Uncertainties of Reason:
Pragmatist Plurality In Basic Design Education

by

Mine Özkar

Bachelor of Architecture
Middle East Technical University, 1997

Master of Science in Architecture Studies
Massachusetts Institute of Technology, 1999

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Signature of Author
Department of Architecture
May 31, 2004

Certified by
George Stiny
Professor of Design and Computation
Thesis Supervisor

Accepted by
Stanford Anderson
Professor of History and Architecture
Chair, Committee on Graduate Students

DISSERTATION COMMITTEE

Edith Ackermann
Visiting Professor, Massachusetts Institute of Technology
Professor of Developmental Psychology, University of Aix-Marseille I, France

Whitman Richards
Professor of Cognitive Science
Computer Science and Artificial Intelligence Laboratory
Massachusetts Institute of Technology

George Stiny
Professor of Design and Computation
Massachusetts Institute of Technology

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ABSTRACT

Creativity, in the sense that it emerges from differences in reasoning, can be fostered in an education system where personal experiences are an integral part of the curriculum. The basic design course is an attempt to pursue this understanding in architectural education. The Bauhaus in Weimar and the VKhUTEMAS in Moscow are two schools renowned for starting the tradition of basic design education in early 1920s. However, the ideology of modernist universalism dominant at these schools and their followers in Europe and America avert the pursuit for plurality.

An interest in basic design education existed earlier in America through the educational practices of Denman W. Ross in Architecture and Fine Arts Departments of Harvard University between 1899-1935, and Arthur W. Dow, first at Ipswich, MA, later in Teachers College at Columbia University in New York between 1908-1922. Ross and Dow's methods were partially affected by their involvement in the Arts and Crafts and the Orientalist movements. At the same time, their ideas coincided with those of the philosophers, psychologists and scientists of the intellectual community around them, such as William James, George Santayana, John Dewey, and Hugo Münsterberg who altogether emphasized the continuity of experience and the role of sensory experience in learning. Whereas the modernist basic design education falls short in sustaining the plurality, Ross and Dow's pedagogical theories, despite their dated style, acknowledge that people's differences make design a worthwhile creative enterprise.

The ideas that arise in Ross and Dow's approaches to basic design are relevant from a contemporary viewpoint. Today, the inflexibility in the ways that design processes integrate technology contrasts the designer's interest in variance and uncertainty. Reasoning plays into creativity in much more flexible ways than those usually attributed in technology. This dissertation argues to encourage creativity in the formative years of design education, and as a personal reasoning process that allows for uncertainty.

Thesis Supervisor: George Stiny
Title: Professor of Design and Computation

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Finally, my continuous and biggest gratitude is to my parents and my brother. I dedicate this work to them.

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Chapter 1

Introduction: Rethinking Basic Design Education

Basic design instruction, a modernist program as it came to be understood within architectural discourse, is a preliminary curriculum in art and architecture education. Through the experimental use of abstract forms and materials, it attempts at enabling the student with fundamental design skills that would universally apply. This dissertation questions the key concepts of basic design education from a contemporary viewpoint in architecture, and argues that the potential in basic design instruction lies in endorsing *differences in reasoning* as its central objective. Creativity, in the sense that it emerges from the differences in reasoning, can be fostered in an educational method where personal experiences are an integral part of the curriculum. The common history of basic design education points at the Bauhaus in Weimar for the beginnings. The Bauhaus was one of the renowned schools where this understanding was tried in the 1920s. However, its pedagogy changed greatly from its initial years, and overall, it rather fit the modernist agenda for normalizing, digressing from the earlier viewpoint that anticipated the self-conscious creative thinking.

An earlier tradition of basic design instruction existed in America through the educational practices of Denman W. Ross in Architecture and Fine Arts Departments of Harvard University between 1899-1935, and Arthur W. Dow, first at Ipswich, MA, later in Teachers College at Columbia University in New York between 1908-1922. Ross and Dow separately developed abstraction as a method of intellectual inquiry into design, earlier than the European 20th century modernism.[1] Ross and Dow's formalisms were partially affected by their involvement in the American Arts and Crafts and the Orientalist movements. At the same time, their ideas coincided with those of the philosophers, psychologists and scientists of the intellectual

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[1] See Marianne W. Martin, "Some American Contributions to Early Twentieth-Century Abstraction," in Arts Magazine, n. 10, v. 54 (June 1980), 158-165. Martin discusses the parallels between the method of abstraction Ross, Dow, and their affiliate Ernest Fenollosa were interested in developing, and the "reformative aesthetic" of abstraction in early 20th century Europe. For a comprehensive history of Ross and Dow in the intellectual and architectural setting of their time, see Marie Ann Frank, *The Theory of Pure Design and American Architectural Education in the Early Twentieth Century*, PhD dissertation, University of Virginia, 1996.

community around them, such as William James, George Santayana, Hugo Münsterberg, and John Dewey who altogether emphasized the continuity of experience and the role of sensory experience in learning. In terms of ideas, Ross and Dow's approaches establish a vanguard to the modernist design education. Nevertheless, their progressive ideas, presented in conservative visual styles, are overshadowed by the visually compelling and progressive work of the avant-gardes.

Some aspects of the methods that Ross and Dow proposed for design and art education are certainly outdated today. The value in reconsidering the beginnings of basic design education through the work of Ross and Dow is the relevance of their background in the current discussions and the fast growing technological objective. Ross and Dow emerged from an intellectual community that put emphasis on individual reasoning processes and critiqued the inflexibility of timeless and universal intellectualism, past and present. In this sense, Ross and Dow's ideas provide a more relatable inquiry today than the modernist account of basic design education. Additionally, the fallacies in Ross and Dow's methods and those that followed, together with the modernist thread, present a more complete picture for discussion. Developed to undermine overbearing conceptual systems, basic design methods in the 20th century inadvertently set limits to creativity. Although the exchanges with philosophy and psychology prove to be valuable, the weakness of basic design education may well be its proximity to positivist and logical thought. Reasoning plays into creativity in much more flexible ways than those usually attributed to the sciences.

The prominent viewpoint in this dissertation is that conceptual structures are temporary and discardable. Creativity is not a mysterious mental state. Rather, it is to develop unique strategies in changing contexts, and subsists on the awareness that conceptual structures inhibit further exploration of our senses. This idea, reiterated in the poststructuralist literature of the last forty years, goes back to the late 19th century philosophies that represent an important stance against deterministic thought structures. The pragmatist view, contemporary with theories of evolution, developments in psychology and other origins of 20th century modernism, takes into account changing parts and relationships, and pursues flexible descriptions of the world. This quest is still relevant today in creative lines of work, such as architecture, which is often overwhelmed by emerging technologies that converge on only particular ways of thinking. A critical perspective is

needed in architectural education, more than in the professional domain, to assure that the marginal thoughts and uncertainties, necessary in creative endeavors, are not cut back.

This perspective can be integrated in design education when the focus is on the personal development of the student, and sensory experience is a crucial function of this training. The basic design curriculum in architecture schools attempts to do so. But historically, these attempts have usually moved away from the creative idea. Mostly associated with the Bauhaus, the history of basic design is traced back to early 19th century child educators Johann H. Pestalozzi and Friedrich Froebel with their interests in hands-on learning. Johannes Itten, who set up the basic design course at the Bauhaus a century later, was a former kindergarten teacher himself. Itten's *Vorkurs* was not light-hearted, but his contemporaries at the VKhUTEMAS (the Higher Artistic-Technical Studios), another design school in Moscow, were more determined to involve sensory experience in design. Nikolai Ladovsky had organized a basic course around the psychoanalytic method and had set up a psychotechnics laboratory for measuring factors such as "attention", "memory", "perception measurements" and "spatial and motor abilities." All this was inspired by the work of Hugo Münsterberg, a German psychologist at the head of the experimental psychology laboratory at Harvard University as early as 1890. There is not much written on how the developing field of psychology affected the Russian avant-garde. Detailed descriptions of what the laboratory equipment at the VKhUTEMAS really showed also do not exist. But the implication of this kind of a set-up for the pedagogical program was towards converging sensory experiences into a shared corpus rather than exploring the differences.

Similar directions ensued in the Bauhaus legacy with the influences of Gestalt psychology as well as the Vienna Circle from late 1920s onwards. The Gestaltists proposed a set of rules for perception, such as the laws of proximity, similarity, closure, good continuation, and symmetry. These helped, not so much the pedagogical ideas in the basic design curriculum but a particular visual and formal exploration that was later deemed a style. Additionally, contemporary to the beginnings of the Gestalt effect on the Bauhaus, its faculty developed close relations with the logical positivists such as philosopher Rudolf Carnap and sociologist Otto Neurath in the Vienna Circle. Even though both Carnap and Neurath were interested in visual thinking, their primary agenda to unify life around the same set of building blocks reduced experience to logical propositions and engulfed perceptual variation. This agenda was an uprising to the one-sided

politics overpowering at the time, and later coupled with the functionalist view that embraced technology as a universal liberation of mankind from subjective criteria. Within all this, the affiliation between the Bauhaus and the logical positivists resulted in reducing basic design instruction to a basic vocabulary of forms that are universally shared. Ramifications continued as the avant-gardes fled to America before the war, and as the impact of Gestalt psychology on the arts grew in 1940s.

William James, who had initially invited Münsterberg to Harvard, advocated a different viewpoint. In his inquiries about reasoning, sensations were unique and experimentation served to reveal this rather than demoting them to anticipated ideals. These inquires were concurrent with the 'pure design' course instigated by Denman Waldo Ross in the architecture and fine arts department at Harvard. Ross's course, where the student was learning to develop his own understanding of forms, stood out at the school in what was otherwise a Beaux-Arts tradition of education. Ross taught at Harvard from 1899 until his death in 1935, so most of his teaching predated Walter Gropius's arrival from the Bauhaus.

Ross's ideas had partially grown out of interactions with Arthur Wesley Dow, a local painter who separately developed a curriculum to teach 'composition' in painting. After teaching in Boston and Ipswich, Dow taught at Teachers College in Columbia University from 1908 to 1922 and took part in John Dewey's efforts there to establish active learning in education.

The Arts and Crafts movement in England and America, a general reaction to the mechanized ways of the developing industries, was an important part of the intellectual setting with the Pragmatists. Having been exposed to John Ruskin's theories and William Morris's work, and with Charles Eliot Norton promoting the movement in Boston, Ross and Dow were both involved. Their interest was pedagogical as well as for their own art works. The emphasis on techniques and how the process of creation relates to these techniques contributed to their advocacy of sensory experiences in design teaching. The ornamental and decorative arts also allowed Ross and Dow to isolate formal relationships and focus on the abstraction process in their pedagogical courses. Instead of de-emphasizing the ornament, a thing that is only visual, utilizing it as a tool to understand how the visual and other material qualities play into the process of creative thinking is a progressive idea. Although a "meaningful" social context is

something that plays itself out in the design process all the time, it will never literally translate to any visual aspect of form. Forms will be perceived through the context, and be meaningful in unique ways for each instance.

Ross and Dow's interest in decorative arts was combined with their exposure to the work of the Impressionists in Europe and curiosity for the arts of the Far East. They were among the first to show the Orientalist interest in America and through Ernest Fenollosa, at the Museum of Fine Arts in Boston, they were exposed to quite a lot of it. These relationships contributed to many aspects of their work, from being keen on sensory experience in the design process, and the use of different techniques in painting, to moving away from realistic representations and utilizing minimalist and asymmetric aesthetics in understanding how paintings could be structured in abstract ways.

More than their aesthetic choices and how they itemize principles for design, this thesis dwells on Ross and Dow's concerns with how design is done. The principles they propose give clues to their understanding of the design process but are often not much more than other theories that have been proposed and utilized over time. Therefore, more than their fundamentals of design, as published in their magnum opuses *The Theory of Pure Design* and *Composition*, I look at Ross' wallpaper exercises, photograph analyses, use of grids, general notes on organic form, and Dow's woodcut printing techniques as he learnt them from the Japanese, his ways of abstracting form relations in developing design ideas, and his general notes on education. Ross' work is significant for keeping the parts and wholes dynamic while Dow's work sees the impact of techniques on the design process. Both show ways to set up constraints through diagrams of relations between abstract forms. At the same time, they are aware of how personal engagement and the sensory experiences of the individual play into the design process and that these constraints change along the way. The strong point in their pedagogical theories is in acknowledging that people's differences make design a worthwhile creative enterprise.

Also evident in Ross and Dow's work, the shortcoming of trying to address uncertainties in design education is in structuring the exercises given to the students. The answer to the question of what the student is going to walk away with from an exercise should be left open rather than being established as "a sense for balance, rhythm, or symmetry." The fall back into a set of

timeless principles has often happened for the arts and architecture. We see it in a variety of instances from the mathematical ideals of the Renaissance to Owen Jones's *Grammar of Ornament* (1856), and Christopher Alexander's *Pattern Language* (1977), but also in the context of design education with the Bauhaus basic design tradition. The problem is imminent today in how designers interact with emerging technologies in their thought processes. Computation in the engineering sense compromises the plurality of thought with predefined and hierarchical structures. This is not surprising. In line with the logical positivist approach, engineering objectives converge on feasibility, efficiency, and optimization, and rely on repeated elements. Designers' efforts to grasp, accept, and embrace this view is understandable from a strictly practical standpoint in the architectural profession. At the same time, it is daunting that this view applies to architecture at all as the profession contributes to the society through much more than a recurring mechanical functionality.

There are no doubt redundancies in needs and realities of human life, but wanting the same for all men comes as a petty excuse to in fact impose certainties on them. Surely, creative endeavors do not need to be a part of this contract when they can allow for plurality. The design process needs to be emphasized as a course of action that shows variation in concepts. Computing could be considered from a designer's point of view, as unique reasoning, with or without machine. Attentive to this problem, George Stiny has shown that with visual sagacity, computation can be reflective of a design process. With a flexible formalism, there is no need to fall back into reductions and symbolisms that are set once and for all.

Additionally, endorsing a creative stance in the use of new tools also addresses the other extreme view today. The more romantic view of design excludes, along with the determinism, all kinds of reasoning from the creative process, and utilizes technological tools only in representations. Design is reasoning and, at the same time, makes use of visual and tactile resources to deal with preconceived limitations. Interaction with intellectual and technical tools, as well as materials, is an active part of it. Basic design education is an appropriate way for engaging individuals in unique ways of seeing and making, whatever the tools and materials at hand are.

Content

In Chapter 2, "Abstract Forms and Form Relations in the Works of Denman Waldo Ross and Arthur Wesley Dow," I mainly give an overview of Denman Ross and Arthur Dow's particular works that have pedagogical implications. Surveying four different instances of their work, I try to show the emerging concepts of abstract forms and form relations in their design pedagogies. Ross's wallpaper pattern designs published in *Illustrations of Balance and Rhythm: for the use of students and teachers* (1900) carry importance as they were exercises given to students. Ross's unpublished analyses of photography and painting indicate processes of abstraction. Similarly, Dow's teaching method, from his book titled *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers* (1899) and a collection of his unpublished personal notes, illustrates how to structure paintings with abstract guidelines. Finally, I consider the impact of techniques and material, especially on Dow's work, as a precursor to discussions on hands-on learning. The material reviewed in this chapter is not widely accessible. Ross's analyses of photography and painting are currently stored in the Harvard University Art Museums Archives. Dow's personal notes are in Ipswich Historical Society Archives. For this reason, I concentrate on introducing the variety of work, leaving the more in-depth discussion with reference to the historical context and ideas to the following chapters.

Chapter 3, entitled "Pedagogical Use for Abstract Forms and Form Relations," discusses the implications of the concepts introduced in the previous chapter as pedagogical methods, and presents them within the late 19th century philosophical context. The main objective of basic design education, as it originates from this context, is the personal development of the student. Sensory experiences are an active part in it as students learn to develop their own ways to approach problems. To further articulate the dynamics of abstract form and form relations with reference to sense perception, I discuss the notions of sagacity and changing part-whole relations that arise out of the philosophical discussions in the 19th century. These discussions, as well as the interest for the psychology of art at the time, provide a background to the emerging perspective to creative thinking. Finally, I concentrate on how Dow and Ross developed the abstract forms and relations as intellectual tools in design and utilized them to convey a reasoning process that varies with perception.

In Chapter 4, "Past and Present of Similar Pedagogies with Basic Design," I discuss the shortcomings of Ross and Dow's approaches but also argue that their thinking was progressive in foreseeing the methodologies applied to the extreme later at the avant-garde schools such as the Bauhaus and the VKhUTEMAS. Ross and Dow belong to a short-lived period in between the formal idealisms of the past and the 20th centuries. Additionally, this is the period that saw the emergence of pragmatism in American philosophy. Recent discussions suggest reintroducing the pragmatist plurality to the architectural discourse today. Nevertheless, as pragmatism is often confused with pragmatics, I contend that the current perspective mostly falls into a technological determinism similar to that pursued by the avant-gardes. My attempt is to reintroduce the pragmatist perspective through the theme of creativity in design education.

Chapter 5, "Conclusion: Why basic design education is still important today," ends the thesis discussion on the point that uncertainties and reasoning can be handled simultaneously, and to the benefit of creativity. Basic design education is important in general because its set up can provide ways to experience the creative process as such, through abstract forms, and with focus on form relations. Nonetheless, basic design instruction should be enhanced to make this point more explicit to the student. This is necessary in order to refrain from the fallacies of the earlier attempts in the history of basic design education, and possible by providing the students ways to think about their process without relying on fixed elements and structures. Future work is proposed for the studio in encouraging students to reflect on their designs and thought processes in typical basic design exercises. This is to develop a self-awareness regarding the process and how it can be represented. The key is in translating form relations to a non-conventional concept of visual rules. This will also help the students to understand the creative process in terms of computing with indefinitely changing personal rules.

Chapter 2

Abstract Forms and Form Relations: the Visions of Denman Waldo Ross (1853-1935) and Arthur Wesley Dow (1857 – 1922)

I. Introduction

A tradition of basic design education existed in America in late 19th century through the educational practices of Denman W. Ross in Architecture and Fine Arts Departments of Harvard University between 1899-1935, and Arthur W. Dow, first at Ipswich, MA, later in Teachers College at Columbia University in New York between 1908-1922. Denman Waldo Ross and Arthur Wesley Dow are mostly known for their artwork and discourses on art and design education. They were in the same circles and knew each other as early as 1896 when Dow visited the other in Venice. They worked closely in Massachusetts after that, especially in 1901, as Dow observed Ross's class in Boston and they reportedly painted together. Having correlated design-teaching ideas, they even collaborated in a published article on architectural education and "pure design" as a part of its curriculum.[1]

Dow's pedagogical influence persists with *Composition*, his book on the basics of painting which was first published in 1899. He is also a prominent figure in the American arts and crafts culture with his New England landscapes and woodcut prints. Ross's watercolor patterns place him along the same lines, although they are not published, exhibited or discussed as much. On the other hand, his theories on design principles and teaching are more published than Dow's, culminating in works titled *Illustrations of Balance and Rhythm* (1900), *Design as Science* (1901), *A Theory of Pure Design* (1907), and *On Drawing and Painting* (1912). Still, Ross's pedagogical legacy seems to exist more through his students at Harvard than through his written work.

Ross and Dow's treatises allude to their understanding of dynamics in the design process but mainly outline fundamentals of design for teaching. These principles, when viewed in isolation, are often not much more than what other theories and formalisms have offered throughout

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[1] Denman W. Ross and Arthur W. Dow, "Architectural Education," in *The Inland Architect and News Record*, n. 5, v. 37 (June 1901), p 38.

history. Their significant viewpoint on design teaching, regarding the personal development of the student, mainly comes to light through marginal aspects of their work discernable in their public lectures on education, exercises they give to students and their personal notes and analyses. This chapter looks at some of these works to draw out the key element of abstract forms and relations employed in Ross and Dow's basic design pedagogy.[2] It also presents these as a precursor to the broader discussion about basic design education at the end of 19th century in the following chapter.

II. Wallpaper patterns by Denman W. Ross: From ornaments to exercises in abstract forms and form relations

Denman Waldo Ross was a professor of design theory at Architecture and Fine Arts Department at Harvard University between 1899 and 1935. Despite his endorsement of "design as a science," Ross's approach to design education targeted the imposing aesthetic structures and timeless formalisms that were dominant in the field at the time. He promoted what he called "pure design" as an introductory curriculum in architectural education. He wrote that "the study of pure design should be preliminary to the study of art in its various and specific applications." This was partially a reaction to the general misconceptions of design. He explained:

> Design, as it is commonly understood, is to serve the purpose of decoration or ornament by the various arts and crafts. The teaching of design means teaching 'Historic Ornament,' the practice of design means following historic precedents and adapting them to modern requirements. It means doing what the public knows, understands, appreciates, wants. Design is the glass of fashion, the handmaid of commerce. In three words, it is not a fine art, as it should be. The creative imagination has very little to do with it.[3]

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[2] Marianne W. Martin shows the parallels between the abstraction of Ross, Dow, and their affiliate Ernest Fenollosa, and the "reformative aesthetic" of abstraction in early 20th century Europe. See Marianne W. Martin, "Some American Contributions to Early Twentieth-Century Abstraction," in Arts Magazine, n. 10, v. 54 (June 1980), 158-165.

[3] Ibid. p 38.

"Pure design," instead, was a more creative understanding of the underlying formal structure in designs. Ross pursued to show it in his pattern designs, and his analyses of paintings and photographs where he abstracted forms and looked at form relations. While detaching form from prescribed aesthetic meaning, he utilized form relations as a tool to comprehend how the visual and other material qualities play into the design process of an individual.

Ross published some of his and his students' exercises in wallpaper pattern design in *Illustrations of Balance and Rhythm: for the use of students and teachers.*[4] There is no text to explain the illustrations and the book is only a compilation of prints, but the arrangement of prints reveals the process to some extent. Preceding each design is a set of amorphous shapes. These units are put together in a design, which in turn, performs as the basic element of a wallpaper pattern.

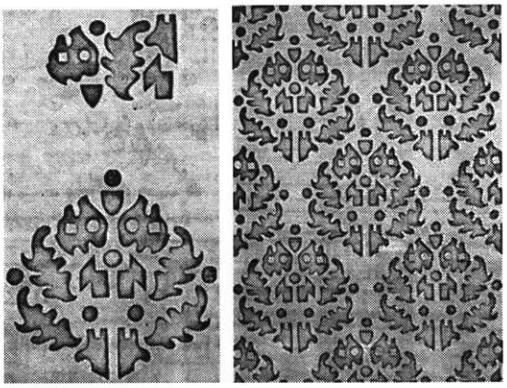

Figure 1. The arrangement of prints in Ross's *Illustrations of Balance and Rhythm* to some extent reveals the process followed in the wallpaper pattern designs. A set of amorphous shapes precedes each design. These units are assembled and together perform as the basic element of a wallpaper pattern. See Denman W. Ross, Edgar O. Parker, S. Clifford Patchett, *Illustrations of Balance and Rhythm: for the use of students and teachers*, (Boston: W. B. Clarke Company, 1900), plates 2 and 3.

How the designed element repeats with vertical symmetries and off-axis rhythms in the overall wallpaper pattern is expected in such designs. The smaller units in the beginning however, yield to more experimental arrangements. In the example above, six shapes and multiple duplicates are organized symmetrically to fit inside the imaginary boundary of a larger onion-like shape. Some

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[4] Denman W. Ross, Edgar O. Parker, S. Clifford Patchett, *Illustrations of Balance and Rhythm: for the use of students and teachers*, (Boston: W. B. Clarke Company, 1900).

of the spatial relations here include edge and corner alignments as well as shapes or parts of shapes tucked into niches in other shapes or niches formed by groups of other shapes.

Figure 2. Some of the spatial relations in the design from the previous figure are shown here in detail. The first three illustrate edge and corner alignments. The second three illustrate shapes or parts of shapes tucked into the niches in other shapes or formed by groups of other shapes. The designer establishes various spatial relations according to different perceptions of parts of the shapes.

Most of the units are amorphous with many features identifiable in many ways. How they come together relies more on their visual qualities in that particular context. For example, the circle sits in different niches each time, one of which is shown above. Rather than being grouped with an equilateral triangle and a square as most 20th century avant-garde designs have shown, circle in this case is explored in the context of a group of irregular shapes. Other than the formal expectations based on precedents in textile and wallpaper prints of the time, these decorative patterns do not have representational and functional qualities and are purely formal exercises. At the same time, they avoid idealized forms and form relations while simply constituting a medium to explore abstract forms. Even most of the duplicates slightly vary in size, by an extended edge, an extra curve or a trimmed end. The exercise allows for changes in shapes as well as their relations to one another.

It is not clear whether the little amorphous shapes in the examples here were appropriated from previous wallpaper designs, for example by William Morris, or the students or Ross creates them at that moment. Illustrations in *A Theory of Pure Design* display similar shapes that Ross constructs in the course of the text using commonplace principles of harmony, rhythm and balance.

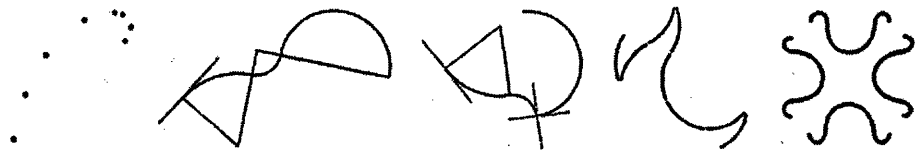

Figure 3. In *A Theory of Pure Design*, Ross shows how to construct various shapes out of parts and their designs. He mostly relies on visual criteria. Denman W. Ross, *A Theory of Pure Design: Harmony, Balance, Rhythm*, (Boston and New York: Houghton, Mifflin and Company, 1907) p 25, 40, 41, 46, and 65.

As for the origin of the wallpaper design units seven years prior to the book, there is no indication that the shapes were constructed carefully and intentionally. The shapes in the patterns are not symbols, and neither are they marks from brush strokes. The intention seems to be having unconventional figures that are difficult to deal with at the abstract level. Even if the shapes are abstract motifs transforming natural forms such as petals, leaves and stems, as was the case for Owen Jones,[5] they serve the same purpose. The level of abstraction resulting in the unfamiliarity of forms sets a distance between the students and the forms so that they dismiss their biases and worry about establishing new and surprising relations between the forms. Without any concerns to what the units are, these exercises focus on how they come together.

Moreover, there is little precision in how the shapes are drawn or printed. Formal features that are taken into account change from one end of the design to the other. Rules are not decipherable because they are context-specific. They are not even shared between separate designs. The designs in **Figure 4** relate the leaf like figure to the flame like figure (with circle and square in it) in different ways.

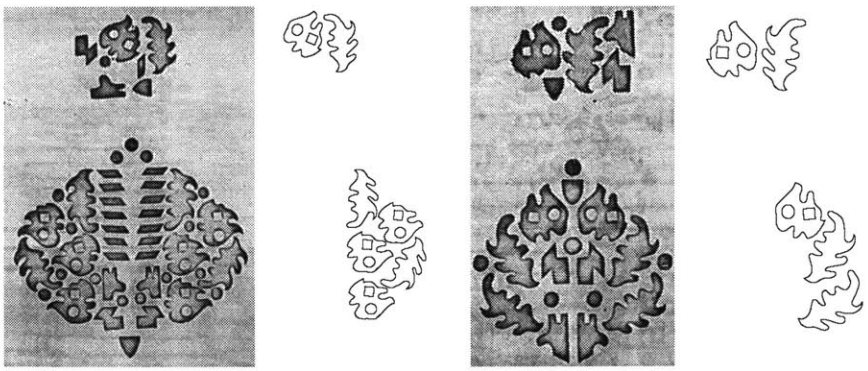

Figure 4. The given vocabularies of the two different wallpaper designs shown here share two units. But they are treated differently in the designs. In each design, the leaf like figure relates to the flame like figure (with circle and square in it) in various ways. See Ross, Parker, and Patchett (1900), plates 1 and 2 [line drawings by the author].

In another series of examples, a core set of little shapes is used in three different designs, one of which is by Ross and remaining two are by different students. Again, in each, shared units are

[5] Mary Ann Stankiewicz "Form, Truth and Emotion: Transatlantic Influences on Formalist Aesthetics," in *Journal of Art and Design Education*, n. 1, v. 7, (1988), p 84.

used in different contexts. Their relations among one another and to other shapes vary greatly between the three designs. Ross does not prescribe any rules to his students in how to arrange them. Only, spatial relations applied are similar to those given earlier where edges or corners align or shapes are tucked into niches formed by others.

