ABSTRACT

CRAWFORD, THOMAS CARTER. Foundations of American Design Education. (Under the direction of Professor Arthur Rice.)

This dissertation is a study of the evolution of design education, its relationship to broader education theory, and specifically of the evident correlations between the thoughts of the American pragmatist philosophers and the practices of modernist design educators of the twentieth century. As a work of historical/philosophical interpretation, it is organized into a narrative form.

The work establishes the historical context of the primary subject area by tracing the development of the relationship between philosophy and education beginning with ancient Greece and continuing through the twentieth century, and by outlining the progress of design education beginning in the first century BC. Particular emphasis is given to American design education commencing in the mid-nineteenth century.

The connection of the streams of design and general education is established via the linkage of studio instruction and the concept of “learning by doing.” The work culminates in a discussion of the writing of pragmatist philosopher John Dewey in relation to the methods of artist and teacher Josef Albers.
Foundations of American Design Education

by

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Art has also introduced me to the world of academia. His years as a teacher and administrator give him a perspective that he has shared with me often. My way of teaching has been validated and reinforced by Art’s way of thinking and talking about teaching.

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Mark Scearce, when my thinking was unclear, and my direction unsure, had the perspective and the courage to require me to face my own belief and to follow my heart. The resulting moment of clarity was the turning point of this work.
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This dissertation is concerned with the philosophical and intellectual roots of American
design education at the college level, with an emphasis on architecture and landscape
architecture. (Before Harvard offered landscape architecture in 1900, design education was
architecture education. Other disciplines arrived on the scene in the twentieth century).
Design differs dramatically in its pedagogical practice from many other fields of academic
study. The questions that drive this inquiry are: Why is this so? How did it happen? The work
establishes context by outlining the history of design education in relation to general
educational philosophy. It then explores the intersection of the twentieth century Bauhaus
expression of European modernism with the philosophy of American pragmatism by
concentrating primarily on the thought and practice of Josef Albers in relation to the
philosophy of John Dewey.

This work is meant to examine fundamental issues about education within the field of
design. One intent of design education is to help students gain marketable skills; others are to
introduce them to design culture and to develop an array of cognitive skills. One of its main
goals is to help students harness, develop, and direct their creativity. Albers and Dewey both
had intense interests and firm stances on that subject, and each has had profound influence on
subsequent thinking.

Design education at the college level in the United States is usually understood to have
begun with the initial offering of Architecture as a major at MIT in 1868. (Note: The
Appendices show timelines at three scales to help illustrate the relationships of events described herein). The MIT program was largely based on the content and methods of the École Des Beaux-Arts in Paris (its founder, William Ware, and many of the instructors during the first seven decades of the program were Beaux-Arts graduates) (Pause, 1976, p. i). “There were nine well-established professional schools of architecture by 1898;” the level of Beaux-Arts influence varied (Weatherhead, 1941, p. 62). In 1900, Harvard instituted the first baccalaureate program in Landscape Architecture (Simo, 2000, p. 1). Today, there are roughly 45 institutions in the United States that have accredited programs in both architecture and landscape architecture at the bachelor’s and/or master’s level. Many of these schools offer degrees in other design disciplines or in art. Almost half of them offer PhD programs in architecture, landscape architecture, or design.

In 1919, the Bauhaus opened its doors in Weimar, Germany, under the direction of founder Walter Gropius. Though the Bauhaus was not the only group of modernist thinkers in Europe during the 1920s and early ’30s, it had two main advantages in terms of its eventual influence: First, it was a formally administered school offering an organized curriculum; this meant that it had a specific center that helped solidify its identity, and that its former students and faculty could move out into the world carrying that identity with them. Second, it had in Gropius a highly charismatic and opportunistic leader who understood the value of creating a brand for his vision.
Anni Albers describes her initial experience at the Bauhaus: “Outside was the world I came from, a tangle of hopelessness, of undirected energy, of cross-purposes. Inside, here, at the Bauhaus after some two years of its existence, was confusion, too, I thought, but certainly no hopelessness or aimlessness, rather exuberance with its own kind of confusion. But there seemed to be a gathering of efforts for some dim and distant purpose, a purpose I could not yet see and which, I feared might remain perhaps forever hidden from me.

“Then Gropius spoke. It was a welcome to us, the new students. He spoke, I believe, of the ideas that brought the Bauhaus into being and of the work ahead. I do not recall anything of the actual phrasing or even of the thoughts expressed. What is still present in my mind is the experience of a gradual condensation, during that hour he spoke, of our hoping and musing into a focal point, into a meaning, into some distant, stable objective. It was an experience that meant purpose and direction from there on…. Last year some young friends of mine told me of the opening speech Gropius gave at Harvard at the beginning of the new term. What made it significant to them was the experience of realizing sense and meaning in a world confused, now as then—the same experience of finding one’s bearing” (Albers, 2000, p. 1-2).

Modernism in architecture had existed in the United States since the late nineteenth century, most notably in the work of Frank Lloyd Wright, and the design schools were well aware of European Modernism before 1930. Still, American modernism did not have the vigor of the European version, and the European influence was not strong or widespread
here. Europe was reeling from the physical destruction wrought by World War One; it was in
the midst of widespread social upheaval; its industrial infrastructure was in a shambles and
was not generating quality products. For these reasons, and many more, Modernism found
more fertile ground in Europe. The United States did not go through crises of the same
magnitude during that time. Innovation in design education was more a matter of applying
new technology to established styles than of exploring and establishing new conceptual
solutions (Alofsin, 2002, p. 55). This was not only a matter of recalcitrance; there was no
irresistible driving force to precipitate change.

With the 1929 stock market crash, subsequent bank insolvencies, and the Great
Depression of the 1930s, American design professions were compelled to recognize the fact
that new social realities demanded different design approaches and solutions—approaches
and solutions they were not well-prepared to produce. Meanwhile, in 1933, the Bauhaus was
forced by the ascendant Nazi government to cease operation. The school that had become the
face of European modernism was forced to look for a new home at the historical moment
when the United States was in need of a new design philosophy. Several Bauhaus faculty
members emigrated to the United States—most famously at the time Walter Gropius and
Ludwig Mies van der Rohe (Kentgens-Craig, 1999, p. 224).

To say that the United States in the early twentieth century was not in the dire crisis mode
that Europe was experiencing is not to imply that there were not significant social, political,
economic, educational, and intellectual questions being asked (Kloppenberg, 1986). The late
nineteenth century saw calls for reform from many quarters concerning many issues. At about the same time, American pragmatism was initiated by Charles Sanders Peirce and developed further by William James and John Dewey. Pragmatism was carried to its broadest extent in the prolific and far-ranging writings of Dewey (in roughly 40 books and 700 articles between 1883 and 1952). Of particular importance in the context of this dissertation is Dewey’s explication of the transactional paradigm (in which knowledge is viewed as a system of object, observer, and environment) and its implications and influence in the areas of education and aesthetics.

Dewey’s educational program is well known for its emphasis on “learning by doing.” In the 1890s, while at the University of Chicago, he established the Laboratory School, in the curriculum of which he “called for a pedagogy that would build on the inherent interests of the children, while leading them to the accumulated wisdom of adults embodied in the established subjects. He urged teachers to structure the classroom as a cooperative community of inquiry, thereby fostering in children both the skills of scientific investigation and the character essential for a democratic society” (Westbrook, 2001, p. 185).

The work of Dewey (along with that of Kant, Piaget, Vygotsky, and others) is often cited as being seminal in the development of the constructivist theory of education (Hein, 1991), (Phillips, 1995, p. 6). Though there are fundamental philosophical differences between the pragmatism of Dewey and the constructivism of Piaget and Vygotsky, their classroom
methodologies are very similar. The viewpoint of constructivism is summarized in contrast to
the objectivist view in Table 1-1.

Table 1-1 Objectivist View - Constructivist View (Thanasoulos, 2001)

<table>
<thead>
<tr>
<th>Objectivist View</th>
<th>Constructivist View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge exists outside of individuals and can be transferred from teachers to students.</td>
<td>Knowledge has personal meaning. It is created by individual students.</td>
</tr>
<tr>
<td>Students learn what they hear and what they read. If a teacher explains abstract concepts well, students will learn those concepts.</td>
<td>Learners construct their own knowledge by looking for meaning and order; they interpret what they hear, read, and see based on their previous learning and habits. Students who do not have appropriate backgrounds will be unable to accurately “hear” or “see” what is before them.</td>
</tr>
<tr>
<td>Learning is successful when students can repeat what was taught.</td>
<td>Learning is successful when students can demonstrate conceptual understanding.</td>
</tr>
</tbody>
</table>

In the history of American design education, whether it has been derived from the Beaux-Arts tradition or from the Bauhaus, one constant has been the centrality of the studio teaching model. Most accounts of the style of teaching prevalent during the Beaux-Arts era point to an orientation along the lines of the objectivist view (Rykwert, 1982), (Pause, 1976), while many of the tenets of the constructivist model of education may broadly be said to be manifested in the studio method used in American design instruction at the college level as it exists today (Schon, 1987). (See Table 1-2). But even in the Beaux-Arts era, the studio environment facilitated a hands-on approach to learning.
Lawson has shown that fifth-year architecture students differ significantly in their approaches to solving ill-defined problems than do freshman architecture students or post-graduate science students. Briefly, the results of his work demonstrated that the fifth-year architecture students tended to use solution-focused strategies that required them to create their own problem definitions (“It is a familiar and significant saying that a problem well put is half solved” (Dewey, 1938, p. 108)), whereas post-graduate scientists focused their efforts on understanding the problem as presented to them. The freshman architects appeared to use a strategy similar to the fifth-year architects, but were not as successful. Using a “solution planning orientated strategy.... designers... evolve a methodology which does not depend on the completion of problem analysis before synthesis can begin” (Lawson, 1979, p. 67). This

<table>
<thead>
<tr>
<th>Beaux-Arts View</th>
<th>Bauhaus View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeless truth and beauty are expressed in the language of Classic</td>
<td>Classic forms and orders have lost their ability to express meaning in the modern world.</td>
</tr>
<tr>
<td>forms.</td>
<td></td>
</tr>
<tr>
<td>Students must learn the Classical orders through strictly disciplined and repetitive drawing.</td>
<td>In the manner of the Medieval builders, students must learn craft and the essence of materials before attempting design.</td>
</tr>
<tr>
<td>Art is related to a higher plane of academic reason.</td>
<td>Art must to be restored to its former level of importance in everyday life through good design applied to industrial production.</td>
</tr>
</tbody>
</table>
evidence begins to indicate that the fifth-year architects’ education may have instilled (or encouraged) in them an orientation more closely aligned with the constructivist view than with the objectivist views of the scientists.

Walter Gropius, who of course had many opportunities to observe Josef Albers in action both at the Bauhaus and later at Black Mountain, said: “Albers has the very rare quality of a teacher who treated every student in a different way. When the student was unsafe of himself, and he couldn’t swim yet, so to speak, he pushed him into the water, and when he started drowning, then he got him and he was open for advice. He was just ingenious, doing that… He is really the very best teacher I could imagine because he brought the student to himself. Imitation was taboo, and he brought him really down to earth and developed him out of his own qualities” (Gropius, 2007).

In 1941 Albers asked: “How can we develop imagination when the schedule of study confronts the student merely with a set of given problems to be solved by a given set of solutions? To place theory before practice, knowledge before experience, or research before search will end in mechanical application of rules and tricks. Such schooling may develop laborers or imitative disciples but not imaginative and productive minds” (Horowitz, 2006, p. 99).

“Pushing the student into the water” is a time-honored practice in design studios. One architect describes her first experience at the NC State University design school, in the 1980s: “In high school, I was always a good girl and did exactly as the teachers told me.
Then, in Design Fundamentals, the first project Michael assigned was to design ‘green.’ I didn’t understand. When I went to him for an explanation, he asked: ‘Do you want this to be your one question for the semester?’” (Hess, 2011).

This sort of experience leads one to develop a viewpoint and an associated set of habits that involves a certain level of comfort with ill-defined problems, a mode of operating that allows one to derive one’s own definition of the task at hand and get on with it—precisely the kind of ability and proclivity that Lawson found. William G. Perry’s work provides insight into the process of learning that leads from a way of thinking that works only when questions have well-defined correct answers to a more facile orientation that allows one to function in a world where knowledge is relative and no absolutely truthful answers exist (Perry Jr., 1999).

