purposes and not for creative development. Many architectural drawings are referential in this manner, especially the technical ones. The referential diagram is exemplified by the engineer's drawing of machine parts, or by the map of a metro. Empirical visualisations are referential diagrams, and as they are intended for communication, they downplay the ambiguity of multistability. Furthermore, referential diagrams are emphatically hermeneutic, to use postphenomenological terminology; they are dependent on conventions like scale, projection, etc. The abstract diagram has no signifié in the real world. It is a pure concept and can be exemplified by a triangle or a grid. Ideational visualisations can of course contain abstract diagrams, but also referential ones. Contrary to the empirical visualisations, ideational visualisations emphasize multistability; they renounce at least some fullness for thinness, and it is through this thinness that the ambiguity of multistability truly thrives.

Ideational visualisations can be what I call fictive diagrams that bridge referential mapping and imaginary emergence in an intermediary zone. Zbedik points out that the diagram occupies a

[51] Botin, Lars and Berling Hyams, Inger: "Introduction: From the Vitruvian Man to Human Centered Design."
[52] Stjernfelt, *Diagrammatology*, 99.

space between form and matter.[53] Here form is the abstract concept, while the fictive diagram is the zone of exchange between form and matter, abstract and empirical.[54]

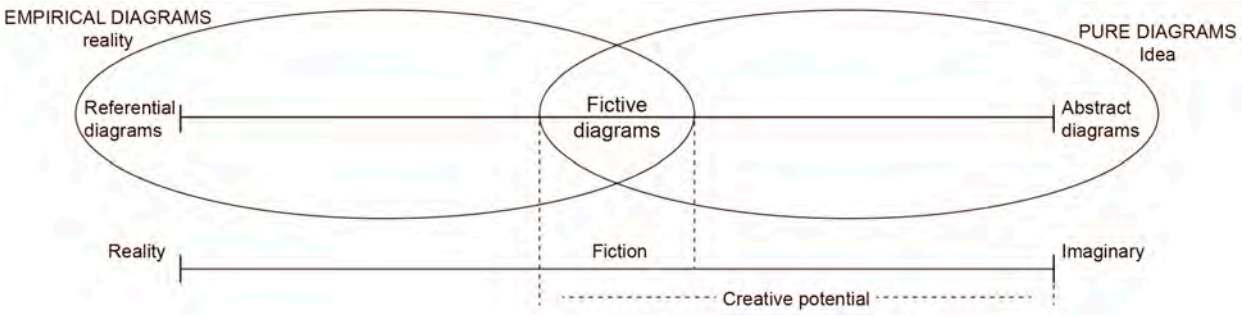


FIGURE 7.3: The Fictive diagram between the referential and the abstract diagrams or as the overlapping zone between empirical and pure diagrams. [55]

A fictive diagram embodies its own reality, which refers not only to an outside reality or to real objects – and herein lies the difference between the referential diagram and the fictive diagram. The fictive diagram zone becomes imperative for rigorous practice in architectural design work, because it is here that an alterity relation – back-talk of the material – can arise. In a radically imaginary realm there are no restrictions, no resistance. Conversely, in a completely referential realm there is nothing new. To enable rigorous creative work, alterity is sought as a sort of radical non-neutrality of the drawing. The architectural drawing of a student project is real, though it is also imaginary, as philosopher Anne Sauvagnargues writes, commenting on Deleuzian theory:

> "Art is real; it produces real effects on the plane of forces and not forms. The result is an extremely original shift within the fracture between the imaginary and the real. The imaginary ceases to be considered a mental fiction, and art is no longer considered a cultural distraction."[56]

Sauvagnargues' reading of Deleuze's shift in the normal divide between the real and imaginary is an argument similar to what literary scholar Wolfgang Iser has argued about the relation between the fictive and the imaginary.[57] The imaginary leaves an imprint that produces real effects, and thus becomes tangible as something fictive. The fictive is real to the extent that it bears the print of the imaginary, and it is through the fictive that the imaginary moulds the material. The fact is that place and space do not consist of tangible elements alone, and architects need tools where they can engage with the material as well as the immaterial qualities of a place.[58] If approached as *real fiction*, the

[53] Zdebik, *Deleuze and the Diagram*, 2.
[54] According to Anne Sauvagnargues this exchange lies at the foundation of Deleuzian thought: "*concepts arise out of pragmatics*." Sauvagnargues, *Art Machines*, 3.
[55] Christensen-Dalsgaard, *Tegningstænkning, diagram og projektudvikling,* 28.
[56] Sauvagnargues, *Art Machines,* 19.
[57] See Iser, *The Fictive and the Imaginary,* particularly 20-21.
[58] For more elaboration on this, please refer to Berling Hyams, "Diagramming the in – between" (Appendix 11), where the issue is unfolded in relation to specific educational practices and topology.

architectural drawing can give architecture students (and architects) a tool with which they do not just gain experience of a technical character, but can work across a technical and aesthetic divide – working with multiple kinds of knowledge and with their impact on each other. It is often said that architecture is a syncretic art, referring mainly to the different skills that architects must possess; it would seem that it is epistemologically syncretic too. This explains why drawing is such an important medium: without generating real inconsistencies, it contains fundamentally different types of knowledge.

7.4. DRAWING EPISTEMOLOGIES IN THE THREE PARADIGMS

In this final section of this chapter, I will briefly propose how the three paradigms relate to the theories of drawing mediation and diagrammatics sketched above. For the Beaux-Arts paradigm, I argued that knowledge came from history – that is, precedence – and that drawing emphasized image qualities and aesthetics. For the polytechnic paradigm, knowledge comes through the technical understanding of *universal principles*, close to an approach that we know from the technical sciences. Drawing, correspondingly, is fixed to mathematized rules and conventions; aesthetic elements are thoroughly distrusted. In a practitioner paradigm, knowledge is viewed as situational, and the drawing is therefore a virtual test space. Both the polytechnic and the beaux-arts paradigm can be said to work both empirically and ideationally at the same time, but do so in very different ways. The emphasis on past examples in the Beaux-Arts paradigm is an empirical focus, dissimilar to the more abstracted way of working with the empirical that the polytechnic paradigm would exemplify. This difference can be demonstrated by intersecting the ideational/empirical spectrum with the spectrum from thinness to fullness (see figure 7.4 below). The Beaux-Arts paradigm works with a desired fullness or image effect to support its own aesthetic agenda, whereas the polytechnic paradigm, mistrustful of drawing, works with the thinnest possible drawing. The fictive zone continues to span the middle, and the practitioner paradigm works roughly around the fictive zone: it draws on both ideational and empirical elements, as well as a certain fullness needed for *back-talk*, and *thinness* is sought to exploit multistability.
It should be noted that neither of the paradigms in this figure work solely on the one “side” of the scale, which is laid out to underscore the connectedness of the spectra.

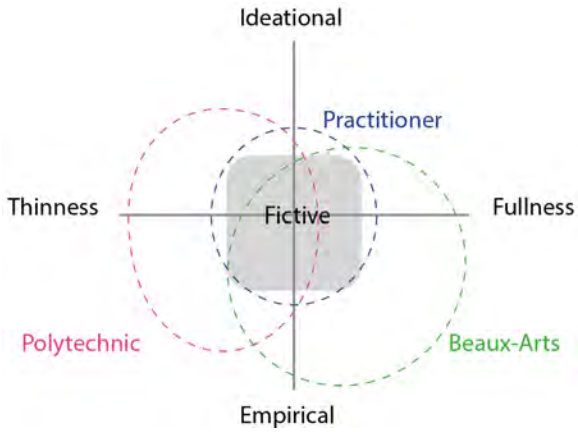


FIGURE **7.4**: A schematic model of the beaux-arts, the polytechnic and the practitioner paradigm.

A very schematic sketch like the one above could benefit from embellishment, which I shall avoid here, but it does suffice to illustrate that we cannot talk of epistemology of drawing in the singular, but must admit several epistemologies of drawing. The existence of different epistemologies could be taken to indicate that the different paradigms could be considered better or worse at working with particular types of tasks. That would essentially be to operationalise them as methods. However, the empirical studies carried out here do not indicate much awareness of working among different methodologies, but rather that method is regarded as linked to specific tools and epistemology in place.[59] The model also demonstrates how paradigms overlap and can weave in and out of each other. This is what the next chapter will concern itself with in asking how the various instances of architecture education studied relate to the paradigmatic framework.

[59] See Chapters 4 (4.3.4) and 5 (5.4.2).