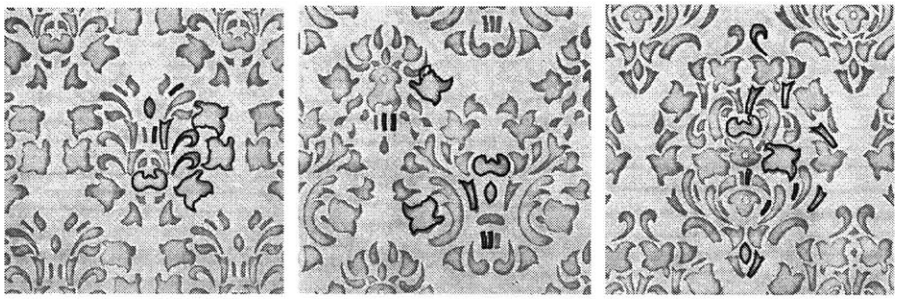

Figure 5. Ross does not prescribe any rules to his students in how to arrange units. Above are three different designs built from one vocabulary. The first is by Ross, and the other two are by students. In each, shared units are used in different contexts. Their relations among one another and to other shapes vary greatly between the three designs. Details from Ross, Parker, and Patchett (1900), plates 7, 8 and 9, [emphases by the author].

As mentioned earlier, Ross uses comparable shapes in *A Theory of Pure Design* to illustrate the general organizational principles of harmony, rhythm and balance. But these principles are vague because they are general, and do not explicitly guide these exercises or any others by Ross. There is no visual evidence of how more detailed rules are developed and applied in wallpaper designs. Ross's motive seems to be leaving that to the students.

Additionally, these exercises also allow the students to understand dynamic part-whole relations. Designs created with small units are units in a bigger whole of the wallpaper design. And overall pattern elements resemble some of the smaller units as shown in **Figure 6**.

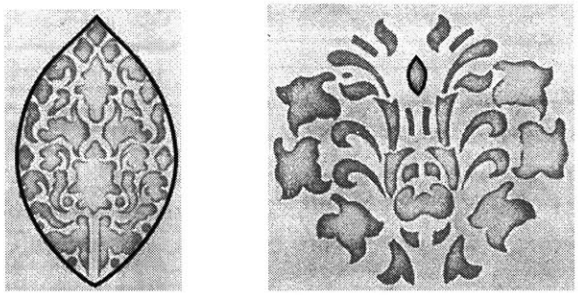

Figure 6. Figure on the left illustrates that the contour of a pattern design resembles one of the smaller units used in another pattern design shown on the right. The pattern exercises allow the students to understand dynamic part-whole relations as shapes are used at different levels of the design. Details from Ross, Parker, and Patchett (1900), plates 10 and 6, [emphases by the author].

Furthermore, as two separate patterns are overlapped in **Figure 7 (a)**, some of the units are cut, or modified into new shapes. These new shapes are utilized as units in other designs, for example in **Figure 7 (b)**.

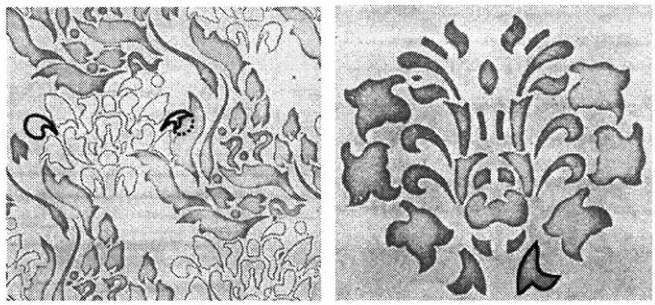

Figure 7. (a) Parts of shapes were also used as units. Two separate patterns are overlapped in the figure on the left. **(b)** A part of the unit that is compromised in the overlap is used as a unit in the design on the right. Details from Ross, Parker, and Patchett (1900), plates 22 and 6, [emphases by the author].

Ross explicitly shows in *A Theory of Pure Design* that the combinatorial arrangements in the designs can overlap and create new spatial relations.

Figure 8. Ross shows in *A Theory of Pure Design* that the combinatorial arrangements in designs with similar shapes can overlap and create new spatial relations. Denman W. Ross, *A Theory of Pure Design: Harmony, Balance, Rhythm*, (Boston and New York: Houghton, Mifflin and Company, 1907) p 124.

Figure 7 (a) above illustrates an overlapping spatial relation between two patterns of a wallpaper design, while their parts also engage in spatial relationships as specified before. As shown in **Figure 9,** a part of one pattern encases a part of the other. This all indicates that these exercises go beyond combining given sets of shapes as students explore emerging shapes and relations.

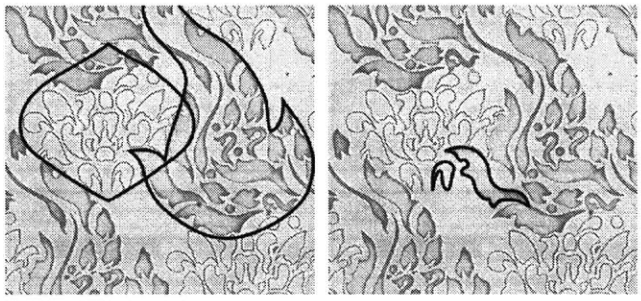

Figure 9. The exercises go beyond combining given sets of shapes as students explore various relations between shapes at different levels. Details from Ross, Parker, and Patchett (1900), plate 22, [emphases by the author].

There is one other point to studying the wallpaper examples. Among Ross's personal notes, there are a few hand drawn patterns similar to the wallpaper patterns discussed above. One of them, shown below, illustrates Ross's utilization of a background grid in establishing forms and relations between the forms. Distances, symmetries and repetitions as well as the extrusions of the parts are all based on the verticals and horizontals of the grid.

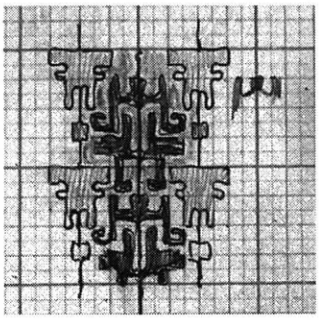

Figure 10. Ross utilizes a background grid in establishing forms and relations between the forms. The grid is an organizational means. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

Guideline grids are expected in regular designs as wallpaper patterns. Another plate among Ross's personal notes depicts a wallpaper pattern on a triangular grid as shown below. However, this one being triangular, hints at the use of different guideline geometries to adjust distances, symmetries and repetitions.

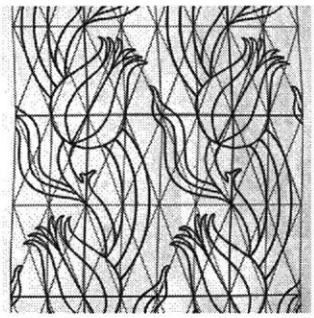

Figure 11. Ross uses a triangular grid similar to that of Hardesty G. Maratta's to organize a pattern. Because patterns are repetitious by nature, the use of grids for organizational purposes is not surprising. Detail, from Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

Ross was acquainted with designer Hardesty G. Maratta who owned a design company that produced and distributed grid papers in mid 1910s. These design papers were significant because their grid was triangular for the purpose of serving designers and artists. Maratta must have thought that designers appreciate dynamics of the equilateral triangle better than the square. Ross certainly did as he wrote "easier to get good compositions with triangles than rectangles."[6] Based

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[6] Denman W. Ross, *Experiments in Drawing and Painting*, (The Century Association of New York, Exhibition November 1923) p 2.

on the archived material, it is possible that Ross distributed these papers to his students for drawing exercises. **Figure 12** shows another plate, drawn and sent to Ross by Maratta himself, possibly to demonstrate the use of the design paper.

Ross utilized and furthered the idea of connecting the figural composition with abstract lines in the analyses described in the next section.

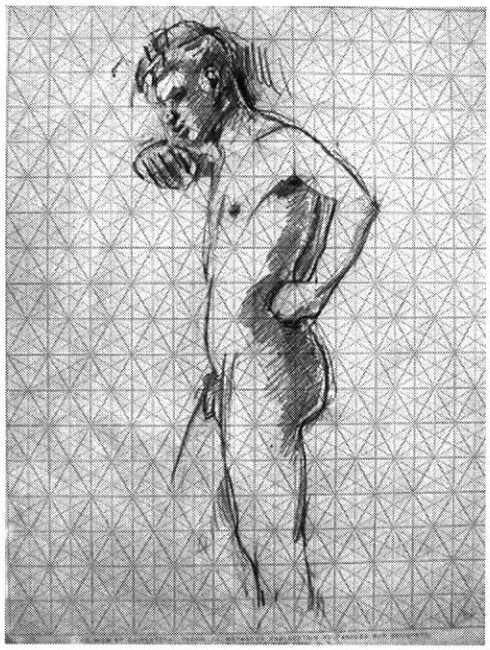

Figure 12. Maratta's design paper introduces a triangular grid rather than a square one. This anticipates later practices of Ross that utilize abstract lines as active guidelines in design. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

III. Analyses of photography by Denman W. Ross: Organizational form relations

In his analyses of paintings and photography, dated late 1920's, Denman Ross uses grid lines more dynamically than in the examples of the previous section. At a first glance, his analyses of paintings resemble conventional ones, of mostly classical paintings, executed to represent how various figures are compositionally linked in a picture.

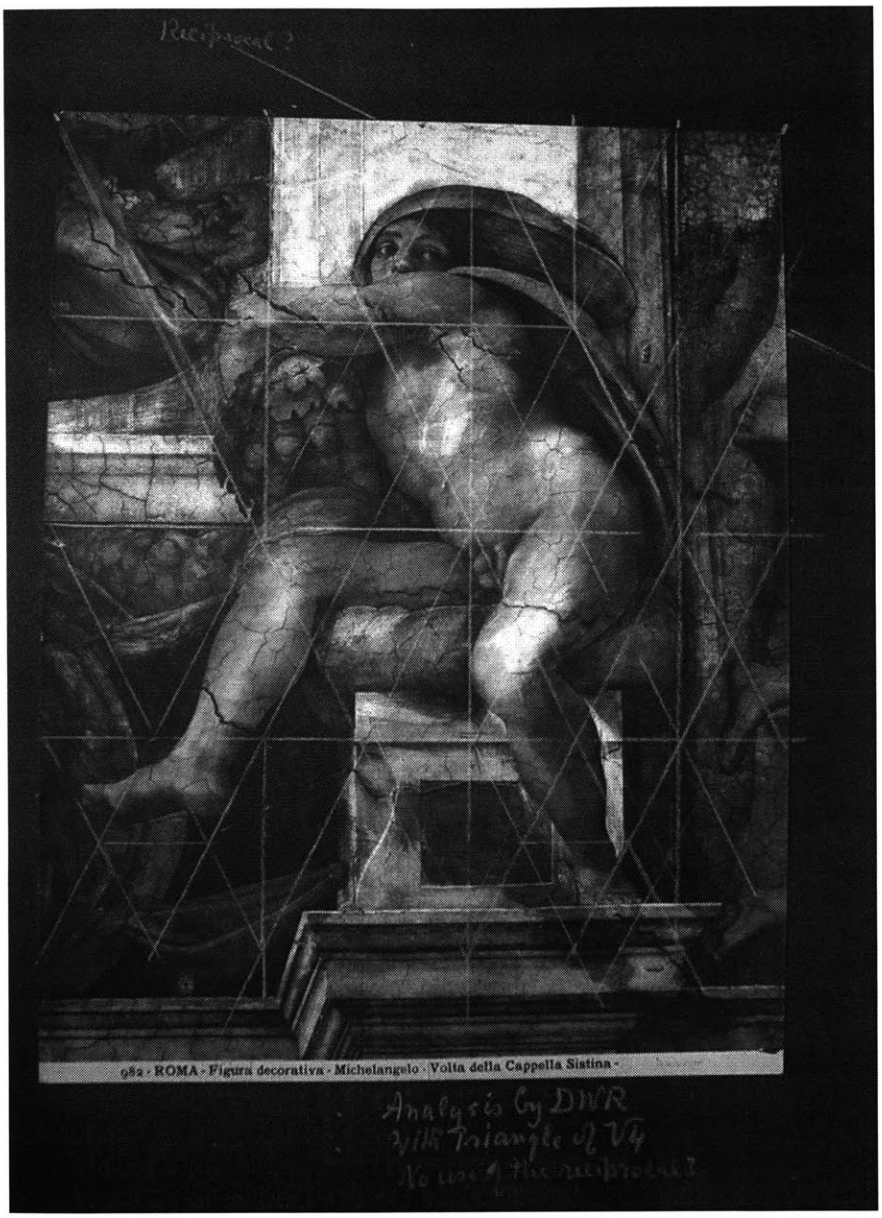

Figure 13. Ross draws a triangular grid similar to Maratta's over a reproduction of a Michelangelo fresco in Sistine Chapel. The grid differs from Maratta's design paper in the sense that it is constructed after the fact, in analysis, and that it is not complete to the ends. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

In the example below and in a few other analyses, Ross examines Michelangelo's compositions. His visual analyses consist of lines drawn on a tracing paper, which he places on the image, or

directly drawn on the image with chalk or crayon. Lines form triangles that connect to one another or overlap.

In the margins of his analyses, Ross often indicates his method. He spells out which right triangle and the corresponding rectangle is in use. He identifies triangles through the nomenclature of roots. In the example above, the explanation for his formal analyses is "with triangle of $\sqrt{4}$" referring to the elemental right triangle in the analysis with the 2:1 ratio of hypotenuse to one side. A triangle of $\sqrt{4}$ is a right triangle where the sides are multiples of 1, $\sqrt{3}$ and 2 consecutively. "No use of reciprocal" means he does not rotate the triangle. Except for the one referred to by the question mark at the top, all triangles have the long side upright. These together form the equilateral triangular grid that Maratta also popularized in his design papers.

Since he draws long lines rather than individual triangles, it is not clear why he writes down the basic unit as the triangle. In the catalogue for the 1923 exhibition, he explains his process:

> I then look at my subject and make up my mind which one of many possible diagonals will be the best one for the purpose. I draw that diagonal and another to balance it and reciprocal lines crossing the diagonals at right angles. These six lines will give me directions and angles of a single right angles triangle and are all I require.[7]

What he creates is an incomplete grid, in connection to the previous grid examples he has either used or been exposed to. There are analyses where he frames the diagonals by squares or rectangles, as in the photographs to come later on in the section, and he often refers to square or rectangle of a triangle in the figure caption. Nonetheless, Ross is not interested in constructing a grid to homogenize the form relations in the entire painting. He focuses on local relations and he is willing to flex the structure of the grid, for example by using reciprocals of the same triangle in another Michelangelo analysis shown in **Figure 14.**

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[7] Denman W. Ross, *Experiments in Drawing and Painting*, (The Century Association of New York, Exhibition November 1923), p 4-5.

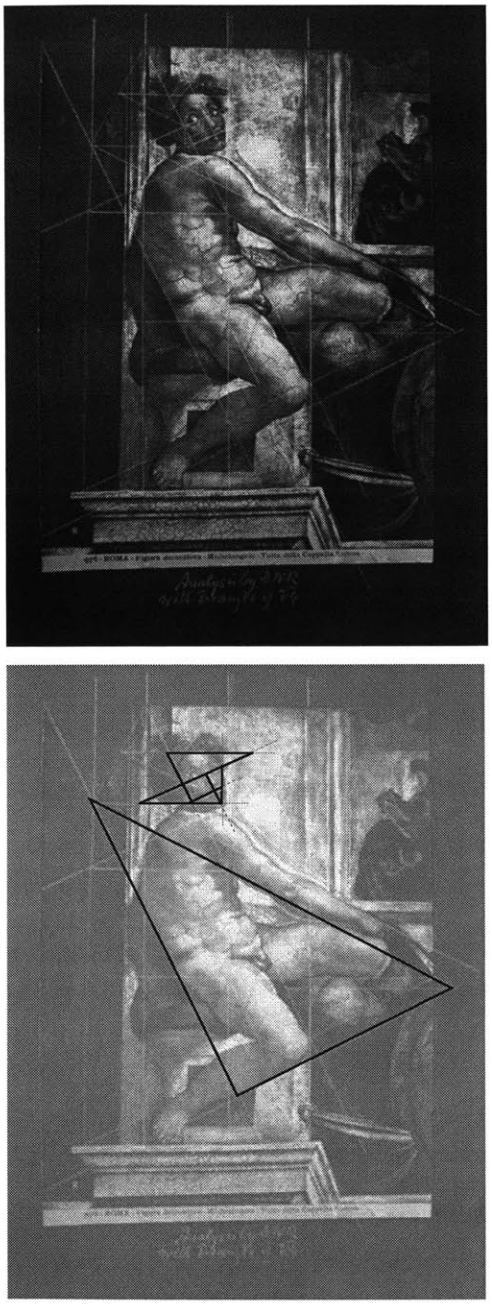

Figure 14. Ross constructs his abstract lines differently than Maratta's uniform grid. The basic unit is still a $\sqrt{4}$ right triangle but Ross modifies its scale and orientation as he places it on the image. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials [dark line drawings by the author].

In **Figure 14**, Ross breaks down the grid to a system of varying scales according to the picture. He focuses mostly on the face area with smaller triangles. His selective use of lines indicates how he utilizes the concept of a grid. Unlike holistic geometry in analyses by others, Ross's lines display his perception of the images in the painting and explore the different form relations they may offer. They do not impose an external order on it. The schema to emerge at the end is not a simplistic diagram of the painting that claims to give a mathematical explanation for its composition. Rather, it is a plane of diagonals relating to one another in an experiment to discover abstract form relations.

Among Ross's notes we find examples of conventional analyses that aspire to the beauty and harmony in nature and superimpose finished geometries on design images.

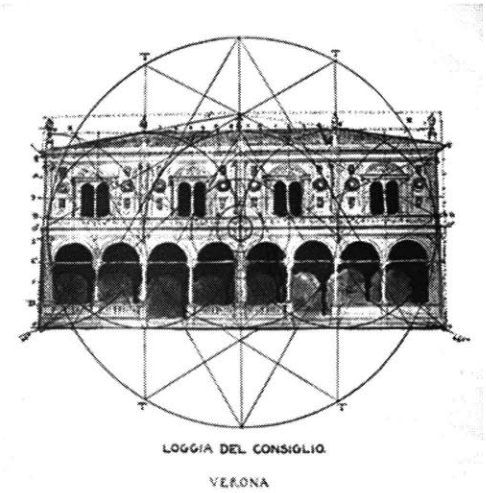

Figure 15. Ross's approach is different than the idealistic analyses such as the one shown above. The geometry Ross uses interacts with changing parts of with the image. The geometry in this figure is finished and superimposed on the façade. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

Figure 15 situates Ross's work for us in an intriguing way. Such diagrams surely have influenced Ross, but he develops a different approach. He moves away from the rigidity of a finished and idealized diagram to explore form relations in unfinished ones. His motivation differs from romanticizing about geometric explanations for classical forms. For example, he goes out of his way to indicate that his choice of geometry is personal. In the same exhibition catalogue mentioned earlier, he explains that the equilateral triangle is his favorite shape and the "right

angled triangle is wonderful as module."[8] He must be thinking along the same lines as Maratta that triangle offers more possibilities if it is the base for a grid.

The background grid for wallpaper patterns prompts a simple way to think about form relations. Its triangular unit in Ross's analyses above works similarly. The triangle represents an abstract form relation and has a smaller number of components to deal with. The difference in this case is that its instances connect to varying parts in the image. In this sense, Ross's picture analyses rise above the shortcoming of a grid in understanding dynamic relations. The angles and the scale of the grid change, along with the relations they prescribe. Ross uses systems of triangles not because he believes that they truly represent the relations of the images, but because it is a way for him to understand how the simple relations between the triangles translate to different contexts.

These triangles and grids resemble 13th century engineer-architect Villard d'Honnecourt's sketches, as well as the studies of Ross's contemporary Jay Hambidge. Hambidge developed the notion of dynamic symmetry as a technical structure for the creative arts. Incidentally, his writings refer to d'Honnecourt to show that designers in the medieval past have used guides to understand and create form relations.[9] D'Honnecourt, like Ross, looks at the relationships between forms at an abstract level. But again, Ross does not idealize any of his abstract forms. Without holding onto a general aesthetic preference, he develops a better understanding of organizational relations and his study carries more awareness for the flexibility of experimentation.

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[8] Denman W. Ross, *Experiments in Drawing and Painting*, (The Century Association of New York, Exhibition November 1923) p 2.
[9] Jay Hambidge, *Practical Applications of Dynamic Symmetry*, (New York: The Devin-Adair Company, 1960 [1932]) p 5.

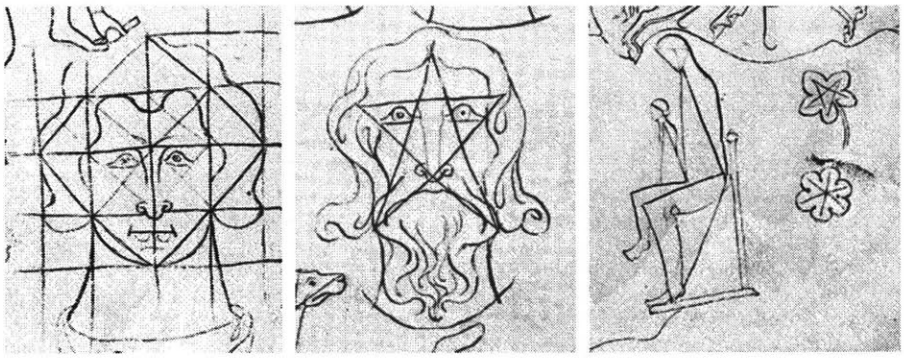

Figure 16. The first sketch resembles a few of Ross's analyses with the exception that it is a square grid. Ross almost always uses a triangle grid. Again differently than Ross's unfinished diagrams, d'Honnecourt's other two sketches display self-contained geometries. See Hans R. Hahnloser, *Villard de Honnecourt,* (Graz: Akademische Druck- u. Verlagsanstalt, 1972 [1935]), plates 38, 36 and 37.

With the exception of the occasional diagonal square grid, d'Honnecourt's sketches display self-contained geometries while Ross's analyses show open-ended grids and construction of the geometries. Additionally, d'Honnecourt's sketches tend towards displaying symbolic meaning, for example, the pentagon in **Figure 16.** Painting analysis done in Johannes Itten's Berlin school in 1932 comes closer to Ross's organization of the picture plane as it is also detached from symbolic meaning. Itten explains this analysis in the original figure caption:

> Its purpose was to study the geometric-constructive organization of the picture plane. The guides, found by the student, connect points of accent and reinforce the structure.[10]

Ross's work anticipates this later study in many ways, and even shows more for "constructive organization" because it employs a more willful and controlled investigation of the guides.

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[10] Johannes Itten, *Design and Form: The Basic Course at the Bauhaus*, trans. John Maass, (New York: Reinhold Publishing Corporation, 1963) p 128.

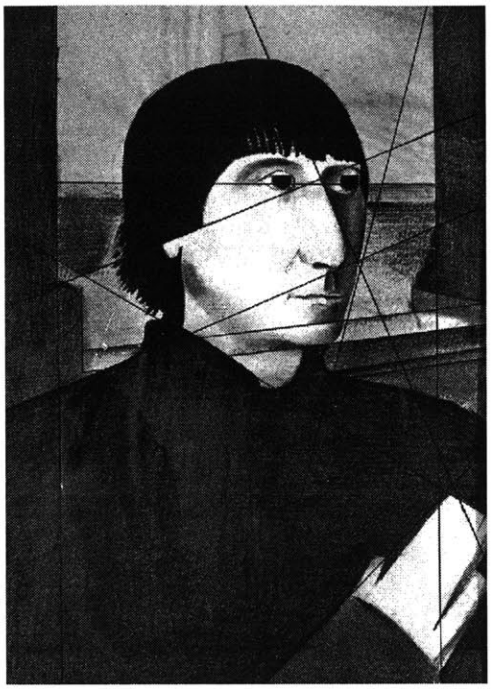

Figure 17. This analysis of Memling's portrait of Willem Moreel is by a student at Itten's design school in Berlin. Itten writes, "its purpose was to study the geometric-constructive organization of the picture plane. The guides, found by the student, connect points of accent and reinforce the structure." Johannes Itten, *Design and Form: The Basic Course at the Bauhaus*, trans. John Maass, (New York: Reinhold Publishing Corporation, 1963) p 128. Ross's work anticipates this study in many ways, and even shows more for "constructive organization" because it employs a more willful and controlled investigation of the guides.

A few of the painting analyses by Ross are of natural scenes. That he does not confine his analyses to classical paintings is further evidence to his efforts in understanding form relations. As he overlays his grid lines, he pays attention to compositional arrangements and utilizes the lines in a selective and dynamic way. **Figure 18** and **Figure 19** provide two examples. In **Figure 18,** rather than looking at how the composition fits into the geometry of √4 triangles, Ross observes its elements in relation to one another such as where the break in the clouds is, and how this relates to the direction of the storm as well as the general framing of the image.

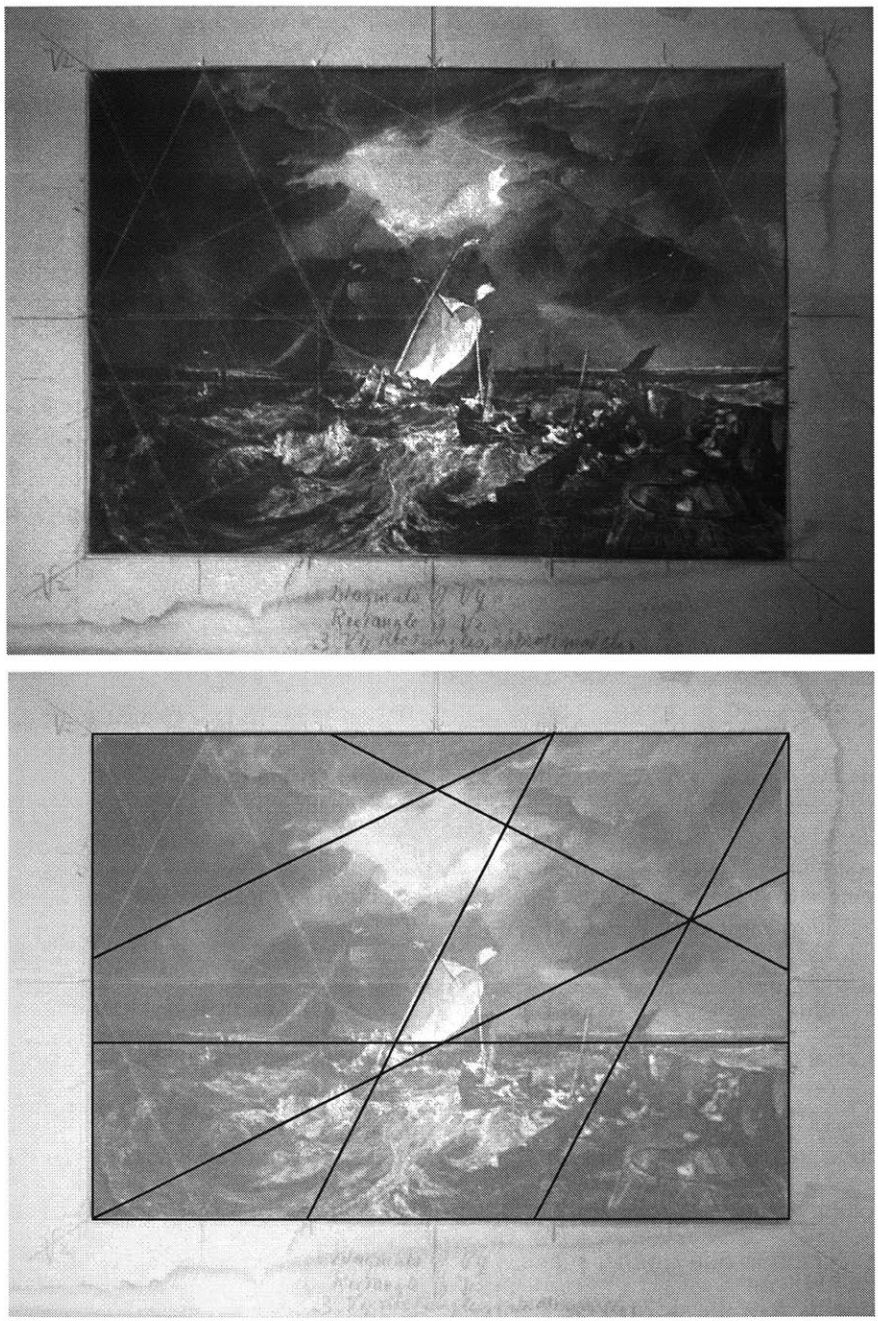

Figure 18. That Ross does not confine his analyses to classical paintings is further evidence to his efforts in understanding form relations. He pays attention to various compositional arrangements and draws his analysis lines he in a selective and dynamic way. In this figure, more than looking at how the composition fits into the geometry of $\sqrt{4}$ triangles, he observes its elements in relation to one another such as where the break in the clouds is, and how this relates to the direction of the storm as well as the general framing of the image. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials [dark line drawings by the author].