Perry’s work reveals that when faced with the sort of ill-defined issues posed in the realm of liberal education, students grow through a series of positions relative to knowledge that, when successful, leads them to an epistemological stance that allows them to establish commitment to a belief system that works for them in the absence of universal truth. The process Perry describes is dynamic rather than linear—there are retreats and retrenchments, and a person’s position will not be constant across various areas of their intellectual and personal life. His study group was comprised of Harvard students (mostly male) in the 1950s and early ‘60s. Perry’s group was allowed to come to these difficult realizations about the inadequacy of their dualistic views of knowledge relatively slowly—over the course of a year or more—whereas in design school the experience is more of an immediate shock (in
Albers’s words: “I put them in a vacuum and teach them how to breathe” (Horowitz, 2006, p. 99)). But even given its limitations and temporal distance, Perry’s work grants us a way of looking at the design school experience that resonates—as an epistemological shift toward the pragmatic paradigm.

This shift in the way of seeing knowledge demands a transcendence of the subject/object dichotomy that hinders both the rational and empirical views of knowledge and requires a viewpoint that Dewey described as “transactional”—a paradigm in which the subject and object are both elements of a relationship involving them and their environmental context. In Dewey’s view, knowledge is neither “out there,” a pure entity separate from human experience, nor a mental construct that exists only in a person’s mind. Knowledge is an interaction that might be likened to an ecological system. This paradigm is the foundation of American pragmatism.

Perry’s position of Commitment, then, is a delicate balancing act—a position that allows for decision-making in a relative world, but that does not become another level of inoperable Truth. William James writes: “The pragmatism or pluralism which I defend has to fall back on a certain ultimate hardihood, a certain willingness to live without assurances or guarantees” (James, 1978, p. 249). This seems to be at least part of the essence of ongoing creative thinking—the ability to see relative truths in productive relationships while never allowing those relationships to harden into dogma. “Giving up the ideal of certainty in knowledge, however, did not mean embracing skepticism or despairing of knowing anything
at all; on the contrary, it meant tempering our judgments by the available evidence and refusing to make claims that the evidence will not support. As Peirce put it, referring to our cognitive powers, when we know the limitations of the instrument, we are all the more secure in setting it to work” (Smith, 1999, p. 5).

Lawson’s work and other evidence (Cross, 2006) points to the existence in design education of a marked influence of Pragmatic thinking. The questions arise: Why does design education do this? How did it happen?

Why, in an educational system that at every level is dominated by the objectivist view, is Design the one pedagogy (or one of a few) that exemplifies the constructivist view? The question becomes even more interesting when one factors in the dearth of theory associated with design pedagogy. It appears that the constructivist education theory points to an ideal form of learning that is rarely realized, and that design instruction generally conforms to the theory without being particularly aware of its existence.

How could this have happened? Design instructors have traditionally almost never been educated as educators—thrown into the deep water of teaching and forced to find a way to swim on their own, they have taught “as they were taught.” “The rejection of top-down learning, the promotion of shared learning experiences, an openness to the new, education as problem-solving [all characteristics of Dewey’s Pragmatic approach to education]: these qualities characterize art education virtually everywhere today, and can be traced back
directly [not to Dewey via mainstream education theory, but] to Albers’s beliefs and teaching practices” (Horowitz, 2006, p. 252).

We know that Josef Albers was a student at the Bauhaus beginning in 1920, and a master there from 1925 until its closing in 1933, where he taught the Foundations course (after having being a student in the course under Itten, and collaborating with Moholy-Nagy in its instruction until 1928) (Wick, 2000, p. 166). Though some of William James’s work was translated into German as early as 1899, and several of Dewey’s works were translated before 1914, “the outbreak of World War I abruptly broke off the development of the pragmatism debate that had begun to spread through Germany in the pre-war years. The fact that it was not resumed after the war is one of the most significant lacunae in the history of German philosophy. Instead of a productive exchange of ideas there arose a long chain of misunderstandings and misconceptions of American pragmatism, originating from some of the most eminent German philosophers, and passed on with an amazingly uncritical self-assurance to others” (Oehler, 1981, p. 27). This is not to say emphatically that no one at the Bauhaus was familiar with, or influenced by, American pragmatism. But it does not seem likely that pragmatism figured directly in the thinking at the Bauhaus.

With the demise of the Bauhaus, and with the help of Philip Johnson and others, Josef and Anni Albers moved to Black Mountain College, where they taught from 1933 until 1949. Josef Albers became the head of the Design Department at Yale in 1950, serving there until his retirement in 1958. His primary offerings at Black Mountain and Yale were in basic
drawing, basic design, and the interaction of color. These courses were well suited to his inductive approach to teaching and concept of learning.

Begun in 1933 under the direction of John Rice, Black Mountain was one of a number of American progressive colleges that sprung up in the years between the world wars. One particularly important facet of the program at Black Mountain was the vital importance of the active learning of art in the context of a liberal arts education. “Through Albers, Rice, and [Theodore] Dreier, Black Mountain achieved a unique synthesis between American progressivism in education and European modernism that resulted in an exceptionally dynamic, creative atmosphere” (Harris, 2002, 14-15). It is known that John Rice felt a particular affinity for the philosophy of John Dewey, and that Dewey visited Black Mountain on at least three occasions (Reynolds, 1995, p. 12). The obvious and apparently reasonable assumption is that there was a basic and explicit philosophical common ground between the protagonists and the schools of thought they represented.

Yet Albers says that though the primary goal of the Bauhaus was to influence industry, “instead, we gained something else, something much more effective: a new visual education. We had a disorganized but very far-reaching influence on general education. This was an unexpected success. I do not believe that during the ten years of my life at the Bauhaus I heard the word ‘education’ mentioned. We talked a lot about design, production, and industry, but hardly about education. We simply tried to teach anew. In America today the mistake is made of talking of a Bauhaus method. We have heard that it is of no use to talk
about the Bauhaus style because no style was sought. A Bauhaus teaching method was never intended, because each master developed his own method of teaching, independent of the others and especially independent of any agreed principles and aims of teaching” (Albers, 1993, p. 181).

Gropius, in the “Bauhaus Manifesto and Program,” ends the manifesto section with: “Let us then create a new guild of craftsmen without the class distinctions that raise an arrogant barrier between the craftsman and artist! Together let us desire, conceive, and create the new structure of the future, which will embrace architecture and sculpture and painting in one unity and which will one day rise toward heaven from the hands of a million workers like the crystal symbol of a new faith” (Gropius, 1919, p. 1).

Black Mountain’s stance was different: “If there was a single unquestionable assumption underlying the college’s structure and philosophy, it was a belief in democracy as a way of life. In education, this meant the opportunity of every person to realize the full development of his or her abilities; in a political system, the right of each person to have a voice in the decision-making process” (Harris, 2002, p. 7).

Another angle on this mystery is that a significant difference exists between Albers and most of his peers and successors in design education: before he enrolled at the Bauhaus at age 32, he had actual training and experience in teaching. During the 1909-10 school year, Albers taught in Weddern, at a small community school where all the pupils between the ages of six and fourteen were collected in one classroom. The methods he was forced to develop
in response were based on the model provided by Johann Heinrich Pestalozzi, whose work
Albers was familiar with because of his teacher training. Füssl makes the case that the
“construction of Albers’s art education was nothing other than the adaption of a crucial part
of the Prussian teacher seminar curriculum established in 1817. Pestalozzi’s How Gertrude
Teaches Her Children belonged to the required readings and instructional canon of Prussian
teacher seminar participants…. Josef Albers read and understood Pestalozzi as did few of his
contemporaries. His complete professional development and educational career was based on
this experience” (Füssl, 2006, p. 91). Elsewhere (p. 89) in the same paper Füssl tells us
“evidence indicates that [for various reasons] Albers rejected the practice of progressive
education and Dewey’s theory.” Whether these contentions are completely valid or are
lingering German distaste for pragmatism (which Martin Heidegger in 1967 called an
ideology “‘for engineers and not for human beings in the full sense of the word’” (Oehler,
1981, p. 33), the Pestalozzi connection is important.

Finally, please consider Albers’s formal comments on the introduction of his design of the
logo for Black Mountain (a simple motif of a circle within a square) in relation to Dewey’s
transactional paradigm and its ecological view of truth-in-process. Albers ends with a quote
from Plato: “‘By beauty of shapes I do not mean, as most people would suppose, the beauty
of living figures or of pictures, but to make my point clear, I mean straight lines and circles,
and shapes, plane or solid, made from them by lathe, ruler, and square. These are not, like
other things, beautiful relatively, but always and absolutely’” (Harris, 2002, p. xix). This
statement stands in contrast to Albers’s admonitions in class and in print about primacy of relationship.

Albers was an enigma—just like every other human being. Along with being enormously innovative, enlightened, and enlightening, he was generally anti-intellectual and sometimes conservative to the point of being hidebound. Still, if Albers’s choice of naming his 1935 paper ‘Art as Experience’ was not in homage to Dewey’s 1934 book of the same name, it is hard to see it as a refutation of it. It is not surprising that Albers didn’t buy wholesale everything Dewey was selling; Dewey wrote a lot, and Albers might have found much to disagree with. American pragmatism was, after all, American, and the Bauhaus most certainly was not. Also, Albers was kind of stubborn and absolutely not well suited to being a disciple (an assertion that, one feels confident, would be confirmed by Walter Gropius and John Rice).

Sometimes, at close quarters, minor differences between like-minded people are magnified. And actions speak louder than words—the results of Albers’s actions seem pretty close to what Dewey would have hoped for. The important thing is how, upon reflection, we can learn from them. Albers and Dewey may not have completely agreed, but on one vital point they are in accordance: the value of individual creativity. They make each other far more helpful than either would be alone, and we need both: Albers for his method and Dewey for his theory. Albers makes Dewey viable in the real world as perhaps no one else does; Dewey gives us a framework in which to talk about what Albers did. Together they
form a generally unified system of theory and practice within the context of education and creativity.

If we believe that “education” is inclusive of and more than “training,” its goal goes beyond preparing students to fill positions in professional practice with minimal competence. The goal of design school is to help develop, as Albers said, “imaginative and productive minds.” Design education is a matter of providing an environment in which students can begin to learn how to navigate a world where context is always changing and there is never one correct answer—an environment in which they can develop their own beliefs about what is important to them and make basic decisions about what they really want to accomplish. One of the first steps is the realization that the truth is a moving target. As Dewey says: “The result of the educative process is capacity for further education” (Dewey, 1916, p. 40).

Each student possesses implicit belief about the nature of knowledge, about what constitutes truth, and how truth can be found. This implicit belief, when examined, becomes conscious, and with time develops into an epistemological position. Design education, therefore, includes both the development of technical facility and the establishment of an epistemological self-knowledge that allows for well-considered decision-making in a relative world. The technical element enables the “what” of design; the epistemological element enables the “why.” Further, the two are not independent; they constantly inform one another. The hands and the mind are connected through process—the “how” of design. The what,
why, and how together enable what Albers called the ability to “think in situations” (Peterson, 1945b, p. 54).

Dewey and Albers both have much to tell us about the way we teach design. They are two sides of the same coin; if we look at them closely in relation to one another we can discern something of real value. Dewey has shown that old dichotomies can be usefully transcended. A foundational belief system is one of the results; that belief system appears to be functioning implicitly in design school.

Clearly, it would be pointless and anti-productive to try to define an overarching “design school paradigm.” The variation of viewpoint of individual teachers is at the core of design’s identity. That doesn’t mean that we can’t or shouldn’t try to understand the intellectual and philosophical history of our field. Otherwise, what do we have to measure our relative positions against?

We as a profession need to do what we try to get our students to do—that is, to ask ourselves questions that when answered, begin to make our implicit beliefs explicit. It is not expected that this dissertation will answer all the questions it touches upon; it is the intent of the author to try to provide a historical context and interpretation that will lead to intelligent discussion, clearer goals, more reasoned decisions, and better ways of assessing performance. When we have said clearly what we want to do, why we want to do it, and how we plan to do it, we can make reasonable judgments about how successful we have been. Otherwise we have no way of knowing.
Designers don’t seem to like theory very much, and to a large extent, that fact has in itself defined us. But if we don’t dig deeper, how do we know what we have to offer and how we can change in response to new pressures and opportunities? Most important, how do we know what we can’t afford to lose? There is a fine line between epistemological commitment and dogma. The former gives us a basis for creative thinking; the latter, as the Beaux-Arts and Modernism in turn have shown, is a sign of incipient creative decline.
2. THE CENTRAL ISSUE IN THE CONTEXT OF THE SCHOLARLY LANDSCAPE

Contemporary American design education appears to be congruent in many ways with the tenets of American pragmatism in general and with the educational philosophy of John Dewey in particular. Is this phenomenon coincidental, or is it the result of a discernible sequence of events?