CHAPTER 8:
PARTLY PARADIGMATIC

8.1: WORKING WITH THE FRAMEWORK

A central research question asked in Chapter 2 concerns how the Danish architecture school in Copenhagen relates to the Beaux-Arts, polytechnic and practitioner paradigms. Based on the findings from the empirical work in Chapter 3, 4 and 5, in this chapter I will use the framework of the three paradigms that were described in Chapter 2 to discuss that question. As already mentioned, rather than being empty labeling, the framework is meant to establish a discussion of issues such as the epistemology of schooling practices, and creativity and drawing. For instance, the label of Beaux-Arts is, without much real deliberation, too often applied to describe the Danish architecture education tradition.[1] The danger is not only that it paints a simplistic image of the educational practices, but that this type of labeling also hinders critical thinking between the paradigms, and thereby stifles critical pedagogic approaches. Thinking between the paradigms is a prerequisite to making operational the different conceptions of knowledge, of assessment, and of drawing approaches.

In Chapter 2 I outlined the differences between the three paradigms using six different parameters: those of surface structures, pedagogic activities, epistemology, ontology, creativity and drawing. The parameters are obviously linked, which is why they will be treated more thematically in the following. As the features of the Copenhagen School are more of a Beaux-Arts and practitioner character, the three paradigms will receive somewhat uneven treatment.

Whereas Danish architecture education has undoubtedly sprung from the academy tradition, if one had to give a concise answer as to whether the Danish architecture school was an *Académie des Beaux-Arts*, as its name at the beginning of the 20th century would suggest, it would have to be no. Although it was undoubtedly influential, there are too many discrepancies between the Danish educational model and the Beaux-Arts paradigm. One may point out that the Danish Academy became, in name, an *Académie des Beaux-Arts* five years before the Parisian academy did.[2] The Danish architecture education also did not have the same direct exchange with the *École* that, for instance, the American schools did.[3] Nevertheless, the educational model at KADK has commonly been labeled as a Beaux-Arts education, and not – as one perhaps might expect – only around the turn of the 20th century, but also in the present day.[4] The obvious and strong

[1] See for instance Reinmuth, "Context 1: Architectural Education in Denmark"; Lauring, "From ecological houses to sustainable cities"; and Harlang, "Negotiating with the Surrounding Society."
[2] See Chapter 2.1.1.
[3] For example Phillipe Cret, who was Harbeson's teacher at the University of Pennsylvania. In Denmark there are examples of architects who had connections to, and worked or studied in, Paris, for instance Hack Kampmann and Gerhardt Poulsen. Earlier in the 19th century we also find C. F. Hetch, who studied in Paris under Percier and Lebas; and of course Nicholas Jardin in the 18th century.
[4] The examples in note 1 all point towards the impact of Beaux-Arts on modern-day architecture education.

link between the Danish architecture education and the Beaux-Arts paradigm is of course that they are both part of an art academy rather than a technical school or a university. In a Danish context this has meant a strong link to the aesthetic dimensions of architecture. With the contemporary emphasis on artistic development[5] it is indeed tempting to view KADK as a Beaux-Arts based education, but it does not have some of the fundamental building blocks of the Beaux-Arts paradigm: (a) superficially, it does not have a *concour* structure*,* where students advance in their studies depending on how well they performed; (b) on a didactic level it does not have the *system of the esquisse*, a systematic creativity training with the restraints of keeping within the outline of a first sketch[6]; (c) and finally on a more ontological level, it has a (perhaps understandable and modern) lack of belief in 'true beauty,' as exemplified in the focus on the singularity of projects that work according to their own rules in the *Taking Place* pin up.

On the other hand, even in the middle of the 20th century, where it arguably most resembles a polytechnic paradigm, the Copenhagen Architecture School was of course still actually organized as part of an art academy. Although there is no doubt that the Copenhagen School does not have a polytechnic foundation, it would be too superficial to dismiss any influence from the polytechnic paradigm, based simply on the school being part of an art academy rather than a technical university. As a closer look at drawing practices, structure and epistemology will reveal, all three paradigms weave in and out of the educational practices at the Copenhagen School.

8.2: DRAWINGS AND DRAWING PRACTICES

Turning to the drawings is a good example of why it is too simplistic to look simply at style rather than drawing practices, when describing the history of architecture education. A quick glance at three exemplary drawings in Figures 8.1, 8.2 and 8.3 might give the impression that there has been a clear progression from a Beaux-Arts school, in the beginning of the 20th century, to a polytechnic school in the mid-20th century, and then to a practitioner paradigm school in KADK's contemporary format.

[5] See for instance the description of the architecture school at KADK on their website: https://kadk.dk/arkitektskolen/om-kunstakademiets-arkitektskole.
[6] Harbeson, *The Study of Architectural Design,* 7-8; and Pai, *The Portfolio and the Diagram,* 45.

FIGURE 8.1: Gerhardt Poulsen: "A Guild House", 1906.

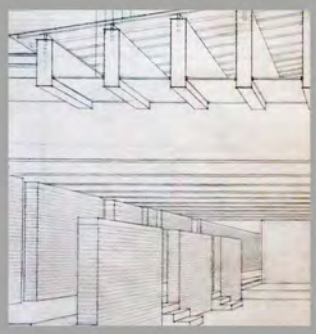


FIGURE 8.2: Lise Sass Clemmesen: "An Exibition Hall, Lyngby", 1961

FIGURE 8.3: *Taking Place*, Student works, 2014

To begin with the Beaux-Arts, the elaborate watercolors of Gerhardt Poulsen certainly have resemblances to the French École des Beaux-Arts drawings; however, some of the practices behind them were fundamentally different. Harbeson describes the *esquisse* system to be foundational for a Beaux-Arts design education process, but the *esquisse* system, where students began a project with a sketch that they later adhered to, was never a part of Danish educational practice.[7] As has been described in Chapters 3 and 4, there were indeed sketch exercises, as also seen in the portfolios of Lise Sass Clemmesen and Charlotte Buhl.[8] And in the early 20th century, two mandatory sketch exercises were also assigned just before the final project.[9] There are similarities between the sketch exercises and what was known in the Beaux-Arts system as *esquisse-esquisse*, although the *esquisse-esquisse* seems not to have been predominantly small-scale projects, as is usually the case in the Danish context.[10] Adhering to the first sketch forcibly trains the student to think through solutions at an early stage, and to quickly and systematically come up with viable concept solutions. The *system of the esquisse*, on the other hand, can be rather strict and limiting, which even Harbeson admits, while stressing the benefits to the training of thinking within limitations.[11] A defense for the less systematic approach, as found in the Copenhagen School, is that in not settling for a solution one liberates a much broader potential to work with plan and organizational solutions. On the other hand, there is a danger that the project keeps being 'renegotiated' and thus in a way starts from scratch multiple times. This in turn could be harmful for the level of detail and sophistication of the final project. Even if not working with an esquisse stystem, students up until the *red school* still had to adhere to the limitations of a program,

[7] In the rules for the final project around the turn of the 20th century, the French word "loge" is used, signaling knowledge of the French system and vocabulary: *"To Skizzeprøver, a) en praktisk og b) en kunstnerisk efter detaillerede Opgaver, ikke under en Linie pr. Alen, udført hver 1 Dag i Loge under Tilsyn af Akademiet"* (Meldahl and Johansen, *Det Kongelige Akademi*, 1904, CXV). Nonetheless, these were not linked to the main assignment, but were simply just drawings made without guidance in a short space of time – usually 9 hours – where the students were allowed to hand in drawings in pencil.
[8] See Chapters 3.2.2 and 4.2.2.
[9] See Chapter 3.1.1 and 3.1.2
[10] Harbeson, *The Study of Architectural Design*, 245ff.
[11] Harbeson, *The Study of Architectural Design*, 2, 78, 215.

since projects were mostly not self-programmed. Furthermore, it might be argued that the more recent inclusion of sketches and design process documentation as part of project presentations reaches back to a Beaux-Arts *system of the esquisse* thinking.[12] This approach, however, is significantly less academic and systematic than the Beaux-Arts *esquisse system* and is instead much more practice-oriented. The *system of the esquisse*, and the regular sketch assignments, are in turn examples of how different assignment approaches could foster the training of different types of design skills. The absence of the *system of the esquisse* points to a design tradition in Danish architecture education that favors, to a higher extent than the Beaux-Arts paradigm, the continuous open-ended development of projects. This could be said to be more in line with a practitioner paradigm.