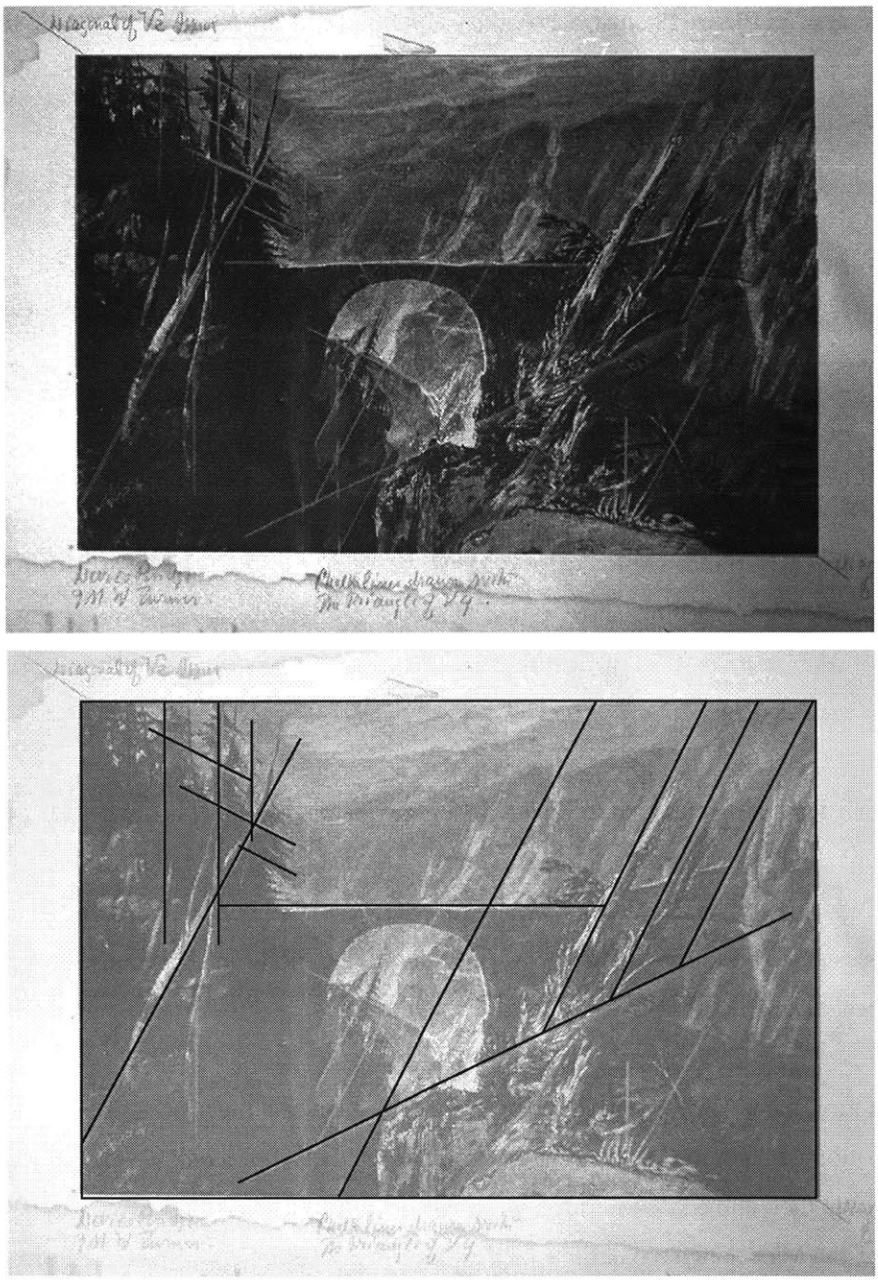

Figure 19. This analysis illustrates similar observations as the one in Figure 18. The trees mimic the rhythm of rock slopes and the composition brings the two systems together. Ross simplifies and abstracts how he sees the formal arrangement. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials [dark line drawings by the author].

The second analysis in **Figure 19** illustrates similar observations. The trees mimic the rhythm of rock slopes and the composition brings the two systems together. Ross simplifies and abstracts how he sees the formal arrangement.

A larger set of Ross's analyses is of photographs, where he additionally has control over the content and looks at how he can manipulate the formal arrangement. Some of his photography work was exhibited along with his paintings in 1923. However, I have not come across an extensive publication of these analyses. It is possible that the content of these photographs – mostly of nude young males – have discouraged their publishing since they are archived in unintelligible ways even today.

Ross's choice to analyze photographs seems curious. As mentioned above, most of them use young male models. Similar to the Classical and Renaissance imagery, the reasoning behind this might be in connection to an ideal of Beauty. Still, Ross contemplates a little further on this point in *A Theory of Pure Design*:

> I refrain from any reference to Beauty as a principle of Design. It is not a principle, but an experience. … While I am quite unable to give any definition or explanation of Beauty, I know where to look for it. The Beautiful is revealed, always, so far as I know, in the forms of Order, in the modes of Harmony, of Balance, or of Rhythm.[11]

In that perspective, the analyses might have been for understanding the abstract rules underlying the classical notion of "Beauty." Furthermore, as the selected examples below will show, despite the classical poses their subjects sometimes give, photographs are still products of a different realism than of the Michelangelo paintings or the idealism in Hambidge's Greek meander analyses.

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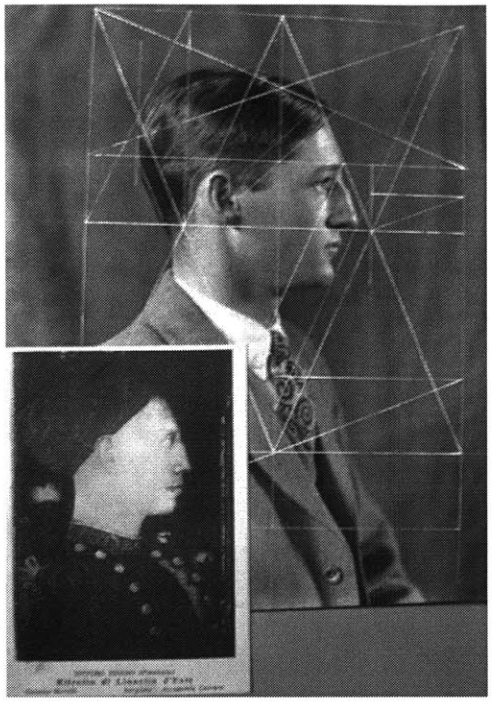
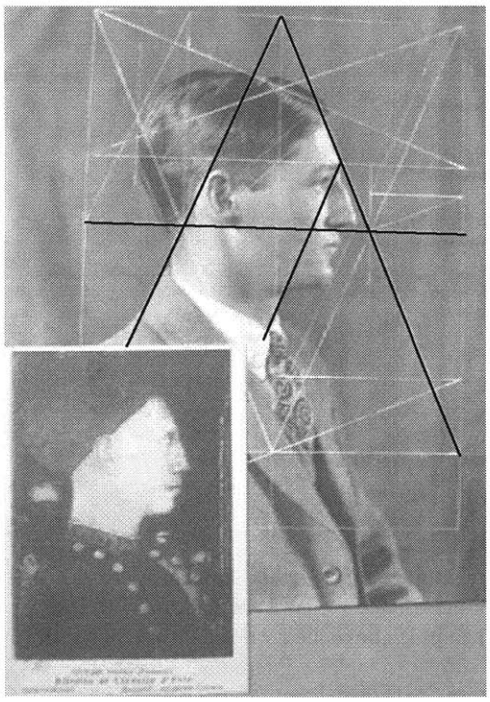
[11] Denman W. Ross, *A Theory of Pure Design: Harmony, Balance, Rhythm*, (Boston and New York: Houghton, Mifflin and Company, 1907) p 4.



(a)



(b)

Figure 20. (a) In the analysis above, the attached painting hints at what features Ross is looking at. The profiles in the two images have similarities. **(b)** The lines redrawn on the right are possibly the first diagonals. Based on the spatial relation established, Ross constructs a system. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials [dark line drawings by the author].

Ross starts his analyses with diagonals that relate to certain features in the photographs. In the analysis above, the attached painting hints at what compositional features Ross is looking at. The lines redrawn in **Figure 20 (b)** are possibly the first diagonals. Based on the spatial relation these initial lines produce – defined with the angle between the lines – Ross constructs a system. The system repeats the same relation in different scales, rotations, and symmetries. The composition of diagonals correlates with the figural composition in the photograph.

Occasionally, there are attempts at possible changes in the figural composition based on decisions at the abstract level. The detail in **Figure 21** shows one of these instances where Ross is considering moving the hand of the subject to fit a different triangle in the system he constructs. This indicates Ross's interest in utilizing the lines for more than analysis.

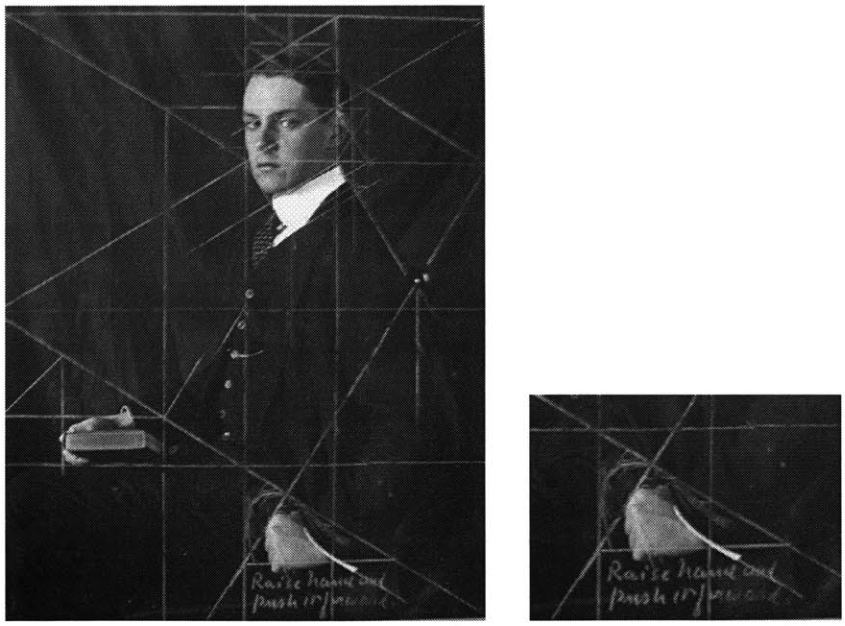


Figure 21. Even if rarely, and given the size of the image overall, reluctantly, Ross occasionally attempts to modify the actual image based on his observations with the abstract lines – his intellectual tool. In the example above, he reconsiders the position of the hand in relation to the other. Note the similar triangles contemplated for both hands. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

These are not pleas for aesthetic principles but attempts to develop ways to construct designs and at the same time to understand these ways. Ross shows how, at different levels of abstraction, he wishes to apply principles of composition. Relations are easier to see with simpler shapes. This could easily have been his pedagogical method as well. For Ross, the grid in the background and the diagonals instigate a learning of how to relate simple forms in simple contexts. This approach is not very different from Arthur W. Dow's abstractions.

IV. Abstractions by Arthur W. Dow: Structuring pictures with abstract guidelines

Arthur Wesley Dow's approach to abstract guidelines is more explicit although it is not demonstrated visually as well as it was in Ross's analyses. There is one illustration to exemplify what Dow otherwise profusely writes about.

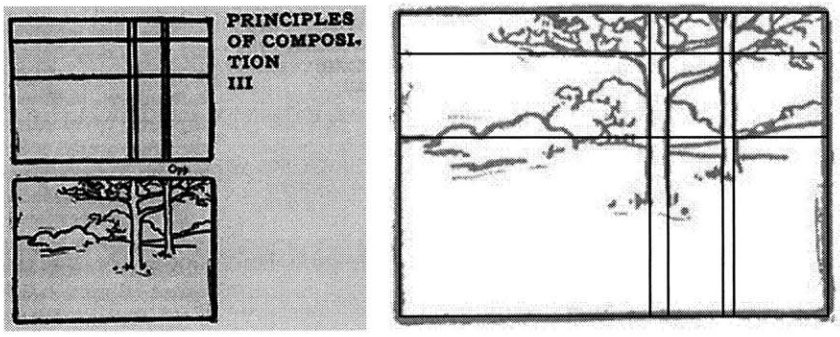


Figure 22. Dow demonstrates that simple form relations underlie compositions despite what the forms are. And to start learning these, he chooses to show the concept through abstract forms. First illustration from Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]) p 83; second illustration by the author.

Unlike Ross, who experimented with overlaying abstract lines on existent work, Dow shows these lines as a constructive tool from the beginning in the design process. Ross was trying to understand existent compositions in terms of form relations and was experimenting with simpler forms to take these relations to different contexts. Dow's illustration above establishes a similar connection between the landscape sketch and the line arrangements even though they are not overlapping. At the same time it emphasizes that these simple lines display the structural

relations to construct this painting. Dow's approach is parallel to Ross's in principle, especially to Ross's use of the grid for wallpaper patterns. But Dow's work lacks the rich experimentation Ross allowed himself in the picture analyses regarding what various structural relations might be. On the other hand, unlike Ross's inarticulate aspiration for an authentic composition in the analyses, Dow utilizes the abstract relations as guidelines to achieve paintings.

Dow's abstractions work in the pedagogical sense. He uses the abstract lines first to show that relations exist at all levels, and second to build paintings on. In almost all of the exercises given in Composition, he encourages his students to start by thinking simply in this way. Max Weber was a student of Dow before returning to Paris in 1907 and getting involved with the Cubists. He describes a class with Dow:

> [Dow] would come into class and make an unbounded drawing of trees and hills, or perhaps a winding road against the sky. Then he would ask the class to copy the drawing freely and enclose it in a rectangle, to make a horizontal picture or a vertical, as they chose, and to make whatever changes necessary to fit the drawing to the frame which they had selected, to balance the drawing by making less foreground, or more sky, to change the masses what not.[12]

The examples in **Figure 23** illustrate various framings of the same landscape in the way described by Weber. In an exercise Dow asks the student to find their "best way of setting the subject upon canvas or paper, arrange this in rectangles of varying shape, some nearly square, others tall, others long and narrow horizontally. ... To discover the best arrangement, and to get the utmost experience in line and space composition, the landscape should be set into several boundaries of differing proportions."[13]

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[12] Cited in Frederick C. Moffat, *Arthur Wesley Dow (1857-1922),* (Washington: The Smithsonian Insitution Press, 1977) p 82.

[13] Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers,* (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]) p 106 and 107. Dow's *Composition* was originally published in 1899 by New York: Doubleday, Doran & Company, Inc.

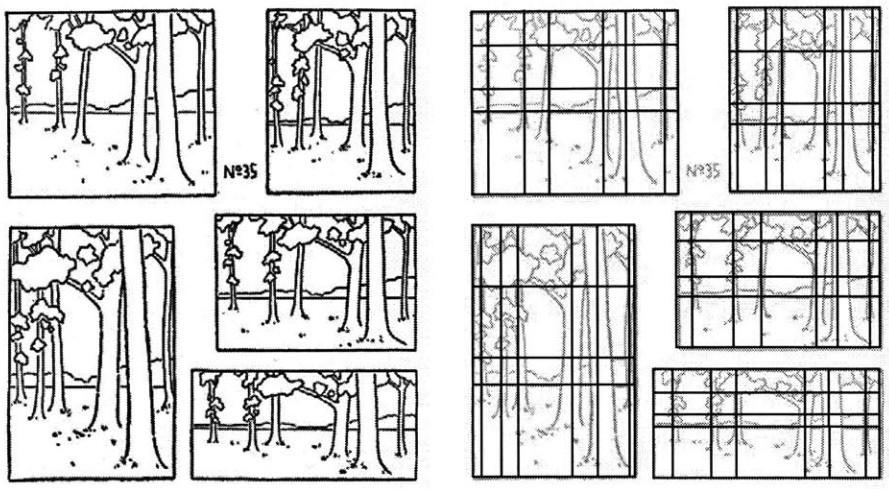

Figure 23. Dow experiments with the idea of variance in composition based on form relations. In the illustrations above, the framing of the landscape, and dependently, the compositional structure vary. Nature is observed not as an ideal, but in representations that change. Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]) p 104.

Dow's intention to structure a painting starts from the framing. Contemporary to Dow, another American painter, John La Farge emphasizes the significance of how an image is framed: "The frame decides the question - for there is no frame in nature."[14] Similarly in the examples above, the arrangement of elements inside the frame changes along with the frame. Dow is interested not so much in the structure of Nature but how to structure its various representations. He develops his interest in a system of abstraction demonstrated by horizontal and vertical lines as seen below. And the choices in how a landscape is framed fit within this system of abstraction for vertical and horizontal lines. Contrary to Ross's analyses, that are usually open-ended and incomplete systems of lines, Dow's illustration(s) display line arrangements that are self-contained and premeditated simple compositions.

In his talk given to the Kindergarten Association in Philadelphia on February 15 1906, Dow identifies two misconceptions as to the nature of fine art. One is that art is representation that is expected to have a communicative accuracy, even a grammar like in language. The other

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[14] From John La Farge, *Higher Life in Art.* (1908) p 175-78. Cited in Henry Adams, "The Mind of John La Farge," in *John La Farge: [Exhibition]: Carnegie Museum of Art, Pittsburgh; National Museum of American Art, Smithsonian Institution, Washington, D.C.*, (New York: Abbeville Press, Inc., 1987), 11-77.

misconception is that art and science are directly linked. Adhering mechanical components to design, and applying set formula is seeking the easy way out.[15] As a reply to the misconception regarding the representational value of art, Dow has a clear stand that painting is not to imitate nature but represent aspects of it with inaccuracy. In the first one of his famous *Talks on Appreciation of Art* Dow states that "the artist does not teach us to see facts: he teaches us to feel harmonies..." By harmonies, I assume he is referring to relations. In the exercises he gives his students, he promotes painting from memory, to escape from truth to varying perceptions of nature and classifies imitation as "picture-writing," as "literature" not art.

> To set [the students] to drawing from nature as a means of studying art is philosophically and pedagogically wrong.[16]

Instead the teacher gives the student some – indistinct – guiding principles and allows for an experience before drawing. Dow's abstractions help this pedagogical idea in that the student first experiences the form relations in the abstract contexts, right then and there, contained within the example. This to a certain extent allows the student to apply these experiences later in other more sophisticated or complex situations.

Dow's concept of abstraction lets the students experiment with the basic relations, so that they can come up with their own experiences. This ties to his answer to the misconception of art being a science: nature-copying becomes mechanical if practiced as a teaching method, and is only a search for Truth. Dow is critical of conventional ways of teaching art and academicism. He emphasizes his perspective against holding a formula, again and again, in reports about his classes as well as in his writings.[17]

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[15] Draft for a talk given at Kindergarten Association in Philadelphia, (February 15 1906) Ipswich Historical Society Archives, Arthur W. Dow Collection.
[16] *An Explanation of Certain Methods of Art Teaching: Q & A,* (not dated) Ipswich Historical Society Archives, Arthur W. Dow Collection.
[17] Instances of this point can be found in the text for an exhibit at the conference of Fine Arts and Industrial Arts, (February 21, 1914) Ipswich Historical Society Archives, Arthur W. Dow Collection; sixth and last lecture in the course titled "~~Modern~~ Landscape Painting" given to the Board of Education, (November 8, 1905) Ipswich Historical Society Archives, Arthur W. Dow Collection; "Talks on Appreciation of Art, No. IV Color" in *The Delineator* (February 1916) p 15.

When Ross executes his analyses, he does not think of this minimalist formalism as a new style but rather as a tool in understanding the design/process. He does not open the aesthetics in his work to discussion as a stylistic issue at all. He assigns peculiar shapes in the wallpaper designs and uses peculiar triangles in his analyses as he likes, and he proposes that somebody else will have different preferences. Dow on the other hand, in his abstractions, is more or less influenced by the minimalist aesthetics of Japanese art along with the production techniques that have effect on it. Nonetheless, his approach, like Ross's, helps simplify the spatial relations from a pedagogical point of view. He encourages his students to think about composition through abstract guidelines and inquire, through changing relations, different ways to deal with changing forms.

V. The impact of techniques, methods, and materials on Ross and Dow's processes

Simultaneously with structural lines, Dow writes about the material and tools used in painting. He describes various kinds of brushes, ink and other painting tools, as he wants the students to understand the qualities that come from these. He discusses the ink marks left on the paper if brush is held differently. But more importantly, Dow achieves abstraction, similar to that with lines, through his choice of technique. His notion of 'notan,' which is explained as harmony of dark and light, comes from woodcut printing that he appropriated and mastered in Japan.

The influence of technique is even more evident in Dow's woodcut prints. Aside from contextualizing aesthetics, technique helps Dow think about the abstract. Woodcut printing encourages a minimization of details as well as homogeneity of color and shade in individual surface areas.

Figure 24. Dow's woodcut prints were another tool to abstract forms. This poster is presented here to illustrate the abstract quality of the image which is prepared using this technique. Nancy Green and Jessie Poesch, *Arthur Wesley Dow and American Arts & Crafts*, (New York: The American Federation of Arts, 1999), p 16.

The minimalism, suggested in the poster above and other woodcut paintings, gives rise to the idea of notan exhibited in the exercises below. Additional to showing different ways of using black and white contrast to depict scenes, these indicate abstraction of forms to zones of shade and light.

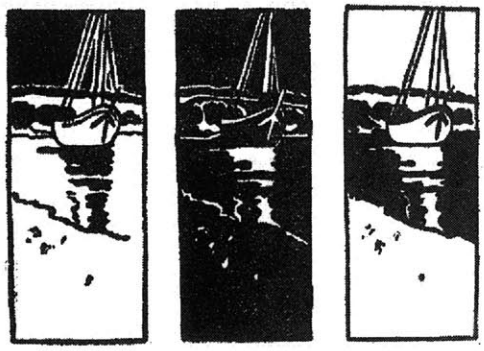

Figure 25. Dow achieved formal abstraction in black and white. Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]) p 128.

Using stencils as in the example below, achieves the same kind of abstraction. The stencil does not have the kind of a hand control there is with the brush. For the ink to have the desired effect, lines need to be continuous and forms need to be abstract displaying new relations proposed by the painter. For example, a tree in front of a house in the shadow now blends in with the house simply because of light-shade criteria. Material and techniques become a part of the thought process, in the sense that they shape the relationships to observe and represent. Components of the painting are abstracted to a simple relationship that students can experience and experiment with.

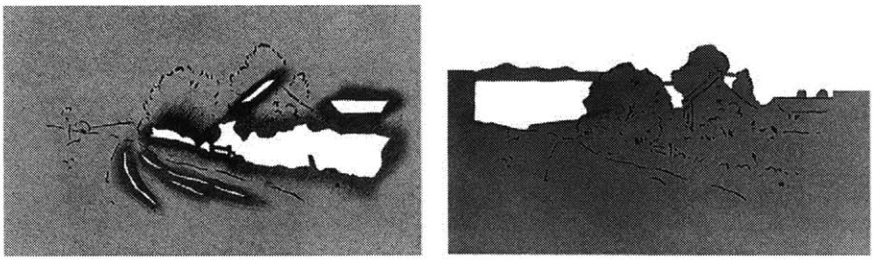

Figure 26. The way stencils are punched affects what the ink marks on the paper are. It is a different tool than the pen or the brush. The ink marks are controlled by predefined cuts to the paper. Nancy Green and Jessie Poesch, *Arthur Wesley Dow and American Arts & Crafts*, (New York: The American Federation of Arts, 1999), p 68.

Also in the concept of notan, lines upgrade from being boundary elements to representing shade, actual texture, and surface. The idea of lines blending beyond the boundary is also a trait of the Impressionist art Dow was familiar with, especially from his travels to Europe. Another New England painter, John La Farge was interested in blurring the blots of paint rather than drawing discrete lines to draw outlines of forms.

Differently, Ross's work displays more of an interest in the intellectual apparatus. It is possible that because he is drawing and not painting, material does not seem to bind his process as much. The evidence for Ross's interest on how materials affect the visual quality of a work exists in his collection of pixilated photographs printed in magazines and newspapers. Ross magnifies some of these to accentuate the pixilated quality of the print. He seems to be interested in how line is no more simply a boundary-defining element.

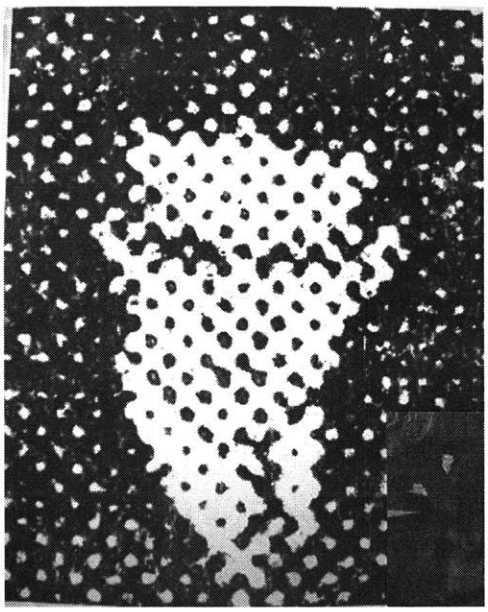

Figure 27. Ross magnifies newspaper prints and is possibly interested in observing a new kind of organizational structure in the image. Differently then his abstract lines, it is a grid of dots of different densities. There are no boundary-defining elements. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

The magnified prints and the display of diffusing boundary lines resemble the pointillist approach to painting at the time.

While Ross allowed his students to experiment with form, Dow emphasized techniques. Evidently, Ross's formal experimentation utilizes what we can call the intellectual apparatus. The triangles in the photography analyses, or the grid underlying the wallpaper designs, exemplify such attempts. Still, Ross is not engaged in a design process unless he considers the analyses to be abstract compositions. He most apparently shows intention to engage in an active role when he tries to make changes in the photograph. Dow's guidelines, framing and notan are also intellectual tools. Overall, both Ross and Dow acquire an abstraction, which seems to be the key point to these analyses. It is interwoven with various aspects of their work, such as the techniques they choose to use, the influences of European Impressionists and Postimpressionists along with photography, natural sciences and the Orient. The abstraction they acquire is not a timeless approach but a synthetic one, as Dow announces in the title page of his *Composition,* and it is to serve a pedagogical purpose. The next chapter will articulate in an epistemological context, how this notion of the abstract develops into a design pedagogy.

Chapter 3

A Pedagogical Use for Abstract Forms and Form relations: the Psychology of Basic Design

I. Introduction

The previous chapter showed that Denman W. Ross and Arthur W. Dow acquired notions of abstraction and dynamic part-whole relations in their work. These elements served a pedagogical agenda that was centered on the personal development of the student as a unique designer and thinker. This chapter will articulate the line of thought involved and the intellectual context relevant to these ideas at the time.

Individual development of the student is the core of what is known as basic design education in the curricula of many art and design schools today. Türel Saranlı, a contemporary educator, calls it a "character development."[1] The history of basic design education as individual development is traced back to early 19th century child educators Johann H. Pestalozzi and Friedrich Froebel and their pedagogies of hands-on learning.[2] Ross and Dow continue this understanding in their design teaching. It is also concurrent with their interest in craft production methods. Ross emphasizes the point about hands-on learning and personal development in his public address at the Rhode Island School of Design in 1903. He observes that, in hands-on learning, the student "thinks in the materials, in the terms, in the forms of effort and exertion belonging to the art in which his work has to be done."[3] According to Ross, the student acquires personal values through experience and does so while utilizing his/her developing technical ability. Similarly, in the introduction chapter to *Composition,* Dow writes that learning design, as a preparation to drawing in his case, is "training the judgment."[4]

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[1] Türel Saranlı, "Başlangıçtan Bugüne Temel Tasarım [Basic Design in past and present]," in *Temel Tasarım/Temel Eğitim [Basic Design/Basic Education]*, ed. Necdet Teymur and Tuğyan Aytaç-Dural, (Ankara: ODTÜ Mimarlık Fakultesi Yayınları, 1998), p 39.
[2] Gillian Naylor, *The Bauhaus Reassessed: Sources and Design Theory*, (London: The Herbert Press, 1985) p 77.
[3] Denman W. Ross, *Address on Design: Public Exercises at the Dedication of the Memorial Hall*, (Rhode Island School of Design: unpublished, November 24, 1903), p 10.
[4] Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]), p 64.

Against the timeless and universal principles imposed on aesthetic phenomena, personal development cultivates one's own principles in relating to a world with changing parts. Sensory experiences (not emotions or isolated sensory apparatus) play into the development of the individual thinker proposed through basic design education. Both Ross and Dow's abstract forms facilitate the utility of senses in the design process. This is primarily because the unfamiliarity requires a fresh eye in experience. Accordingly, relations between forms change with the experience. Neither can forms be conceived ideal in any way nor the relations between them as fixed principles. Abstract forms and dynamic form relations provide that.

The concept of sensations that developed in 19th century psychological and philosophical works provides a backdrop to Ross and Dow's practice of abstraction. The 18th century empiricist view and psychophysiology research in Germany on mind-body connection culminate in the philosophical work of American pragmatist William James. His idea of sagacity is traceable to Ross and Dow's approach as well as to other movements in art the two educators were exposed to. Also comparable to Ross and Dow's understanding of changing part-whole relations in perception and thought, are the dynamic worldviews developing at the time. The organicist position in art and architecture links to then-recent scientific assessments regarding growth of life. Simultaneously, descriptions of the universe incorporated the notion of process and changing part-whole relations. These epistemological connections will be discussed below.