We know that European modernism as practiced at the Bauhaus has had an enormous influence on design education in the United States, and that Josef Albers is one of the most significant figures (from a pure teaching perspective, perhaps the most significant) to emerge from the Bauhaus. We know that only a few months after the closing of the Bauhaus, Albers began teaching at Black Mountain College. Finally, we know that John Dewey’s ideas were held in high regard by John Rice, the founder of Black Mountain, and that Dewey himself visited Black Mountain at least three times.

Josef Albers was hardly an impressionable youth when he arrived at Black Mountain; he was 45 years old. He came from a working-class background and had lived in tough neighborhoods in Berlin. He had spent the immediately previous thirteen years at the Bauhaus in the presence of Walter Gropius, Mies van der Rohe, and many other high-powered personalities. American pragmatism had been either ridiculed, not taken seriously, or ignored by philosophers in his country after World War I. The Bauhaus had been consciously anti-academic.
Existing scholarship has generally assumed that there was at least something common about the two movements that allowed them to peacefully coalesce. The question of how these two vectors, which in some ways seem to be antithetical to one another, could have combined into such a positive force has not been addressed in depth.

**Paradigm and Bias**

One premise of the current work is that design school emphasizes a way of thinking that appears to be congruent with that of American pragmatism. The author of this work is a landscape architect with a design school education, working within the transactional paradigm explicated by John Dewey. This paradigm is at the root of pragmatic philosophy, and posits knowledge as a relationship between subject and object within a particular (spatial, temporal, social, historical) context. This epistemological position is in contrast to purely rational or purely empirical philosophies that require a dichotomous subject/object model and a two-tiered view of knowledge (one tier in the objective realm of pure thought, one in the subjective world of sensation) (Hildebrand, 2008, p. 52).

Dewey’s pragmatism proposes experience as an ecological system and the search for truth as an ongoing, fallible, and experimental process of inquiry. He defines truth as “warranted assertion” (Dewey, 1938, p. 7), the best available explanation based on scientific investigation—a definition that could as well be applied to the word “theory.” Truth is defined by Peirce as “that concordance of an abstract statement with the ideal limit towards
which endless investigation would tend to bring scientific belief, which concordance the
abstract statement may possess by virtue of the confession of its inaccuracy and one-
sidedness, and this confession is an essential ingredient of truth” (Peirce, 1901). Peirce
visualizes an integral calculus of progressively more precise approximations that can never
overcome Zeno’s paradox, but gets close enough for practical purposes. According to
William James, the “true is the name for whatever proves itself to be good in the way of
belief, and good, too, for definite and assignable reasons” (James, 1978, p. 40).

The transactional paradigm is appealing to a designer, and particularly so to a landscape
architect. It bypasses the troublesome discontinuity between art and science, allowing them
to be thought of as two aspects of a single whole. Other aspects of Dewey’s thinking that
resonate with landscape architecture are:

• his emphasis on context and connectedness (which flows through from Darwin and
ecological holism);

• his definition of the components of consummate experience (definition, character,
dramatic climax), which correspond neatly with the elements of great places: edges,
integrity (in the sense of wholeness), sequential event structure;

• his primacy of process and the knowledge that the designer is changed by the act of
designing—which amounts to the dissolution of another dichotomy, this one between
theory and practice;
his explication of aesthetic experience as (potentially) an integral part of everyday life and his judgment of the “fineness” of art based on the depth and nuanced character of the experience it engenders for multiple constituencies.

Perhaps most compelling is Dewey’s definition of inquiry: “Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole” (Dewey, 1938, p. 104-05). Inquiry is a matter of finding (or creating) order—as is design.

This dissertation uses the pragmatic intellectual framework apparently inculcated by design education to explore its subject: design education. This is not to say that pragmatism is the one and only philosophy that guides design school on a daily basis or that everyone there thinks alike—a design school is a community of individualists. Implicit beliefs about knowledge come in an infinite variety and Plato and Berkeley have not been banished from everyday usage because Dewey disagrees with their epistemological positions.

Though designers and teachers of design are not to be pigeon-holed, in order to function within the design school community, they have to operate within certain parameters and communicate in ways that make sense in context. There has to be a foundational paradigm shared at some level that keeps people from talking past one another. The goal of this dissertation is to explore that shared way of knowing and its origins. Design education, in many ways, looks and feels like pragmatism: why is this so and how did it happen?
Barzun and Graff quote Gaetano Salvemini: “‘Impartiality is a dream and honesty a duty. We cannot be impartial, but we can be intellectually honest’” (Barzun, 2003, p. 155). Every competent researcher must avoid the trap of cherry-picking findings to support an argument. The goal of this dissertation is not to prove a case or to attempt to impose a way of thinking. It is an inquiry, not a manifesto.

**Method**

The exploration and interpretation of the meanings of various forms of expression, (whether the messages are intended or otherwise) falls into the realm of hermeneutics, the primary method of criticism and history. The roots of hermeneutics are found in Aristotle’s *On Interpretation*; the method’s history and philosophical foundations can be traced through the work Aquinas, Erasmus, Schleiermacher, Dilthey, Heidegger, and Gadamer (Crawford, 2009). Important characteristics of the method are:

- the importance of context in the interpretation of meaning
- the necessity of a familiarity with the meanings shared by the author with his or her original audience
- the realization that the author may unknowingly reveal his or her intrinsic beliefs
- the notion that any and all methods of expression are subject to analysis through hermeneutics
interpretation is a dialogue, an act that changes both the vision of the past and the interpreter.

The basic method of hermeneutics is the continuous refinement of understanding through the use of the Circle of Hermeneutics (Bontekoe, 1996, p. 6). “The grasp of each part of a text (or other subject of study) is based on the conception of the subject as a whole. Simultaneously, the whole can only be understood in terms of its parts. The cycle continues until a deep and profound comprehension is achieved” (Crawford, 2009, p. 7). As Dewey states, “the point that every temporal proposition is a narrative proposition means that the proposition is about a course of sequential events, not about an isolated event at an absolute point in time” (Dewey, 1938, p. 227).

“The circle may help uncover a multi-layered construction built by the author of a work (such as the self-referential quality of a Bach cantata) ([Hofstadter, 1979]) or it may reveal aspects of the author’s world that he or she did not consciously intend to convey. The presumption is that any object of study, whether intentionally or simply because of the circumstances of its creation, will naturally have an integrity that can be discerned with enough study” (Crawford, 2009, p. 7).

The Circle of Hermeneutics is a process that, like the scientific method, is characterized by its cyclic use of deductive, abductive, and inductive logic. Theory (intellectual context), through deduction, leads to specific cases. Abduction (defined by Peirce as “guessing” (Peirce, 1976, p. 319)) allows for creative experimentation informed by
judgment. Induction applies the specific results of experiment back onto the theory, perhaps resulting in refinement or even refutation. In another formulation, the process begins with induction. This starting point is necessary when one has empirical evidence but does not have an established theory.

John Dewey’s view of historicism follows from his naturalistic paradigm: natural history is discernible through the scientific method; human history is a subset of natural history; man differs from other natural objects of study in that he consciously changes his environment.

“The first task of historical inquiry, as in any inquiry, is that of controlled observations, both extensive and intensive—the collection of data and their confirmation as authentic.” Further, “because of connection with a problem, actual or potential, propositions about observed facts correspond strictly with conceptual subject-matter by means of which they are ordered and interpreted. Ideas, meanings, as hypotheses, are as necessary to the construction of historical determinations as they are in any physical inquiry that leads to a definite conclusion” (Dewey, 1938, p. 232-233). “Historical inquiry is to be distinguished from scientific inquiry by its subject matter, not by its methods” (Blau, 1960, p. 98).

A critical point about Dewey’s experimental approach to the study of history is that the hypothesis is not merely in the form of proposing that events occurred in such-and-such a way and then confirming or denying that hypothesis. Each decision, each instance of abductive reasoning in the process is a small hypothesis that either yields useful results or does not. Also, historical research is a proactive endeavor. Historicism is a matter of
examining the data to arrive at a nuanced judgment about a complex, even contradictory, set of past events, and then using that understanding to form a testable hypothesis about how to proceed in the present.

“When experience ceased to be empirical and became experimental, something of radical importance occurred. Aforetime man employed the results of his prior experience only to form customs that henceforth had to be blindly followed or blindly broken. Now… we use our past experiences to construct new and better ones in the future. The very fact of experience thus includes the process by which it directs itself in its own betterment” (Dewey, 1948, p. 94). “The study of history, conceived in the light of Deweyan philosophy, is instrumental to the future” (Blau, 1960, p. 95).

In Dewey’s view, history is a basis for the creation of intelligent options for bringing flexible resolution to problematic, disordered situations in the present. “The plans which are formed, the principles which man projects as guides of reconstructive action, are not dogmas. They are hypotheses to be worked out in practice, and to be rejected, corrected, and expanded as they fail or succeed in giving our present experience the guidance it requires… Intelligence is not something possessed once for all. It is in constant process of forming, and its retention requires constant alertness in observing consequences, an open-minded will to learn and courage in self-adjustment” (Dewey, 1948, p. 96). Good history forms the theoretical framework for the development of hypothesis and subsequent experimentation. Intelligence is creative.
Given the concept that all serious inquiry follows the same pattern, historical research is subject to the dictates of scientific rigor. It follows that it is necessarily required to adhere to standards of internal and external validity, reliability, and objectivity. The choice of looking at the intersection of American pragmatism and European modernism by examining the relationship of Josef Albers’s work in relation to John Dewey’s writings was made partially because of the relatively hermetic environment of Black Mountain College in which Albers spent his first fifteen years in the United States. Black Mountain, though certainly not devoid of turf battles and intrigue, at least did not match the highly charged atmosphere of say, the Harvard Graduate School of Design. Further, many of the tribulations Albers endured at Black Mountain were the result not of theoretical or academic tensions directly related to his tuition, but to the (radical, perhaps) nature of the direct democracy there—a form of community that is at least partially attributable to John Dewey’s influence. Therefore, whereas it is not claimed that Black Mountain was a laboratory where one variable could be studied while holding others constant, at least it can be said that it featured fewer day-to-day pedagogical distractions and a resultant clarity of vision.

The reliability of this work depends on the completeness of the historic record. “All historical construction is necessarily selective… if the fact of selection is acknowledged to be primary and basic, we are committed to the conclusion that all history is necessarily written from the standpoint of the present, and is, in an inescapable sense, the history not only of the present, but of that which is contemporaneously judged to be important in the
present” (Dewey, 1938, p. 235). Judgment is a critical factor in every area of research, whether in deciding which box of archival material to sift through or in evaluating the likelihood that a particular experimental method will achieve useful results.

The issue of objectivity requires special attention here. It is not suggested that pure objectivity is achievable in any research—certainly not in the study of history. The paradigm upon which this work is based posits an epistemological stance that precludes any possibility of a view to an unquestionable Truth.

It is precisely because the indeterminacy of truth and the historicity of reason are now widely conceded that we can no longer claim to find objectivity in science or in history... Beyond the noble dream of scientific objectivity and the nightmare of complete relativism lies the terrain of pragmatic truth, which provides us with hypotheses, provisional syntheses, imaginative but warranted interpretations, which then provide the basis for continuing inquiry and experimentation. Such historical writing can provide knowledge that is useful even if it must be tentative. It is within that realm that historical truth—like all truth in a world that has moved beyond the discredited dualisms of both [rational] positivism and [empirical] idealism—must be made, questioned, and reinterpreted. As historians, we cannot aspire to more than a pragmatic hermeneutics that relies on the methods of science and the interpretation of meanings. But we should not aspire to less (Kloppenberg, 1989, p. 1030).

This dissertation is to some extent concerned with exploring relationships between what Dewey said and what Albers did, with the hope that a clearer picture of current theory and practice will be revealed. The emergent understanding is a matrix of agreement and contradiction. “Probably nowhere else is the work of judgment in discrimination and in creation of syntheses as marked as in historical evocations. Nowhere is it easier to find a more striking instance of the principle that new forms accrue to existential material when and
because it is subjected to inquiry” (Kloppenberg, 1989, p. 1015). In history, asking the question creates conditions that make further inquiry possible.