As summarized in Chapter 2.3.5, for the practitioner paradigm the drawing's character as a virtual world is important, rather than any particular stylistic traits. This would seem to be close to the approach observed in the *Taking Place* study where, as shown in Chapter 5.4.1, what I call *the rule of productivity* situates the material dialogues as pivotal in the program's way of working with architecture. Teachers for instance emphasized that they preferred giving feedback on concrete material rather than on ideas. Of course, this was never explicitly related to drawing as a virtual world, but it effectively means that drawing functions as a virtual world. The virtual world is a space where the drawing can give resistance to the designer rather than just conform to their ideas. The rigor of the approach at *Taking Place* is thereby in line with a practitioner paradigm that relies on the virtual world of the drawing (or model) to give resistance and *back talk.* However, there were also other approaches to drawing found both in the *Taking Place* study and the historic interviews that bore a resemblance to more polytechnic traits.

For the polytechnic drawing approach, I summarized that there is a focus on building as utility, and that drawing is therefore preferably considered to be something abstracted or mathematical. Projects become a type of problem solving. The fine ink lines of the drawing from the mid-20th century (see Figure 8.2) certainly demonstrate a different and more abstracted approach to drawing than the elaborate watercolors of Gerhardt Poulsen, but despite this it has not completely abandoned the poetics of drawings and aesthetic image qualities, as is also mentioned in Chapter 3.2.3. To reiterate, the polytechnic influence on the Copenhagen School is not the strongest, there are, however – also with respect to drawing – certain robustly polytechnic reminiscences even in the Copenhagen School. As mentioned in Chapter 4.3.2, several of the participants recounted how they always started a design from a plan drawing, which indicates an emphasis on space rather than on image in the drawing approach.[13] The pre-eminence of the plan drawing harks back to Durand, who as described in Chapter 2.2.3 argued that starting with an elevation drawing

[12] This was seen in the Taking Place final projects as well. See Appendix 8.
[13] See Chapter 4.3.2. For example, Torben Baltsen # 25:39,5 - 26:27,5; and Per Graham # 23:20,4 - 24:09,3.

rather than with a plan confused the cause and effect of the building, and that the plan should be primary.[14] There is a clear functionalism in such approaches and arguments, because the plan drawing focuses on how the building functions rather than on what it looks like. Moreover, the primacy of the plan drawings tends to move focus away from ornamental and stylistic attention. Even in the early part of the 20th century the plan drawings are by far the most low-key of the otherwise quite elaborate drawings, displaying only moderately the characteristics of Beaux-Arts mosaic and entourage.

The plans of the early 20th century might disclose certain quite practical leanings in the otherwise largely artistic education, but they also appear much less worked on, and therefore perhaps simply not as central to the educational practices of the time. It should be noted that the *Taking Place* first semester did not show a primacy of plan, but instead worked especially with sections and axonometric drawings. While it would be hasty to conclude too much from this because of the abstract character of the first semester projects, it does nonetheless indicate a slightly different artistically abstracted practice. At *Taking Place,* I found that in the first semester the drawing was used for analysis and to penetrate through pictorial surface qualities of structures and to discover how they worked.[15] Although the program in many other ways is not at all polytechnic, the analytic drawing approach thus does bear polytechnic resemblances. As the program leader, Anne Romme, explained: "*as architects we are obliged to cut through things and look at how they are constructed."*[16] Similar resemblances are also found in the *analytic freehand drawing* that Holmgreen describes in chapter 4.3.2 as a way to reveal construction behind the exterior. Both practices would seem in line with Durand's aim to "reveal the true principles that underlie the complex forms of the actual design,"[17] as Leandro Madrazo has put it. Madrazo has also shown how Durand, in his search for universal principles, simplified the structures drawn up in his book *Recueil et parallele des edifices de tout genre, anciens et modern,* and here there is a definite difference to the practices of *Taking Place*.[18] At *Taking Place* the analytic penetrating drawing technique is instead aimed at deconstructing a simplifying immediate gaze, or as a teacher said: "*They [the students] would like to assume that everything is much simpler than it really is. But [they] realize that the brain is heavily involved and reads between practically everything we perceive and [affects how we] understand our surroundings."*[19] In other words, it is not so much underlying universal principles of construction, but rather the complexity and plurality of architecture that is the aim of the *Taking Place* approach. Furthermore, the manner of using historical examples at *Taking Place* is much more in line with Beaux-Arts approaches. The complexity revealed is a good example that while the Danish

[14] See also Durand, *Précis*, 139.
[15] See Chapter 5.3.1.
[16] Anne Romme #42:30,3 - 44:47,4. See Chapter 5.3.2.
[17] Madrazo, "Durand and the Science of Architecture," 14.
[18] Madrazo, "Durand and the Science of Architecture," 13.
[19] Tine Bernstorff Aagaard # 15:57,1 - 17:00,5. See chapter 5.3.2.

educational practices do not work strictly within one of the proposed paradigms, using the paradigms as analytic lenses allows for a more detailed analysis of the practices they employ.

We shall now turn from the drawings towards seeing the joint thematic of structure and classes through the paradigmatic lenses. As with the drawings, we will again see that the paradigms are woven together at the Copenhagen School.

8.3: STRUCTURE AND CLASSES

Structure is an often-overlooked subject in studies of architecture education, and looking at structure through the paradigmatic lenses brings forth an interesting image of the Copenhagen School.

When the structure of both the American and French Beaux-Arts schools are compared to the Danish school, even historically, there are intrinsic differences. Perhaps most characteristically, as described in Chapter 3.1, the structure of the Danish architecture education around the turn of the century did not actually have an *atelier* structure. It was definitely a studio structure, but the studios were organized not as multilevel parallel *ateliers* but more as a progressive order of different classes. The difference that I would like to highlight here is that the *ateliers* enabled a sort of vocational training among the students (in the French Beaux-Arts terminology, the *anciennes* and the *nouveaux*). The different studios in the Danish system were, however, run by practicing architects, and as it were for the French, it would have been common for Danish architecture students to work as assistants in architectural offices, until this was somewhat hindered by the implementation of the full day-school structure in 1924. In the architectural offices, the more inexperienced architecture students could spar with older colleagues.[20]

A closer resemblance to an *atelier* structure, where students were grouped together across class years under a leading architect or *patron* – perhaps oddly enough – only really appeared with the incident from the early sixties, described by Charlotte Buhl. Here a group of students were finally allowed to stay together as a class, and they chose their professor.[21] The *atelier* or full department structure continued to build until it was arguably really cemented in the 1999 department structure of the Copenhagen School. The structural reform of 2014/2015 at KADK can nonetheless be said to be a step away from the *ateliers* model, not just because of the six-week blocks, but as the institutes generally gather more students in general BA programs, and then offer several specialized programs for master students.[22]

Structurally the three paradigms are woven together in the Copenhagen School with a certain kind of characteristic pragmatism. An example is the six-week blocks at KADK, which likely reflect external

[20] See for instance Kryger, "'Græsk stil' eller alle fortidens stilarter," 201.
[21] See Chapter 3.2.2.
[22] More on this in Berling Hyams, "Structures," 236. (Appendix 9).

pressure for a more practice-oriented and unified architecture education. Nonetheless, also here one finds an insistence on regarding the practice of architecture as syncretic and complex rather than a mainly technical approach.[23] As the organizer of the six-week block, Kjeld Vindum, explained:

> "*We are subject to different forms of demands and pressures. At the moment it has a lot to do with technology and relation to practice… that we have to make them ready for the profession [of architecture]. And plainly speaking we think that is maybe too early for a first year student to be met by all sorts of demands of a more specific character, legislation and the like. We believe that our way of making them ready for the profession is to open up its complexity to them*."[24]

This making pragmatic of demands similarly resounds in the teaching of technical subjects via drawing,[25] and the suiting of the styles to Danish conditions – as Nyrop's assignments had prescribed in the beginning of the century.[26] As I have also argued in the "Structures" article, it is enticing but overly simplistic to regard the current six-week blocks as a polytechnic element and the twelve-week blocks as a Beaux-Arts element.[27] Firstly, because the content as well as the teaching style of the six-week blocks are far from being purely instruction-based exercises in technical subjects, but for instance often include aesthetic or historical domains. Secondly, because the style of work is often project work that is not aimed at design proposals, but is still creative and far from aimed at the universal knowledge of polytechnic-minded exercises.