II. Dynamics in abstract forms and form relations: Sense perception

A. The concept of sensations in late 19th century philosophy

Integrating senses to the design process contributes to the (empiricist) stipulation that creative knowledge is not all innate or learnt, but also provisionally developed through experience. For example, hands-on experimentation with materials allows the individual to see unconventional qualities in materials. There are numerous examples to this in the tradition of basic design education such as the common exercise in folding, which focuses on discovering how flimsy

materials like paper can be (made) sturdy. Josef Albers of the Bauhaus describes the materials course in 1928:

> Instead of pasting it, we will put paper together by sewing, buttoning, riveting, typing, and pinning it; in other words, we fasten it in a multitude of ways. We will test the possibilities of its tensile and compression-resistant strength... In doing this, we do not always create 'works of art'; it is not our intention to fill museums: we are gathering 'experience'.
>
> ...
>
> In order to be even surer of avoiding the use of materials in their known application, we prefer to work with such materials or constructive elements as have not yet found a usage or application, or whose treatment is not yet known. For example, we construct with straw, corrugated cardboard, wire mesh, cellophane, stick-on labels, newspaper, wallpaper, rubber, match-boxes, confetti, phonograph needles, razor blades.[5]

What these exercises demonstrate is not an act of *revealing* some unforeseen qualities as in a phenomenological approach that builds up on a finitely described universe. Instead, students try new definitions and ascribe new perceptions to materials to explore indefinitely many possibilities. From each combination of materials and actions a new experience emerges, not just another combination. A finite description of the universe implies that all parts are fixed. But definitions are rather created when necessary, and the universe can be defined in indefinitely many ways. Presumptive existence of concepts, however complex and detailed, inhibits further exploration of the senses in changing contexts. The purpose of the exercises that Albers mentions is to change the context for either the known materials or the known processes in order to allow for new sense perceptions of each. Limitations in creative processes will come momentarily as part of the material, technical and psychological circumstances involved. Designers will also be able to assign limitations according to desired strategies. Assuming them upfront is unnecessary.

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[5] Hans Wingler, *The Bauhaus*, (Cambridge: The MIT Press, 1969), p 142.

Early 19th century research in psychophysiology (of nerves and sensations) by German psychologists such as Johannes Müller, Hermann von Helmholtz, and Wilhelm Wundt shaped the late 19th century development of modern psychology in America.[6] Additionally, 18th century British empiricism in philosophy was also influential. John Locke's position that idea principles are not innate but come from experience (1690) and his successor George Berkeley's thesis that vision is prior to form (1709) affected American Pragmatists, such as William James, who kept the dispute against the Cartesian divide between mind and body.

James recognized the external world and subjective inner experience as a continuum where thoughts are not discrete entities but are perceived contextually like visual sensations. He wrote:

> No one ever had a simple sensation by itself. Consciousness, from our natal day, is of a teeming multiplicity of objects and relations, and what we call simple sensations are results of discriminative attention, pushed often to a very high degree.[7]

Notions of contextual apprehension and discriminative attention are what James calls "sagacity" (as an indispensable part of reasoning) in *Principles of Psychology*.[8] He picks up this term from John Locke, who explains that in intuitive logic, sagacity is the ability to apply "intermediate ideas" to discover "the agreement or disagreement of any other."[9] This, in plain and contemporary terms is the concept of embedding. An example in the visual sense is to be able to embed shapes in other shapes. What Locke calls sagacity, J. S. Mill calls "good" observing, and James refers to it elsewhere as "mode of conceiving." In the previous chapter, varying modes of conceiving not only allowed for different combinations of units in wallpaper patterns as different parts of units were taken into consideration for each relation, but also non-combinatorial designs with newly perceived parts. The simple example below, from one of Ross's wallpaper pattern exercises, illustrates how two of the given units are applied in the design. A shape that is picked out from

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[6] Edwin G. Boring, *A History of Experimental Psychology*, (New York: Appleton-Century-Crofts, Inc., 1950 [1929]).
[7] William James, *Principles of Psychology*, (Cambridge, MA: Harvard University Press, 1983), p 219. James's *Principles of Psychology* was originally published in 1890 by Henry Hold and Company.
[8] Ibid. p 957.
[9] John Locke, *An Essay Concerning Human Understanding*, (London: Rutland, 1993 [1689]), p 297.

one of these units, and a shape that back-to-back copies of the other are embedded in, form two new parts for the design.

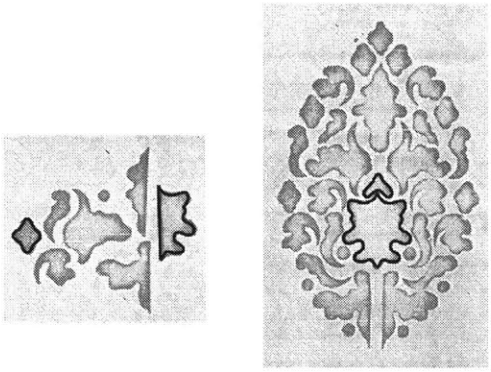

Figure 28. This particular wallpaper pattern illustrates how two of the given units are applied in the design. A shape that is picked out from one of these units, and a shape that back-to-back copies of the other are embedded in, form two new parts for the design. The smaller one is distinctively not a combination of given parts, but a newly perceived part in a given part. Details from Denman W. Ross, Edgar O. Parker, S. Clifford Patchett, *Illustrations of Balance and Rhythm: for the use of students and teachers*, (Boston: W. B. Clarke Company, 1900), plate 10 [emphases by the author].

Sagacity explains the visual ability to pick out parts within wholes where and when they are relevant. It implies a selection process based on perception partial to context, allowing for all kinds of individual biases (conscious or not) as well as Gestalt switches like shown above for individual shapes. Ross's cut in the four-pods shape reflects how he defines its features. And at another time, he may define it differently and cut it differently.

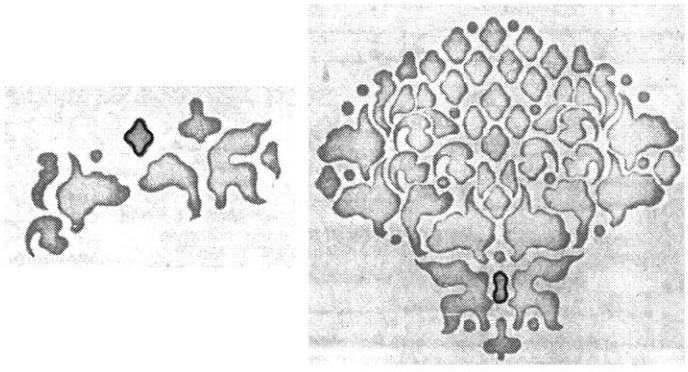

Figure 29. This wallpaper pattern illustrates how the small unit from the example above is applied differently. It seems that Ross's student Edgar O. Parker applies visual rules to how he uses these parts in his designs. The units are instances in a general schema. He does not hesitate to divide them in various ways according to how he visually places

> them in the design. Details from Ross, Parker, and Patchett (1900), plate 12 [emphases by the author].

In his analyses of photographs, Ross uses abstraction as a tool to show how to define and pick out parts. He utilizes lines to refer to parts of the image and their relations as he sees them. His students will, in turn, utilize different lines and systems of lines to see parts they were traditionally not trained to. More will come on sagacity, and the plurality it brings, in the upcoming section about concept of sensations in 19th century art.

B. Dynamic worldviews in late 19th century philosophy

Emphasis on sagacity holds a strong foothold in the critique of scientific methodology at the turn of 20th century. Criticisms were not only at a level of addressing practical implications of industrialism, as with the arts and crafts movement, but also philosophically drawing attention to how to perceive the world with changing definitions. The critique in philosophy formed mainly against the confidence in establishing timeless concepts. A priori and timeless definitions disregard the perceptual context that is constantly changing. William James often indicated wariness towards the conventional elementism (reductionist approach to vision) and fixed mental processes in German psychology. He generally questioned the static and constrained view of intellectualism. Alongside with the French philosopher Henri Bergson, James praised instead the dynamic plurality of intuitions and that definitions need not be set beforehand as perceptions change continually. He wrote

> We are so inveterately wedded to the conceptual decomposition of life that I know that this will seem to you like putting muddiest confusion in place of clearest thought, and relapsing into a molluscoid state of mind. Yet I ask you whether the absolute superiority of our higher thought is so very clear, if all that it can find is impossibility in tasks which sense-experience so easily performs.[10]

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[10] William James, *A Pluralistic Universe: Hibbert Lectures on the Present Situation in Philosophy*, (Lincoln and London: University of Nebraska Press, 1996), p 256. James gave the lectures at Manchester College in 1908.

At the same time, a general dynamic worldview formed in science and philosophy, as temporal concepts challenged static notions of space and (systems of) thought. Temporal aspects of experience affected James' work, as well as many more. Among comparable works is the relational view and process philosophy of another American philosopher from a later date, Alfred North Whitehead.[11] (1920) Not only in physics, but also in biology, concepts of temporal change and changing relations played part in new theories. Theories of anatomist Georges Cuvier (1769-1832) on organic wholes, and Sir Charles Lyell (1797-1875) on geological development over time led to Herbert Spencer's treatises on synthetic philosophy which included sociology, biology, and psychology (1855-1898), evolution (1887), as well as Charles Darwin's discourse on species and selection (1859-1871). These works contributed to the views on dynamic systems in physics and philosophy in 19th century America. Philosopher Philip P. Wiener explores the connection to the pragmatist thought in detail in his book *Evolution and the Founders of Pragmatism.*[12]

Nonetheless, the work of James and other pragmatists overall contributes a viewpoint that digresses from this historical and epistemological continuance. Richard Hofstadter points this out in relation to the theories of Herbert Spencer:

> Spencer had been content to assume the environment as a fixed norm – a suitable enough position for one who had no basic grievance against the existing order. Pragmatism, entertaining a more positive view of the activities of the organism, looked upon the environment as something that could be manipulated.[13]

The notion of continuity between the subject and the object in the pragmatist view gives rise to an understanding of the universe as an ongoing process.

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[11] Alfred North Whitehead, *The Concept of Nature*, (London, UK: The University Press, [1920] 1964).
[12] Philip P. Wiener, *Evolution and the Founders of Pragmatism*, (Philadelphia: University of Pennsylvania Press, 1972). Originally published in 1949 by Harvard University Press.
[13] Richard Hofstadter, *Social Darwinism in American Thought*, (Boston: The Beacon Press, 1962 [1944]), p 123-4.

Accordingly, the relevance of pragmatists for philosophy of design differs from the usually cited organicism in designs of the period. As art historian Caroline van Eck observes, organicism in 19th century art and architecture is usually interpreted in terms of the idea of organic unity where parts have a functional correlation to each other and the whole.[14] This is more in line with the instrumentalism in Cuvier's anatomical or Darwin's biological findings where parts are distinct and follow a formal idealism. The organicist view Kevin Nute attributes to Arthur Dow and Ernest Fenollosa, Dow's mentor in ideas of the organic, is not very different. It focuses on "organic wholeness" as "mutual interdependence of each contributing part." Fenollosa writes:

> A true synthetic whole cannot have a single part added or subtracted without destroying the peculiar character of its wholeness, without disturbing the perfect equilibrium of the mutual modifications. Thus such a synthetic whole is an individual, a separate entity, [with] a peculiar organic nature, an unchangeable possibility, a foreordained unit from all eternity.[15]

Fenollosa's knowledge on organic systems and their dynamics is not obvious, but Nute points out that he was interested in Nature as a source for unique, ideal beauty as demonstrated in Japanese art:

> ... in many ways [Fenollosa's analysis above] reflected the general idealism of late-nineteenth century Western aesthetic theory, having derived from a combination of the Kantian concept of the purely formal 'aesthetic idea' exemplified by the organic whole, and Hegel's metaphysical explanation of the unique appeal of the organic form as the most complete material manifestation of the Spirit or metaphysical 'Idea'. For Fenollosa, then, Japanese art in itself was much less important than what it had to teach about the nature of art in general.[16]

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[14] Caroline van Eck, *Organicism in Nineteenth-century Architecture: An inquiry into its theoretical and philosophical background*, (Amsterdam: Architectura and Natura Press, 1994), p 20.
[15] Originally written in 1891, cited in Kevin Nute, "Frank Lloyd Wright and Composition: the architectural picture, plan, and decorative design as 'organic' line-ideas," in *Journal of Architectural and Planning Research*, n. 4, v. 14, (Winter 1997), p 273.
[16] Ibid. p 273.

Ross and Dow both knew and worked with Fenollosa personally. And they had interest in natural forms as well as in Japanese art. Ross collected scientific images, and drawn analyses of organic forms (such as skeletons), showing various rhythmic structures found in nature. Below are pictures that Ross cut out and collected. They are "fragments of leaves partially eaten by insects…" as the original figure captions identify.

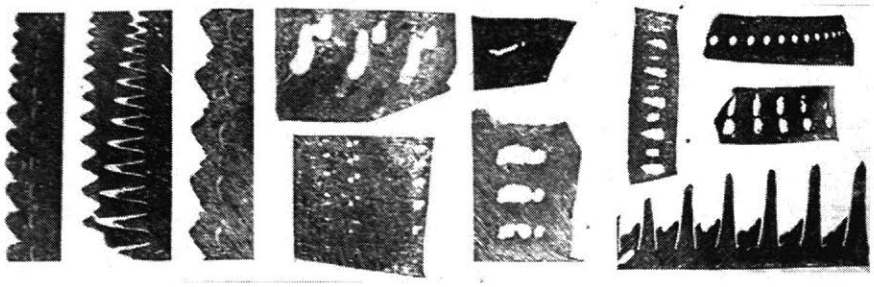

Figure 30. "Fragments of leaves partially eaten by insects…" as the original figure captions identify. Ross was interested in the variance of rhythmic patterns as well as variance within the patterns. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

While Ross drew attention to the variety between species with different anatomies and life patterns, Dow observed nature in a painterly way. He presumed and directly utilized rules of axial and rotational symmetry, along with scale transformations to create formal variations of flowers as the examples from his notebooks show below. Note that the captions for his illustrations read "design."

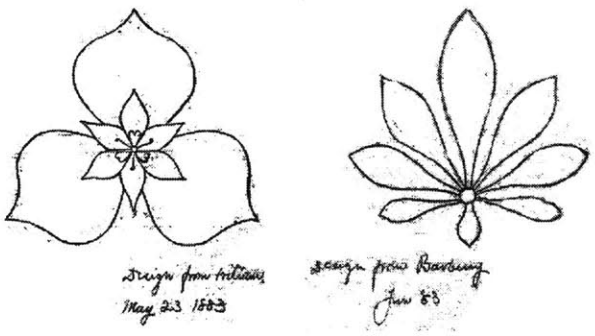

Figure 31. Barberry and tirillium drawings by Dow. Captions read "design." Dow is interested in understanding aesthetic organization in nature and how he can reconstruct it on paper. From Arthur Wesley Dow papers, Archives of American Art/Smithsonian Institution.

Yet, there is more to be gained from organic systems than their static hierarchies of interdependent parts. A different history of organic theories could be written from this point of view. It would include pragmatists, both the philosophers and artists like Ross and Dow, who pick up on dynamic relations in organic processes. Dow's flower sketches above may indicate a conventional interest in symmetries of natural form. Nevertheless, this and hierarchies of organic parts/systems that Nute puts emphasis on, are not the only formal relationships Dow generally employs in his diagrams. His nature photography provides more evidence. Spatial relations that he captures simply reflect his direct experiences in nature and not so much the deductive, mathematical, and scientific formula. Nancy E. Green writes

> Dow used his photographs as studies for paintings ... His photographs were often made as exercises in light and dark tonalities, experiments in his study of *notan.* In this regard, photography was especially useful, since the negative could, like a woodblock, be manipulated and printed in many variations.[17]

In his photography, Dow clearly used "his theories of patterning design and composition" in addition to the potential with light. He was interested in manipulating the image into a design. The figure below shows a photograph where he frames the scene in a similar way that he frames his landscape paintings.

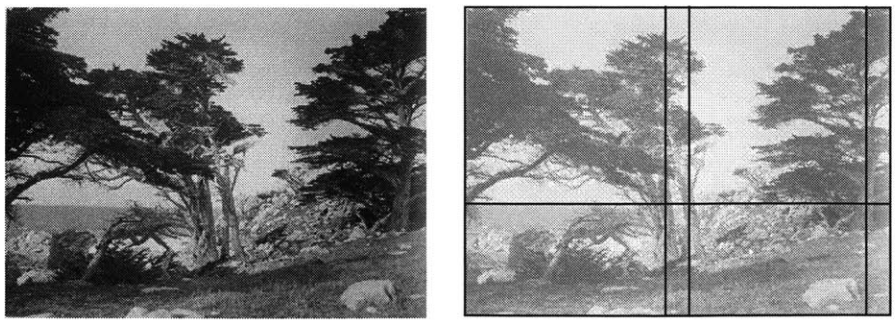

Figure 32. Photograph by Dow, Pacific Grove, 1912. Nancy Green and Jessie Poesch, *Arthur Wesley Dow and American Arts & Crafts*, (New York: The American Federation of Arts, 1999), p 92. [analysis by the author] Dow framed landscape in photography in the

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[17] Nancy Green and Jessie Poesch, *Arthur Wesley Dow and American Arts & Crafts*, (New York: The American Federation of Arts, 1999), p 76.

> ways he would for paintings. The structural forms are not in the nature but are what he creates to picture it. They are temporary tools.

What Dow wrote in *Composition* regarding abstract landscape exercises applies to this photograph as well.

> Looking out from a grove we notice that trees, vertical and straight lines, cut horizontal lines – an arrangement in Opposition and Repetition making a pattern in rectangular spaces.[18]

The underlying organization of this particular composition in photography could easily have been the lines shown in the analysis. Dow uses his usual framework of vertical and horizontal lines as his tool in framing the landscape and creates a unique way of observing it.

Like Fenollosa, Dow might have been after capturing the unique ideal beauty. But the fact that we have access to his tools of abstraction, and that these, as well Ross's, are subject to change according to persons and times, shows that Dow and Ross were more interested in unique experiences of nature than capturing an ideal. In their pedagogies, they were trying to encourage students to experience what is around them sagaciously with tools of abstraction that they would create. Unlike in the typical interpretations of organicism, the notion of parts and wholes does not necessarily imply set hierarchical relations that the trained eye recognizes in nature. These hierarchies are only a possible definition. Especially in spatial/visual experiences, parts are not always distinct to begin with. Every part that gets identified as a part at one time can be identified as a whole at another.

In the context of design teaching, where focus is on process, this is even more crucial to observe. Seemingly unrelated to the developments in psychology of vision, this idea was already partially in use in 19th century child education that preceded Dow and Ross. Friedrich Froebel's agenda in child education was to encourage looking for "parts of wholes," in order to understand more

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[18] Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]), p 104.

about the universe.[19] Froebel created his educational tools called gifts (mock-ups of the external world) and occupations (strategies from the inner world), based on four main groups of wholes, and showed how each could be a part in the other. He was following geometric truisms in defining a framework: points, lines, planes and solids (just like Wassily Kandinsky of the Bauhaus would, years later in his theories of form). Beads (point) could make a necklace (line); thread (line) could be woven into fabric (plane), or be wrapped in a yarn (solid) etc.[20]

In these examples, the number of relations between parts in the framework is limited. This is significantly different from the arrangements in the wallpaper patterns. Ross's multifaceted units come together in various spatial relations. As it was explained earlier, this is partial to how parts are perceived at each moment. Similarly, in Froebel's gift sets, part-whole dynamics are really explored in the child's interaction with the gifts. The interaction, which he called occupations, included molding, carving, weaving, cutting, folding, etc. Through these, the child engages in forming new relations between the units. Later, Arthur Dow listed similar craft activities as part of a creative education program: leather, metal and wood carving, modeling in clay, wax, plaster, and papier mache, printing, batik, textiles, paper, etc. (IHS archives) Both Froebel and Dow set precedence to the Bauhaus exercises mentioned a while earlier.

The notion of part-whole relations extends to another level in Froebel's pedagogy. Froebel explains that his pedagogy aims to develop a feeling of personality in the child. This, according to Froebel, is the means to perception, and happens when "the child feels itself a part-whole."[21] Gifts and occupations allow the child to connect to the world as a unique, active and changing part in it. Johannes Itten, who set up the basic design course at the Weimar Bauhaus two decades later, applies this continuous relation between mind and external matter in his pedagogy. Partial to his background in Froebelian kindergarten teaching, he stresses the unique qualities of the individual, self-expression and self-discovery as he guides individual students on their own individual paths.

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[19] Froebel, Friedrich. *Education by Development,* trans. by Josephine Jarvis, (New York: D. Appleton and Company, 1902), p 209. Reprinted 2001 by the Froebel Foundation, Grand Rapids, Michigan.
[20] Froebel, Friedrich. *The Education of Man,* trans. by W. N. Hailmann, (London and New York: Routledge, 2001) [1888 by D. Appleton and Company].
[21] Froebel, Friedrich. *Education by Development,* trans. by Josephine Jarvis, (New York: D. Appleton and Company, 1902).

> My teaching was intuitive finding. ... My best students are those who found new ways through their own intuition. In teaching the means of design it seemed important to me to appeal to diverse individual temperaments and talents. ... First, imagination and creative ability must be freed and strengthened.[22]

In terms of personal development, Itten's view follows the general motivation behind basic design education. However, a more contemporary way to discuss "intuitive finding" in design pedagogy is the utility of senses as a key factor in the self-conscious thought process.

C. The concept of sensations in late 19th century art

Utility of senses is tried in the context of basic design education as early as 19th century. Ross and Dow's work is exemplary and hence the subject of this thesis. But basic design education history, mostly the legacy of the Bauhaus, usually points to other links in psychology such as the empathy and Gestalt theories. These theories are based on sense perception but do not explore the senses as active parts of reasoning. For example, Rudolf Arnheim, a prominent 20th century Gestalt psychologist writes, "the perception of the shape is the grasping of generic structural features (found in, or imposed upon, the stimulus material)."[23] He illustrates this in his example where the sides of the square are its "genuine parts – that is, sections representing a segregated subwhole within the total context."[24]

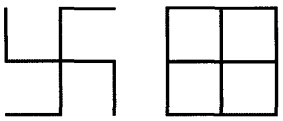

Figure 33. Arnheim writes that the swastika on the left is "obviously" not a part of the figure on the right "because the local connections and segregations that form the swastika are overruled by others in the context of the square." See Rudolf Arnheim, *Art and Visual Perception*, (Berkeley and Los Angeles: University of California Press, 1974

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[22] Johannes Itten, *Design and Form: The basic course at the Bauhaus*, trans. John Maass , (New York: Reinhold Publishing Corporation, 1963), p 7-8.
[23] Rudolf Arnheim, *Visual Thinking*, (Berkeley: University of California Press, 1969), p 29.
[24] Rudolf Arnheim, *Art and Visual Perception*, (Berkeley and Los Angeles: University of California Press, 1974 [1954]), p 78.

[1954]), p 77-78. Arnheim supposes that the definition of the square, thus the context it sets is fixed. Visually it is not so.

Arnheim also mentions "mere portions or pieces – that is, sections segregated only in relation to a limited local context or to no inherent breaks in the figure at all." But he implies that these are "mistakes" and "misinterpretations." In the Gestaltist viewpoint, the whole and its parts always seem to be fixed. In a creative process however, the surprising portions and pieces that are visible in local contexts are more interesting than the "genuine" parts.

Arnheim follows a tradition that was established by Kurt Koffka and Max Wortheimer who developed the Gestalt theory in late 19th and early 20th century. But the notion of Gestalt perceptions were in the making before, in psychological works of Wilhelm Wundt as well as being implied in some of the late 19th century art works. Painter John La Farge's writings in 1908 gave visual examples of Gestalt switches between black forms and white background.

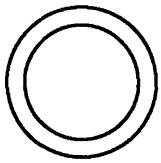

Figure 34. Painter John La Farge's writings in 1908 gave visual examples of Gestalt switches between black forms and white background. But, he talked of the switch as a conscious act of selection. "If the [certain lines] are very important to us, we see none but those, and not the ones that cross them, however distinctly these may all be traced. That is to say, that voluntarily and by effort we strengthen the sensation we wish to have, and weaken the one that we do not care for. ... Thus if on a white surface I trace two concentric circles, I can look upon the image as representing two black rings, and I shall see black rings; or I can look at the interval between the circles, and see a white ring..." See John La Farge, *Considerations on Painting*, (New York: The MacMillan Company, 1908), p 100-101.

Few of Dow's ideas are also precursors to the Gestalt approach. For example, Dow's notan exercises shown in the previous chapter are merely illustrations of figure-ground relations. Nevertheless, Dow uses the concept as a pedagogical system of abstraction. In his *Talks on Appreciation of Art*, Dow instructs on how to abstract pictures – such as by Corot – in black and white spots: "Put a piece of tissue paper over one of the pictures, and with a soft pencil blacken all the dark shapes. You will produce flat tones like [figure #]. ... There is a big leading spot or mass – of light or of dark – and all the others are grouped with it and seem to belong to it as if

they were all in one family. Your tracing will show you this [see figure #]. Or, turn the picture upside down and you will readily see what I mean."[25] This is not different than drawing vertical and horizontal lines to simplify an image to understand simpler form relations. He selectively perceives wholes, or parts.

Figure 35. "Dark-and-light plan of picture by Corot" from Arthur Wesley Dow, "Talks on Appreciation of Art, NO. III Dark-and-Light" in *The Delineator,* (July 1915), p 15. Dow is interested not in the fact that dark forms gather together on a white background, but more in understanding and conveying the simple relation between dark-and-light. Just as perpendicular lines are abstractions of landscapes, dark-and-light is an abstraction of a colorful picture.

Examples of Gestalt perception usually show switches between two different perceptions as in black and white figure-ground, or filling in the blanks in point or line drawings to reveal a whole shape that is already known. Actual Gestalt possibilities exceed these binary relations. Apropos Ross's perceptual changes in pattern designs, being open to all possible perceptions is important. Ross and Dow differ from the Gestalt psychology. Seeing with a fresh eye each time is part of what makes each design process unique and creative. Sketching is often praised as the tool of design thinking. Its benefit is along the same lines. An idea is put down on the paper and another is collected from it. Pragmatists like William James recognize the changing perception of shapes. He writes,

> We conceive a given reality in this way or in that, to suit our purpose, and the reality passively submits to the conception. ... You can treat the adjoined figures as a star, as two big triangles crossing each other, as a hexagon with legs

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[25] Arthur Wesley Dow, "Talks on Appreciation of Art, NO. III Dark-and-Light" in *The Delineator,* (July 1915), p 15.

> set up on its angles, as six triangles hanging together by their tips, etc. ... No one of them is false. Which may be treated as the more true, depends altogether on the human use of it.[26]

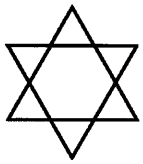

Figure 36. James gives multiple descriptions to this shape, and implies that there may be many more. From William James, *Pragmatism*, (New York: Dover Publications, Inc., 1995 [1907]), p 97.

Although Bauhaus methodology follows Gestalt psychology later on, for Itten, personal experience resonates with the theory of empathy. Gillian Naylor describes that in the drawing course, Itten had his students cry before Magdalene, and roar before tiger in preparation for drawing them.[27] Based on this, Itten's interest in the connection of self to the external world seems to refer to empathy. Empathy was first elaborated as a psychological theory of art around 1870 by Robert Vischer, and developed by psychologist Theodore Lipps around 1900. It is also traced to some late 19th century German texts on aesthetics, perception and space.[28] It is the unconditional connection between formal properties of an object and sense apparatus (from muscles to emotions). Lipps' contemporary, art historian Wilhelm Worringer writes that empathy reflects a confidence in the world as it is.[29] Usually interpreted as imitation of nature, empathy contradicts the basic design education agenda discussed in this thesis. At this point, Itten's approach diverges from this agenda as well.

Dow's approach, on the other hand, was reactionary to copying from nature. This is despite that he painted landscapes all the time. He was concerned that sense perceptions were reduced to symbols in imitations of nature, as well as painting from memory. He referred to these as "picture-writing." About copying form nature, he wrote

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[26] William James, *Pragmatism*, (New York: Dover Publications, Inc., 1995 [1907]), p 97.
[27] Gillian Naylor, *The Bauhaus Reassessed: Sources and Design Theory*, (London: The Herbert Press, 1985), p 77.
[28] Harry F. Mallgrave, ed., *Empathy, Form and Space: Problems in German Aesthetics 1873-1893*, (Santa Monica, CA: The Getty Center for the History of Art and the Humanities, 1994).
[29] Wilhelm Worringer, *Abstraction and Empathy*, (Chicago: Elephant Paperbacks, 1997 [1953]). It was originally in German, (1908).