Dewey’s philosophy can be accessed in his voluminous and wide-ranging published work. This body of work is built on an intellectual foundation which is elaborated upon in various ways in individual writings; these writings build a generally consistent and integral structure.

Albers’s articles, speeches, lectures, notebooks, and bibliographies are items that provide glimpses of what he did in the teaching environment of the studio. Class notes recorded by students have been particularly instructive. Albers’s most ambitious published work, *Interaction of Color*, was compiled at the culmination of his career; it is has been instructive to review its contents in the context of the archival and other written material.
3. TEACHING DESIGN: HARBESON AND ALBERS

In the early 1930s design education in the United States reached a point of crisis when the theory and practice of its prevailing paradigm failed to meet the needs of educators, students, and society at large. Although not the only system used during the early years of American design education, the influence of the approach that originated at the École des Beaux-Arts in Paris was felt throughout the United States, and it was the dominant method for much of the early twentieth century. “John F. Harbeson’s *Study of Architectural Design*… offers the best text in English to describe, step by step, the system of architectural education termed the Beaux-Arts method… as it was adapted and refined to suit the structure and demands of American departments and schools of architecture.” Harbeson spent his academic career at the University of Pennsylvania, first as the protégé of the great Beaux-Arts designer and educator Paul Cret, who arrived in Philadelphia in 1907, and later as a master of design and gifted teacher in his own right. (Blatteau, 2008, p. xi).

In a revolutionary shift, the Beaux-Arts method was displaced by the modernism of the Bauhaus, which was introduced in the United States primarily by three men. In November of 1933 Josef Albers arrived to teach design at Black Mountain College, where he remained for fifteen years before moving on to head the design department at Yale. Walter Gropius joined the faculty of the Harvard Department of Architecture in 1937. That same year, Ludwig Mies van der Rohe accepted a position at the Armour (now Illinois) Institute of Technology. Gropius referred to Albers as “the very best teacher I could imagine” (Gropius, 2007). We are
fortunate to have in the State of North Carolina Archives excellent student class notes from Black Mountain that, along with other materials written by and about Albers as a teacher, provide a general portrait his methods.

A comparison of the learning environment at Penn as described by Harbeson with the portrait of the classroom of Albers allows us to begin to form a basic picture of the two systems in terms of their approaches to history, critical thinking, knowledge, and creativity. It is intended that these interpretations will help frame the historical explorations that follow.

It is acknowledged that the two educational settings depicted here do not offer a strictly “apples-to-apples” comparison. The Department of Architecture at the University of Pennsylvania had the very clear goal of producing architects for professional practice. Black Mountain was an alternative liberal arts college. But the courses Albers taught at Black Mountain and later at Yale were extensions of his Foundations course at the Bauhaus, which was primarily concerned with professional design, and the ages and education levels of students of the respective programs were relatively equal. Also, “Albers either said or wrote that basic studies incorporated only those elements and principles that were in common to all visual arts including painting, drawing, sculpture, design, and architecture. Within my experience, he never made any distinction between students in one discipline or another, they were all treated equally” (Kelly, 2000, p. 5).
Harbeson

A project assigned to students at an early stage of Beaux-Arts system was called the analytique or “order problem.” Harbeson lays out the steps of the analytique and devotes space to each step as shown below:

1. Taking the esquisse—6 pages.
2. Preparing for the first criticism and laying out the schedule—6 pages.
5. Composing the sheet—10 pages.
6. Passing to ink—8 pages.
7. Rendering—14 pages in two chapters.

“Esquisse is the French word for sketch. It is used in the ateliers [design studios], however, in a specific sense and means a preliminary sketch showing the main ideas of a student’s solution of a problem outlined in a program. It is done in a short and fixed time, usually nine hours, and is made ‘en loge’ [in a private space without outside help or references].” During the first few hours of the esquisse, the important thing for the student is “not to settle on any one idea, nor to think of the merit of any one idea, but to indicate as many different solutions of the problem as possible.” Having done that, the student must then decide on which solution is best, then study and refine it. Once the proportions and arrangement are studied in quick elevation, plan, and section drawings on tracing paper, and
the basic design is settled, the student is “ready to draw the esquisse itself” (Harbeson, 2008, p. 7-11)

This is also done on tracing paper, and, as it is usually the size of the sheet on which the program is printed, the size can be laid out by simply placing the tracing paper over the program, drawing the same time the single line border required.

This sheet can now be placed over the last study of the selected scheme, which is then traced to show all of the essentials, but no details. Figure [3-2] is such an esquisse made over the last sketch in Figure [3-1]. Note that the ornament is indicated only, and that in a conventional manner, showing a “gray” tone. The caps of the columns are indicated in similar fashion, so that when the student starts to study his problem he is free to choose among any of the Corinthian or Composite types. The paneling in the door, and sculpture, are merely suggested.

Figure 3-1 Esquisse sketches
But certain things are absolutely fixed. In working from this *esquisse*, the student would have to have his doorway enclosed with a semi-circular form; that, in turn surrounded by engaged columns supporting an entablature with a broken pediment, with some sculptural form between. The return of the cornice at each side of the each column is also clearly indicated and could not later be omitted.

[The draftsmanship in the *esquisse*] should be neat and workmanlike, and should not attempt cover an indecision on the part of the maker as to two different schemes, leaving him free to choose which he prefers to do. Such an *esquisse*, or a careless *esquisse*, may cause a problem to be thrown out by the jury, just as will a change from the *esquisse*. (Harbeson, 2008, p. 11).
Note the level of detail and precision with which the procedure is outlined. The Beaux-Arts system was extremely well-defined and narrow in its definition of the proper way to work out a problem, and in the amount of time and effort that were to be applied to each step in solving of the problem. Figure 3-3 is a time schedule for a three-week problem, given for comparison with Figure 3-4 (for a five-week problem). “It will be seen that the rendering
must be given as much time, final drawings almost as much; the difference comes in the body of the problem—in the time spent in what we call ‘studying’ it” (Harbeson, 2008, p. 15).

Figure 3-4 Five week problem schedule
Again in the description of the study of the problem we find that the procedure is very well-defined: “The means for the logical study of a problem are the several ‘projections’—plans, sections, elevations; and this is the logical order for their consideration…. The procedure for the study of a problem is quite simple. The proportions of the big masses are studied at a small scale; *these proportions are fixed while the drawing is at a small scale*, as they can then be readily judged. They should not later changed without being tried again at small scale” (Harbeson, 2008, p. 19-21).

In the analytique, after the completion of the esquisse, the next important step is the preparation for the first criticism, a meeting of the student with his primary instructor. “The value of this first criticism is to have the main proportions of [the solution developed in the esquisse] corrected. Therefore, [the] first studies should aim to show these proportions in as striking a manner as possible…. The idea is to determine, at [a] small scale, when it is most visible, what is good proportion between openings and wall—voids and solids—between masses in projection and in retreat, between features, and between all of these elements when related to each other…. Try in these sketches—it is better to make several—to express your ideas fully to your critic. He wants to develop your ideas, not his own; and he would like to correct, at the start, any ideas that you may have that are fundamentally wrong. So, beginning with the esquisse, develop your ideas of the problem as much as possible before you place your work before him. You will be better able to make use of his criticism, and you will
develop your own initiative; he can only help to develop your knowledge of design and proportion and your sense of taste” (Harbeson, 2008, p.15).

In his section concerning the use of documents, Harbeson reveals a defining characteristic of the Beaux-Arts system: its attitude toward history. “Each one of us has certain elementary ideas of proportion… This feeling is the result of tradition. We and our ancestors have become accustomed, through the centuries, to doors and windows of certain proportion; this is true in some degree of all the ‘elements.’ Changes in these proportions have been made only when forced by structural or other considerations. Each door, each window, each building that has been done is a step in a big evolution. Once or twice a break has been made—the beginning of the Renaissance, the so-called ‘revivals,’—but these were breaks back to an earlier tradition, not a cutting loose of all tradition. The one man ‘original’ styles—such as the Sullivan style—have not made headway because they cannot find an audience, the forms being strange to the average beholder, who does not take kindly to them because they are strange—queer—to him.

“Therefore, the study of design—of proportion—resolves itself into a study of tradition; the study, in essence, of the worthy efforts of the past… So to study the proportions of the elements, we study the proportions used by the masters for those elements, from actual examples, if possible, or from books or photographs. We find that they vary, but within certain limits” (Harbeson, 2008, p. 27)
Figure 3-5 Analytique solution
Thirty of the 62 total pages Harbeson writes on the procedure for the *analytique* are devoted to graphics: composing the sheet, passing to ink, and rendering. The rendering section takes up two chapters and provides extensive detail concerning the development of the special skills necessary to produce the distinctive and highly realistic drawings that characterize Beaux-Arts work. Typical student work showing the solution to an analytique is shown in Figure 3-5.

**Albers**

The first assignment recorded in Margaret Williamson Peterson’s notes for Josef Albers’s design course in the summer of 1945 at Black Mountain was: “Exercise 1: write Black, your name, Mr., all upside down, and back to front, and sidewise” (Peterson, 1945b, p. 3). See Figure 3-6.

“Albers had strong feelings about the need for concentration when drawing… he asked students to write their name and hold up their hand when completed. The response was nearly immediate. Next, students were asked to write their name backwards and raise their hand when completed. This took longer. He then asked students to write their name upside down and backwards. This took a considerable amount of time. He used this demonstration to talk about ‘automatic’ drawing, which is done without thinking. Writing their name backwards called for mental visualization and concentration, and it was this state of mind that he felt essential to drawing.
Figure 3-6 Albers exercise one
“Another one of his demonstration exercises [described by an Albers student at Yale] was to take a sheet of paper, fold it, and then flatten it out. The crease made a line. After this demonstration, we were to lay the sheet of paper next to our drawing board. We were to mentally fold the paper on angles and draw in the crease lines. After making two mental folds, the concentration necessary was so intense it became painful. When we reached that point, we were instructed by Albers to have that same degree of concentration each time we drew” (Kelly, 2000, p. 6).

A variation of the above is shown in the notes from Black Mountain: “Exercise 2: learn to reverse forms by folding corners of geometrical forms. Then go on to reverse more difficult forms such as leaves, letters, etc… If an artist does not learn to visualize these forms, he
depends on accidents. He does not master [the notes quote Albers]” (Peterson, 1945b, p. 3). See Figure 3-7.

Albers used another series of exercises, called matière, help students begin to explore the nature of materials. “Matière: how matter looks—in its epidermis. Deals with the appearance of things, of material, not its capacity. Deals with the texture of materials” (Peterson, 1945b, p. 16). A matière might combine gray stone with dried Queen Anne’s Lace over brown cloth. He wanted students to see “how glass and wood, wood and stone, wood and material combinations affect the wood” (Peterson, 1945b, p. 8). The exploration extended beyond the relationship between materials to the relationship between the material and the observer. When you draw a piece of wood, “by graphic means alone, you participate in the stubbornness of the splinters” (Peterson, 1945b, p. 63).

The goal and culmination of the matière was “Rearrangement: To change the materials by intensifying them, to make recognition easier or more difficult—and by so doing producing an additional quality which is not really belonging to the material by itself. Indication that human mind has added something new” (Peterson, 1945b, p. 70). In his exercises, Albers is trying to help students see relationships for themselves and to learn to manipulate relationships to create new meaning. The goal of Beaux-Arts training is to teach students to see how to recreate proper proportions in relationships that convey timeless meanings.
History

Albers’s modernist stance places itself in stark contrast to the Beaux-Arts reliance on the past and its desire to perpetuate a common architectural language based on ancient precedent. He articulates the attitude: “If we ask what is being done now, what direction our studies take in relationship to the past, the present, the future; the answer is clear: we over-accentuate the past, and often are more interested in drawing out a continuous line of historical development rather than in finding out which of the certain art problems are related to our needs of life. The way of an historical seeing has the danger of looking at the world through dead eyes…. Art is an essential part of life. If this is true then we must no longer educate our students either to be art historians or to be imitators of antiquities, but actively to experience artistic seeing, artistic working, and still better, artistic living.” Still, Albers did not discount the value of learning from the successes and failures of the past: “Don’t misunderstand me. I like earlier art very much, particularly the earliest art, but we must not forget that they don’t belong to our life and that the study of them has as its purpose the understanding of the spirit of their period or, what is more important, the getting of a measurement for comparisons with our own work. We need to pay most attention to what we find in our own times” (Albers, 1936, p. 233).