In the polytechnic paradigm as I have sketched it, design work is introduced late, and there is instead a focus on class instruction, exercises and a general education in relevant technical subjects. The preschool curriculum in the mid-20th century in particular had a strong focus on more technical subjects. In Chapter 3.4.1 I drew the conclusion that in a polytechnic paradigm the design problem is perceived as singular, which necessitates the study of universal principles rather than of actual cases. Of course, universal principles are the kind of knowledge that scientific studies such as lessons in statics and material science supposedly build. As shown in Chapter 3.2.1, among other subjects students were taught statics, material science and building law.[28] Millech's account that during these years the school was lacking textbooks supports the idea that there was at least a tendency towards focusing on instruction.[29] The want for textbooks would indicate that the type of universal or general knowledge that can be found in textbooks was sought after, and this would be in line with a more polytechnic approach. Nevertheless, even in the mid-20th century *preschool*, students were handling actual design work. This is as also previously mentioned a contrast to students in the beginning of the 20th century who, in *the common,* were first taught basic drawing skills

[23] See Berling Hyams, "Structures," 237-238. (Appendix 9).
[24] Interview with Kjeld Vindum, quoted from Berling Hyams, "Structures," 240. (Appendix 9).
[25] See Chapter 3.2.1.
[26] See Chapter 3.1.1.
[27] Berling Hyams, "Structures," 239. (Appendix 9).
[28] See Chapter 3.2.1.
[29] Millech, "Arkitekturskolens historie efter 1904," 450.

through reproducing ornaments or by measuring buildings. Moreover, as shown in Chapter 2.2.1, the approach to teaching even the technical classes also frequently included drawing and more embodied practical procedures. The *black school* of the mid-20th century was arguably more polytechnic than Beaux-Arts – at least at a structural glance, but then students far from only did theoretical work. Apart from what they learned in architecture school, those who did not come to the school as a craftsman or with a building diploma had mandatory short summer apprenticeships as craftsmen (typically bricklayers or carpenters) as part of their curriculum. [30] This of course in turn relates most strongly to the 'learning by doing' epistemology that characterizes the practitioner paradigm.

In a practitioner paradigm, learning is learning by doing, which puts a very pronounced emphasis on the student-teacher apprentice model of the studio. Writing in 1954, Millech admits that, in spite of the stricter structure of the full day school, the teaching style was more akin to traditional vocational artist training than technical instruction.[31] Additionally, although the department structure of the Copenhagen School does not resemble the Beaux-Arts *ateliers* model, the teaching styles would certainly be the same as in both the Beaux-Arts and the practitioner paradigm. There is only a relatively short span of the *black school* and the present day six-week courses, where it was common with more classroom-based education, but even here the foundation of the Copenhagen School is, and seems to have always been, the *desk crits* and one-on-one teacher to student education. Both the six-week courses and the classes of the *black school* are to be seen as supplementary to, or at least not as the entirety of, a student's education. Design work remains the main part of the curriculum. Even when at its most polytechnic, the types of assignments, and particular focus on solving them through drawing, to a certain extent pulls the Copenhagen school towards a practitioner paradigm. Albeit with a somewhat theoretical or abstract leaning, in contrast to the much more practice-oriented design-build studios found in some architecture schools.[32]

There are obvious similarities and differences between the three paradigms and the structures at the Copenhagen School, and while structures do not necessarily tell simple stories, they embody the complex web of practices that comprise architecture education. These structures point furthermore towards specifics in design approaches, which I will discuss next.

[30] See Chapter 4.2.1.
[31] Millech, "Arkitekturskolens historie efter 1904," 451.
[32] For more on design-build programs in architecture education see Canizaro, "Design-build in Architectural Education."

8.4: DESIGN APPROACH AND EPISTEMOLOGY

In contrast to the polytechnic paradigm's focus on teaching basic skills first, architecture students at the Copenhagen School generally start design work from the very beginning. This was also the case during the mid-20th century *preschool*, although as Millech indicates they perhaps did not do as much design work as they desired.[33] In the beginning of the 20th century this was different, however, as Poulsen's portfolio is a testament to. There was no real design work in the *common,* and the student would only really start design work when he entered into the building school. As described in Chapter 2.1.3, this differs from the focus of the Beaux-Arts paradigm on the immediate commencement of design work. As also seen in the portfolios of Lise Sass Clemmesen and Charlotte Buhl in the middle of the century, and as described even within the first year of the *Taking Place* BA program, the progressive complexity of tasks in the beginning of the 20th century somewhat resembles the progression from class B to class A problems in the beaux-arts paradigm. The progression of tasks, however, is and was never quite so systematically planned and labelled in the Copenhagen School as seems to be the case for the Beaux-Arts according to Harbeson. Consider, for instance, the assignment in the *Taking Place* first semester, and how it is arranged in stages to reduce complexity for the students and to let them reflect on basic design operations.

The design work seen in the *Taking Place* study is nonetheless of a very abstract character, and it does not seem unusual that many first-year architecture students do not design anything that resembles a 'regular house' while in their first period of architecture school. This reservation regarding designing actual houses in the beginning seems to echo polytechnic thinking, and indicates a desire to steer students away from reproducing the completely conventional – as is also seen in the narratives of Torben Baltsen and Claus Tversted.[34] It is furthermore parallel to the resistance towards reproducing the *givens* of the canvas as Deleuze describes in the case of Francis Bacon.[35] Here there is an underlying belief that knowledge of practice (i.e., how it is conventionally done) will undermine the creativity of novel critical thinking, as Pallasmaa argues.[36] What is commonly regarded as the real break between the Beaux-Arts and the modernist tradition (which here would be somewhat synonymous with the polytechnic) is indeed that the precedence of forms is no longer given any value in the design process.[37] However, it seems that at the Copenhagen School, the hostility towards studying architectural history was not as widespread as was otherwise common particularly in the mid-20th century.[38] On that view, studying previous examples would be futile or directly

[33] See Chapter 4.1.1; and Millech, "Arkitekturskolens historie efter 1904," 442.
[34] See Chapter 4.2.2.
[35] See Chapter 7.3.
[36] See Chapter 4.3.4.
[37] Blattau and Tatman, "John F. Harbeson: Teacher, Architect and Champion of the Classical Ideal," xv.
[38] Walter Gropius taught at Harvard from 1937 and cemented the Bauhaus influence on American architecture schools. Blattau and Tattman argue that his teachings marked a shift away from attention to precedence and architectural history in design. Blattau and Tatman, "John F. Harbeson: Teacher, Architect and Champion of the Classical Ideal," xvi. Describing the developments of architectural

damaging, because it conditions architects to reproduce known solutions even when these are not appropriate; this echoes Durand's mockery of the practice of some architects. Still, as argued in Chapter 3, this creates a rather narrow stylistic focus, which for the case of architecture education is better widened to the more practice-based and methodological view.

What is general for the Beaux-Arts paradigm is the historical knowledge of architecture, and the use of *historical documents* to give a more scientific and methodical approach to design.[39] Rather than a radical new shaping of forms, the creative act in a Beaux-Arts paradigm is a composition with elements. At least in the most contemporary educational practices in the Copenhagen School, the latter does not seem to be prevalent. While the practitioner paradigm also has no hostility towards the use of historical examples, the concepts of 'repertoire' and 'as-if' thinking offers the practitioner paradigm an approach that is not quite so determined by historical precedence, but instead uses it to reflect critically on how a particular current situation is different from the situation that is already known. The program leader of the *Taking Place* study recounted that one of the abilities she valued most in teachers was their use of a complex set of references, or the knowledge of a vast number of examples, and that they could use their experience to make students aware of problems and solutions that perhaps resembled their own project in some way.[40]

When earlier in this chapter I have pointed to discrepancies between a Beaux-Arts paradigm and the Danish architecture education, this perhaps applies more to the structure and educational system than to the underlying approach to drawing and the understanding of the world that, when regarded more from an epistemological point of view, seem to be similar. As witnessed by the mandatory styles at the beginning of the 20th century, but equally during the years of the *black school*, or in the first semester that I observed, the continued interest in historical buildings at the Copenhagen School is a good example of this.[41] The continued interest in architectural history at the Copenhagen School takes on an interesting character of embodied knowledge through the way that it is worked with in drawing.[42] As I have argued in a paper entitled "Danish Vernacular," unlike in many other versions of functionalism, Danish functionalist architects carried an embodied proportioning, interest and understanding of Danish historical and vernacular buildings with them from their school years. Discussing the practices at the beginning of the 20th century, the "Danish Vernacular" paper argues that history was not used in a descriptively dead way in the teaching of architecture. On the contrary, it was given an affective presence in the students' work, based on thorough

education in the 1930s, Alofsin credits Joseph Hudnut with writing architectural history out of the Harvard curriculum, an approach which quickly spread. Alofsin, "American Modernism's Challenge to the Beaux-Arts", 103.