> For a great while we have been teaching art through imitation – of nature and the 'historic styles' – leaving structure to take care of itself...so much modern painting is but picture-writing; only story-telling, not art; and so much architecture and decoration only dead copies of conventional motives.[30]

Empathy theory focuses more on the connection between the object and the observer, rather than the artist/designer. In contrast to empathy, Worringer describes another type of volition, namely abstraction, where man reacts to uncertainties, and transcends them into absolutes.

> ...the urge to abstraction is the outcome of a great inner unrest inspired in man by the phenomena of the outside world ...[the] powerful urge was, so to speak, to wrest the object of the external world out of its natural context, our of the unending flux of being, to purify it of all its dependence upon life, i.e. of everything about it that was arbitrary, to render it necessary and irrefragable, to approximate it to its *absolute* value.[31]

Deliberating on uncertainties is a part of the basic design education agenda, but the objective is not to turn them into timeless certainties. Differently, abstraction, as illustrated in Ross and Dow's work, starts from the unrest, and sustains it. Their pedagogies show how to set up temporary frameworks, instead of submitting to any predetermined structures. Frameworks develop based on variance in sense perception.

Art history has generally put emphasis on the influence of German psychological tradition on early 20th century avant-garde design (education) in Europe. The scene in America is mostly mentioned only after these avant-gardes fled to the continent due to the wars. Then again, William James, contemporary of Ross and Dow, was following the same psychological tradition as early as late 19th century. His background was in the experimental psychology of Wundt and Helmholtz that led to Empathy and Gestalt theories. His point of view, however, was different,

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[30] Dow mentions "picture-writing" in Arthur Wesley Dow, "Talks on Appreciation of Art, NO. I" in *The Delineator*, (January 1915), p 15. The quote is from Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]), p 64.

[31] Wilhelm Worringer, *Abstraction and Empathy*, (Chicago: Elephant Paperbacks, 1997 [1953]), p 15 and 17.

maybe characteristic to philosophical schools only in America at the time. William J. Gavin summarizes the assumptions in psychology James reacted against:

> We accept experience as finished; we assume experience is made of substantive parts; we rely too much on language, which is exclusive.[32]

James acknowledged the "ambiguity" and "indeterminateness" of visual perception.[33] In contrast, symbolisms like language "abridge thought and fix terms."[34] But indeterminateness is not only a trait of the visual sense. It is common to all experience and James applies its properties to consciousness (thought) at large. Every thought is personal, ever changing, continuous, and is based on selection. According to James the characters in thought are:

> 1. Every thought tends to be part of a personal consciousness. 2. Within each personal consciousness thought is always changing. 3. Within each personal consciousness thought is sensibly continuous. 4. It always appears to deal with objects independent of itself. 5. It is interested in some parts of these objects to the exclusion of others, and welcomes and rejects – *chooses* from among them, in a word – all the while.[35]

The psychological tradition that was influential on art is mostly thought to have served for the scientific legitimization of art. In pragmatism's relation to art, the opposite seems to be true. James's ideas on indeterminateness in thought and perception probably formed during his formal training in painting where, as F. O. Matthiesen writes he was able to grasp "the evanescent moment of experience."[36] James had a mutual influence of ideas with John La Farge, a painter and an art theorist knowledgeable in contemporary science. James and La Farge met in William Morris Hunt's painting classes in as early as 1859. With respect to visual uncertainties, techniques such as blurring outlines of figures, pointillist application of paint, and abstraction were

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[32] William Joseph Gavin, *William James and the Reinstatement of the Vague*, (Philedelphia: Temple University Press, 1992), p 18.
[33] William James, *Principles of Psychology*, (Cambridge, MA: Harvard University Press, 1983), p 864-869.
[34] Ibid. p 933.
[35] Ibid. p 220.
[36] Cited in Henry Adams, "William James, Henry James, John La Farge, and the Foundations of Radical Empiricism," in *American Art Journal*, v. 17, (Winter 1985), p 65.

developing features in 19th century painting. La Farge also practiced these techniques. His interpretation of Leonardo's teaching "to look for help in composition to the spottings and veinings of marble, the breaks and disintegration of old walls" may have prompted the blurred images in his paintings.[37]

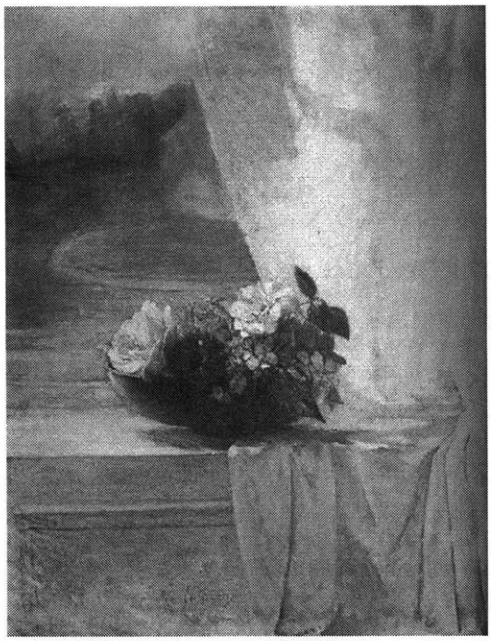

Figure 37. John La Farge, *Flowers on a window ledge*, 1861, oil on canvas, 24x20" La Farge paints in the impressionistic style and experimented with the idea of blurring the image. He explores the potential of paint and brush rather than trying to make sharp outlines.

Henry Adams writes

> Rather than presenting the image as fixed in a sharp focus that does not vary with distance and light, as was customary in American painting at this time, La Farge presents optical vibrations, a sea of different luminosities, colorations, and degrees of focus.[38]

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[37] John La Farge, *Considerations on Painting*, (New York: The MacMillan Company, 1908), p 98.
[38] Henry Adams, "William James, Henry James, John La Farge, and the Foundations of Radical Empiricism," in *American Art Journal*, v. 17, (Winter 1985), p 60.

Blurred images allow for these accidents of vision. Pointillist style was briefly mentioned at the end of the first chapter together with Ross's interest in pixilated photographs. Although Ross's intent is not clear, the photographs, presumably blown up by Ross, illustrated blurring boundaries. Once again using a tool of abstraction/an analysis, Ross might have been exploring the possible accidents of vision.

Dow and Ross constantly crossed paths with pragmatist philosophers such as William James, George Santayana, and John Dewey, who all wrote extensively on art in its relation to experience. Ross personally knew James, and his design theory course in the architecture and fine arts department at Harvard University (1899-1935) coincided with James's professorship in psychology and philosophy between 1880 and 1907. Also, in letters, there is evidence that students simultaneously took classes from Ross and James, and his colleague George Santayana who taught at Harvard between 1899 and 1912. The same applied to Dow in relation to Dewey. He taught at Teachers College in Columbia University from 1908 to 1922 and took part in John Dewey's efforts there to establish active learning in education (1905-1930).

Nevertheless, neither Ross nor Dow explicitly wrote about uncertainties, perhaps because it was a little radical, especially for Ross, who believed design to be a science. (But what Ross meant by science does not have to be its classic definition.) In basic design pedagogy, vagueness permeates aspects of the design process other than just the visual. For example, vagueness is encouraged when a problem is given. Little explanation follows so that students are able to develop their own ideas about what it might be. It is a push towards creating one's own thinking. Another example is, at the end of an assignment. Evaluation is not done based on general rules. Rather, there is a different critique for almost every object produced; the reasoning behind it is discussed; its form is open for debate; evaluation is done openly in a group, where projects are selected not for better-worse value but discussion value. The philosophical stance is 'seeing for yourself and not through anybody else's eyes'. Seeing through others' eyes might work in other cases such as sciences where a systematic build up of knowledge is required. But in education for creative thinking, seeing for yourself is essential because it is how you select an object, and set up a relation.

Additional to their association with trends in 19th century painting, Ross and Dow's involvement in arts and crafts bridges the discussion of vagueness to their design teaching methods. As was the case with John La Farge, who acquired his ideas on creative process from his involvement with stained glass, their interest in arts and crafts achieved a direct relation with the material context. Decorative arts were a stepping-stone for content-free form studies, where a modern understanding of abstraction refrained it from being turned into a formal code. Instead of following methods for learning accepted in the guild system such as copying the master for technique (empathy), Ross and Dow utilized material and technique to create frameworks that would help flex conceptual definitions. For example, Ross's busy but abstract forms in wallpaper patterns stimulate different reactions and constitute a formal design exercise where abstract ornament helps the student focus on form relations and becomes the tool to think with in other contexts. Ross and Dow present abstraction as a tool to think about form relations intuitively. Their systems of abstraction, allowing for plurality that is necessary for creativity, tame uncertainties of perception only momentarily and in context of the "evanescent moments of experience."

III. Constraints in abstract forms and form relations: Reasoning

Diverging from the popular understanding of creative process as one's internal heuristic act, one can look at it as a reasoning process that is guided by the relation of the individual to the outside. Creativity then, emerges from the differences between the individual's will and those of others. The outcome is considered within the plurality of works created by many individuals. What contributes to this understanding of creativity from a designer's view has already been pointed out in the discussion up to now. It is vagueness in sense perception, sagacity as the individual's incentive with it, and a relational view of the world that denies universal hierarchies where objects are classified according to preset notions. Creativity is a reasoning process where definitions can vary.

Not having a predetermined structure for thought does not imply the absence of reasoning. William James gives sagacity as an indispensable part to reasoning that plays into creativity in much more flexible ways than those prescribed by the sciences. In the pragmatist premise,

reasoning builds up on process and process builds up on personal interaction with the object. It is contextual, based on experiences and habits, and does not conform to universal generalizations. Its rules are not finite as long as sagacity is practiced. Grounding definitions of thought in creative process and utility of senses is the opposite of conventional interactions of art with science, where creativity is being explained through scientific principles. All this prevails in a distinctive pedagogical standpoint, shared by Ross and Dow as well, where individuals are encouraged in their unique ways, which can only be represented in temporary and discardable conceptual structures.

A. Reasoning and sagacity: Ross's design constraints

Following this understanding, Ross and Dow's systems of abstraction demonstrate ways of reasoning, how to set up frameworks in a design process and apply rules exceptional to moments in the process. Their work shows a conscious manipulation of forms with the constraints that they establish. For example, Ross founds his analyses of photographs on spatial relations of particular diagonals. He traces geometric triangulations on various portrait photographs showing them as composition lines. These lines mostly refer to the boundaries of the figures in the image, rather than a presumed center of mass. He usually selects one particular triangle and uses this to build a system that explores variations within that system. The first figure below is one of Ross's finished analyses.

Figure 38. An analysis by Ross illustrates a system of abstraction over a photograph. Most of the lines drawn take reference from the image. For example, certain lines follow outlines of the chair while some are tangential to the head. Also, the lines altogether belong in a system based on a formal relation, which is in this case a right triangle with the ratio of one of the sides to the hypotenuse is 1:2. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

In the introductory booklet for an exhibition of his work in 1923, he explains his thought process:

> I then look at my subject and make up my mind which one of many possible diagonals will be the best one for the purpose. I draw that diagonal and another to balance it and reciprocal lines crossing the diagonals at right angles. These six lines will give me directions and angles of a single right angles triangle and are all I require.[39]

Based on this, the illustrations below speculate on how Ross builds up his system of abstraction for one example.

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[39] Denman W. Ross, *Experiments in Drawing and Painting*, (The Century Association of New York, Exhibition November 1923) p 4-5.

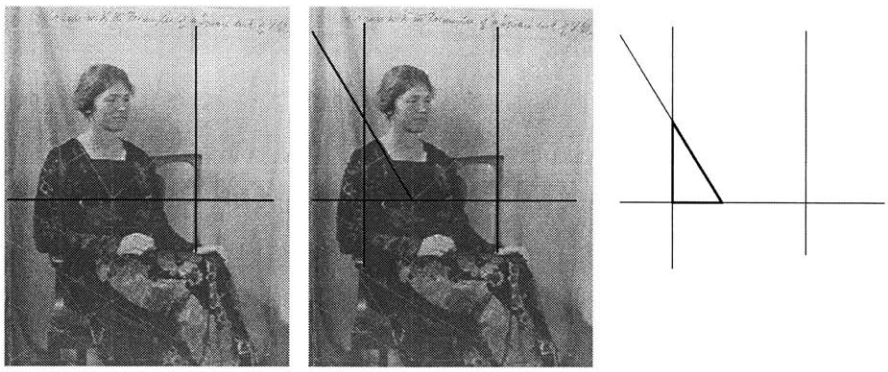

Figure 39. Ross's initial lines are possibly these to establish a triangular relationship. These lines, with the exception of the horizontal line, take reference from the figure in the photograph. The horizontal line is arbitrarily placed but is the result of a perpendicularity rule that will help determine a right triangle. [drawings by the author]

Ross first seems to establish a set of perpendicular lines that mostly take the image as reference. This is so far similar to the motif in Dow's analyses. Simultaneously, a diagonal that traces the dress, and a secondary vertical through the other arm of the chair follow. The spatial relation of the diagonal with the other lines establishes the basic angle for the triangular geometry Ross aims for. The triangle is a right triangle of $\sqrt{4}$; the ratio of its short side to hypotenuse is 1:2.

Ross's first lines mostly follow reference points from the image with the exception of the center horizontal line. It does not refer to anything in the figure (nor is it derived later on in his system of triangles) but it follows a perpendicularity rule. Its placement is arbitrary but the relationship is intended. It enables Ross to define the right triangle. Despite some arbitrary placement of lines, Ross tries to be consistent in his thinking:

> In producing the composition it is possible to modulate from the directions and angles of one triangle to those of another, if there is a good reason for doing so: but the systems combined must have one or more elements in common.[40]

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[40] Denman W. Ross, *Experiments in Drawing and Painting*, (The Century Association of New York, Exhibition November 1923) p 3.

He allows for variation as he sees, but he wants to also continue using at least one rule, or one feature, consistently. Perpendicularity is one of these features. As he builds his system, the triangle that he derived from the initial lines becomes the basic element for the composition.

Later, Ross "modulate[s] from the directions and angles of one triangle to those of another." In a speculative order, the illustrations below show that he mirrors, rescales, and rotates the initial triangle. In the first one, Ross draws a diagonal that is perpendicular to the earlier one and, at the same time, tangential to the face. This produces the reciprocal of the √4 triangle. In the second one, he rescales (doubles) the original triangle and starts establishing a bordering frame for his analysis. In the third one, he draws a new diagonal and a vertical that mirror the last triangle, and maybe, take reference from the figure underneath.

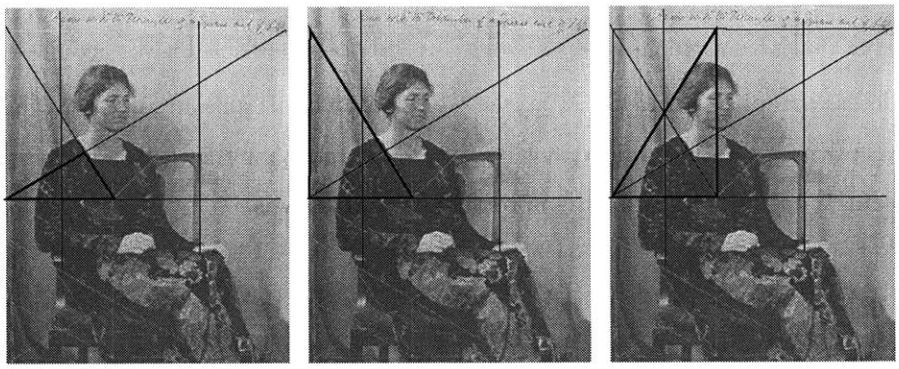

Figure 40. i) Ross draws a diagonal that is perpendicular to the earlier one. He is also attentive to refering to the image. ii) Rescales the original triangle to the implicit boundary of the frame. iii) As he completes the frame, he mirrors the triangle from (ii). He is again true to referring to the image.

He produces a whole series of √4 triangles in similar manner. Nevertheless he allows for exceptions. In addition to the repeating triangles of √4, the caption above his analysis indicates a system of "triangles of a square" as well. This refers to the triangles shown below, even though they are not actually triangles of a square.

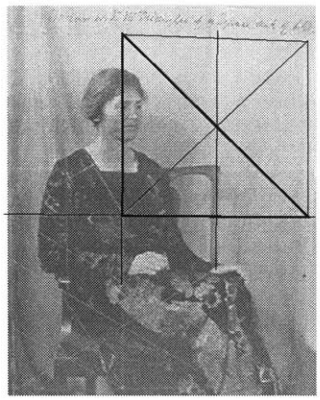

Figure 41. Ross has a secondary system of triangulation connected to the first. He presumes this is a $\sqrt{2}$ triangulation.

The assumed square has adjacent sides with a ratio of $2:\sqrt{3}$. Ross constructs this based on the vertical line referencing the back of the chair and the existing triangular geometry. Following his description that this is a square, however, triangles in this portion of the analysis would be of $\sqrt{2}$. In any case, these comprise a variation from the $\sqrt{4}$ triangulation. It indicates to us that Ross interchanges geometries to his preference. He swaps visual rules, and the transformations he applies to them. It becomes more a design problem than an analysis.

Another example to variation in Ross's analyses is that he carries the same visual rules to other contexts. In the example below, he switches to a different background image and but builds up a system with the same $\sqrt{4}$ triangles applied with various transformations of scale and orientation.

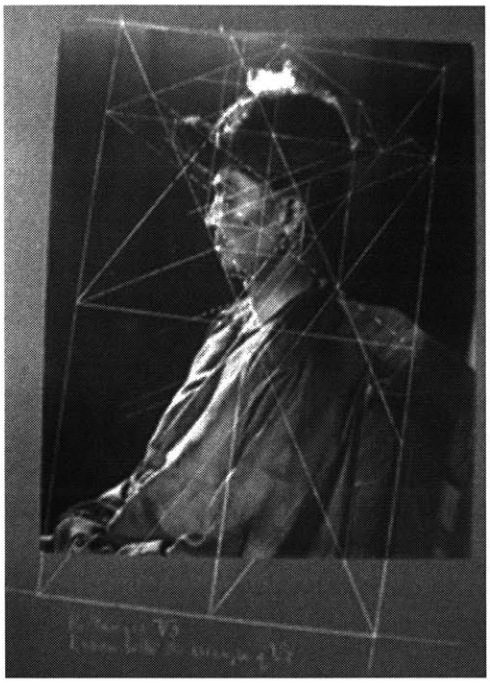

Figure 42. In another example, Ross uses the same triangle with a different background. From Harvard University Art Museums Archives, Denman W. Ross Archival Materials.

There are opportunities for being sagacious while applying the triangle rules. Ross's eye constantly picks out diagonals to draw new diagonals in a triangular relationship. He does this with mirrored or rescaled versions of the triangle that is the basis of the rule. Sagacity also applies at the initial level, when Ross was deciding on the first diagonals, hence the rule. His eye picks out parts that seem relevant then and there. Then, he manipulates the triangle, within the boundaries set by its geometric limitations but still flexibly, as he desires.

An entirely different geometry could also be set up using other spatial relations that abstract form relations from the same background figure. As the system develops with variations of initial rules, new spatial relations emerge like seen in the earlier example. Although the procedure in each example would be very personal, the point in trying out new ones is that at the end what comes out is more than just an analysis of a photograph, but a design. The pedagogical importance of these analyses is precisely this.

B. Grids, networks, and their limitations: Dow's design constraints

Dow's rules are much simpler than Ross's, but serve a similar purpose in setting up constraints. His "diagonals" are always horizontal or vertical in relation to the frame. His placing a line rule is specifically for picking out horizontal and vertical reference lines. The only two spatial relations are of parallel and perpendicular lines. Regarding landscape drawings, he refers to perpendicularity as principle of opposition where vertical lines cut horizon. Sometimes the vertical element is the frame itself. However simplistic his system of rules is, he utilizes these abstract guidelines to demonstrate how to set up constraints accordingly with the context, and through these changing constraints how one can reason at the same time. John Masheck calls Dow's underlying structures "empty diagrams."[41] But these structures are not absolute. Apart from understanding given constraints through experimenting with the material and apparatus, one develops -personal/individual- constraints to guide the design process. Paul Klee's grids in *The Thinking eye* are along the same lines.[42]

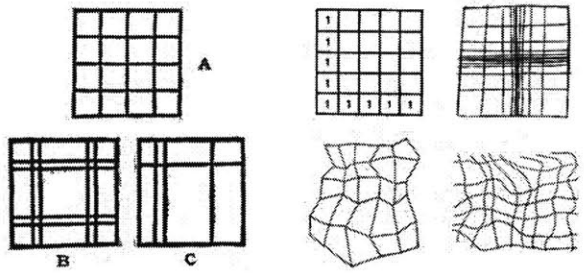

Figure 43. Dow's grids on the left and Paul Klee's grids on the right. (Dow, 1997 [1920], p 89; Klee, 1961) Klee's first grid displays "very primitive structural rhythm." See Paul Klee, *The Pedagogical Sketchbook*, (New York: Frederick A. Praeger, Inc., 1977 [1953]), p 22. Like Dow, Klee also refers to the grid as an underlying structure. Dow changes distances between lines and the number of lines in the grid. Klee does the same, but also allows for distortion in the frame. J. Abbott Miller writes, "Klee's pedagogical writings re-consider the grid as active, rather than passive." See Ellen Lupton and J. Abbott Miller, *The ABC's of [Yellow Triangle, Red Square, Blue Circle]: The Bauhaus and Design Theory*, (New York: The Cooper Union for the Advancement of Science and Art, 1993), p 9.

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[41] John Masheck, "Introduction: Dow's Way to Modernity for Everybody," in *Composition* by Arthur Wesley Dow, (Berkeley and Los Angeles: University of California Press, 1997), p 5.
[42] Paul Klee, *The Thinking Eye*, trans. by Ralph Manheim, (New York: G. Wittenborn, 1961).

It was mentioned earlier that Froebel's grid/network sets up precedence for pedagogical use of abstraction, especially regarding Dow's vertical and horizontal guidelines. But, grids do not allow for uncertainty as much as the frameworks described above do. Primarily this is because Froebel does not manipulate the grid in a design process. That is to say, the rules of the grid are set from the beginning. On the other hand, Dow changes distances between lines, and numbers of lines.

Froebel's use of the grid can also be selective. But this is secondary when its lines serve as a guide for arranging tablets in the manner shown below.

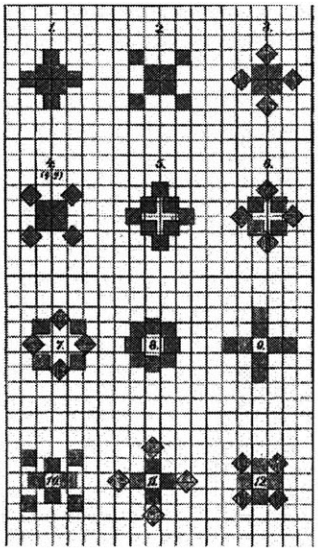

Figure 44. Froebel's network is a static tool. Tablets are arranged solely on their relation to the grid and their own geometry that is a part of that grid. Even if there are offsets from the grid, they are often pedantic fractions like a quarter length or a half.

Compared to Ross and Dow's frameworks, Froebel's grid is very rigid. Tablets are arranged solely on their relation to the grid and their own geometry that is a part of that grid. Even if there are offsets from the grid, they are often pedantic fractions like a quarter length or a half. This kind of a utility only works as a counting system, hence the need for the entire set of lines even if they are not visually used. Ross's lines always serve a visual purpose even if momentarily. If not, they are not there. Ross's grids and Froebel's grids have different efficiencies. Froebel's gives the basic unit, a square in one specific relation to another, and shows all the combinations this provides. Ross's system shows the process with its varying possibilities at each moment. There is efficiency in lines, but not in thought because there is sagacity. Froebel's network repeats the

same relationship that is set in the beginning. Its use is similar to that of Maratta's design paper. Moreover, for Froebel, drawing in the network involves understanding sizes and proportions of shapes. He is interested in cultivating the eye as a measurer.[43] Froebel also gives examples of octagonal arrangements on the grid.

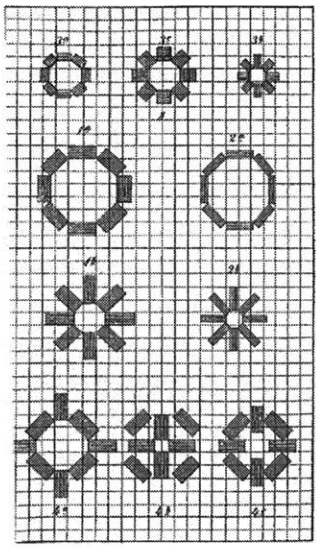

Figure 45. Even "more advanced" arrangements are based on the basic formal relationship in Froebel's network.

He writes that these and other circular arrangements with the tablets are more advanced ways to utilize the grid.[44] These arrangements are still very much dependent on the same principles of the grid. They take its metrics as reference. But in the end, Froebel's grid does not expand the design space. Only when the grid itself becomes an active tool, this results in Dow's paintings and Ross's analyses.

Maratta's triangular grid and Ross's use for it is not much different than Froebel's approach to the grid. Ross does not explicitly mention its measure but utilizes the formal relations between its primitives. Design that is constructed on Maratta paper, relates to those relations in the grid. The deviation is in that this grid carries a geometric bias different than the orthogonal one.

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[43] Froebel, Friedrich. *Education by Development,* trans. by Josephine Jarvis, (New York: D. Appleton and Company, 1902), p 78.
[44] Ibid. p 78.

Nonetheless, very simple shape relations are exercised. The pedagogical purpose in the use of these grids seems to be to show precursors to more active ones.

Off the grid, Froebel's tablets and other gift blocks still constitute a framework because of their defining geometry. In fulfilling the role of play blocks, they show more than what the eye picks out. As explained by George Stiny, Froebel's Kindergarten blocks illustrate how the framework gets manipulated through perception of hand's touch. Alignment of two rectangular blocks against the hand, using it as an edge, is tactile rather than visual.[45] Sagacity permeates to other senses. Ross and Dow do not explicitly talk about systems of reasoning that utilize senses other than the visual. At least, they promote hands-on experimentation with craft activities. This was mentioned earlier.

C. The pedagogical implications of Ross and Dow's systems of abstraction

Pedagogical implications of abstraction in Ross and Dow's work are twofold. Firstly, Ross demonstrates analysis of finished work. How to use that in a generative sense is not clearly articulated. There are no examples where the student makes an analysis and uses it generatively. The only exercises given to students involve finished frameworks like Maratta's equilateral triangle grid for generating designs on it. (Harvard Archives) And the Maratta grid does not connect to a prior context. This might be plausible in terms of avoiding any semantic bias on the students' part. Still, there is a benefit in drawing up a dynamic grid for the purposes of understanding a work, and its elements, and reusing the elements to reconstruct it.

This advantage is also observable in Dow's system of abstraction for landscape drawings. A quick sketching exercise has the same effect, where students are given a time limit. They learn to pick out certain essential parts (there and then, changing from time to time, from person to person) to make a quick representation. Drawing vertical and horizontal axes, as well as framing the scene helps. These abstractions facilitate thinking of design on basic terms. This is apparent especially in Dow's work. He first lays the foundational structure (the abstract, that comes forth as the pedagogical tool) and then works with it, reflectively, to create his painting over it. The

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[45] George Stiny, "Kindergarten grammars: designing with Froebel's gifts," in *Environment and Planning B*, v. 7, (1980), p 420.

abstraction works as a structure. More than Ross, Dow imagines the finished composition at the beginning.

Secondly, Ross's system of abstraction, even without the examples of students applying it, demonstrates a pedagogical tool to think with sagaciously. The framework helps Ross constrain his process. This is in terms of both understanding how constraints affect the process and developing new ways to constrain it. When used dynamically, abstract guidelines allow for observing ambiguities. Instead of claiming there is order in everything, Ross shows he can create order in any context. He chooses between various photographs and paintings, and he also establishes different triangle rules specific for each. He uses tools of abstraction to show his reasoning in design.

Frederick C. Moffatt, John Masheck and Mary Ann Stankiewicz present different viewpoints on the degree of formalism in Ross and Dow. Mostly, they consider Ross's formal methods to be too scientific in comparison with Dow's. Moffatt mentions Ross's "radical" attempt to free composition from "'the accidents of vision' so crucial to the Dow-Fenollosa formulations ..."[46] Moffatt is probably referring to Ross's remark regarding building a science of design: "As we rise above the accidents of vision or of memory ... we discover that our knowledge of nature or life is a knowledge of Nature's consistency..."[47] Despite statements like this that claim a direct link to rules in nature, Ross's approach is milder than both what Moffat gives credit for and the scientific approach to design that followed since. Ross specifically wrote that it is not important what type of line is drawn as foundation: "It is not necessary, therefore to use either photographs or triangles."[48] He noted that it is "easier to get good compositions with triangles than rectangles," and that the right-angled triangle is "wonderful" as a module.[49] He was not idealizing any form in Nature. The significant concept in his work is the foundation, the underlying grid, or the frame, the ephemeral abstract tool. Additionally, he allowed for free experimentation within these boundaries and left judgment of aesthetic value to the students.