The views of history of each school are related to the kinds of reasoning they employ. The Beaux-Arts design method is deductive in that it begins with general truths that lead to decisions about specific relationships. Albers’s process is inductive—specific relationships
are examined to determine the best way to create a whole. “Form as appearance includes shape, space, color, matière, in all variants, nuances possible. Form becomes emotionally meaningful through relationship” (Peterson, 1945b, p. 74).

**Critical Thinking**

According to Harbeson, the purpose of the training of the École des Beaux-Arts “is to impart to each student a method of attacking and studying any problem in architectural design which may be presented [emphasis in original]” (Harbeson, 2008, p. 1). Albers’s statement that the “job of this school is not to teach industrial design but fundamental thinking” (Peterson, 1945b, p. 3) does not seem so different from Harbeson’s assertion that a goal of instruction is to help the student develop his own initiative. The primary difference is that in Harbeson’s system critical thinking occurs within a framework defined by the system; Albers hopes that students will define their own critical identity. “Find out ‘why is my reading?’ Do I ask for sharpness because I myself am soft or do I like sharpness because I am sharp?” (Peterson, 1945b, p. 36).

It sometimes seems easy to characterize the Beaux-Arts as a rigid, regimented, unbending system. But as Lloyd Warren writes in the Foreword to the analytique in Harbeson’s *Study of Architectural Design*, “Bernard Shaw has said somewhere that the things we are taught we never learn, and for this reason I would counsel the reader of the following pages especially to read between the lines. Take, for instance, the article on the composition of the sheet: its
purpose is not to say, arrange your detail so, put a balustrade across the lower part of your paper, place your façade above it, and that is all you have to think about. Far from it, its purpose is, by giving a few examples of good and a few of bad solutions to stimulate the student to search and to learn for himself such variations in the fundamental principles of composition as may be most sympathetic to him, and may give his work that personality which is the basis of all style” (Warren, 2008, p. 5).

Still, the Beaux-Arts framework for thinking is based on a classical model. Its teachings “were rational, which is to say, they rested on a belief in absolute, universal standards of beauty. Their theories of aesthetics constantly sought to meet those standards. The system of proportion and dimension derived from the ancient Greek and Roman orders of architecture—the Doric, Ionic, and Corinthian—underlaid and defined this philosophy. Accordingly, the built work of antiquity and, in turn, of the Italian and French Renaissance also inspired and informed the École’s philosophy” (Blatteau, 2008, p. xii). The pedagogical mode of operation of the Beaux-Arts as demonstrated by Harbeson’s explication of how to solve the analytique was based on finding solutions to design problems through the application of tried and true methods.

In comparison, Albers’s courses should not be thought of as a sort of formless exploration. His

“pedagogy was not suited to every individual's concept of an art education. Because of the restrictive nature of simple exercises with specific criteria and objectives, some felt that he was too dogmatic, rigid, and arbitrary. His classes were never conducive to free spirits who wanted to do their own thing…. He never questioned content, only what the student was doing or trying to do visually [and he]
was open and receptive to all kinds of expression. It always was a matter of the student's level of study and understanding of what they were doing. When critiquing painting students, it was customary for Albers to ask the student what they were trying to do. If the student responded in terms of color, space, or form, Albers engaged in meaningful discussion with the student. If the student responded in terms of feelings, or some esoteric rationale, Albers would throw up his arms and, in a loud voice, exclaim, ‘Gotten Himmel! Don't show me your intestines.’ He would avoid that student for the next few weeks. It did not take students long to learn how they should reply to Albers’s inquiries if they wanted his input. Albers was extremely rational in his approach to instruction. When it came time to put pencil or pen to paper, brush to canvas, or chisel to wood or stone, Albers believed that artists became intensely rational as they concentrated on how best to give form to intent (Kelly, 2000, p. 9-10).

The word *rational* in the preceding quote is not used in the sense it is used in the one before it, that is, as a referring to absolute, universal standards. Instead it is used to point out the fact that in art and design there are practical necessities involved in creating a means of communicating an idea or emotion. This is a pragmatic point of view. A point of agreement between the Beaux-Arts and the Bauhaus is the idea that learning must have order, and that fundamental skills are part of the basis for the ability to do creative work. “Albers constantly admonished students, ‘You must learn to crawl before you can walk, and until you can walk, you cannot run’” (Kelly, 2000, p. 8). The *analytique* is the first of a series of problems that make up the Beaux-Arts canon. It is followed by the Class B Plan Problem, the Archaeology Projet and Measured Drawings, the more complex Class A Problem, the Sketch Problem, and the famous Prize Problems (Harbeson, 2008, p. ii-iii).

“Albers compared learning to the crystallization process in which one crystal forms on another. He believed that, in the first year, students should learn simple, uncomplicated concepts; and as they moved through the program, the work should become progressively more complex. Each bit of new learning is added to the first until a body of knowledge accumulates, and from there on, students are expected to grow as a result of their
experiences…. Albers clearly stated problem objectives which were uncomplicated and easily grasped by students. He always provided criteria for evaluating progress and goals. Consequently, students became increasingly self-sufficient in working toward problem objectives. He presented exercises in sequential and incremental steps, with each new one building on the one before—much like the crystallization process he described as learning” (Kelly, 2000, p. 5, 8-9).

“The terms ‘problem’ and ‘exercise’ often are used interchangeably, but they are really quite different. ‘Problem’ implies a solution, while ‘exercise’ is defined as experiential learning without solution, and it has infinite variations… under Albers, we did exercises” (Kelly, 2000, p. 5-6). Albers told his students: “Deal no more with monuments…. Fight symmetry—because [doing so] frees you from habit.” He hoped they would strive for “chosen order, not habitual order” (Peterson, 1945b, p. 37, 71, 73). In a typical critique “Albers then began to take each student's work and point out those places in the composition where the student had to make a visual decision. He talked about the decision they made, the result of that decision, and what other options could have been explored” (Kelly, 2000, p. 12-13). As Albers said in class at Black Mountain: “Thinking in situations in life is just as important as thinking in conclusions” (Peterson, 1945b, p. 54). The Beaux-Arts method taught students procedure, the modernist helped students learn process.
Epistemology

The Beaux-Arts reverence for the buildings of antiquity with their expressions of timeless truth embodied in the classical orders, along with its method of teaching a procedure to enable the expression of that truth, reveals a conception of truth that places it outside the changing milieu of everyday life. The modernist emphasis on process results from a perception of truth that changes as situations change. “Thinking in situations” demands a kind of flexibility and confidence that following rules does not. Timeless truth in pure form relieves one of the responsibility for examining situations, weighing possibilities, and making difficult decisions. When Albers asked one student how her studio work was going, she “said that it was terrible. Nothing was coming out the way she wanted. He smiled and said, ‘Good! Good!’ Albers understood the role of frustration and struggle as an essential part of the educational process” (Kelly, 2000, p. 12).

At Penn and other Beaux-Arts style design schools, the “esquisse had enormous importance in teaching. It trained the student to develop a design and work out its details at the outset, rather than start and then abandon a design in search of another, better solution” (Blatteau, 2008, p. xv). The Beaux-Arts method demanded that students make decisions and stick to them, whatever the resulting difficulties. The resulting difficulties were an expected and vital part of the learning process. “The value of the esquisse from the point of view of mental discipline is very great. The discipline of working on a problem on which one is tied down to an esquisse is as strong and as persistent a corrective as there can be
against vague and loose thinking…. One of the chief objects of the Beaux-Arts method is to teach a man to confine his efforts to a well-defined channel.” Of greatest importance is the fact that “the student has been obliged to make his point of view precise [emphasis added] at an early stage of the study of the problem” (Harbeson, 2008, p. 8). This is a trait that Albers also demands: “Be precise, clear and sure—that is a designer” (Peterson, 1945b, p. 3). The difference is in the source of the confidence that enables the precision. The Beaux-Arts designer has confidence in his or her knowledge of history and accepted standards of proportion. The confidence of the modern designer must come from self-knowledge—from finding the answer to the question: “Do I ask for sharpness because I myself am soft or do I like sharpness because I am sharp?”

Creativity

As we see from the relative emphases on the steps in the analytique, the Beaux-Arts method placed its greatest emphasis on the final product and taught a procedure that was known to achieve good results. In the Bauhaus modernist mode of teaching as practiced by Josef Albers, the “more judgments students made, the more they learned. Albers’s exercises were designed to make students explore and refine, which are positive learning processes. [Though] Albers always enjoyed seeing student work when it was put up for critique… process was considerably more important to him than the end result” (Kelly, 2000, p. 14).
In Harbeson’s view, directly fostering creativity was not a part of early design training. “Later on there will be opportunity for originality, individuality, fantasy and caprice, which are entirely out of place until they can be founded on a knowledge based on studies of the ‘Classics’” (Harbeson, 2008, p. 24). In Albers’s opinion, the “greatest thing opposed to developing imagination or flexibility is habit.” While “some habits have sense… habit is in the way of creative production” (Peterson, 1945b, p. 3).

![Figure 3-8 A creative thinking sequence adapted from Rice](image)

One simple model of creativity conceives of it as a sequence beginning with a section of divergent thinking followed by a section of convergent thinking. Such a sequence might look
like Figure 3-8. That is, a creative process involves first thinking divergently, trying to find as many ideas as possible. At a certain point, a decision is made—one of the ideas is deemed the best. At that point, convergent thinking begins and the idea is refined to the point that it can be clearly and precisely communicated.

In the Beaux-Arts *analytique*, the divergent thinking section is very short. A decision is made extremely quickly and most of the effort is devoted to the production of graphics to
illustrate the design. This sequence is shown in Figure 3-9. In Albers’s model, Figure 3-10, divergent thinking is far more important and takes up a much larger proportion of the process.

There is one last important factor in the comparison of the methods of Beaux-Arts and modernist design pedagogies: Both schools were based on the design studio. At the École des Beaux-Arts in Paris, learning was centered on the atelier (studio) system to such an extent that though lectures were offered by the École, attendance was not required. The Bauhaus continued the centrality of the studio in the experience of the student. Students learned by doing projects in both systems. From this perspective, when the two together are compared to educational method in general, they share a great deal. Though they differ in many ways, the experience of learning by working with one’s hands, making physical objects to convey ideas and evoke emotions, in a setting with other students going through the same process, is common to both. The phenomenon of the studio and the ways of learning it engenders are at the core of what makes design education unique.
The Ancient through the Medieval

Its way of designing its physical environment is one of a civilization’s fundamental ways of expressing itself. “The city is not so much a mass of structures as a complex of inter-related and constantly interacting functions—not alone a concentration of power, but a polarization of culture” (Mumford, 1961, p. 85). The education of designers is one of the most important means by which culture grows. The connection between the design and craft, between thinking and doing, is fundamental to the understanding of the evolution of education theory. The synthesis of theory and practice has formed the basis of design education. That synthesis has been facilitated through the project method in design education throughout its history. “Learning by doing” is the basic operating procedure of design education.

Architectural design, though its scope and definition have varied, has existed as a learned profession since the beginning of civilization. The theme of the relationship of theory and practice is one that will appear repeatedly in a survey of design education history; the shifting balance of the two is one factor that identifies the state of design in a particular period of time. That balance both reflects and helps define the spirit of the age. In ancient Egypt, “the education of architects was closely tied to the priestly class” (Kostof, 2000a, p. 6). “The principle deity of architecture… was the goddess Seshat, known as ‘Lady of the builders, of writing, and of the House of Books.’” She was “sometimes replaced by Thot, the god of
science, or Ptah, the god of crafts, a constellation that neatly scans the total scope of architecture from pure theory on the one hand to the practical knowhow of construction on the other” (Kostof, 2000a, p. 5).