[39] See Chapter 2.1.5.

[40] See Chapter 5.5.

[41] See Chapters 3.1.1; 4.2.2; 5.1.3 and 5.3.2.

[42] For the students' work with the measuring and drawing of buildings of architectural historical interest, see for instance Chapter 4.2.2 and 5.3.2.

and extensive research. This happened through the measuring and drawing of old national architecture, which suggests that it was an underlying belief that students could learn something about historical building culture not by reading about it, but by embodying it through their drawings. Further, it demonstrates a strong belief in the link between the practice of drawing and the cognitive process of understanding and creating architecture that in my view is foundational for the Copenhagen School's way of working with knowledge. The first semester of *Taking Place* again offers a good example of this, in that their assignments were arranged in a way that was to a large extent tool-oriented.[43] Whereas the tasks certainly were not functionalist, and to a large extent omitted any kind of typological work except in the most abstract form, the tool-orientation nonetheless had a technical approach built in to it as a sort of 'technique research.' This 'technique research' could be seen as a search for universally applicable experiences along polytechnic lines of thinking, especially as the context of the assignment was so highly abstracted. Yet even so, the approach is highly practice-oriented and experimental, and quite unlike the rigid technical scope one might equate with the polytechnic.

The gradual approach observed in the Copenhagen School overall indicates a shared belief between the Beaux-Arts paradigm and the Copenhagen School practices, that, in spite of a general focus on aesthetics, architecture as a discipline can be learned. As John Blattau and Sandra Tatman underline in the introduction to the 2008 reprint of Harbeson's book, a key to understanding Harbeson's project is that he "dispels the illusion that architects are born and not made."[44] Harbeson was a practically minded teacher and architect who believed that although each project is different, there is a methodology behind the design process that when practiced and reflected on, will enhance the design capability of the individual student. Harbeson advices students to:

> "not work for immediate results. Try to work toward a future goal of ever greater knowledge of design, a surer sense of proportion, an increasing vocabulary of forms, greater ability at expressing and presenting this knowledge and a sound method of making the most of conditions, of available time, of procurable documents and of sound criticism. With one's endeavors pointed in such a general direction, success will come one day or another – but come it will!"[45]

The underlying message is that knowledge and know-how, not sudden inspiration, form the basis of the good project (vocabulary of forms, making the most of time, documents, etc.). Along these lines, one might argue that architecture students would benefit from, a conscious handling of all three epistemologies of the respective paradigms – whether the knowledge would come from history or examples, technical understanding and scientific principles, or be situational and based on *hypothesis testing moves* in the

[43] See Chapter 5.3.1.
[44] Blattau and Tatman, "John F. Harbeson: Teacher, Architect and Champion of the Classical Ideal," xiv.
[45] Harbeson, *The Study of Architectural Design,* 297.

particular situation. It is a utopian idea that one could ever begin architectural drawing on a clean slate. Even very green students, with no experience from practice whatsoever, have lived their lives surrounded by architecture and have been affected by it one way or another. It is not realistic to imagine that such *givens* can be easily discarded when the architecture profession is taken up. The defining feature of professional conduct must include a becoming aware of such inspirations. Studies of, and reflection on, why something is effective, or maybe even why something is beautiful, should limit the urge to imitate on a figurative level, and instead move imitation to the level of the techniques or methods. Such an approach would be open to the application of principles and knowledge in new contexts.

8.5: LESSONS FROM THE PARADIGMS

Looking back over the 20th century there are certainly moments where features of a polytechnic paradigm were prominent. Beneath the surface there are links between the *black school* and a polytechnic paradigm, both in the organization of the school into *preschool* and *main school*, and in the contents of the two. In addition, there are, at least on a structural level, features of a more polytechnic description in the contemporary 6-12 week structure at KADK. Similarly, the pervasive attention to the measuring of historical buildings, to drawing, and – apart from the mid-20th century – in the focus away from technical issues, all seem in line with the Beaux-Arts paradigm. Nevertheless, as demonstrated in the discussion above, neither of the two paradigms can be said to have ever existed in a pure form at the Copenhagen School. Moreover, in the form in which it is found in *Taking Place*, the practitioner paradigm is not pure, either; as seen in regards to drawing practices, it is entangled with reminiscences of both a polytechnic and Beaux-Arts approach. It must be concluded that not a single one of the paradigms fully covers the practices at the Copenhagen School, neither for specific periods nor in sum. Firstly, this conveys the emerging image that the Copenhagen School has had an independent take on the orchestration of architectural education – balancing instead the different paradigms in changing formations. However, how significant this is cannot be fully evaluated without further research into other architecture schools. It is for instance entirely possible that this particular kind of entanglement is characteristic for the Nordic schools of architecture. Conversely, it is likely, upon further research that practices at most architecture schools would demonstrate a similar mingling of the paradigms. Secondly, it brings up the question of the fruitfulness of establishment of such paradigms. If they are not pure in practice, can they still be useful? From the beginning, the impetus behind the establishment of the paradigms was not to pin a specific label onto a particular school or period in time, but rather to demonstrate how the framework might by comparison be conducive for an analysis that would penetrate deeper into the specific tradition. There is always a gap between theory and empirical reality. In

this manner the impurities were expected, and might even be the point of an analysis conducted through the paradigmatic framework. The analysis of the Copenhagen School for example has led to the discovery of some stabilities, for instance, how the school through the work with historical buildings, reveals a focus on precedence that does not change with the swaying towards the more polytechnic school that occurs in the mid-20th century. Or that the Danish architecture education tradition simply is not, and has never been, very technically oriented. The paradigmatic framework opens up critical reflections that allow such stabilities to emerge because, rather than simply treating style or institutional affiliation, it helps to focus comparative questions on structure, pedagogic practices and epistemology.

The outset of this chapter was to examine how the Danish architecture school in Copenhagen relates to the Beaux-Arts, polytechnic and practitioner paradigms, and although there might not be a straightforward answer to that question, it does hint towards a more general point around structure and school identity. As I have argued in the "Structures" article, the structures of architecture education make up a field that seems to be ever changing.[46] Although rarely discussed in academic literature, the field of structure in architecture education is frequently highly contested. The high conflict level is perhaps a result of the fact that each structure – or to use the popular neoliberal parlance, *restructuring* – holds agendas of governance, didactics, research and tradition. An architecture school's identity is closely linked to its structural organization. But here one might make the mistake of viewing structures as solids. Jean Piaget, in his little book on structuralism, reminds us that "a structure is a system of transformation."[47] Deleuze as well operates with a notion of differentiation that points to the fact that the individuation of identity does not lie in essence but rather in the ceaseless variations of change.[48] Adopting an *ontology of becoming* with respect to the structures of architectural education might be enlightening, not in an overeager embrace of a neoliberal demand for adaptability, but because structures might be one of the best foundations for the comparison of incomparable, but yet connected, didactic traditions in architecture schools. The morphologies of structures are likely unique to an institution, but there might be a shared approach to architecture as an open and complex field. For instance, with further research into the Nordic architecture schools through the paradigmatic framework, it should be possible to tease out and outline the traditions of Nordic architectural educational practice.

[46] Berling Hyams, "Structures."
[47] Piaget, *Structuralism*, 5.
[48] The argument cannot be fully unfolded here but see Williams, "Deleuze's Ontology and Creativity," 212, where Williams treats Deleuze's ontology of becoming and identity specifically in regards to architecture.

CHAPTER 9:
DRAWING CONCLUSIONS - LEARNING BY DRAWING

9.1 A PROBLEM BETTER SET

As is probably the case with most research, a better understanding propels further questions. Questions that are better and more precisely formulated than at the point of departure of the research project. This dissertation set out to better understand the practices of Danish architecture education. In doing so, a paradigmatic framework was established and three main research questions posed:

1. *How does the Danish architecture school in Copenhagen relate to the Beaux-Arts, the polytechnic, and the practitioner paradigms?*
2. *What evaluation practices and criteria are present, and how are they established?*
3. *How is thinking through the act of drawing taught, and how is it carried out by the students in their drawing process?*

I shall draw conclusions on each of the research questions separately in the following three sections, but collectively the questions gravitate around a core problem, namely, the question of a theory of science for architecture. Architecture as an extremely syncretic field, which with its combination of artistic endeavours, technical sciences, and regular solid craftsmanship lacks the clarity and straightforwardness that many other academic fields enjoy. As Kathrine Lotz has put it in her PhD dissertation from 2008:

> "The 'confused practices' are at the best 'mode 2 knowledge' or 'minors' that have yet to 'find their science' in order to become 'mature'. Practices are regarded as 'messy', 'tacit', 'personal' and 'inexplicable' compared to the 'clear', 'objective' and 'rational' guidelines that are said to rule scientific performances."[1]

Particularly with regard to architecture education, the lack of clarity poses a problem first and foremost for educating students to become reflective individuals rather than 'schooling' their artistic practices, but also with regard to explaining practices and resisting undue political pressure.