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[46] Frederick C. Moffat, *Arthur Wesley Dow (1857-1922)*, (Washington: The Smithsonian Insitution Press, 1977), p 91.
[47] Denman W. Ross, *Design As A Science*, (Proceedings of the American Academy of Arts and Sciences, 1901), p 374.
[48] Denman W. Ross, *Experiments in Drawing and Painting*, (The Century Association of New York, Exhibition November 1923) p 4.
[49] Ibid. 2.

As a follow-up on Moffat's remark on "accidents of vision," Masheck's presentation of Dow's position is similar to Ross's. Referring to Leonardo's "method of stimulating pictorial ideas by studying random spots on a wall for imagic suggestions," Masheck writes that "Dow was out to suspend pictorial incident so as to bring forth image structure, the structure of forms, which, once acknowledged, might be refilled with freely appointed pictorial incident."[50] What needs to be stressed here is that Dow too used ephemeral tools of abstraction. The pictorial incident in blurring blots of paint can also refer to the structures that he set, temporarily. The significance of Ross and Dow's *work*, and maybe not so much their grand theories about art or science, is that they used abstraction as a tool to understand and discuss the design process. To me, they both represent a consciousness in the designer of being able to manipulate the intellectual tools and all the while recognizing perceptual variance.

Reviewing the influence of Ross and Dow's systems on art education, Mary Ann Stankiewicz cites a survey in art education published in 1908 by C. L. Boone. The survey shows that, as early as 1908, many art teachers had been using Ross and Dow's systems as "ends," and not the means.[51] However, Ross and Dow present no absolute resolution. They suggest a technique that could be varied. In reviewing their work, emphasis should be put on developing one's own techniques by trying them out (and observing others). Constraints that Ross and Dow introduce are pedagogical tools, of simple relations. They are not imposing rules to be followed exclusively. Ross and Dow simply exemplify how relations can be set. Their work suggests that the student explores within limits that are individually set and can vary.

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[50] John Masheck, "Introduction: Dow's Way to Modernity for Everybody," in *Composition* by Arthur Wesley Dow, (Berkeley and Los Angeles: University of California Press, 1997), p 4-5.
[51] Mary Ann Stankiewicz, "Form, Truth and Emotion: Transatlantic Influences on Formalist Aesthetics," in *Journal of Art & Design Education*, n. 1, v. 7, (1988), p 93.

Chapter 4

Basic Design in Design Pedagogy: Past and Present Exploitations of Abstract Forms and Psychology

I. Introduction

The previous chapter has shown that Denman Ross and Arthur Dow's design pedagogies developed in parallel with the philosophical setting of their time. They represent the beginnings of a tradition in basic design education that aims to undermine overbearing conceptual systems. Basic design methods are still considered progressive today. Nevertheless, they too inadvertently set limits to creativity. Exchanges with philosophy and psychology in late 19th century were valuable for comprehending the creative process as reasoning. But since then, the tradition of design education has primarily failed in achieving the plurality aspired in the beginnings. Ross and Dow, and even more, schools that historically followed, carried out the core idea of creative reasoning in proximity to scientific thought. Plurality converged into styles, languages and other idealisms.

Partially as a reaction to the Modernist project, some architects today still do not want to associate creative processes with reasoning. At the same time, to the contrary, the technological trend in architecture very much mimics the positivist and functionalist approaches of the early 20th century. But either of these positions is extreme. Reasoning plays into creativity in much more flexible ways than those usually attributed to the sciences. From this perspective, this chapter will summarize the shortcomings of the late 19th - early 20th century attempts in basic design pedagogy, and trace these in similar approaches to design today.

II. Disillusionment of the past

A. The Pragmatist premise and the principles of Ross and Dow

In the intellectual context discussed in the last chapter, Ross and Dow's work shows us an attempt at the (pragmatist) premise for creative thinking – that it is a self-conscious process carried out with individual and changing rules. The process then utilizes perceptual uncertainties and allows for plurality. The difficulty seems to be in maintaining the opportunities for sagacity while trying to establish a pedagogical agenda. For example, the pedagogical method will require a consistent approach. The basic concepts used repeatedly for guiding the processes in assignments could be then mistaken for general principles. Ross and Dow's work demonstrates mutual sagacity and reasoning as in William James's description to a certain extent. But it stalls before further exploration, maybe because of this kind of a failure.

Firstly, there is little evidence of student work to show the applied pedagogy of Ross and Dow. Historical research could be extended to seek out student work that creates varying systems and rules of abstraction. Otherwise, it is not possible to assess if Ross and Dow's demonstrations of setting up frameworks help instigate creative thinking. Furthermore, despite that they draw attention to possibilities of variety, Ross and Dow mostly pursue the same set of frameworks – namely the orthogonal and the diagonal line relations. Additionally, there is not much continuance of their pedagogy through influence. So far, the 1908 survey that Stankiewicz cites provides some information on followers. But it rather brings forth these followers' misinterpretation of the method. Similarly, Arthur Pope, one of Ross's students who continued as a professor at Harvard, tailed Ross's legacy but did so through creating a consistent set of principles in *The Language of Drawing and Painting*.[1]

In England, another influential educator followed Ross's path. In *Vision and Design*, Roger Fry approved of Ross's abstract approach devoid of representational meaning:

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[1] Arthur Pope, *The Language of Drawing and Painting*, (Cambridge, MA: Harvard University Press, 1929).

> Dr. Ross wisely restricts himself to the study of abstract and meaningless forms. The moment representation is introduced forms have an entirely new set of values.[2]

Stankiewicz writes that "thinking about abstract formal relationships, as Ross did, provided a theoretical base for critical theories such as Fry's which explained abstract art and argued for its aesthetic value."[3] But Fry does not seem to have taken full advantage of the "meaningless" forms. Literature on Fry[4] mostly agrees on his formalist approach to abstract art that runs contrary to changing values. Fry himself, on the same page as the quote above, indeed establishes formal values:

> One chief aspect of order in a work of art is unity ... In a picture this unity is due to a balancing of the attractions of the eye about the central line of the picture.[5]

Secondly, Ross and Dow did not break away from general notions such as balance, harmony and rhythm in talking about the basics. In spite of their approach where the principles and frameworks are personal and changing, balance, harmony and rhythm inevitably bring them back to a general idealism in aesthetics.

B. Pure Design, Composition, and the break from the past

The titles of Denman Ross and Arthur Dow's work, consecutively Pure Design and Composition, are also parts of this discussion. The choice of words (pure and composition) seems in accord with the conservative view of aesthetics that largely governed art and architectural education in the 19th century. The words imply a sterile formalism that can be acquired only in a finite number of ways. The general view, dating back to the Renaissance and

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[2] Roger Fry, *Vision and Design*, (London: Chatto & Windus, 1957 [1920]), p 31.
[3] Mary Ann Stankiewicz "Form, Truth and Emotion: Transatlantic Influences on Formalist Aesthetics," in *Journal of Art & Design Education*, n. 1, v. 7 (1988), p 88.
[4] See David G. Taylor, "The Aesthetic Theories of Roger Fry Reconsidered," in *The Journal of Aesthetics and Art Criticism*, n. 1, v. 36, (Autumn 1977), p 63-72 and Berel Lang, "Significance or Form: The Dilemma of Roger Fry's Aesthetic," in *The Journal of Aesthetics and Art Criticism*, n. 2, v. 21, (Winter 1962), p 167-176.
[5] Roger Fry, *Vision and Design*, (London: Chatto & Windus, 1957 [1920]), p 31.

aspiring to Classical models, claimed harmony, rhythm, and balance as well as symmetry to be basic aesthetic principles. Mostly, references for these principles and their flat, geometric applications in art and architecture were idealized natural forms. This was briefly mentioned in the last chapter in relation to organicism as well as in the first chapter with historical precedents to Ross's analyses. But this thesis has shown that there is an operative difference between these and Ross and Dow's works. And so it is possible to perceive Ross's "pure design" as focus on abstract (meaningless) form and Dow's "composition" as focus on the relations between these forms.

My forgiving approach is not common. Art history marks the end of concentric ideals in 19th century Western art and architecture with the "peripheric [asymmetric]" compositions of the European Avant-Garde.[6] This assessment also parallels the divide between two dominating traditions of the classical and the avant-garde in architectural education: the Beaux-Arts and the Bauhaus. Whereas the Beaux-Arts approach maintains the classical formalism based on the notion of types, the Bauhaus methodology, originated in 1919 in Weimar, Germany, is representative of the avant-garde and encourages individual expression. Basic design education is recognized today as the legacy of the Bauhaus. It is an opening curriculum of architecture education and consists of experimentation with material, abstract forms, and constrained abstract problems. A switch between the two traditions of architectural education can be specifically observed in American universities such as at Harvard with the arrival of Walter Gropius from the Bauhaus in 1937.

On the other hand, Ross and Dow's interest in Japanese art had introduced them to the notion of asymmetric compositions in the late 19th century. Their designs and paintings displayed asymmetry as exemplified in the previous chapters. But more importantly, their pedagogical undertaking was not merely about a stylistic inquiry. They were acting from within a history of hands-on child education and the Arts and Crafts movement. Both of these associations had influenced their techniques in achieving dynamic designs. Their – then unusual – formal arrangements served to show the students possibilities for various form relations and to encourage them to think about unique processes to develop these. Probably because of this

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[6] Colin Rowe, "Book Review, Talbot Hamlin, Forms and Functions of Twentieth Century Architecture," in *Art Bulletin*, v. 35, (1953) pp 169-174.

background, Ross and Dow even reacted to the formal expressionism that the European avant-gardes brought. Both of them, having visited Europe in late 19th century, had been friendly with the post-impressionist, pointillist, and fauvist circles. Nevertheless, Ross's conservative side came through in a letter to one of his students. His student was actively involved in founding the first modern art exhibits at the Harvard Fogg Art Museum:

> When it comes to the post-impressionists I have no interest in their theory and no interest in their work. ...The key note of post-impressionists is self-expression; with the will to be unprecedented and shocking. The result is lawlessness ... As for your going to Harvard Square and starting an exhibition and sale of examples of contemporary art because precedence has been given to other and better things at the Fogg Museum; it is a silly and ridiculous example of self-assertion and self-expression on your part.[7]

Considering their own progressive position in America, Ross and Dow's caution and apathy may be interpreted to their credit. Their theories had methodological components that had grown out of the history mentioned above. Dow knew they were ahead of the avant-gardes. In a letter to his painter friend Henry Rodman Kenyon, Dow wrote:

> Perhaps you saw [the American impressionist Charles] Vezin's article on flat tones. It sails into modernism very severely. Mrs. Mowbray-Clark is up here [in New York City] lecturing – a kind of blow, or advertisement of the Davies-Henri crowd [Arthur B. Davies and Robert Henri were among the first to exhibit independently from the National Academy of Design in 1907 (Schwartz, 1984, 49)]. They have just discovered the things Fenollosa and Ross talked about 20 years ago! [8]

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[7] Denman Waldo Ross, Letter to John Walker attached to Letter to Edward Forbes, (May 30, 1929), Harvard University Art Museums Archives, Edward W. Forbes files.
[8] Arthur Wesley Dow, Letter to Henry Rodman Kenyon, (January 12, 1915) Ipswich Historical Society Archives, Arthur W. Dow Collection.

In the end, Ross's fear of lawlessness proved wrong. The design education that emerged from that avant-garde work, as well as from the work of those who followed Ross and Dow, was instead the opposite. Restrictive frameworks somehow reemerged. This thesis is not intended as an extensive historical research of what followed Ross and Dow. Still, it is important to show that the ideas at the end of the 19th century did not see further exploration in basic design education. In thinking about abstract forms and form relations, Ross and Dow were unique in pushing towards a pragmatist approach and anticipating the 20th century modern thought. But their influence did not persist, partially because their work sustained the visual qualities of the old styles. To the contrary, the 20th century moderns introduced new visual material that captivated interest through the years, but slipped back to rigid ways of thinking about design. Below are a few exemplary and significant historical threads that are based on similar pedagogical ideas but fail to appropriate sagacity in creative thinking.

C. Formal idealism after Ross and Dow

Asymmetric line arrangements were exciting because they broke away from strict patterns prescribed in a holistic and static worldview. Expanded knowledge of organic systems and psychology supported this formal change. The change was only an indication of the new understanding of a dynamic world and dynamic creative processes. However, it was also very easy to lapse back to the static view if these forms became the new ideals. Jay Hambidge, in his investigations on dynamic symmetry, geometrically described how to construct asymmetric forms like the spiral.

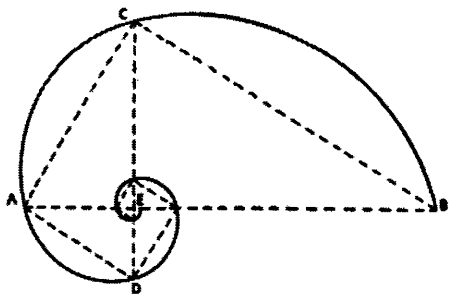

Figure 46. Jay Hambidge describes how to construct a shell spiral. "...the line EC is a mean proportional between the lines EA and EB. E is the pole or eye of the curve. The lines AB and DC are drawn through the pole at right angles to each other. When three

> lines EA, EC, and EB are in this position the lines AC and CB form a right angle at C." See Jay Hambidge, *Practical Applications of Dynamic Symmetry*, (New York: The Devin-Adair Company, 1960 [1932]), p 39. His interest is in idealizing asymmetric forms.

But Hambidge's intention to legitimize classical works like Greek pottery through science gives this pursuit a different meaning. He consistently based his geometric descriptions on proportions like Fibonacci ratios and validated these newly appreciated non-concentric forms through their existence in an idealized Nature. His shell spiral is an example of fractals, alongside which Hambidge's work takes place in bibliographies today in computing as well as aesthetics. Fractals show that organic growth could be understood in categories, as a model for complexity and variation. But this kind of recursive complexity and variation is diametrically opposed to allowing for sagacity in creative thinking. Here, there is no variance in parts. Abandoning symmetries and concentric compositions is only a formal exercise that brings in idealized forms once again, now appreciated as dynamic.

Another slip to the static view is in claiming origins for asymmetric forms. In early 1920s, many look to ethnic art for the formal variety that classical works usually lacked. In a way, this is not different than Ross and Dow's interest in Japanese art. Critics at the time note the parallel between Japanese and primitive arts in terms of the consciousness of the abstract. Roger Fry writes:

> The bushman silhouettes of cranes might almost have come from a Japanese screen. Like Japanese drawings, they show an alertness to accept the silhouette as a single whole instead of reconstructing it from separately apprehended parts. It is partly due to Japanese influence that our own Impressionists have made an attempt to get back to that ultra-primitive directness of vision. Indeed they deliberately sought to deconceptualize art.[9]

At the same time, there is a tendency to identify global concepts as the motivation behind these abstract forms. As an example, the influential Mexican painter and educator Adolfo Best

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[9] Roger Fry, *Vision and Design*, (London: Chatto & Windus, 1957 [1920]), p 97.

Maugard listed seven basic motifs in primitive art as the beginnings of a new language of form: the spiral, the circle, the half-circle, the s curve, the wavy line, the zigzag, and the straight line.

Figure 47. Best Maugard writes, "The suggestions and rules that we will follow are simple and easily understood by everyone. They are quickly grasped and retained in the mind of the student. In this method, there are seven simple motifs and signs, which we consider as fundamental, and a few rules to follow, and these, once in the student's memory, will enable him to make an infinite number of combinations and designs..." See Adolfo Best-Maugard, *A Method for Creative Design*, (New York and London: Alfred A. Knopf, 1926), p 1-2. He aims to identify a finite global vocabulary of basic elements and sees design as combinatorial arrangement of these elements.

Suitable to an educational purpose, playing with these could also serve to understand the works in a particular style. But, an educational agenda to teach the basics as preparation for more complex systems in the future goes back to systems like Owen Jones's set of principles in *The Grammar of Ornament.*[10] Later, Laszlo Moholy-Nagy's reference to Raoul Francé's "seven biotechnical elements" is along the same lines. Moholy-Nagy excludes these elements from production of plastic form (sculpture). He writes that sculpture is understood in "plastic development – and not as the application of geometric and biotechnical elements." Nonetheless, outside of the realm of plastic art, his view of design is functionalist. He reiterates that "[crystal, sphere, cone, plate, strip, rod and spiral (screw)] are the basic technical elements of the whole world."[11]

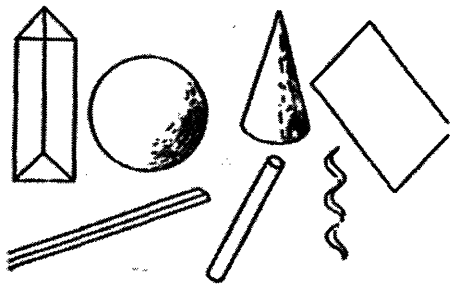

Figure 48. Laszlo Moholy-Nagy lists the "seven biotechnical elements" as basic constructional units of the physical world: crystal, sphere, cone, plate, strip, rod and

[10] Owen Jones, *The Grammar of Ornament*, (London: Studio Editions, 1986 [London: Day and Son, 1856]).
[11] Laszlo Moholy-Nagy, *The New Vision*, (New York: George Wittenborn, Inc., 1947[1928]), p 46.

> spiral (screw). He approaches design from a functional point of view, and believes these are the key forms for efficient designs.

More recently, in a similar approach, Christopher Alexander observes primitive urban settlements to develop a form language based on predetermined components.[12] His basic vocabulary exceeds the sets of seven elements given above and is not purely formal like them. But in principle, it carries out the same motivation of establishing a system of construction from a predefined set of units. In his work, Alexander also shows the hierarchical arrangement of the construction. By explaining how the physical elements of a village emerge, he implies that design is a hierarchical organism. These methods not only pretend to see the limits of physical space but also restrict design to what is already known. Abstract shapes and concepts then work as the convenient basic vocabulary in theoretical languages of form, rather than exploratory tools. These approaches take credit from a functionalist viewpoint. But in the context of basic design education, top-down reduction severs variation in experience.

D. Hands-on, eyes-on: the unmet goal of spatial and visual thinking in design education

Other late 19th century movements, such as the Arts and Crafts, had also preceded the 20th century avant-gardes in questioning geometric formalism. Understanding the role of material and techniques in design, allowed for more spatial qualities to come through the designs. It also brought a new discussion of creativity that involved senses in thought processes as discussed by the Pragmatists. Denman Ross put emphasis on hands-on education in reaction to the idealist model:

> Those old fashioned scholars, they don't know what it is to think in terms of physical effort and movement.[13]

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[12] Christopher Alexander, *Notes on the Synthesis of Form*, (Cambridge, MA: Harvard University Press, 1964), p 136-173. His work on building an urban and architectural pattern language follows in Christopher Alexander, *The Timeless Way of Building*. (New York: Oxford University Press, 1979) and in Christopher Alexander,et al., *A Pattern Language: Towns, Buildings, Construction*, (New York: Oxford University Press, 1977).

[13] Denman W. Ross, *Address on Design: Public Exercises at the Dedication of the Memorial Hall*, (Rhode Island School of Design: unpublished, Tuesday November 24, 1903), p 11.

This critical perspective dates back to earlier pedagogies. Early 19th century child educators Johann H. Pestalozzi (1746–1827) and Friedrich Froebel (1782–1852) emphasized concrete experiences to stimulate senses and for individual development. Lists of "art-occupations" such as leather, metal, wood carving, modeling with clay, wax or plaster, printing, and textiles are among Dow's curriculum notes for Columbia University.[14] They follow up on Froebel's occupations that actively involved the student with the gifts. The abstract two-dimensional analyses of Ross and Dow allowed mostly for the sagacity of the eye. Froebel and Dow's occupations engage both the hand and the eye. The gist of all these instances of hands-on learning is for the student to understand that creativity is a self-conscious process and not simply formal or material variance. This is much more important than asymmetries, or appreciating different visual cultures, even different materials as mentioned in other approaches above. Once individuality of each process is understood, variance is bound to happen.

There are no concrete examples of spatial exercises from Ross or Dow that encouraged experimentation with tactile and visual qualities at the same time. Ross and Dow's work isolates vision and makes possible its misconception as formal inquiry. Their emphasis was primarily on developing the visual sense as common to most educational theories in late 19th century. This common trend might have been because the drawback of intellectualism was imminent, and newly recognized ambiguities of visual perception offered an answer. Perhaps this was also because of the fact that the visual history of humanity provided a more comprehensive background to vision. The sense of touch had not yet been investigated much and only recently incorporated to psychology. In contrast, also in psychology, the sense of vision "was the best known of the five senses."[15] Nevertheless, sagacity applies in tactility as well, and integrating the hand in design processes together with the eye could have especially extended Ross's theory to spatial inquiries and his impact to architecture.

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[14] From Dow's personal files in Ipswich Historical Society Archives.

[15] See Edwin G. Boring, *A History of Experimental Psychology*, (New York: Appleton-Century-Crofts, Inc., 1950 [1929]). Boring discusses the sense of touch on p 110-113, and the primacy of vision on p 93.

E. Psychology as the science of aesthetics: the VKhUTEMAS

Contemporary to the Bauhaus, a design school in Moscow attempted a strong pursuit of integrating psychology to design education. In 1920, architect Nikolai Ladovsky led a group of Russian avant-gardes at the VKhUTEMAS (Higher Artistic-Technical Studios) to set up a basic design curriculum. The key idea behind the basic design course was to integrate sensory experience to design education and design thinking. But Ladovsky's larger agenda was to base the integration on psychological response of individuals to form and space. For this, he referred to contemporary experimental findings in perceptual psychology at the Harvard Psychological Laboratory. Architectural historian Anatole Senkevitch explains:

> The facts of perceptual psychology were employed not as determinants of a style, but as a principle for organizing the design process and cultivating in the designer a dynamic three-dimensional manner of conceiving architectural form and space.[16]

The motivation does not seem to be a formalist one. The projects that were produced in the course focused on mostly three-dimensional arrangements of abstract forms. The relevant literature does not describe the pedagogical methods applied, but the projects look similar to basic design assignments elsewhere. Moreover, comparable to the approaches of Froebel, Dow and the Bauhaus, the school was a conglomerate of various arts and crafts faculties.[17]

All the same, Ladovsky claimed in 1926 that his interest in perceptual experiments was focused on "the laws of perception." This, to me marks a divide with the pedagogical focus on creative thinking. Ladovsky and his colleagues eventually theorized about "connecting object and observer through a mode of perceptual communications linked to body sensations." (Senkevitch,

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[16] Anatole Senkevitch, Jr., "Aspects of Spatial Form and Perceptual Psychology in the Doctrine of the Rationalist Movement in Soviet Architecture in the 1920s," in *VIA: Architecture and Visual Perception*, v. 6, (1983), p 80.

[17] Catherine Cooke, *Russian Avant-garde Theories of Art, Architecture and the City*, (London: Academy Editions , 1995), p 71.

2001) Ladovsky later set up a laboratory at the VKhUTEMAS to accompany the basic course with experiments in visual perception. Detailed descriptions of what the laboratory equipment really showed and their scientific origins do not exist. The reprint of a 1928 laboratory progress report presents photographs and short descriptions of the five apparatuses that separately measured linear, planar, volumetric, angular and spatial magnitudes.[18] The implication of this kind of a set-up for a pedagogical program seems to be towards converging sensory experiences into a shared corpus rather than exploring the perceptual differences. Ladovsky's words support this:

> Such a laboratory could eliminate so many of those misunderstandings which arise in the evaluation of qualitative aspects of architectural work as a result of the absence of any agreed terminology even amongst specialists. ... There can be no elimination of passion that mutual incomprehension causes between teachers and pupils until the laboratory's work has been set up properly.[19]

Interestingly, the set up was inspired by the work at the experimental psychology laboratory at Harvard.[20] This is a direct connection to the pragmatist line of thought instigated by William James and others. James had established the laboratory, but at the time of its influence on the VKhUTEMAS, the German psychologist Hugo Münsterberg was heading it. Senkevitch stresses that in the first decade of the 20th century, this laboratory was unique in the world.[21] Münsterberg was initially invited from Germany to join the Harvard faculty by William James in 1890. His PhD dissertation titled *Activity of the Will* (1888) and his position against scientific idealism in German psychology had prompted the invitation. Later on, Münsterberg diverged from his action theory, or rather, opened up to other disciplines including law. As he became a public figure in America, James, among others, fell out of like with him. Senkevitch concedes in

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[18] Ibid. p 184-5.
[19] Nikolai Ladovsky, "The Psycho-Technical Laboratory of Architecture, 1926," in *Architectural Design: The Avant-Garde Russian Architecture in the Twenties*, ed. Andreas C. Papadakis, Catherine Cooke and Justin Ageros, (London: Academy Editions, 1991), 26.
[20] Ibid. p 26. Senkevitch provides the full citations in his Anatole Senkevitch, Jr., "Aspects of Spatial Form and Perceptual Psychology in the Doctrine of the Rationalist Movement in Soviet Architecture in the 1920s," in *VIA: Architecture and Visual Perception*, v. 6, (1983), p 113, f. 48.
[21] Anatole Senkevitch, Jr., "Aspects of Spatial Form and Perceptual Psychology in the Doctrine of the Rationalist Movement in Soviet Architecture in the 1920s," in *VIA: Architecture and Visual Perception*, v. 6, (1983), p 91.

correspondence that Münsterberg's interests were found to be too diffuse, but also suggests that "Germans at Harvard" were then given a hard time.

Münsterberg's *Psychology and Education* essay elucidates what he believes the role of psychology in teaching is:

> ...experimental or physiological psychology cannot be of the slightest use to the teacher... it is essential that the pupils be considered free subjects who themselves are capable of having ideals and acting in response to them ... You also destroy the values of our practical life if you force on them the categories of psychology...[22]

Ladovsky overlooks this warning and focuses on deterministic aspects of the application of psychology in education. He quotes another text by Münsterberg:

> Psychotechnics cannot create artists ... but it can give them a solid starting point from which they can achieve the aims to which they aspire by the most scientifically correct means and by the same token avoid certain dangers. Through developing psychotechnics across the broadest front, it can in future pose its demands to composers, whilst always affirming that genius will find by unconscious means those things which science works out with great difficulty.[23]

Despite the direct link to Harvard, in the end, the VKhUTEMAS diverges from the main line of thought stipulated in this thesis. The divergence is twofold. Firstly, Ladovsky's approach focuses on the relation between the object and the observer rather than the designer's thought activities. Secondly, the first hand attempt at science is presented as the only option to engage in the

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[22] Cited in Margaret Münsterberg, *Hugo Münsterberg: His life and Work*, (New York: D. Appleton and company, 1922), p 312.

[23] Cited in Nikolai Ladovsky, "The Psycho-Technical Laboratory of Architecture, 1926," in *Architectural Design: The Avant-Garde Russian Architecture in the Twenties*, ed. Andreas C. Papadakis, Catherine Cooke and Justin Ageros, (London: Academy Editions, 1991), 26. Senkevitch (1983) thinks this is from Münsterberg's later work *Grundzüge der Psychotechnik* (1914) translated to Russian in 1924-25. (114, f. 67)

differences in perception. Instead of a reasoning process that benefits from these differences, their rational approach emphasized the deterministic use of spatial perception in design.

Ladovsky and his colleagues theorized about perceptual experience in order to pursue its shared meaning in composition. Senkevitch makes connections to the theory of empathy based on the fact that they attempted to link the architectural object to the observer through bodily sensations.[24] Their approach is far from a design pedagogy that would allow the designer to be active through his or her sense perception. This is also very different from Ross and Dow's way of thinking. The intellectual tools that Ross and Dow provide with abstract forms and form relations allow for perceptual variations in the thought process. The mind-set at the VKhUTEMAS puts more value to communicating meaning through shared percepts than variation. Communication cannot be the prime agenda of creative thinking, because it relies on common concepts. Ladovsky's attempt to define these concepts beforehand places the designer in a more passive position than a thinker.

F. Visual education: the Bauhaus and the logical positivists

The impact of the psychological research at Harvard on the VKhUTEMAS historically connects to the Bauhaus.[25] The connection is not only through Kandinsky's transfer from Moscow to the Bauhaus in 1923. The Bauhaus lived an influence of positivist thought shortly after the time of the rationalist and scientific approaches at the VKhUTEMAS. This was partially in association with Gestalt psychology. The Bauhaus faculty was in touch with Gestalt psychologists Wolfgang Köhler and Rudolf Arnheim in the late 1920s.That epistemological connection continued even after the Bauhaus resettled in America.

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[24] Anatole Senkevitch, Jr., "Aspects of Spatial Form and Perceptual Psychology in the Doctrine of the Rationalist Movement in Soviet Architecture in the 1920s," in *VLA: Architecture and Visual Perception*, v. 6, (1983), p 79.

[25] Jon Lang, "Design Theory from and Environment and Behavior Perspective," in *Advances in Environment, Behavior, and Design*, v. 3, (1991), p 71-2.

The influence was also sourced elsewhere. A mutual interest between the Bauhaus and a group of scientists in Vienna formed as early as 1926.[26] Known as the Vienna Circle, the scientists, who included philosopher Rudolf Carnap and sociologist Otto Neurath, were propagating a scientific conception of the world. Their manifesto set out for a unified structure in science through applying modern logical analysis to experience.