Concerning the education of future architects in ancient Greece, “close examination of the Parthenon and other masterpieces of the period has made it certain that such optical and aesthetic refinements as have been revealed therein could only have been achieved through long and patient study,” although “[w]e do not know whether they learned their craft in the atelier of a master, as pupils or apprentices, or whether there were schools in which they were trained” (Briggs, 1927, p. 22-23). Training “seems to have been both practical and bookish. An early work we hear about is the volume brought out by Theodoros of Samos, a sculptor, architect, and metalworker of the sixth century B.C.,” who directed a private school of architecture in Sparta (Kostof, 2000a, p. 16). Treatises and technical writing existed: Vitruvius, in his Ten Books of Architecture of the first century B.C., at the beginning of Book Seven (Finishing), includes a few bibliographic paragraphs, crediting Democritus, Anaxagorus, Silenus, Theodorus, Chersiphron, Metagenes, Pytheos, Ictinus, Carpion, Theodorus of Phocaea, Philo, Hermogenes, Arcecius, Satyrus, Pytheos, Leochares, Bryaxis, Scopus, and Praxiteles. Concerning their work, and that of “many others,” Vitruvius writes, “of their treatises, I have noted what is useful, and brought it all together in a single body, and all the more because I realized how many Greek books have been published on the subject, but how very few have been written by our own people” (Vitruvius, 1999, p. 86).
Vitruvius entitles Chapter 1 of Book I of *Ten Books of Architecture* “The Education of the Architect.” Therein we learn that the architect’s “expertise is born of both practice and reason. Practice is the constant, repeated exercise of the hands by which the work is brought to completion… Reasoning, however, is what can demonstrate and explain the proportions of completed works skillfully and systematically…. architects who strove to obtain practical manual skills but lacked an education have never been able to achieve an influence equal to the quality of their exertions; on the other hand, those who have placed their trust entirely in theory and in writings seem to have chased after a shadow” (Vitruvius, 1999, p. 21). Technique without theory is pointless; theory without technique never amounts to anything. To be educated, the architect must be “an experienced draftsman, well versed in geometry, familiar with history, a diligent student of philosophy, know music, have some acquaintance with medicine, understand the rulings of legal experts, and have a clear grasp of astronomy and the ways of Heaven” (Vitruvius, 1999, p. 22). “It may be objected that such a curriculum is of a general rather than a technical nature, and that it omits the two most important subjects in modern architectural training—design and construction. That Vitruvius did not mean to exclude these from his syllabus is apparent from the scope of his own treatise, which is largely devoted to them” (Briggs, 1927p. 31). The architect is responsible for the functionality and structural integrity of buildings and for quality of craft. Further, the architect, as a member of the educated class, is capable of, and expected to, convey important meanings through a language based on the skillful composition of design elements.
Architecture was a vitally important part of the program of the Roman empire after Vitruvius. The enormous built record left behind by the Romans attests to the sophistication of their design skills in city planning, buildings, and public works. Their consistent use of form, proportion, and decoration points toward a system of shared understanding that is only acquired through training. Further, their great works go far beyond a mere copying of precedent; they combine conventional design elements in innovative, subtle, and creative ways—a sign that the designers were fully aware of their opportunities for expression and responsibilities to their culture. Yet “[m]ost of the few great Roman architects whose names we know—and whose buildings we know something of—appear in the literature as acknowledged masters, and little or nothing is given about their training,” (MacDonald, 1977, p. 37). We “are left in complete ignorance of the means by which the young architect acquired his knowledge,… nor do we know whether the Roman State, so highly-organized in many respects, required an architect to satisfy any test or obtain any diploma before he commenced practice” (Briggs, 1927, p. 32). The meagre evidence that exists seems to imply that in Rome there were “three avenues to professional status: training first in the liberal arts and then through service with an established master…; training in the army…; or an ascent through the graded levels of the imperial civil service” (MacDonald, 1977, p. 37).

The fall of the Roman empire in the fifth century A.D. changed life dramatically for individual architects and for the profession as a whole. “The Classical concept of the architect as it is represented in Vitruvius faded and was replaced by something else: the
architect as master-builder. For Vitruvius, the theoretical aspects of the profession and a thorough grounding in the Liberal Arts were as important to the architect as expert knowledge of building technology. Not so in the case of the medieval architect, who rose from the ranks of the building crafts…. What changed was not fundamental to the traditional task of the architect, the conception and supervision of buildings. The change was rather one of social standing” (Kostof, 2000b, p. 61). In ancient Egypt “the post of chief state architect clearly belonged at the very peak of the governing hierarchy. At times, there was no more powerful official after the king” (Kostof, 2000a, p. 6). In the early second century A.D., the architect Apollodorus consulted directly with Trajan, and got himself slain because of his intemperate criticism of the work of another architect: Hadrian, who succeeded Trajan as emperor (MacDonald, 1977, p. 48). Medieval European architects did not move in such circles.

Still, “it is inaccurate to assert that… the rules of design… insisted upon by Vitruvius were of no interest in the Middle Ages.” Most of the big Medieval architecture jobs were funded by the church. The proportional relationships of dimensions in plan outlined by Vitruvius were brought forward and adapted to form the basis for Christian symbolism in the layout of churches. During the Carolingian Renaissance of the eighth and ninth centuries, Charlemagne’s drive to revive Roman authority “encouraged the study of older buildings.” The results are seen in a number of projects, including in the plan of the forty-building
monastery complex of St. Gall, “the earliest architectural drawing of the western Middle Ages to survive” (MacDonald, 1977, p. 70-71).

Another important Roman legacy was the hereditary collegium, or craft guild. The collegia were controlled by the state under the Theodosian Code of 429. By the end of the Middle Ages, the guild system was in full force, though by then it operated through apprenticeships rather than through heredity. “The success of the apprenticeship system during the Middle Ages and the period of the Renaissance was largely due to two factors: First, the close personal relationship and identity of interest existing between master and apprentice; and second, the supervision of master and apprentice by the craft gilds….’” The educational objectives foreshadow later developments; notably, it was the duty of the master to prepare the apprentice “to be not only a good craftsman but a good citizen as well” (Scott, 1914, p, 50). The role of education in determining social order and the character of culture arises often, e.g.: in the works of Locke and Rousseau; in the educational reform movements in Prussia in the early 19th century and in the United States in the early 20th; in John Dewey’s Democracy and Education; in the Bauhaus Manifesto.

“The apprenticeship system, whether formally or informally applied, possessed many advantages. Under it no gap existed between training and practice. Apprentices observed and helped their masters on real projects. They met live clients and had close contact with builders and workmen. They heard primary decisions being made and followed the progress
of construction at first hand. The effectiveness of the system is amply attested to by the splendid monuments created by the men it produced” (Bannister, 1954, p. 83).

The role of the church during the Medieval period in preserving and proliferating secular knowledge generally and design principles in particular should be acknowledged. By then, the monasteries had become “the schools for teaching, the place of professional training, the only universities of research, the only publisher of books” (Bennett, 1926, p. 20). The “monasteries not only encouraged and practiced admirable architecture throughout the Middle Ages but… they were largely responsible, in the early centuries, for the training even of those laymen, who carried on what we call ‘private practice’ in later life” (Briggs, 1927, p. 110).

Given the complexity of Medieval architectural works, particularly toward the end of the period, “[t]he notion that Gothic cathedrals were the triumph of anonymous teamwork or the conjuring of scholarly churchmen cannot be seriously entertained.” By the eleventh century, “designers and clerks of the works… began to acquire a high status and command wide respect” and “the architect was more and more distinguished from the body of craftsmen.” Though “it was not until the thirteenth century that the emergence of the new image of the architect is complete… by then the intellectual detachment of the designer from the workforce” was commonly recognized (MacDonald, 1977, p. 75-77). The late Middle Ages had seen significant technological advances (Zenner, 2004). As “building became more complex in the Gothic period, designers had to have increasing skills at geometric
manipulation to design arcading, tracery, and vaults. So true was this that the designer-architect became clearly differentiated from the hands-on mason. Not everyone understood this distinction, though the separation began even before 1000” (Barnes Jr., 2009, p. 219).

The French draftsman or architect Villard de Honnecourt left a visual record of his travels in the early 13th century; many of his drawings depict architectural subjects. If he “is at all typical of his time, we may safely infer that, either in the monastery or under some able lay architect, he became a talented draughtsman of figures and ornament, and that he was also well versed in geometry and mechanics. He was a well-educated man, according to medieval standards, understood Latin, and could write neatly. We may even infer that an architectural student of those days was expected to travel and sketch, so far as circumstances then permitted” (Briggs, 1927, p. 110). While the assertion that Villard was himself an architect has been seriously questioned (Barnes Jr., 1989), his work illustrates a “challenge to the belief that the work of the mind was both completely separate from, and higher than, the work of the hand” (Grafton, 2000, p. 78). This challenge was the basis for “new philosophies and new methods for the schools which bore fruit in the sixteenth and seventeenth centuries. During this period there appeared two of the fundamental ideas upon which modern instruction in the manual arts has been built. The first of these is that sense impressions are the basis of thought and, consequently, of knowledge. The second is the related idea of ‘learning by doing.’ Out of the first idea grew the object method of teaching and later, the laboratory method; out of the second came the recognition of the value of working through a
process, of making something with the hands or with tools, of doing something skillfully, as a basis for rational thinking” (Bennett, 1926, p. 30). Bennett here is writing about manual and industrial education rather than about design education, but the two branches have grown from the same roots; it is impossible to understand design without recognizing its ancient and continuing connection to craft. A particularly interesting implication of this conception of knowledge and learning is the position it gives design education in relation to education theory in general.

The Renaissance through the Baroque

Humanism was “an educational and cultural program based on the study of the classics and colored by the notion of human dignity…. [It] was the most important single intellectual movement of the Renaissance” (Rice Jr., 1994, p. 78). In the 14th century, Italian thinkers led by Petrarch rejected the Scholastic tradition, in particular its tendency to attempt the direct application of ancient writings to contemporary professional practice. Instead, they studied and critiqued classical works in search of the wisdom within them. The value of their work was widely recognized and the movement resulted in schools that “would train young men not to carry out a single defined specialist function but to become effective generalists—active scholars prepared, like the ancient orators on whom they modeled themselves, to deploy their knowledge of history and morality in every arena of public life.” In On the Advantages and Disadvantages of Letters, “with its sharp condemnation of the greed of the
professionals and the unworldliness of the humanists,” Leon Battista Alberti (1404-1472) “was contributing to a lively ongoing debate on the status of the professions” (Grafton, 2000, p. 39).

Giorgio Vasari, writing in 1550, asserts that: “theory, when separated from practice, is, for the most part, found to avail very little; but when theory and practice chance to be happily united in the same person, nothing can be more suitable to the life and vocation of artists, as well because art is rendered much richer and more perfect by the aid of science, as because the councils and writings of learned artists have, in themselves, a greater efficacy, and obtain a higher degree of credit, than can be accorded to the words or works of those who know nothing beyond the simple process they use, and which they put in practice, well or ill, as it may chance. Now that all this is true is seen clearly in the instance of Leon Batista Alberti, who, having given his attention to the study of Latin as well as to that of architecture, perspective, and painting, has left behind him books, written in such a manner, that no artist of later times has been able to surpass him in his style and other qualities as an author” (Vasari, 1886, p. 1). In the second paragraph of On the Art of Building in Ten Books Alberti echoes the Vitruvian concept of the architect as an educated man who balances liberal arts sensibility with technical knowhow: “Him I consider an architect, who by sure and wonderful reason and method, knows how both to devise through his own mind and energy, and to realize by construction, whatever can be most beautifully fitted out for the noble deeds
of man…. To do this he must have an understanding and knowledge of all the highest and most noble disciplines” (Alberti, 1988, p. 3).

Alberti’s best contemporary example of the emergent generalist intellectual/technician was Filippo Brunelleschi, who had studied Vitruvius, journeyed with Donatello to Rome to examine and draw the ancient ruins in great detail, (re)invented mathematical perspective drawing (as made clear by Alberti, “not a matter of manual skill but an intellectual feat” (Wilkinson, 1977, p. 125)), (Edgerton, 2009), and solved the century-old problem of how to build the dome on the Florence cathedral (Manetti, 1970). Alberti dedicated the Italian text of his treatise On Painting to Brunelleschi and invited him to “read my work carefully, and if anything seems to you to need amendment, correct it” (Alberti, 2004, p. 35), thereby identifying him “as a man of learning” and making it “clear, in terms no contemporary humanist could miss, that he saw the architect as his colleague” and “forcefully acknowledg[ing] that Brunelleschi too practiced a liberal art or arts, arts that required the use of the intellect (a point that Brunelleschi had made, two years before, when he refused to pay guild dues” (Grafton, 2000, p. 76).