Pallasmaa has criticised our contemporary educational institutions for not including types of knowledge other than standard academic and scientific ones to an adequate degree:

> "The prevailing educational philosophies regrettably continue to emphasize and value conceptual, intellectual and verbal knowledge over the tacit and non-conceptual wisdom of our embodied processes."[2]

[1] Lots, "Architectors," 62.
[2] Pallasma, *The Thinking Hand*, 22.

An educational system that better includes and handles the tacit, artistic, and non-conceptual wisdom that Pallasmaa calls for, should nonetheless also work in unison with more conventional knowledge forms, as the *other knowledge forms* would have to be somehow communicable and also subject to critique. A problem with tacit practices is that by virtue of their tacit character, they are difficult to question and reflect on critically, and thereby risk stifling students' abilities in critical thinking. It may be that clarifying a scientific field of architecture without repressing and limiting the more artistic and tacit sides might necessitate a reformation of the rift between aesthetics and rationality.[3] The task of clarifying the precise rationality (or irrationalities) at work in architecture education is certainly far from answered by means of this dissertation's investigations; yet through them, I believe I have shown it possible to ask questions more concisely that might point in such a direction. For research question 1, the paradigms shed light on the different epistemologies and approaches that blend together in real educational practice. Despite the rather rigid set-up of the paradigmatic framework, the different paradigms do nonetheless delineate distinct elements of architectural thinking, as laid out in the schema in Chapter 2.4. Additionally, with regard to research question 3, understanding knowledge formation through drawing in the light of diagrammatics and mediation points to how the incongruent elements of architectural thinking might still work together in a design methodology that does not aim to be limiting or technical. The latter point is related to the question of rigor in architectural thinking – and to research question 2. For how is it possible to evaluate a student project when clearly defined criteria possibly cannot be established?

In hindsight, I would have liked to have done many things differently, and must admit that many questions have still not been answered comprehensively. First and foremost, the conditions for this dissertation did not allow for broader and more thorough research into different programs within the present-day KADK setup. It would thus be a rather sweeping statement to say that I have researched Danish architectural education, as only a fraction of the diverse practices have been examined. At KADK today, the various programs have differences in approach that could be mapped and studied much more extensively in relation to the paradigmatic framework.[4] Furthermore, much ground still needs to be covered with respect to understanding epistemologies of drawing in architectural education and the special mediated form of thinking that drawing is. While the present investigations might not provide a solution to this problem, it is at least now better set for further research.

[3] See Korsmeyer's description of the severing of aesthetics from rationality since Hutcheson's philosophy. Korsmeyer, *Making Sense of Taste*, 48-50.

[4] Anecdotally consider as an example the story told by Lucas in Chapter 5 (§5.3.2): "*Those I know from for instance Design, they started out making a room of light. Crazy abstract. And then in the end they had to produce a summerhouse, where they should account for wall thickness, load bearing walls in the construction and the like*" Lukas 2 # 7:27,5 - 8:42,0.

9.2: RIGOR AND ARTISTRY IN ARCHITECTURE SCHOOL

9.2.1 KEY FINDINGS:

- There are four different types of judgements in the architecture school critique: 1) authoritative; 2) technical; 3) normative; and 4) situated.[5]
- As all four types of judgement have strengths and weaknesses, a multimodal evaluation framework is proposed. This includes the three steps of 1) perception, 2) judgement, and 3) justification.

One way to shed light on educational aims is to research evaluation practices and criteria, as the judgement of work reveals some of the underlying ideals and epistemologies present in the educational institution. Accordingly, in Chapter 2 (section 2.4.2), I raised the following research question:

- What evaluation practices and criteria are present and how are they established?

This question is addressed in Chapter 6, where I find that the issue by no means is straightforward for architecture education. Architectural education, at least in its Danish form, includes both artistic and technical elements. Evaluating artistic elements poses a particular difficulty that is well captured by the Kantian definition of the beautiful as extra-personal but without a conceptual basis. In other words, it is not possible to justify an aesthetic judgement even if it feels like it is. One might be tempted to suggest simply moving away from the aesthetic elements of architecture, but as I argue in section 6.5, the aesthetic dimension of architecture is absolutely indispensable. First of all, even if we pay no attention to aesthetics, aesthetics is indeed part of our relation to any object, beyond mere functionality. Moreover, it must be seen as part of an architect's professional moral obligation to aim to create safe, functional, and pleasurable frames for lived life. Criteria can be set for the safety and functionality, but for the pleasurable there are none. To simply work from a subjective feeling for what is pleasurable is not rigorous. However, the classic notion of the beautiful reaches for the common through the subjective, and thus might open a pathway to working with rigorous artistry.

Similarly, the classical notion of beauty is not interchangeable with other categories like "the interesting" that do not have the same collective outreach. The better question to ask is how it is possible to include aesthetics in the education of architecture students without creating a suppressive schooling of their tastes, and to live up to what Pallasmaa has envisioned:

> "The duty of education is to cultivate and support the human abilities of imagination and empathy, but the prevailing values of culture today tend to discourage fantasy, suppress the senses, and petrify the boundary between the world and the self. Consequently, education in any creative field in our time has to begin with the questioning of the absoluteness of the lived

[5] See Chapter 6 (§6.4).

> world and with the re-sensitization of the boundaries of self. The main objective of artistic making, but in the emancipation and opening up of the personality of the student and his/her self-awareness and self-image in relation to the immensely rich traditions of art, and to the lived world at large."[6]

As I point out in Chapter 6 (section 6.5), Shaffer's finding of the "highly individual shaping of identity in aligning individual and (professional) community perspectives"[7] calls for a multimodal approach. I establish such an approach based on 1) my observations of a first semester pin-up at *Taking Place*; 2) a 2012 study by Oh et al. concerning evaluation practices; and 3) the practice epistemology of Schön. First, I propose a reformation of the Oh et al. evaluation model that both a) includes a wider variety of sensory input through *perception* rather than *observation* in step 1, and b) introduces a step of *justification* rather than *identification*, since *justification* admits the possibly subjective element of the assessment. My observations of the pin-up made me aware of four distinct types of judgements (not all of which were actually performed): 1) authoritative judgements on aesthetics, 2) technical judgements of functional or objective criteria, 3) normative judgements relating to precedence in practice, and 4) situated judgements focusing on the internal coherence of the project. In section 6.4 I merge these different types of judgements with the reformed Oh et al. model, forming a multimodal evaluation framework that is intended to help clarify deliberations in an evaluation process. To relate the framework to the proposed paradigms, *normative judgements* might be linked to the Beaux-Arts consensus aesthetics, which are accordingly also conservative, and do not handle new things well. The polytechnic paradigm can be linked to *technical judgements*, which are both solid and objective in many ways, but also limited. Man is not entirely a rational creature, and has other needs as well. *Situated judgements* because of their attention to the material can be linked with the practitioner paradigm; here the danger is self-encapsulation, as the "logic" found there does not point outwards. *Authoritative judgements* are not based on any criteria, but have the danger of becoming either idiosyncratic or authoritarian. With regard to the justification of purely aesthetic judgements even where there are no concrete criteria, I suggest that drawings are sensory producers, and that one might direct the sensory attention of the other, which could lead the other to an experience similar to one's own.

The pin-up at *Taking Place* showed that no strict Beaux-Arts or polytechnic paradigm was in place, as very little of the technical or normative types of judgement were present there. However, it also became clearer that the different types of judgements complement each other, at least in the evaluation context. For this reason, the proposed evaluation framework was multimodal: the combination of the different types of judgements should mitigate against the weaknesses that each

[6] Pallasmaa, *The Thinking Hand*, 20.
[7] See Chapter 6 (§6.5).

has, and as such the evaluation framework ought to ensure a more rounded critique. Further, it might be argued that architectural education would be generally more well-rounded, robust, and agile if it included all three of the paradigms proposed on a similarly reflected and deliberate basis.