> Since the meaning of every statement of science must be statable by reduction to a statement about the given, likewise the meaning of any concept, whatever branch of science it may belong to, must be statable by step-wise reduction to other concepts, down to the concepts of the lowest level which refer directly to the given.[27]

The *concepts of the lowest level* were experiences. But they were reduced in form to the basic elements in a language that would unite all knowledge in one common definition.

The method, logical positivism (or modern empiricism), starts out with reliance on only what is directly experienced. But this reliance is rather on what is defined as experience. Empirical material is classified as propositions that are to be building blocks of the larger structure of knowledge. The classification eliminates uncertainties as all experience is reduced to concepts from the start. As William James writes, "the real units of our immediately-felt life are unlike the units that intellectualist logic holds to and makes its calculations with."[28] Thought is an extension of perception, and does not have discrete parts. This understanding is important from a design point of view because design is a reasoning process that is not solely based on preconceived knowledge. Design creativity should not conform to an intellectual structure that severs the variation in experience. Logical positivists, for their own political reasons, neglected the changes in social, cultural, and physical contexts. The unified system of knowledge that they proposed eliminated these not to affect experience and excluded uncertainties.

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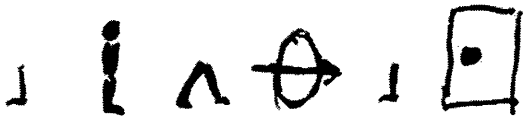
[26] Otto Neurath, "Das neue Bauhaus in Dessau," in *Aufbau*, n. 11-12, v. 1, (November-December 1926), p 209-211.
[27] Otto Neurath, "Der Wiener Kreis, [1929]" in Otto Neurath, *Empiricism and Sociology,* eds. Marie Neurath and Robert S. Cohen, (Boston: D. Reidel Publishing Company, 1973), p 309.
[28] Ibid. p 287.

Neurath's attempt at visual education discloses his understanding of the potentials of perception. Otto Neurath had recognized the non-linear perceptual qualities of visual representations. He seemed to appreciate the changing part-whole relations in visual perception as opposed to the linearity in verbal languages. He showed that overlapping parts of a shape are simultaneously conceived unlike in a linear reading of a series of the parts that are separately laid out.[29]

> If one shows realistic pictures instead of using impressive sentences or expressions, one uses a language which is a rather vague one, but vagueness in itself is no objection as long as ambiguity is avoided.
>
> Visual statements and verbal statements are different and not translatable element by element. An example: a boy walks through a door

and not



[a boy walks through a door]

Figure 49. Neurath shows that overlapping parts of a shape are simultaneously conceived unlike in a linear reading of a series of the parts that are separately laid out.

Neurath was interested in the efficiency of visual perception. This helped his larger motivation for educating the masses with a common language. ISOTYPE, the international picture language he proposed, was built from simple visual elements that combine to acquire more complex figures. For example, the symbol for coal imprinted on the symbol of a worker was to represent a coal-worker.

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[29] Otto Neurath, "Visual Education: Humanisation Versus Popularisation," in *Encyclopedia and Utopia: The Life and Work of Otto Neurath (1882-1945)*, eds. Elisabeth Nemeth and Friedrich Stadler, (Dordrecht: Kluwer Academic Publications, 1996), p 330.

Figure 50. Visual descriptors for "worker" and "coal" together build the descriptor for "coal-worker" in Neurath's ISOTYPE. See Enrico Chapel, "Otto Neurath and the CIAM – *The International Pictorial Language* as a Notational System for Town Planning" in *Encyclopedia and Utopia: The Life and Work of Otto Neurath (1882-1945)*, eds. Elisabeth Nemeth and Friedrich Stadler, (Dordrecht: Kluwer Academic Publications, 1996), p 181.

In the end, Neurath's visual method is a symbolic language that is much more depictive than verbal, but no more "vague." But, Neurath was after clarity anyway.

The attempt at a general structure for unified science, extended to a unity of life in Rudolf Carnap's "logical construction of the world."[30] This included art, which was otherwise a metaphysical statement of mood and spirit.[31] The logical positivists were happy to be associated with the Bauhaus as this link supported their position. Historian of science Peter Galison writes that the formalist motivations of the Vienna Circle and the Bauhaus were parallel.[32] Walter Gropius had even invited Carnap to lecture at the Bauhaus in 1929. Galison notes that at the visit, Carnap was particularly impressed by the basic design course, especially Kandinsky's work.[33]

By the time Carnap visited the Bauhaus, the basic design course had changed in philosophy. Itten had left in 1923, around the time that Kandinsky arrived from Moscow. The Bauhaus faculty was

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[30] Rudolf Carnap, *The Logical Structure of the World*, trans. Rolf A. George, (University of California Press, 1969). Original German edition, *Der Logische Aufbau der Welt*, 1928.
[31] Otto Neurath, "Der Wiener Kreis, [1929]" in Otto Neurath, *Empiricism and Sociology*, eds. Marie Neurath and Robert S. Cohen, (Boston: D. Reidel Publishing Company, 1973), p 307.
[32] Peter Galison, "Aufbau/Bauhaus: Logical Positivism and Architectural Modernism," in *Critical Inquiry*, n. 16, (Summer 1990).
[33] Ibid. p 737-38.

already thinking similar to the logical positivists. Kandinsky's form theory was exemplary of this similarity. He had reduced the plane to three fundamental elements square, triangle, and circle.[34]

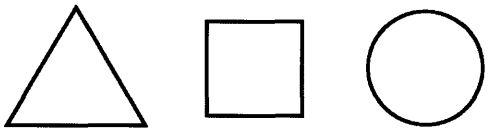

Figure 51. Kandinsky had reduced the plane to three primary forms: triangle, square and circle. Wassily Kandinsky, *Point and Line to Plane*, (New York: Dover Publications Inc., 1979 [1926]), p 74.

These geometric elements were rather like logical propositions as building blocks for all other forms. Kandinsky's reductionist approach was earlier referenced in relation to Ross and Dow's frameworks. Ross and Dow also establish basic rules to build up their framework from. Nonetheless, Ross's utilization of triangles and Dow's application of perpendicularity is part of thought processes that are self-conscious of perceptual variation. Neither of them establishes any forms as universally basic elements in any case. Kandinsky's approach rather ties back to the primitive elements identified by Best Maugard. Unity of life required getting rid of uncertainty, and in the parallel case of the Bauhaus, this resulted in visual idealism.

Galison explains that Carnap immediately saw a similarity in Kandinsky's elements with axiomatized geometry, "a model for the construction process he had in mind for all of philosophy."[35] The geometrical building up from the elementary suits the logical positivist agenda, as much as Neurath's visual language did. Galison quotes Bertrand Russell to illustrate the constructional program of Carnap:

> Unlike other conceptual systems, a constructional system undertakes more than the division of concepts into various kinds... it attempts a step-by-step derivation or 'construction' of all concepts from certain fundamental concepts, so that a genealogy of concepts results in which each one has its definite place.[36]

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[34] Wassily Kandinsky, "Bauhaus, 1919-1923 [1923]," in *Complete Writings on Art*, (New York: Da Capo Press, 1994), p 500.
[35] Peter Galison, "Aufbau/Bauhaus: Logical Positivism and Architectural Modernism," in *Critical Inquiry*, n. 16, (Summer 1990), p 737-38.
[36] Ibid. p 733

This description summarizes the construction in two steps, namely dividing and hierarchically arranging discrete concepts. Nevertheless, the step-by-step construction in design does not work in division or hierarchies. Rather, as in Ross's analyses, it follows unique paths. The basic element, that is a visual rule, varies according to formal transformations or is entirely replaced with other rules. There are no discrete parts to the process that are defined beforehand as universal elements.

This discussion also ties to today, in terms of the involvement at the Bauhaus with the technologies of the day. Starting in late 1920s, the pedagogical agenda of training students as individual thinkers had changed into a different educational plan. Especially under the directorship of Hannes Meyer, the Bauhaus operated more like a research laboratory where solutions were sought for an already defined problem: architecture and design was to integrate the economical and technical efficiency of the production world. The application of technological resources in architecture is very similar to the interaction with technologies at architecture schools today. One difference is that Meyer had openly dismissed aesthetics completely replacing it with functionalism:

> Building is not an aesthetic process. ... building is only organization: social, technical, economic, mental organization.[37]

Form production is an important part of the interaction that goes on today. But between the formalisms of the techniques and expressionistic mannerisms, aesthetics is not sufficiently pursued as an ongoing discussion. When the aesthetic discussion dies, the utility of senses and uncertainties are lost along with it. The point Meyer's Bauhaus missed, and a lot of designers miss today is that aesthetics is imperative not only to beautify the world but more to serve in the crucial role in criticism. The later Bauhaus misconstrued the idea of involving the visual sense as an active part in creative thinking. In parallel with the logical positivists, their vision was subsumed by intellectualism and focused on logical thinking. The pedagogy that aims at unique and self-conscious individuals was abandoned. There is a similar trouble today.

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[37] Cited in Frank Whitford, *Bauhaus*, (London: Thames & Hudson, 1984), p 180.

Gropius, milder in his functionalist approach than Meyer, was still hopeful that ambiguities would persist throughout the interaction with new methods:

> Only by constant contact with advanced technology, with the diversity of new materials and new methods of construction, is the creative individual able to bring objects into a vital relationship with the past, and to develop from that a new attitude to design...

This is true. But it is not, if this new attitude is

> namely: Determined acceptance of the living environment of machines and vehicles ... Exclusive use of primary forms and colors comprehensible to everyone ... [38]

According to Gropius, there is only one way to interact with advancing technology, to accept its determination. This is not very different than Meyer's position. Gropius speaks for many in architecture today that absorb emerging technologies as fashionable research. The diversity in materials and new methods is grand. But why submit to them? On the other hand, I would like to note that this thesis does not defend the expression of primal feelings. Perceptions and ideas are describable. My position is that design does not need predefined symbolism.

When European intellectuals migrated to America before World War II, the Bauhaus resettled at the University of Chicago. At that time, the Bauhaus faculty associated with the agenda of the American philosopher Charles Morris. They also got involved with Gestalt psychology as interpreted by Rudolf Arnheim and Gyorgy Kepes who, like the logical positivists, institute gestalt wholes as visual propositions. In Morris's perspective, the general program of the New Bauhaus joined the American intellectual tradition following Dewey's Art as Experience. But Galison explains:

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[38] Walter Gropius, "Dessau Bauhaus – principles of Bauhaus production [March 1926]", in Frank Whitford, *Bauhaus*, (London: Thames & Hudson, 1984), p 206.

> [W]hatever its similarity with American pragmatism, Morris continued the Vienna Circle's preoccupation with the reduction of all utterances to protocol sentences.[39]

Charles Morris wrote:

> [W]e need desperately a simplified and purified language in which to talk about art ... in the same simple and direct way in which we talk about the world in scientific terms. For the purposes of intellectual understanding art must be talked about in the language of scientific philosophy and not in the language of art.[40]

It seems that not only does this perspective reduce art to a logical language, but it also takes away its visual component. It restricts thought to a closed system that is indifferent to perceptual variation. Even "the language of art," and I assume in this quote, this refers to the visual and aesthetic quality of art, can be discarded. Morris supposes that the creative thinking process matches "scientific philosophy" and all the perceptual aspects involved are add-ons. But it is possible to talk about design "intellectually," as reasoning, without confining it to a linguistic and logical structure. Ross and Dow's pragmatist push was an attempt to do so.

The other attempts described above show that the pragmatist thread Ross and Dow possibly started does not find a continuation in basic design education. The desired flexibility diminishes as design is more and more viewed with the positivist glasses of the modernist tradition. The bold character of the avant-garde in terms of being seemingly progressive, looking towards the future, and having confidence in what science and technology present to us, did not exist in Ross and Dow. Their pedagogies failed in rigor and in creating followers. Their importance, however, is because they grew out of the same context the philosophical ideas (of pragmatism) emerged from. They precede and differ from the avant-garde modernist thread.

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[39] Peter Galison, "Aufbau/Bauhaus: Logical Positivism and Architectural Modernism," in *Critical Inquiry*, n. 16, (Summer 1990), p 748.
[40] Cited in Ibid. p 748.

III. Pragmatist Plurality in architecture today?

A. Pragmatism and architecture theory

Relation of architecture to pragmatist philosophy was recently reviewed in 2000 at a series of workshops organized at Columbia University. The meeting tried to address the divide between theory and practice in architecture by talking about a "theory of practice."[41] Triggered by the comeback of pragmatism to philosophy since the early 1980s, it was titled *Things in the Making: Contemporary Architecture and the Pragmatist Imagination.* It picked up from conversations between Modern architecture and pragmatism with reference to Lewis Mumford, with his democratic functionalism, and the logical positivists in relation to the Bauhaus.[42] The role of perception and subjective reasoning in creative acts was not much of a discussion topic. Ideas of self-development, utility of senses in reasoning have already died away in histories written by the 20th century Modern. In the current cultural context, it seems that "things in the making" refers to the production of technology rather than a reflective design process where perceptual, material and social contexts are some of its other dynamic components. This standpoint recalls the functionalist and logical positivist approaches and the voluntary dependency on scientific methodology in architecture in early 20th century.

Pragmatist architecture today is stigmatized as following technological developments, utilizing the tools provided, all the while being driven by economic determinants. Pragmatism then turns into pragmatics (practicality). Full utility of senses is left to the phenomenologist approach, and the notion of flexibility in thought is forgotten. Presenting pragmatism – old or new – as ideologically an American trait, and presenting it as dependence on economy, is a practical (not pragmatist) view. The practicality of employing technology in architectural design does things that James's pragmatism a century ago (and Richard Rorty and Donald Davidson's neo-pragmatism today) never sought: abstracting experience in modular and finite bits. Pragmatism is

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[41] Joan Ockman, "Pragmatism/Architecture: The Idea of the Workshop Project," in *The Pragmatist Imagination: Thinking About Things in the Making,* ed. Joan Ockman, (New York: Princeton Architectural Press, 2000), p 17.
[42] Casey Nelson Blake, "Afterword: What's Pragmatism Got to Do With it?" in ibid. p 267; Ockman, in ibid. p 18.

not functionalism, efficiency, or problem solving. Its reliance on sensory experience and skepticism of concepts set up problems with unique resolutions. On the contrary, overvaluing fundamentals of technological thought neglects artists and designers who operate by experience and their personal abstractions. The point about the visual sense is missed, as it is restricted to logical (and syntactic) thinking.

Shortcomings of this approach were earlier shown in methods that created visual languages. For example, common concepts that looked simple enough were deemed basic and fixed as units. Carried out for the purposes of efficiency and accuracy, this was despite the fact that the shapes constituting these units are visual and can be perceived and defined differently in changing contexts. Neurath's visual alphabet also assumed common concepts. The most important problem then seems to be that the only way to build up new concepts is by combining units. People can share knowledge of a symbol. Nonetheless, for the sake of creative thinking, shapes cannot be deemed symbolic or concepts. If they are represented as such, their definitions and parts are preset. And there seems to be little possibility for any visual exploration for new forms and form relations.

Today, fashionable architects explore and exploit various media to produce Form and sometimes the object. New 'design' techniques, such as parametric designs and genetic algorithms, are constantly introduced to architecture through interdisciplinary research. These techniques and algorithm writing methodologies reduce design process to engineering. Design may never be "purified," or freed of the production economies, but this overly practical approach diminishes aesthetic and social discourse in architecture, or at least changes it in limiting ways. Hannes Meyer had already set precedence to this extreme in the Bauhaus by capturing the dynamics of design in strictly functional algorithms. In the absence of a critical discourse for this techno-activity, architecture is being trimmed down simply to production. Look-alike architectures that come out of these practices imply either a convergence in rules, or (stylistic) determinism based on tools. The spectrum of design rules can be expanded, only if we realize it is not hard to let go of optimization, and discard permanent conceptual structures. Giving this awareness should be a basic task of design education. It is possible if the students are encouraged to understand how to develop and use intellectual tools in their design processes.

From a pedagogical point of view especially, production tools do not equate to design tools. As mentioned before, in the work of Dow, materials are integral parts of the design process. His emphasis is on design thinking and not merely production. So materials and tools are rediscovered and recreated all the time. Other basic design practices such as at Itten's basic design course at the early Bauhaus, carry out similar intentions. In the integration of contemporary design technologies into education of architecture, schools have tried different ways. Building technologies are usually integrated in the studio and in part in materials courses (sometimes integrated with structures courses) in advanced years of instruction. On the other hand, representation and modeling techniques are taught as early as the first year through graphic communication courses. When computer got introduced into the architectural education, it came as an attachment to later years, and was presented as an alternative tool for graphic communication. It was not grasped as an integral part of design thinking. Later, in the hands of advanced architecture students, its representational use has shifted to prototyping. This way production methodology overtakes design. Accordingly, the computer is still not an integral part of design thinking. It is unfortunate that the designer does not develop his or her own tools. Nonetheless it is possible at least at the conceptual level. The primary requirement is that the designer is self-conscious in a thought process that is always flexible.

While the new technophile culture in architectural design adapts computational technologies and methodologies, design thinking itself is evolving. As designers gear the process towards 'making' with what technology offers, they slowly shift their own gears to thinking in technologists' terms. To partially address this issue, there has been much empirical research on how CAD/CAM, despite its generous classifications, does not fit the flexibilities of the hand and eye. Ted Krueger and Scott Johnson's attempts to bring critical viewpoints to the matter are among the more recent.[43] In return, there are numerous efforts in creating similar design tools with enhanced flexibility. Works on sketching and designing in computer environments are exemplary.[44]

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[43] Ted Krueger, "Eliminate the Interface," in *Journal of Architectural Education*, n. 2, v. 56., (November 2002), p 14-17; Scott Johnson, "The Slow and Incremental 'Revolution'," in *Journal of Architectural Education*, n. 2, v. 56., (November 2002), p 49-54.

[44] Mark D. Gross, "Recognizing and Interpreting Diagrams in Design" in *Advanced Visual Interfaces (AVI '94)*, eds. T. Catarci. M. Costabile, S. Levialdi, G. Santucci, (ACM Press, 1994); Ellen Yi-Luen Do, Mark D Gross, in "Drawing as a Means to Design Reasoning" in *Artificial Intelligence in Design (AID) '96, Workshop on Visual Representation, Reasoning and Interaction in Design*, Palo Alto, CA, 1996); "Ambiguous Intentions: A

Following Donald Schön's path on the "reflective practice," Nigel Cross calls for a discipline of design that is separate from the "positivist, technical-rationality basis of The Sciences of the Artificial."[45] Nevertheless, despite that it is already vast, the field for "designerly ways of knowing" does not provide a means, independent of the rationalist basis, to talk about the reflective practice.

As Nigel Cross assesses, designers are not only trying out new tools for old methodologies but also new methodologies. Additional to the efforts mentioned above, cellular automata, genetic algorithms and parametric modeling are among the more recent trends. Surely, there is value in expanding the designer's sensory space to varying range of materials, tools and approaches. However, shifting gears to thinking in the technologists' terms affects the design methodology more than just by inspiration. The shift of gears is apparent as early as in Charles and Ray Eames's efforts to *programme* architecture according to the then-newly-emerging Cybernetics theory[46], and more recently in the efforts to designate *Pattern Language*, and *Space Syntax* for healthy urban growth.[47]

Technologists' terms here simply refer to a pre-structured representation of the world. Similar to the approach of the Vienna Circle, and earlier than that, of the Enlightenment project, its epitome is language. Philosopher Susanne Langer describes language as follows:

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paper-like interface for creative design" in *Proceedings of 9th Annual Symposium for User Interface Software and Technology (UIST 1996)*, (1996) p 183-192.

[45] Nigel Cross, "Designerly Ways of Knowing: Design discipline versus design science," in *Design Studies*, n. 3, v. 17, (Summer 2001), 49-55. For the references Cross uses, see Donald Schön, *The Reflective Practitioner*, (Aldershot, England: Arena, 1991) and Herbert A. Simon, *The Sciences of the Artificial*, Third edition, (Cambridge, MA: The MIT Press, 1996 [1968]).

[46] Constance Chunlan Lai, *Charles Eames and Communication: from Education to Computers*, S.M. Thesis, (Massachusetts Institute of Technology, Department of Architecture, 1999)

[47] General references are Christopher Alexander, *A Pattern Language: Towns, Buildings, Construction*, (New York: Oxford University Press, 1977); Bill Hillier, et. al., "Space Syntax," in *Environment and Planning B: Planning and Design* v. 3 (1976) 147-185; Bill Hillier, *Space is the Machine: A Configurational Theory of Architecture*, (Cambridge; New York: Cambridge University Press, 1996).

> [It is] essentially discursive; it has permanent units of meaning which are combinable into larger units; it has fixed equivalences that make definition and translation possible...[48]

This description matches the visual propositions that Neurath saw fit to represent the world in a unified way. That it is linear and symbolic makes it flexible only within the limits of what is already known. To talk about a language or languages of architecture gives architecture a similar quality. A symbolic utility emerges. For example, a certain type of forms reiterates when motives in the new context are similar to those previously assigned to that type. Languages of architecture are basically glossaries of forms, sometimes words, to be utilized in creating more and more 'sentences' in the same language. Some examples are John Summerson's widely known book, *The Classical Language of Architecture,* alongside with more contemporary languages of architecture, ranging from analytical ones such as Bruno Zevi's *Modern Language of Architecture,* to computational ones such as *Pattern Language,* and *the Palladio and Alvaro Siza grammars.* These make architectural form accessible to many, in a regular format and as 'established' norms. But they are not necessarily informative of the creative process.

We see an analogous understanding in much of design computing. The languages of architectural form mentioned in the above paragraph are already examples of such design computing. In his well-known book *The Sciences of the Artificial,* Herbert A. Simon takes on the task of dealing with dynamics. He attempts to deal with social, economic and artistic schemes, where goals are changing upon feedback from the system.[49] Simon's claim is "there is no limit on diversity in the world." Then again, his socially contextualized dynamic thinking is limited. Simon wants to "keep open the options for the future or perhaps even to broaden them a bit by creating new variety and new niches." But he proposes to create unbounded variety "by combinatorics on a few primitive elements." His definitions with niches and primitives are set after all, in the hierarchical structures he creates. Computational research in Artificial Intelligence, Neural Networks and Genetic Algorithms is very much operating on predefined, hierarchical,

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[48] Susanne Langer, *Philosophy in a New Key: A Study in the Symbolism of Reason, Rite and Art,* (Cambridge, MA: Harvard University Press, 1942), p 96.
[49] Herbert A. Simon, *The Sciences of the Artificial,* Third edition, (Cambridge, MA: The MIT Press, 1996 [1968]), p 166-7, 216.

and temporally linear thought structures. These foresee how the changes will be integrated to the system and establish hierarchical complexities at the very start. Hierarchical categorizations will not be sufficient for the work of designers. To reiterate what has been claimed before in this thesis, definitions in design and thus rules in design are plural and changing.

The structural aspects of language, as understood and applied today in computational science fall short in allowing for creative thinking that utilizes the senses just as much as learnt abstractions. Creative thinking demands a more ambiguous space, where definitions are conditional, and when necessary, the structuring is possible. But there is not one universal structure that categorically organizes all. Post-structuralist literature in architecture provided the critique but did not achieve much. It was rather consumed up as a style or a trend. Instead, today, we see that structural thinking implied in technical tools overwhelms architectural practice and the teaching of it. For example, the frame of thought that brings about computer tools is rarely discussed. More importantly, the propositions that these tools assume about designer's thinking are rarely questioned. Awareness that inquires about varying material qualities of paper in a basic design assignment is missing from the utilization of these seemingly more complex tools. They may be taken for granted because they are a scientific, thus an unquestionable enterprise. Along these lines, varied research in design thinking and design process, assumes that logic explains the process well enough. On the other hand, design studios are converging to practices (of phenomenology) that marginalize design as unexplainable creativity. Between these two extreme positions, there is little research that talks about design thinking as a legitimate thought process in itself and with all its ambiguities too.

Sagacity is not practiced unless visual (or other non-discursive) forms are treated differently than symbols that are one dimensional and binary with fixed equivalences. The limitations of predetermined structure need to be emphasized in design. Dow and Ross along with other pragmatists have reflected on this in another time and context. The systems of abstraction they demonstrate are conceptual frameworks that are temporary. They are simply tools to constrain the process at that time. But since they are tools created by the designer, they are flexible in the process. A similar awareness needs to be established today, as early as in the basic design courses, so that questioning the tools that are used in design thinking is always an imperative part of it.

This chapter so far noted failed attempts in approaching design process as self-conscious reasoning. In these attempts, the limitation was that representations of the design process fall back to logical hierarchical thought structures, because of the lack of a better means to represent the reasoning process. The appropriate description needs to allow for flexibility of experience but still is able to register decisions that take the process forward. Instead the representations used in these failed attempts assume fixed units for the process beforehand and neglect that this is limiting the dynamic thought process.

B. Visual rules that take sagacity into account

Reasoning with sagacity can be handled through the use of visual rules as George Stiny presents in his computational point of view. Stiny values the design process as a calculation that allows for ambiguities in sense perception. Conventionally, a rule is A → B (given A, you get B). A basic formulation in modern linguistics and the related computational fields, a rule illustrates a step of the thought process. Again conventionally, the notion of a rule represents narrowly the communicative role and symbolic aspect of language. In structuralist references, this symbolic aspect finds counterpart in deSaussure's *signifier-signified* relationships, where every sign has a correspondent meaning: A means B. Despite its semantic significance, a symbol in language is a static representation. It is so because it conveys one (or more) exact meaning(s) across times and places. It is an a priori definition for communicative purposes.

On this premise, Gestalt psychology and a whole range of cognitive research focus on people's convergence in perception. In a contrasting design point of view, and as much of the previous discussion of the thesis elucidates, creativity is based on the fact that people see differently as much as they may see similarly. A design computation cannot afford to have rules that will inhibit the visual thinking process. With this concern in mind, Stiny's enterprise broadens the implications of the left side of a rule. A is not simply a given; its definition rather depends on what the conditions are. A can be seen anywhere anytime with momentary conditioning rather than a universal one. It could be a part of a whole, and one of its less obvious parts. For example, I am able to pick out a particular shape A in the diagonals of this analysis by Ross. In the figure below, five A's of the same proportions are shown.

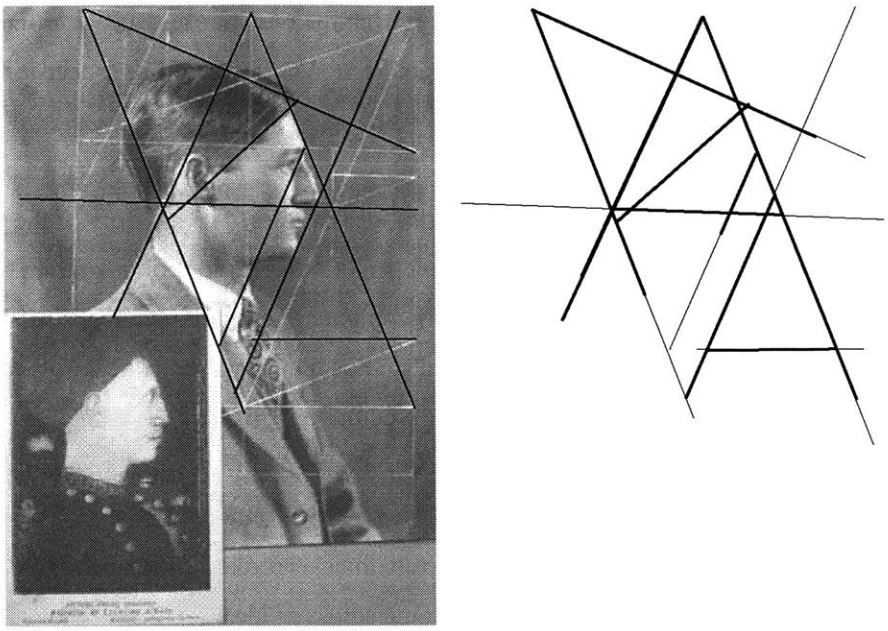

Figure 52. My eye can pick out five different A's in Ross's triangulation.

My eye picks out the A's in other shapes. A is a shape and not a symbol. The diagonals of the analysis constitute another shape. I am able to perceive that as a whole as well as its parts (diagonals) as defined by Ross. I am also able to embed the shape A in it, in any scale and orientation. If my rule is to identify A's (A → A), then I see the likes of it embedded in the picture, despite what the entire picture is and how it was constructed.