“Almost every famous architect whose life is described in detail by Vasari, even the poorest of them, somehow contrived to spend long periods, often many years, in measuring and drawing the antiquities of Rome” (Briggs, 1927, p. 142). In 1519, about a century after Brunelleschi’s trip to study the ancient Roman ruins, Rafael was commissioned by the pope to document ancient Rome. “The drawings proposed by Rafael were to be of two kinds.
There were to be views of the ruins, but, more important, he also suggested true architectural drawings, consisting of plans and elevations. The tradition started by Brunelleschi as essential for architectural practice—and we may add, for the training of architects—had now reached maturity” (Ettlinger, 1977, p. 105).

“The essential difference between Alberti and Vitruvius is… that the ancient writer tells you how the buildings that you may admire as you read him were built, while Alberti is prescribing how the buildings of the future are to be built…. Vitruvius, for all his encyclopedic and philosophical pretension, writes to confirm his position as the custodian of a tradition,… Alberti writes to claim a high place in the social fabric for the re-formed discipline of the architect, which has to be established anew” (Rykwert, 1988, p. x). Brunelleschi embodied the re-establishment of architecture as a profession. Alberti re-invented the architect as an intellectual.

That intellectualism carried with it a cultural responsibility. For Alberti, “humanism was not simply book learning or acquaintance with ancient monuments, but the application of all knowledge in the public interest; and the structure of the treatise on architecture is determined by this basic belief. It is not a classicist’s primer on style, but rather a guide through an ideal city which can offer the best living conditions for the community…. [He wrote] as a social philosopher” (Ettlinger, 1977, p. 112-13).

“The majority of architects in Italy before 1550 were trained as painters or sculptors… Vasari ascribed [this phenomenon] to the fact that artists were trained in disegno—‘the father
of our three arts’. Developed by Vasari (and others) into a theory of artistic creativity, *disegno* was the foundation of the liberal status of the practice of art, without which it would not have been possible to distinguish the artist from the craftsman” (Wilkinson, 1977, p. 134). Architects in the Renaissance needed to master mathematics and perspective, skills they could attain via training in painting or sculpture, along with a knowledge of the ancient Roman structures as mentioned above. As artists moved into architecture, they *learned by doing*, or at least from watching: “…the practical precepts of the profession were learned by Raphael, Peruzzi, and even by Michelangelo, from observing what went on in Bramante's Vatican studio whether or not these men were originally given any architectural assignments there” (Ackerman, 1954, p. 4). “In none of Vasari’s biographies of architects is there any mention of a school where architecture was taught, but most youths are stated to have been apprenticed or articled to an architect in practice” (Briggs, 1927, p. 139). The “rugged individualism” that Ackerman attributes to the Renaissance architect

is illustrated first in his unwillingness to be bound by those abstractions we call plans and elevations; second in his refusal to establish a permanent office staff or even a studio for his own work; and third in his suspicion of theoretical principles and his avoidance of the written word, whether it be his or another's. We are accustomed to caricatures of the bohemian painter and sculptor in the proverbial garret, and the businesslike architect with offices in the commercial district, but in this segment of the Renaissance these roles, in a sense, were reversed. The Roman Renaissance architect was less trained in the technique and less organized in the practice of his calling than any of his contemporaries in the arts. But paradoxically this was a step toward establishing architecture as a respected profession, because it represented, far more than the procedures of painters or sculptors, a liberation from the bonds of the medieval shop system. At this stage the development of the architect's freedom and social stature was more important than the establishment of standards of workmanship (Ackerman, 1954, p. 10).

Still, the theory/practice dichotomy was in full force; the need to establish the profession and with it the necessity for a recognized body of knowledge and therefore a program of
training and education was clearly understood. Alberti’s *On the Art of Building in Ten Books* appeared almost concurrently with the introduction of the printing press and the resulting information explosion after about 1450. Over the next two centuries, numerous treatises appeared, notably by Filarete (1465), Martini (1475), Serlio (1537), Palladio (1570), and Scamozzi (1615). “[L]ike Vitruvius before them, Renaissance architects were anxious to unite theory with practice because the definition of their profession depended on it. The development of a professional literature in the sixteenth century was largely the result of their coping with this problem” (Wilkinson, 1977, p. 149). Palladio represented the model architect: “well-read in architectural theory, supremely knowledgeable about Roman antiquities, and personally responsible for sound and economical buildings for his clients.” His *I quattro libri dell’architettura* (*The Four Books on Architecture*) is the “great reintegration of humanist theory with contemporary practice” (Wilkinson, 1977, p. 153-54). The ancient orders—their details, proportions, and appropriate uses—became the common language of architecture. The *Canon of the Five Orders of Architecture* by Giacomo Barozzi da Vignola (1562) was, for many years, “highly influential and crucially important” (Wassell, 2000, p. 185). It was one of the books recommended for beginning architecture students by John Harbeson in his *The Study of Architectural Design*, published in 1926.

In France, the Royal Building Administration, the sources of which date to the mid-1300s, had evolved by the mid 1500s to the point that Francis I, “the first French monarch to be interested in the quality of architectural education, provided by the Royal
Building Administration, commissioned Serlio to write several books” (Rosenfeld, 1977, p. 162). Many French architects in the early 16th century journeyed to Rome for their training.

The term “architecture” “seems to have been first printed in its modern English spelling” (Briggs, 1927, p. 3) on the title page of John Shute’s The First and Chief Groundes of Architecture of 1563. Shute’s book “not only represents the earliest exposition of the Classical Orders in England but was the first attempt to consider the practice of architecture from a theoretical standpoint. Paraphrasing Vitruvius, Alberti, and Serlio, [Shute] advocated the Renaissance ideal of the designer as universal man, not simply proficient in drawing, surveying, geometry, arithmetic, and optics, but also versed in literature, history, and philosophy as well as medicine and astronomy” (Wilton-Ely, 1977, p. 180).

“Up to the middle of the seventeenth century, training continued to be chiefly by means of pupilage or apprenticeship, supplemented by exhaustive measuring and sketching of Roman antiquities. Subjects of study, besides drawing, included especially mathematics, geometry, perspective, and mechanics, but literary subjects are frequently mentioned” (Briggs, 1927, p. 169). The Accademia di San Luca in Rome was founded in 1577, where “[a]fter 1634,… architects entered the Academy with rights equal to those of painters and sculptors” (Luca). Other academies were soon thereafter established in Italy. Even then, “all such academy instruction was intended solely as a supplementary system to enhance the training of apprentices and relieve their masters of the responsibility of elementary instruction” (Bannister, 1954, p. 84). In the early years, architectural instruction
at the Accademia di San Luca apparently was sporadic and no detailed records have been
found, but it can be inferred from early eighteenth century evidence that by that time “there
was a strong emphasis on the teaching of the five orders, which conforms to the teachings of
Italian theoretical writers since Vignola” (Hager, 1984, p. 129-30). The “subjects studied,
according to Nicola Pio, the biographer of Antonio Canevaro (…who probably studied at the
Accademia around [1700]), were mathematics, plane and solid geometry, perspective, and
architecture. There were other subjects as well. Measured drawing and rendering were among
them. Also included (most likely within the term architecture) were subjects such as
materials, the orders,… military architecture…. theory or design, …construction, and
history” (Millon, 1984, p. 15-16).

The Accademia di San Luca was “the direct inspiration for both the Academie Royale de Peinture et de Sculpture and the Academie Royale d’Architecture, both of which were
founded largely for the purpose of combating the hegemony of the medieval guilds of
craftsmen, now relegated by the academies to an increasingly secondary role” (Egbert, 1980,
p. 19). “In 1664, Jean-Baptiste Colbert, Louis XIV’s Finance Minister, was appointed
Inspector General [of the Royal Building Administration]…. His most important innovation
was the foundation of the Royal Academy of Architecture in 1671; [he thereafter] determined
the way in which architects were trained” (Rosenfeld, 1977, p. 173). “The French Academy
in Rome, established already in 1666, served as an outpost which took care of the
pensionnaires selected to study in Rome [though only of few of whom were studying to be
architects (Briggs, 1927, p. 225)], and provided a link with the Accademia di San Luca to which the French academic institutions were formally aggregated in 1676” (Hager, 1984, p. 129).

The humanist educator Erasmus of Rotterdam wrote in the early sixteenth century:

The motives of victory and competition are deeply embedded in our children, and the fear of disgrace and desire for praise are also deeply rooted, especially in children who have outstanding intellectual abilities and energetic personalities. The teacher should exploit these motives to advance their education. If he cannot make headway with a certain pupil by using entreaties, flattery, or praise or by promising small rewards, he should organize a mock contest between him and his fellow-students. A lazy student should hear his comrades being praised; and a boy who is deaf to his teacher’s exhortations will be stirred to action by the desire to emulate his fellows. The palm of victory should not be conferred for good and all, but hope should be held out to the loser that with concentrated effort he may make good his disgrace—this is how commanders exhort their soldiers in war. Sometimes it is right to leave a pupil in the illusion that he can win even though he does not have the capacity. In short, by alternating praise and blame, the instructor will awaken in his pupils a useful spirit of rivalry ({Erasmus, 1978, #3206c, p. 340}).

An important event in the context of this study is “the Concorso Accademico of 1677, the first public design competition for the Accademia…. The soggetto, or prescribed task, was the design of an octagonally planned church with a cupola, campanili, and ‘grand’ entrance portal” ({Smith, 1984, #56167}, p. 27). The design competition became a ubiquitous device in design education for the next 250 years. Though important in its own right, the competitive aspect is not the critical issue here. The heart of the competition was the soggetto, the prescribed task—the vital component was the project. The emphasis on the project as the primary means of teaching has defined design education; it is the characteristic that differentiates it from mainstream education in the liberal arts and in the sciences.
The most influential ancient Greek philosophers are Socrates, Plato, and Aristotle, and their thoughts have had important effects on the history of education. The context for their thought was in part established by the sophists, who “were itinerant professional teachers and intellectuals who frequented Athens and other Greek cities in the second half of the fifth century B.C.E. In return for a fee, the sophists offered young wealthy Greek men an education in aretē (virtue or excellence), thereby attaining wealth and fame while also arousing significant antipathy” (Duke, 2012). One of the earliest and most influential of the sophists was Protagoras (ca. 480-411), who famously stated: “Of all things the measure is man, of the things that are, how they are, and of things that are not, how they are not” (Poster, 2005). This statement leads to the difficulty that if each man is the measure, and each man measures according to his own subjective perception, we are plunged into a relative reality with no objective truth. Each person’s opinion is as valid as the next person’s.

Socrates accepted the idea of man as the measure of all things, but “added that the first obligation of man is to know himself. As opposed to the purely individualistic basis of opinion, he held that knowledge possessed universal validity, and from this arrived at the fundamental principle: “Knowledge is virtue”” (Cordasco, 1967, p. 7).
The Socratic method of questioning has often been used to confound opponents in debate by leading them into self-contradiction: “I… grew very artful and expert in drawing people, even of superior knowledge, into concessions, the consequences of which they did not foresee, entangling them in difficulties out of which they could not extricate themselves, and so obtaining victories that neither myself nor my cause always deserved” (Franklin, 2006, p. 20). But the value of the method for education is not primarily in disputation; it is in dialectic, reasoned conversation, in bringing the contradictory statements into the light where they may be compared. This process forces one to examine one’s own beliefs, many of which may have been previously implicit. The Socratic method is a tool for self-knowledge, which is an essential condition for finding truth. Relativism and the self-examination advocated as a solution to it by Socrates is directly related to design education where problems are almost always ill-defined and success is dependent more on finding new ways of seeing than on applying formulas.

Book VII of Plato’s *The Republic* contains his famous allegory of the cave, in which he has Socrates say “you will not misapprehend me if you interpret the journey upwards [from the cave into the sun] to be the ascent of the soul into the intellectual world… in the world of knowledge the Idea of good appears last of all, and is seen only with an effort; although, when seen, it is inferred to be the universal author of all things beautiful and right, parent of light and of the lord of light in the visible world, and the immediate and supreme source of
reason and truth in the intellectual; and that this is the power upon which he who would act rationally either in public or private life must have his eye fixed” (Plato, 2012).