9.3 PARADIGMS IN ARCHITECTURE EDUCATION

9.3.1 KEY FINDINGS:

- The establishment of three educational paradigms – the Beaux-Arts, polytechnic, and the practitioner – as an analytic framework.
- At the Copenhagen School, the paradigms are not found in "pure" instances, but weave into one another.
- Perhaps unsurprisingly, the Beaux-Arts paradigm exerts a greater influence in the Copenhagen school than does the polytechnic paradigm. Nevertheless, this does not mean that the Copenhagen school can be straightforwardly labelled a Beaux-Arts school. Furthermore, it differs in significant ways from both the practitioner and polytechnic paradigm.
- The particular mingling, waxing, and waning of paradigms in an architecture school might be the best way to understand the particular in comparison to other architecture schools, hoewever, to base such hypothesis, research would have to be done on other architecture schools using the paradigmatic framework.

In Chapter 2 of this dissertation, I set up a framework of three paradigms as an analytic tool for architectural education. I added what I called the *practitioner paradigm* to the two traditions in architectural education already described, namely, the Beaux-Arts and the polytechnic traditions. This was done because, as I argued, contemporary architecture education in particular cannot be understood within these two traditions alone. I have insisted on conceiving of the Beaux-Arts, polytechnic, and practitioner traditions as paradigms because, as I argued in Chapter 2 (section 2.4), a paradigm indicates something that is less simply habitual than a tradition, but more of a deliberately cohesive community. A shift in the focus to the methodology, rather than the output style, of different architecture traditions helps the paradigms emerge from them. A paradigm brings with it adherence both to specific practices and specific epistemologies. I concluded section 2.4 by outlining the three paradigms, differentiating them according to the parameters of surface structures, pedagogical activities, epistemologies, drawing, ontology, and creativity.

Nevertheless, these parameters are somewhat linked, as my analysis of the view on creativity within the three paradigms reveals. In the Beaux-Arts paradigm, creativity is compositional, and new

construction is made with elements known, for example, from architectural history. For the polytechnic paradigm, form is generated from the capabilities of the materials; whereas for the practitioner paradigm, creativity is dialogical, and comes from an interpretation of back-talk with the material.[8] The paradigms' various stances on creativity feed into their different epistemologies, where the Beaux-Arts paradigm emphasizes precedence (history), the polytechnic paradigm emphasizes technical understanding, and the practitioner paradigm to an extent rejects both of these and insists on knowledge being situated and singular. To practice architecture rigorously therefore means something very different in each of the paradigms.

Much more work should be done on the paradigms. First, they ought to be linked to standard scientific approaches: the polytechnic paradigm, for instance, might be linked to a positivist tradition, the Beaux-Arts to a hermeneutic tradition, and the practitioner paradigm to a new materialist tradition. I would add, however, that inasmuch as the paradigms are specific to architectural education, none of them will be synonymous with any of these positions. Second, the paradigmatic framework should be further challenged through analysis of other architecture schools. For this dissertation, however, the question I set out to answer was:

- *How does the Danish architecture school in Copenhagen relate to the Beaux-Arts, polytechnic, and practitioner paradigms?*

The paradigmatic framework analysis of the Copenhagen School showed how the paradigms weave into each other, and in Chapter 8 I show how, although it would be compelling to think of different paradigms dominating the Copenhagen School during different periods of the 20th century, there are no pure instances of the paradigms. In the beginning of the 20th century, where one would expect the highest adherence to a Beaux-Arts paradigm, we find significant differences in both structure and method. Not even at that point in time would it be fitting to label the Copenhagen School as a pure Beaux-Arts school. Nonetheless, the Beaux-Arts paradigm has held greater sway at the Copenhagen School than did the polytechnic. Even in the middle of the 20th century, when the Copenhagen School came under significant influence from a polytechnic paradigm, with quite rigorous technical training of students, the technical training was often implemented practically through drawing exercises (a practitioner trait) and parallel with an equally meticulous interest in architectural history (a Beaux-Arts trait). If the paradigms are this deeply intertwined in educational practice, it is worth questioning their usefulness. To this question there are at least two answers.

First, the framework could be used to relate different architectural schools to each other, at least historically. Here an analysis of other architecture schools would of course be required, but as hypothesized in Chapter 8 (section 8.4), examining the particular mingling, waxing, and waning of

[8] See Chapter 2 (§2.4.1).

paradigms in an architecture school might be a good way to understand its development and compare it to others. Second, the paradigmatic framework could be useful in enabling architectural educators to expand their didactic toolboxes by means of greater awareness of the didactics of the various paradigms. For example, the Beaux-Arts paradigm's *esquisse* tradition and the conscientious copying of works of architecture bring with them an embodied learning that might find also contemporary applications. In turn, the polytechnic focus on function and economy, as well as its interest in form generation from material abilities, do live on, at least in certain curricula; but greater awareness of the epistemology and approach of the paradigm would make them more accessible as tools. Finally, insights from the practice-based paradigm are not being utilized fully if the practice is always simulated in the same manner. Utilizing different types of simulations would perhaps capture something closer to professional practice, which might give students different types of insights.

Architecture educators could operationalize the paradigm framework in different exercises, designed to scaffold systematic student work within different approaches and epistemologies. Particularly in the bachelor part of their studies, the systematic learning of fundamentally different approaches to how architecture can be thought and practiced could give students a methodological agility, and scaffold their individual approaches and views on architecture, rather than schooling them too narrowly in a particular approach. Some of the architects interviewed in the historical interviews did indeed mention lacking such varied approaches in their education.[9] This too, however, is inextricably linked to the quest for better understanding of different epistemologies of drawing.

9.4 DRAWING EPISTEMOLOGIES

9.4.1 KEY FINDINGS:

- The back-talk of the drawing can be seen as a sort of alterity relation in a postphenomenological sense. This leads in turn the understanding that drawing achieves back-talk capability through its *multistability.*
- *Multistability* in drawing is linked to the drawing as diagrammatic. That is, drawing relates to the world through *thin* similarity.
- Architectural drawing has elements of both empirical and ideational visualisation. Through its thin similarities, the diagrammatic is able to encompass several types of incongruent knowledge and work between them.

[9] See Chapter 4 (§4.3.3).

- The Beaux-Arts paradigm works with a desired fullness or "image effect" to support its type of aesthetic agenda, whereas the polytechnic paradigm, in its distrust of drawing, works with the thinnest possible drawing. The practitioner paradigm works roughly around the fictive zone, drawing equally on ideational and empirical elements. Here, too, a certain fullness is needed for *back-talk*, and *thinness* is sought to exploit multistability.

Through the case studies presented in Chapters 4 and 5, the question of how thinking happens through drawing became increasingly prominent. Both of those chapters, along with chapter 7, address the central research question posed in section 2.4.2:

- How is thinking through the act of drawing taught, and how is it carried out by the students in their drawing process?

Drawing is a mediating technology, meaning that it is neither instrumental nor determining. The different approaches to drawing described by the architects interviewed in section 4.3.2 include specific aims and capabilities that allow them to be used as methods. As argued in Chapter 7.2, drawings mediate in certain ways that are not entirely unpredictable. In a postphenomenological terminology, the back-talk that drawings give off can be described as an *alterity technology relation*. In other words, the architect interacts with the drawing as if it were an "other."

It is the multistability of the drawing that is the foundation of this relation. And the multistability in drawing is related to the drawing as diagrammatic. In the particular case of creative architectural drawing, the drawing spans a fictive zone between the empirical and the imaginary, where it functions as a sort of recipe. This means that multiple actualizations are possible, but at the same time also that some possibilities are closed off; the drawing is *multi–stable*. The drawing strives toward a "thinness" or abstraction, yet still has concrete material and empirical traits. The relative thinness or recipe-like character of the architectural drawing gives it an enhanced multistability, allowing the architect to search with a pencil.[10] A model such as sketched in Chapter 7, I believe comes closer to describing what happens when architects think through drawing, at least in a more detailed way than some stage-based models. As argued by Peter Rowe, stage-based models of architectural creation, do not shed much light on what actually goes on in a design process, nor do they explain what the mechanisms are through which an architect or architecture student can pass from analysis to synthesis, or why a unique solution can come from standard procedures.[11] Whereas the ability to *search with a pencil* can be seen as crucial for performing successful idea generation with drawing, this ability is difficult to describe and difficult to pick up for a student.[12] In section 4.3.3, this

[10] See Chapter 4 (§4.3.4) and Carsten Hoff # 46:20,1 - 48:47,0.
[11] Rowe, *Design Thinking,* 51.
[12] Take Jeanette Frisks account quoted in Chapter 4 (§4.3.4) as an example. Jeanette Frisk # 34:17,1 - 35:07,6.

emerges from the narratives of some of the interviewed architects as what I have called *the dark side of drawing*.