The rule A → … is actually "when and if you see A or a like of it, you replace it with …" In Stiny's terms, the rule shape A → shape B applied to a shape C is (C– t(A)) + t(B). This formulation is a more comprehensive description that includes transformations of a shape.[50]

Visual rules as such offer a means to represent the design process without falling into the determinism of logical structures. Visual rules represent the thought steps in a process and at the same time are not discrete parts of it because they are visual and open to interpretation in all ways desired. Any ambiguity is appreciated and lived in the left side of a rule. Response comes only after one sees and makes one's own definitions each time. It is also important to underline

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[50] George Stiny, "How to calculate with shapes," in *Formal Engineering Design Synthesis,* eds. Erik Antonsson and Jonathan Cagan, New York: Cambridge University Press, 2001), p 32.

that in design, a rule emerges or gets recalled based on what the designer sees at that instant. Perception can sometimes be conditioned by the desired action as it is by other aspects of the context, but the response subsists on perception.

Basic design education today does not fully explore this idea of rules. The majority of the work that applies the idea to design is in the form of analytic studies that explore finite grammars.[51] Studios that take on the task of applying the idea only compare to basic design in abstraction rather than by concept. For example, there have been studios that teach the concept of rules through given grammars. Pedagogically, it is arguable whether design exercises with a given grammar of an architect are sufficient to communicate to the student that rules are just rules.

In other applications of the theory, when students create their own rules, students often do not realize that rules are tools at their command. Rules come across as idealizations. Students' inadequate attempts with their personal shape rules are a function of how the studio and the problems are presented. In an architectural context, building-from-blocks exercises fall short in achieving what a basic design exercise of the same sort would. The result is that students design additively from predetermined shapes. They arrange the blocks recursively in preset spatial relationships. From one point of view, given the same spatial relation and the same set of shapes, students have a chance to explore the vastness of the design space, just by varying the application of the rule in transformations. From an alternate point of view, they are missing out on how they can actively manipulate the design space. Because students do not understand why they are working with a particular spatial relationship in the first place, they cannot see how they might change it. The pedagogy involved must afford them deeper inquiry into how spatial relations get established.

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[51] George Stiny, "Ice-ray: a note on Chinese lattice designs," *Environment and Planning B: Planning and Design,* v. 4, (1977), p 89-98; "Kindergarten grammars: designing with Froebel's building gifts" in *Environment and Planning B: Planning and Design,* v. 7, (1980), p 409-462; George Stiny, William J. Mitchell, "The Palladian Grammar" in *Environment and Planning B: Planning and Design,* v. 5, (1978), p 5-18; Terry W. Knight, "The generation of Hepplewhite-style chair back designs" in *Environment and Planning B: Planning and Design* v. 7 (1980) 227-238; "The Forty-one Steps: the languages of Japanese tea-room designs" in *Environment and Planning B: Planning and Design,* v. 8, (1981), p 97-114; "Transformations of the meander motif on Greek geometric pottery" in *Design Computing,* v. 1, (1986), p 29-67; "Transformations of the De Stijl art: the paintings of Georges Vantangerloo and Fritz Glarner" in *Environment and Planning B: Planning and Design,* v. 16, (1989), p 51-98; "Mughal gardens revisited" in *Environment and Planning B: Planning and Design,* v. 17, (1990), p 73-84.

Chapter 5

Conclusions: Why basic design education is still important today

It is often thought that students who apply to design schools should have certain skills and abilities to draw, sketch freehand etc. But, motivation and a sagacious eye are really all that is needed. As discussed before, sagacity is not merely a cognitive trait, but also the understanding that definitions and concepts are temporary. Biases in methods, techniques and materials will be altered, so they are unnecessary to begin with. Basic design education, which is practiced today as an introductory and formative course in architectural education, is based on this idea. The main motivation behind it is to start the student off in creative thinking. The student is to understand that creative thinking is a personal reasoning process that feeds off of uncertainties in interacting with the materials. This is more important to convey, at the beginning of a design education, than knowledge of sophisticated design tools, media, and aesthetics.

Especially in an age of emerging technologies, the design process needs emphasis as a course of action that shows variation in concepts. Primarily to endorse a creative stance in the use of these new tools, this emphasis also addresses other extremes. Specifically, the more romantic view of design excludes any kind of reasoning from the creative process. Assuming that reasoning is deterministic, this view utilizes technological tools only in representation of form. Design is reasoning, but at the same time it makes use of visual and tactile resources to deal with preconceived limitations. Interaction with intellectual and technical tools is an active part of design. Ross and Dow's work, in contrast to the rigid approaches of the early 20th century, exemplify this.

In Chapter 3, I have described creativity as a reasoning process where definitions can vary. To be able to talk about "designerly ways of thinking," designers do not have to compromise either the reasoning or the uncertainties of experience that are crucial to their process. Reasoning is not as rigid as described by those who do not see experience as a dynamic component. Furthermore, as in the common assumption about art, variation in experience cannot simply be attributed to the mind's mysterious ways. Variation is in experiencing the external. The creative process is not discrete and does not have a set vocabulary. Rather, it is continuous. In order to maintain it as

such, beginning design students should understand the creative process as a thought process that explores uncertainties and redefines constraints.

The basic design curricula in many schools today try to encourage students to see creativity from the pragmatist viewpoint reiterated above. Two features of the basic design studio are key in realizing these explorations, as similarly seen in the methods of Ross and Dow. Firstly, the content matter is abstract forms and abstract problems. The simplicity of these forms helps to focus on form relations, but also serves another purpose. Unfamiliarity of abstract forms brings variance in perception. This triggers thinking, and taking action to understand, make up or develop definitions. As a result, the student is expected to make new sense out of form relations. Secondly, the exercises in the basic design studio follow up on the idea of variance. The student is not instructed but instead encouraged to develop unique ways to deal with the material and problems at hand. Exercises demonstrate that definitions change as the students interact constantly with the material in the process. There are no predetermined value systems, but only contextual handling of materials and problems. Visual and tactile involvement is encouraged, rather than verbal, to surpass habitual thinking.

The basic design course setup provides grounds for experimentation, and exploration of possibilities. How to get to "design" through this open experimentation is left to the student without any predefined formula. Yet, the more difficult task is to convey to the student that this process is reasoning. The failed attempts discussed in Chapter 4 go to the extreme of defining timeless basic elements and aesthetic values. But reasoning does not depend on a finite, universal vocabulary. Rather, it develops with definitions that continuously change. This idea, illustrated in Ross and Dow's pedagogies in my earlier discussions, already exists in the basic design studio set up. Nevertheless, it is not sufficiently exposed for the students to experience easily.

This chapter provides a summary of my concluding discussions. By drawing attention to the essential features of basic design, I recapitulate how basic design supports creativity. At the same time, I show that its conventional use is insufficient in conveying the ideas. I propose ways to develop awareness in students regarding their creative processes. To be carried out in future work, one of my proposals is to encourage personal narrations in order to display the process more openly. George Stiny provides the formal device to represent sagacious thought processes

visually. Yet in the studio, there is no direct way to convey to the student that a process can be represented through rules. This is mainly because the student does not have a developed sense of rules in a flexible process. Therefore prior to any formal approach, the focus should be that the students grasp the changing aspects of a design process in order to understand the concept of dynamic rules. Then, my other proposal is that students are deliberately stopped at certain stages in the design process and asked to (non-verbally) record what they are seeing and doing. Instead of contemplating on the past processes, this exercise would encourage perceptual variance of the object in the making. The formalism may not be commonplace in the basic design studio in the near future. But the dynamic use of rules certainly is the core of basic design education and should be perceptible throughout. This would also be an early integration of a computational perspective to design education.

I. A Summary: Creative thinking is reasoning with uncertainties

Basic design, as a pedagogical term, entails much *less* ambitious concepts than the fundamentals of composition. "Basics" refer to isolating the design problem in the relations between material and other external qualities. Abstract forms that are the signature of basic design education are tools to isolate and focus on form relations. Form is not the objective of a basic design problem. Rather the aim is to consciously produce it. This is the compelling aspect of Dow's approach. Dow draws attention to a simple formal relation and its varieties instead of trying to teach the complexities of a landscape.

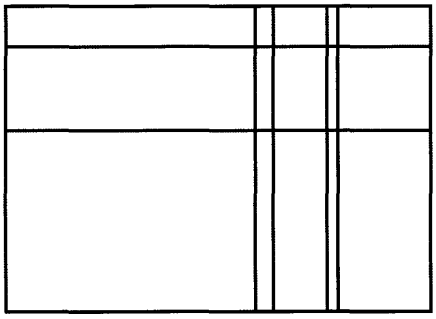

Figure 53. Dow's abstraction demonstrates some of the compositional relations in the landscape drawing. This puts emphasis on form relations in learning design, rather than specific and idealized forms. See Arthur Wesley Dow, *Composition: A Series of Exercises in*

Art Structure for the Use of Students and Teachers, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]) p 83.

These underlying relations that Dow chooses to establish support the motivation behind basic design. The main pedagogical purpose in design education is showing that the designer establishes the relations. Basic design deals with simpler forms to give the fundamental understanding of how this is done. Nonetheless, these simpler forms should not be interpreted as fundamental relations or forms that universally apply. They are arbitrary, meaning they are contextual. For example, however common they are, the triangle, square and circle, which Kandinsky introduces as primary forms, are arbitrary. Dow and Ross refrain from defining a basic formal vocabulary. Firstly, they focus on form relations rather than forms. And epitomized in concepts such as harmony, balance, and rhythm, these relations are as vague as they can be. Secondly, the relationship that is emphasized in Dow's example, as well as those in Ross's analyses, is basic only at one level. It may not be special for anybody else, and in another context. Dow acknowledges its commonality, and teaches it so, as a principle of design. But differently than in a formalist approach, Dow shows with it *how to abstract.* Ross's remarks in his RISD lecture on the object of design education are along the same lines: "teaching not merely what to do but how to do it."[1]

Today quick sketching exercises that are carried out complementary to the basic design curriculum follow up on this understanding. For a quick representation of an image, the student is forced to think of abstracting it. In a continuous slide show, images vary from desert landscapes to busy cityscapes. One cannot abstract a rural scene the same way as a street perspective. This exercise trains students in how various form relations can be abstracted. Claiming that there are basic elements and relations is an overstatement for the purposes of basic design. Shapes cannot be reduced to elements of triangle, square and circle, but to anything. And in basic design, the point is to show that they can be anything, because individuals set them.

These examples so far demonstrate how to abstract and think within relevance to the bigger picture. And as it was mentioned earlier, "abstracting" exercises are complementary to the basic

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[1] Denman W. Ross, *Address on Design: Public Exercises at the Dedication of the Memorial Hall*, (Rhode Island School of Design: unpublished, November 24, 1903), p 10-11.

design assignments, which already deal with the abstract material directly. (At least, this is so in the beginning. Later on students are asked to abstract.) The abstract forms are already the material of basic design. Hence sometimes they are mistaken as universal givens.

A. Abstract forms and form relations

The pedagogical features of abstract forms and form relations are twofold. One is the simplifying aspect that helps the student initially focus on a small number of form relations. It allows for contemplation on how relations get established, or can change. For the abstract forms given in Dow's drawing above, Dow provides variations.

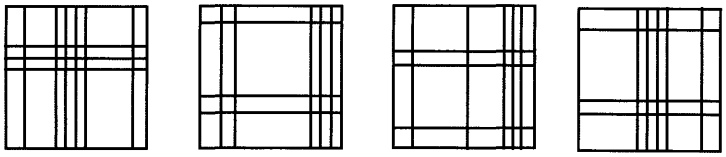

Figure 54. Dow explores variations that share only a few constraints: a set number of perpendicular lines and the square frame. See Arthur Wesley Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, (Berkeley, Los Angeles, London: University of California Press, 1997 [1900, 1920]) p 89.

The rules that Dow applies in these variations are not easily decipherable. Although there are common elements, reasoning behind each variation is not specified. However, the common schema seems to be as shown below.

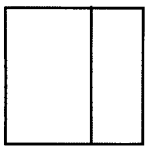

Figure 55. The general form relation that Dow applies in the variations above is a dividing rule that applies to the square and off center. How this schema is applied in each variation is Dow's visual preference.

Dow's variations illustrate applications of this single schema. A similar example by Maurice de Sausmarez explores "a variety of area divisions of a square."

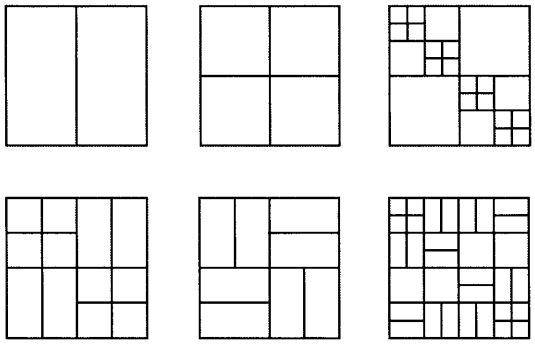

Figure 56. Maurice de Sausmarez shows various divisions of a square. In the text that accompanies these and ten more different divisions of a square, he does not specify the reasoning behind each. However, his rule is simple enough to decipher. The first shape given in this figure is the simple form relation that makes all the other variations possible. But how this is applied visually brings about the variation. It is not simply added, but rather selectively. Why these selections are made is not so much the point of this example, but that they are possible. See Maurice de Sausmarez, *Basic Design: The dynamics of visual form*, (New York: Reinhold Publishing Corporation, 1964), p 39.

De Sausmarez uses just one rule of division (vertical line through mid-space of square) and he is able to apply it in various ways to explore "a seemingly infinite number of possibilities" with just that.[2] Also, he writes that the system could be "on a basis of mathematical proportion or intuitive." I would like to replace "intuitive," once again, with utility of senses. I can then go back to Dow's examples, which seem to follow visual relations. De Sausmarez's schema is really an instance of Dow's schema. Mathematical rules are easier to identify maybe because they are quantitatively defined. But visual rules are definitions too. If the student answers "what is your rule? Or why did you do this so?" with "It looked right," then the particular spatial relation that "looks right" is the rule, and can be represented by drawing. The next time the student applies it, he or she might see it fail and discard it. The point to basic design exercises such as Dow's and de Sausmarez's is not at getting down mathematical rules only. Even arbitrary rules are rules. The student needs to see what is going on, and rules facilitate that.

De Sausmarez's example remains a very simple way of showing the reasoning process in design. The focus is one spatial relation, because even then, there are indefinitely many possibilities. But

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[2] Maurice de Sausmarez, *Basic Design: The dynamics of visual form*, (New York: Reinhold Publishing Corporation, 1964), p 39.

the idealization (*straight line* through *mid*-space of *square*), simplicity (that there is one rule) and repetition might give the illusion that there are universal basic elements.

Ross's analyses also indicated a design process, as articulated in the previous chapter. But neither in Ross, nor in more recent examples like de Sausmarez's, are rules discussed. In basic design education, the exercises could be designed such that they are talked about. Basic design assignments usually give abstract forms and/or specify frameworks. In an initial set of exercises in the curriculum, students are asked to arrange abstract forms without altering the general framework while exploring the variety in application of a few rules. In de Sausmarez's example, there was only one rule. For each of these assignments, an additional task could be introduced to activate the self-conscious learning process: once an arrangement or part of an arrangement, a rule, a spatial relation is proposed, students could be asked to look and record what they see. This recording is not to be simply of what has been done so far, but rather what is visible right then. This no doubt happens in the flow of any design process, but taking a moment to reflect on it, would emphasize it. For de Sausmarez's example, we would then be able to talk about various applications of the rule where squares are picked out from a conglomeration of straight lines. Or at these moments of re-thinking the visual material, additional constraints could be introduced.

B. Abstract forms, changing rules and changing definitions

The Dow and de Sausmarez examples above simply show how the system of abstraction leads to new designs that follow similar principles. To avoid falling into idealization and believing that there are only a few basic elements, the inquiry could be furthered in exercises where the relationships are questioned and new rules are tried. Unfamiliarity, the other pedagogical aspect that is brought about by abstract forms provides ground for this. Abstract forms detach the thought process from habits. Their unfamiliarity helps the student understand and experiment with changing definitions. For example, Ross's wallpaper patterns keeps the focus of the design problem in relations rather than in forms, by keeping the shapes not simple but unfamiliar.

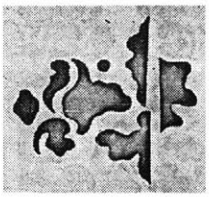

Figure 57. Units in Ross's wallpaper patterns are significant from a basic design point of view because of their unfamiliar forms. The student visually thinks how these forms might relate to one another. Variety emerges in the process. Detail from Denman W. Ross, Edgar O. Parker, S. Clifford Patchett, *Illustrations of Balance and Rhythm: for the use of students and teachers*, (Boston: W. B. Clarke Company, 1900), plate 10.

(It is possible that shapes in those patterns had a different degree of familiarity to the students a hundred years ago. But Ross is aware of the value of abstract forms, when he chooses these exercises as a part of his curriculum.) Exercises similar to Ross's wallpaper patterns are often practiced in basic design studios today.

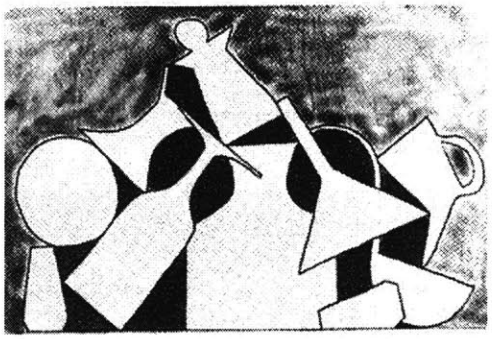

Figure 58. Exercises with irregular abstract forms allow the student to consider how irregularities might come together. See Kemal Aran, ed., *Stüdyolar,* (Ankara: ODTÜ Mimarlık Fakültesi Yayınları, 1987), p 4.

From edible objects to amorphous everyday objects, anything can be treated as an abstract part for a composition. The central theme to these exercises is thinking about how irregular forms might come together. Designers continuously inquire about new relationships. The value in working with unusual material is that new relationships are discovered between forms and parts of forms. The thought process involved is mostly constrained by how the shapes are perceived. As preferences are made momentarily in the interaction with the materials and tools, the students understand and develop personal reasoning in a given context. More importantly however, the students must be able to show how they position these forms together, whether the arrangement was a one-step process or had multiple thoughts put into it. As speculated for the earlier

examples, the students could be stopped at certain points in the process, and asked to look again and record what they see. They can then discuss if what they see at that point is really what they think they did. The objective would be to develop a way of questioning each deed and to be able to project from it towards some other process.

As iterated above, simple forms and contexts aid in training the individual to strategize based on what is at hand and at that moment. Basic design in an educational context is not intended as a prototype to professional design. It is not even a laboratory where simplified versions of realistic problems are tested out. Abstract forms rather offer *strange* contexts for thought experiments that focus on form relations. Basic design is prior to any architectural knowledge and deliberately neglects this knowledge to benefit a creative process. In an abstract design problem, meanings, or definitions, are temporarily projected based on what is perceived then and there. Design rules are different, or differently applied, every time. Diagrams, popular thinking tools in design practices, employ the same idea. Most contemporary architects obscure the contexts of the design problem in abstract diagrams in order to strategize with new set of constraints that emerge from these.

Consequent to the arguments above, no value systems should be imposed on the student in an educational environment. Often in basic design studios, assignments end in general discussion together with the students. For example, a hypothetical assignment is "given this material, create something that has 'balance'," where balance is an undefined concept. The principal questioning in the end discussion is "why do any of these finished works have balance?" which will be left unanswered in the end. The discussions could always expand however, to further understand the processes involved. Contemplative steps could be introduced in the assignments to visually represent the rules employed in each different approach to the problem.

C. Reasoning with uncertainties

So far, I have focused on variance, changing definitions and all the uncertainties that designers are to cherish. These are common practices in the basic design curricula since basic design aims at the personal development of the student. But for this to be a self-conscious development, the experimentation that results in design needs to be understood as a reasoning process. This is

usually not obvious enough. Not having a predetermined structure for thought does not imply the absence of reasoning. Reasoning builds up on process and process builds up on personal interaction with the object. Pedagogically, simple forms are tools for developing basic relations between concepts. A relational view of the world denies universal hierarchies where objects are classified according to preset notions, and presents dynamic definitions to what may be a part and what may be a whole in perceptions. Apart from understanding given constraints through experimenting with the material and apparatus, one develops -personal/individual- constraints to guide the design process. Reasoning is contextual and does not conform to universal generalizations. It needs to be more obvious as such in basic design exercises as well.

Basic design education usually tries to demonstrate that there are a variety of rules and that the students can develop their own. This is primarily because each student apprehends that he or she is doing things differently than others. Personal rules also keep changing. But all this variation often gets overshadowed by general discussion, general framework that tends to overbear with concepts such as balance, and harmony, or the stylization of the minimalist geometry in use. The interaction with other students in the studio tends to converge different ways into one. Usually, the studio turns into a determined exploration of one ideal. All this sharing and interaction is not necessarily bad, but it needs to be understood by each student that they develop their own rules. Contexts, rules, and goals are all dynamic. The constraints given in each problem need to change accordingly. The setup must guide the student not towards a preferable design product but to a self-conscious process.

The kind of problems that are given, as well as how the end discussions are executed, are important. Tentativeness should appear as the central idea. "Look again, record, and change" are seemingly vague tasks. But questioning, and while doing that, understanding how to strategize, is imperative. Again, the idea is not to record what has been done previously, nor is it to get overwhelmed with possibilities. It is to encourage the student to understand how he or she develops ways to reason. My discussions have been to argue this point. But, the "stop and look" exercises need to be tried out in an actual basic design project with an ongoing thought process, and get tested in future work.

D. Visual rules in representing creative thinking

As part of the future work in studio, rules could be used to represent the processes in the exercises mentioned above. However, there is no direct way to convey that process is representable through rules to the student who will not have a developed sense of what a rule is in its flexible definition. One primarily needs to grasp the changing aspects of a design process to understand a concept of dynamic rules. Allowing for personal narrations, visual rather than verbal, is one idea suggested in the previous section.

Furthermore, as mentioned earlier, rules are already implicitly recorded in design processes through models and drawings. Slowing down the process will only demonstrate how the individual sets up constraints and reasons through continuous perceptual shifts. Nevertheless, this should not mislead the student into thinking that design process has discrete parts or steps. Rather, the purpose of the exercise is for making the conceptual changes explicit.

Below is a simple example to show how a process is explicable in visual means. The example is based on an earlier illustration regarding one of Ross's wallpaper designs.

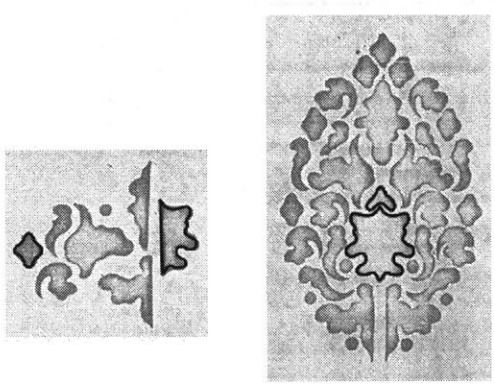

Figure 59. This particular wallpaper pattern illustrates how two of the given units are applied in the design. A shape that is picked out from one of these units, and a shape that back-to-back copies of the other are embedded in, form two new parts for the design. The smaller one is distinctively not a combination of given parts, but a newly perceived part in a given part. Details from Denman W. Ross, Edgar O. Parker, S. Clifford Patchett, *Illustrations of Balance and Rhythm: for the use of students and teachers*, (Boston: W. B. Clarke Company, 1900), plate 10 [emphases by the author].

The sagacity applied in this wallpaper pattern exists just the same in other forms as in the figure below.

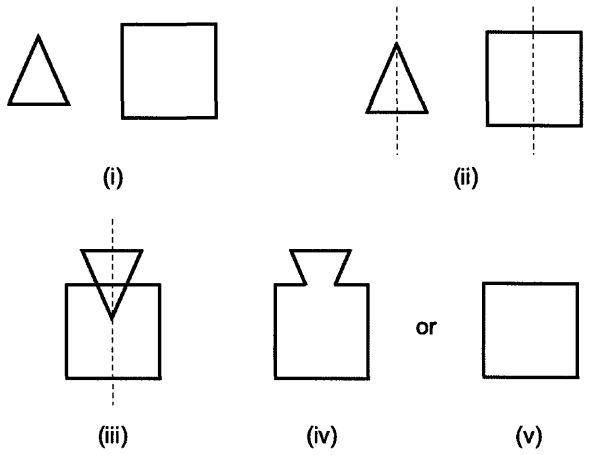

Figure 60. (i) Two initial shapes are given, a triangle and a square. (ii) Two spatial rules are specified to indicate these shapes are to be placed on a symmetry axis. (iii) The triangle and the square coincide on one axis. The triangle is rotated and a part of it is overlapping the square. Then, a new rule is introduced to erase the triangle. (iv) and (v) show two ways to apply this rule to the shape in (iii).

Two initial shapes, a triangle and a square are given. Additionally, two spatial rules are specified to indicate these shapes are to be placed on a symmetry axis. These are the initial constraints in a very simple design exercise that asks for a composition with these two shapes. The third figure shows an arrangement. The triangle and the square coincide on one axis. The triangle is rotated and a part of it is overlapping the square. Then a new rule is introduced to erase the triangle. There are two choices to apply this rule. One application takes away the smaller triangle, and the other takes away the large one. The final figure above shows the two possibilities side by side. The variation here exemplifies sagacious thinking. There is nothing else to it. The formalism for such representations is given in George Stiny's computational theory.

II. Concluding remarks

The primary motivation for this work has been to develop a context of ideas for discussing creative thinking as a relational reasoning process. Although this motivation emerges in and for a contemporary setting, I have been primarily interested in forming a background that the current

discussions in the field of design and computation seem to be missing. Looking at 19th century thought has been refreshing in terms of breaking away from the usual references, of architectural history as well as design computation. It has also been crucial in reviving the pragmatist discussion on senses for a reconsideration of the conventional understandings of reasoning today. Certainly, hundred-year-old perspectives are obsolete in many ways. However, the end of 19th century represents an interlude between the formalisms of the past and the present, in terms of how *thought* is perceived. Thus, it sets a frame for understanding the origins of the current ideas, and also provides traces for alternative paths. This dissertation does not in any way provide a complete study of the ideas mentioned. The theoretical inquiry should certainly be expanded, to include broader assessments with the contemporary perspectives in philosophy and cognitive science. Expanded studies will also impinge on the problems imminent today with the interaction of architecture and other research disciplines such as computer science. Moreover, a continuing study of ideas will add to the future work proposed above for the studio.

A secondary motivation for this dissertation has been to emphasize the importance of basic design education from a contemporary point of view. The 19th century context of ideas included educational reforms that put emphasis on active learning, student psychology and hands-on experimentation. The dissertation has pointed out the parallel ides in design education through the works of Denman Ross and Arthur Dow. Their work, and the background they emerged from, paved the way for the 20th century developments in education and the basic design instruction as it came to be understood today. Looking back at the 19th century origins brings a perspective that considers the utility of senses in design education.

This dissertation, however, does not elaborate on the concept of learning separately from the broader term of education. William James writes that two indispensable parts of reasoning are sagacity and learning.[3] Throughout the dissertation, I followed this reference, but focused on reasoning as a whole and accentuated sagacity as it conveys the argument for uncertainties.

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[3] James writes, "the art of the reasoner will consist of two stages:

> First, sagacity, or the ability to discover what part, [M], lies embedded in the whole S which is before him:
> Second, learning, or the ability to recall promptly M's consequences, concomitants, or implications."

See William James, *Principles of Psychology*, (Cambridge, MA: Harvard University Press, 1983), p 957.

Learning, on the other hand, requires further reflection and possibly a separate discussion. In the sense that James refers to it, learning is by habit, and is part of a different philosophical, or rather physiological, discussion than that of learning in design education. In its place, I have used the terminology of changing rules. Habitual learning in reasoning can be described using consistently recurring rules, but it dilutes the general discussion of this dissertation. My argument, from a creative point of view, has been to call attention to not how people hold on to what they know, but rather that they can discard it. I have tried to address the question of learning, in a more general sense. I have considered that learning, in the case of basic design education, is the student's awareness of changing personal rules. This perspective could be broadened in a separate discussion that focuses on learning, as well as its social and material aspects.

Finally, in an attempt to emphasize the importance of basic design education in the technological context today, I have presented it as a precursor to integrating computers to design education. This stems from the observation that basic design material allows us to think about design with ever-changing rules. Especially now in an age of emerging technologies, with the intention of preparing the student not only to design but thinking about design as computation, basic design studio can incorporate the concept of rules more rigorously. Computation can be reflective of the design process. This way creative thinking is not compromised in design.

Other ways to prepare the way for this perspective to computation exist outside the basic design curriculum. For example, the student's graphic communication skills could also be developed as techniques of thinking and not just techniques of representing. Another way could be to use conventional computational elements in basic design exercises. For example, a small set of a particular software's commands could be the unusual units of abstraction. Potentials and limits of the framework would certainly be explored. How far results end up from the intended tasks in each command would provide valuable discussion in terms of changing definitions. Defining the design process as reasoning with uncertainties and sagacity is important to set models to those who create tools of abstraction for designers. Designers should compute like they design. Showing visual rules as an integral representation of design will not immediately change how computers work. But it would be a way to integrate computation to design education early on. At the least, it would reinstate the designers' confidence in how they reason.

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