While the mechanics of drawings might be directly trainable, the ability to approach the multistability of drawing and pick up on the back-talk is far more difficult to teach, but is nonetheless at the core of architectural training – as is also seen in the Taking Place study. Here, contrary to what I expected, the first-semester students did not state that they saw "new" directions in the material. Instead, they used their teachers to help them spot things in their material – and so, in Chapter 5 (section 5.5), I regarded this practice as a kind of vocational pedagogy. The students trained their ability to regard their material as multistable, and found different paths of back-talk in it by observing their teachers do exactly this – predominantly in the desk-crits. The back-talk that results from the mediation of drawing is somewhat directed by the concrete materiality. To a certain degree, as argued in Chapter 4 (section 4.3.2), students can learn to manage and direct this through different approaches to drawing. However, as it also emerged in that section, the interviewed architects seldom recalled having practiced or been taught many different approaches to drawing. This is similar to the *Taking Place* students' reports of being quite uncertain around different methods and approaches in their work. Since architecture is a syncretic profession, methodologies of architecture need to include different "data" sources. An architectural drawing might favourably be considered as concomitantly empirical, imaginary, functional, and artistic. The ability to incorporate different types of incongruent data is again linked to the multistable and diagrammatic materiality of drawing. Accordingly, it is not possible to abstract universal rules about it, but still, at the level of pragmatic practice, teach thinking through drawing through the insistence on discussions based on material rather than explanations, as seen in the *Taking Place* study.

In Chapter 7 (section 7.4), I relate the theories of the diagrammatic and mediation in drawing epistemologies to the three paradigms. This establishes a model in which the drawing epistemologies of the three paradigms are set into relation with each other. The Beaux-Arts paradigm, with its emphasis on drawing aesthetics and history, works towards more fullness or image quality in drawing, whereas the polytechnic paradigm, in its distrust of drawing, works with the thinnest possible drawing. The practitioner paradigm draws equally on ideational and empirical elements; here fullness and thinness are balanced. A certain fullness is needed in order for *back-talk* and *thinness* to exploit multistability. The model illustrates not only the particularities of the paradigms, but also how they overlap – as was indeed the case in the Copenhagen School, as shown in Chapter 8.

9.5 TOWARDS A PHILOSOPHY OF SCIENCE FOR ARCHITECTURE

In *Architecture and the Crisis of Modern Science*, Pérez-Gómez traces how the division between the rational and the intuitive has marked architecture since Durand, but also sees the possibility of healing the rift through the primacy of perception of phenomenology.[16] The aim of this dissertation has been to understand the framework for explaining and legitimizing the decision-making that is gradually learned as the basis for becoming a proficient architect, in a way that reveals not a divide, but a reintegration of the rational and the intuitive, through the three paradigms. Yet architecture, and particularly architectural education, is indeed still an academic field at an impasse or under definition, as Lotz argues, [17] and as such it is at times fussy and tacit. Now, perhaps more than ever before, the field of architectural education is under pressure by increasingly stricter budgetary and governance controls. A pressure it will be only too easy to succumb to if the historical trend of resisting justifications for aesthetic practices continues. Architecture education as a scientific field must fully come of age and establish itself not as a minor field of aesthetic niceties over functional constructs, but as an independent way of approaching thinking and knowledge. The work in this dissertation far from reaches even a proper sketch for this, but it does provide at least some building blocks for a better understanding and structure of the research field of Danish architectural education and epistemologies of drawing.

The discussion of paradigms in relation to architectural education and thinking is vital as it treats the field not as a naturally given but constructed and thereby opens it to critical approaches and methodological consideration. Along a similar vein, the inquiries into evaluation practices helps deconstruct any simplistic notion of "good work" and facilitates structured debate in the practice communities. Finally, the key concept of *drawing epistemology* is at the core of better understanding and justifying architectural educational practices as well as creative architectural work. To believe in the fruitfulness of an architectural education, with an emphasis on *education* and not simply *training*, one must commit to the continued investigation and attempts at clarification of practices, epistemologies, stabilities, and structures, along the lines of what Carl Petersen, Danish Professor of Architecture, stated in 1920: "*And if schools have any part in the Arts at all, it must be first and foremost to clarify the rules that can be said to govern all applied arts.*" [18]

It is my firm belief that Danish architectural education must engage further in the continuous development of knowledge about what the scientific framework for architecture is, namely, rigorous and artistic. Disseminating such knowledge among students of architecture would achieve, if not

[16] Pérez-Gómez, *Architecture and the Crisis of Modern Science*, 324-325.
[17] Lots, "Architectors," 62.
[18] Carl Petersen, "Modsætninger", 138. [Own translation from Danish]

clearer goals, then at least more open discussions about the content, form, and ambition of the profession. Such inquiries inevitably come to deal with the very nature of the philosophy of science that underlies architecture. The investigations carried out in this dissertation are intended to point toward what might one day amount to such a theory, echoing how Petersen continues his above statement with a humble wish for the gradual emergence of clarity in the field:

> *"Sadly, we have not had great architectural educators in our time, as is the case in music. We have to make do with individually observing and gaining experience, reporting this to one another and hoping that it will amount to something."*[19]

It might be that there are inherently tacit elements of a process of learning through drawing. Yet continuous probing and critical questioning remains paramount for the reflective artistry that good architecture requires. Ultimately, asking questions about architecture education informs not only our knowledge of this type of education, but also more broadly our built environment. To finish with the words of Dana Cuff: *"By studying the process of becoming-an-architect, we discover what it means to be an architect, thereby gaining further insight into the culture of architecture."*[20]

[19] Carl Petersen, "Modsætninger", 138. [Own translation from Danish]
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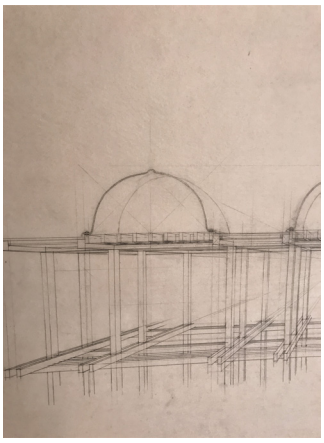
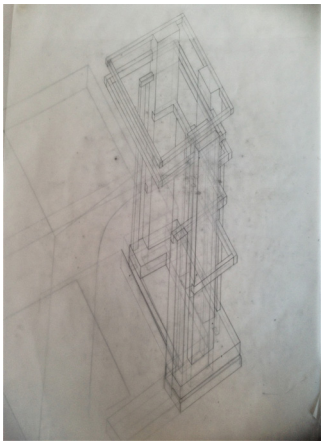


How exactly is it that you become an architect? What sort of knowledge do different exercises give students and how is it that you form the experience that, in the end, enables you to be a good designer? Such questions are difficult to answer and particularly in the context of Danish architecture education, which as a field of research is still underdeveloped. I propose a framework for a paradigmatic analysis of architecture education that distinguishes between the Beaux-Arts, the polytechnic and the practitioner paradigms. Both the Beaux-Arts schools and the Polytechnic schools are described in scholarly literature, but to lift the labels from something historical and into the more epistemic, I attempt to describe them in relation to specific epistemologies and drawings practices. Therefore the paradigms become interconnected with the themes of drawing as a technology and an underlying interest in what I term *drawing epistemology*. That is to say, how, as an aspiring architect, you achieve experience through the act of drawing.



It is significant for Danish architecture education that it has remained closely linked with an artistic tradition, and is thus also, to a highly accentuated degree, based largely on visual expression rather than on language. Drawings are therefore vital sources to consider when analyzing Danish architecture education. What is particular to the architectural context is the syncretic nature of attention. The architect must not simply learn mathematised representational forms to be able to work with technical aspects of design, but works with aesthetic and symbolic impressions as well. Intrinsic to this dissertation is an ambition to understand the framework for explaining and legitimizing the in part aesthetic decision-making that is gradually learned as the basis for becoming a proficient architect. Nowhere is better suited to research *drawing epistemology* than an architecture school: it is where it comes into being, where it is taught, or if not taught then at least learnt. This dissertation thus has not only an interest in better understanding the general practices in architecture school, but what the particularities of drawing practices are and how they are related to thinking through drawing.