Plato offers a vision of a two-tiered reality, one of appearance (available for observation, never fully accurate), one of pure truth (not available through observation, ideally accessible through reason). Truth, in Plato’s formulation, exists outside of experience and can be reached only via rational thought. The sensible world is in motion, changing, in constant flux. Truth is constant, fixed, eternal: The “instrument of knowledge can only by the movement of the whole soul be turned from the world of becoming to that of being.”

Sensible objects

are of two kinds… some of them do not invite the intelligence to further inquiry because the sense is an adequate judge of them; while in the case of other objects sense is so untrustworthy that inquiry by the mind is imperatively demanded…. [In the case of an intellectually interesting object,] the sense coming upon the object, whether at a distance or near, does not give one particular impression more strongly than its opposite…. those which strike our sense simultaneously with opposite impressions, invite thought….

[For] if simple unity could be adequately perceived by the sight or by any other sense… there would be nothing to attract towards being; but when something contrary to unity is always seen at the same time, so that there seems to be no more reason for calling it one than the opposite, some discriminating power becomes necessary, and in such a case the soul in perplexity, is obliged to rouse her power of thought and to ask: “What is absolute unity?” This is the way in which the study of the one has a power of drawing and converting the mind to the contemplation of true being…. knowledge only which is concerned with true being and the unseen can make the soul look upwards, and whether a man gapes at the heavens or blinks on the ground, when seeking to learn some particular of sense, I would deny that he can learn, for nothing of that sort is matter of science….

We have at last arrived at the hymn of dialectic. This is that strain which is of the intellect only…. when a person starts on the discovery of the real by the light of reason only, and without any assistance of sense, and perseveres until by pure intelligence he arrives at the perception of the absolute good, he at last he finds himself at the end of the intellectual world…. And assuredly no one will argue that there is any other method of comprehending by any regular process all true existence or of ascertaining what each thing is in its own nature; for the arts in general are concerned with the desires or opinions of men, or with processes of growth and construction…. dialectic, and dialectic alone, goes directly to the first principle and is the only science which does away with hypotheses in order to make her ground secure….
And do you also agree, I said, in describing the dialectician as one who attains a conception of the essence of each thing? And he who does not possess and is therefore unable to impart this conception, in whatever degree he fails, may in that degree also be said to fail in intelligence?

And you would say the same of the conception of the good? Unless the person is able to abstract from all else and define rationally the Idea of good, and unless he can run the gauntlet of all objections, and is keen to disprove them by appeals not to opinion but to absolute truth, never faltering at any step of the argument—unless he can do all this, you would say that he knows neither the Idea of good nor any other good: he apprehends only a shadow, if anything at all, which is given by opinion and not by science (Plato, 2012).

For Plato, the aim of intelligence is to “abstract from all else and define rationally the Idea of good.” His dialectic is a greater and greater refinement of an idea, a deductive process of stripping away everything that does not contribute to the essence. (“Deduction is the method of inference which substantiates a conclusion on the basis of a number of previously established premises by means of the application of laws of logic, rather than by drawing on experience” (Marxist Internet Archive)). Truth, beauty, and virtue flow from the Idea of the good, which exists in absolute form, accessible through pure reason only. Every sensible phenomenon is an approximate manifestation of an ideal form. The ideal form determines the sensible attributes of an object but the senses do not give us access to the ideal form. The senses reveal shadows, at best.

With the decline of Rome and the ascendance of the church, intellectuals were faced with the problem of how to resolve the conflicts between classicism and Christianity. The Greeks and Romans were pagans, but their way of thought was embedded in western culture, and the Christian scholars had to find a way of addressing it. “One of the decisive developments in the western philosophical tradition was the eventually widespread merging of the Greek philosophical tradition and the Judeo-Christian religious and scriptural traditions. Augustine
[354-430] is one of the main figures through and by whom this merging was accomplished” (Mendelson, 2012).

In Augustine’s time, most of the original writings of the Greeks were unavailable. It is known that he read a Latin translation of Aristotle’s *Categories* (Tkacz, 1999, p. 58); otherwise his knowledge of Plato and Aristotle was through secondary sources. He was aware of some of Plato’s works and ideas, including the allegory of the cave and the eternal and unchanging world of forms. “Augustine is interested in establishing the existence of eternal beatifying Truth, intelligible to humans. He records a history of philosophy to establish the existence of such truth, in which history Plato is the philosopher *par excellence*” (Van Fleteren, 1999, p. 652).

Augustine’s attempt to address the question of how humans can find actual knowledge (ideal, form, truth) leads him to conclude that it can be achieved only through divine illumination. He writes:

> Everything which the bodily sense touches and which is called sensible is constantly changing… But what does not remain stable cannot be perceived, for that is perceived which is grasped by knowledge, but that cannot be grasped which changes without ceasing. Therefore truth in any genuine sense is not something to be expected from the bodily senses…. Accordingly it is in our own greatest interest that we are admonished to turn away from this world, which is clearly corporeal and sensible, and to turn with all haste to God, i.e., Truth, which ever abides and exists always the same (Augustine, 2002, p. 40-42).

With this statement, Augustine establishes a fundamental epistemological agreement between Platonic philosophy and Christian doctrine. For both, knowledge is a two-tiered system; Truth is on the upper tier, mortal humans are on the lower.
For Aristotle knowledge requires more than reason, but the something more is scientific rather than divine. In order to begin to understand the extra-sensory world, empiricism is also necessary; “the knowledge of the essential nature of a substance is largely promoted by an acquaintanceship with its properties: for, when we are able to give an account conformable to experience of all or most of the properties of a substance, we shall be in the most favorable position to say something worth saying about the essential nature of that subject” (Aristotle, 2012, Book I, Part 1).

A substance in the sense Aristotle uses above is an individual instance of a species (a group that shares an essential quality). Unique quirks of individuals are incidental and do not reflect the essence of their species, which is present in all its members. Individual people look different, but but they are all members of the human species.

A substance can be classified based on many criteria, but the essential nature is the primary cause for its being what it is. A human is an animal that reasons. A human is human because it reasons, whatever its shape, size, color, or any other incidental attribute—or how its appearance changes. Here Aristotle turns Augustine’s concern about the constant change of the sensible world into a an argument for the usefulness of experience—attributes that change about a substance cannot possibly be attributes that define its essential nature; observation allows us to rule them out.

Plato insists on the power of pure reason. Aristotle recognizes the value of empirical observation in addition to reason. They agree on the goal of science: to find the essence. The
thing Plato calls form, and Aristotle calls essential nature, is constant, pure, and unchanging: the Truth.

One result is that for Aristotle, and therefore for the science his philosophy supports, the species must also be constant, pure, and unchanging—when we observe growth and change in substances, we witness the transformation of their matter from potential to actual form. A second result is that though experience can help us apprehend the essential nature of a substance, it can have no effect on the substance itself; the object is entirely independent of the observer.

Plato’s dialectician is a mystical figure: a sort of shaman using pure reason to reach the absolute at the end of the intellectual world. Aristotle does not expect the dialectician to explain the unexplainable. He refines Plato’s definition of dialectic and adds a second type of reasoning: demonstration.

Reasoning is a discussion in which, certain things having been laid down, something other than these things necessarily results through them. Reasoning is demonstration when it proceeds from premises which are true and primary or of such a kind that we have derived our original knowledge of them through premises which are primary and true. Reasoning is dialectical when it reasons from generally accepted opinions. Things are true and primary which command belief through themselves and not through anything else; for regarding the first principles of science it is unnecessary to ask any further question as to “why,” but each principle should of itself command belief. Generally accepted opinions, on the other hand, are those which commend themselves to all or to the majority or to the wise (Aristotle, 1960, Book I, p. 273).

Demonstration begins with unquestionable principles—axioms. Dialectic begins with opinions. This is where, for the Christians, divine inspiration comes in handy. They might even make the case that Aristotle is on their side:

Actual knowledge is identical with its object: in the individual, potential knowledge is in time prior to actual knowledge, but in the universe as a whole it is not prior even in time. Mind is not at one time knowing and at another not. When mind is set free from its present conditions it appears as just what it
is and nothing more: this alone is immortal and eternal... and without it nothing thinks (Aristotle, 2012, III, 5).

In actuality, Aristotle leads not to the spiritual, but to the workable. In the absence of supernatural help, he is forced to use empirical data as a starting point from which to reason inductively toward general principle.

“All teaching and all learning of an intellectual kind proceed from pre-existent knowledge... Similarly with arguments, both deductive and inductive: they effect their teaching through what we already know, the former assuming items which we are presumed to grasp, the latter proving something universal by way of the fact that the particular cases are plain” (Aristotle, 2002, I, 1 (71a 1)).

His thinking is the basis for modern scientific method—theory is derived inductively based on observation. From a practical standpoint a theory is a provisional axiom. Using deduction, experiments are devised to test theory. Specific phenomena can never prove a general rule; they can show that a supposed general rule does not apply. A conclusive experiment can therefore only lead to the rejection or refinement of theory. Theory, and therefore science, never attains the level of truth. We never know anything absolutely via induction. However

...we do know things through demonstrations. By a demonstration I mean a scientific deduction; and by scientific I mean a deduction by possessing which we understand something... demonstrative understanding in particular must proceed from items which are true and primitive and immediate and more familiar than and prior to and explanatory of the conclusions (Aristotle, 2002, I, 2 (71b 17)).

Late in the medieval period, the style of thought known as Scholasticism became dominant; it was practiced in the new universities that arose in the twelfth and thirteenth centuries. Most of Aristotle’s works were re-introduced to the west at about the same time. Thomas Aquinas (1225-1274) uses Aristotle’s language to assert the primacy of principle, and again to make the case for the synthesis of reason and faith:
The whole certainty of scientific knowledge arises from the certainty of principles. For conclusions are known with certainty when they are reduced to the principles. Therefore, that something is known with certainty is due to the light of reason divinely implanted within us, by which God speaks within us. It comes from man, teaching from without, only in so far as, teaching us, he reduces conclusions to the principles. Nevertheless, we would not attain the certainty of scientific knowledge from this unless there were within us the certainty of the principles to which the conclusions are reduced (Aquinas, 1953, Article I, Answers to Difficulties 13).

Aquinas goes on to establish that to demonstrate is synonymous with to teach: There are two ways of acquiring knowledge. In one way, natural reason by itself reaches knowledge of unknown things, and this way is called discovery; in the other way, when someone else aids the learner’s natural reason, and this is called learning by instruction…. Now, in discovery, the procedure of anyone who arrives at the knowledge of something unknown is to apply general self-evident principles to certain definite matters, from these to proceed to particular conclusions, and from these to others. Consequently, one person is said to teach another inasmuch as, by signs, he manifests to that other the reasoning process which he himself goes through by his own natural reason. And thus, through the instrumentality, as it were, of what is told him, the natural reason of the pupil arrives at a knowledge of the things which he did not know. Therefore… a man is said to cause knowledge in another through the activity of the learner’s own natural reason, and this is teaching. So, one is said to teach another and be his teacher. This is what the Philosopher means when he says: “Demonstration is a syllogism which makes someone know” (Aquinas, 1953, Article I, Reply).

The only difference between demonstration and dialectic is the starting point—principle for demonstration, authoritative opinion for the dialectic. If principle is not available, reason can move forward only after the best opinion has been identified. Comparison of opinions is at the core of Scholasticism.

Aquinas’s Summa Theologica is an excellent example of Scholastic teaching (Brown, 2007, p. 255). “Because the doctor of Catholic truth ought not only to teach the proficient, but also to instruct beginners (according to the Apostle: As unto little ones in Christ, I gave you milk to drink, not meat-1 Corinthians 3:1-2), we purpose in this book to treat of whatever belongs to the Christian religion, in such a way as may tend to the instruction of beginners” (Aquinas, 2008). The Summa Theologica consists of over 600 main questions, each with a number of subquestions called articles. For instance, Question 49-Habits in

Each article is addressed by a series of objections, a statement to the contrary, Aquinas’s answer, and replies to each of the objections. Each of these ways of addressing the article is likely to depend on reference(s) to authority—the Bible, the Philosopher (Aristotle), or another learned source. The first issue is often either to establish the correct interpretation of the authority or to determine which authority is the most authoritative: “Objection 1. It would seem that habit is not a quality. For Augustine says…” “On the contrary, the Philosopher says…” Once authority is established, reasoning can proceed.

This dialectic sequence is fundamental to Scholasticism. The kind of reasoning employed drives the kind of result produced. The most straightforward and predictable way of teaching is by starting with a given principle or an unimpeachable authority and proceeding deductively to a known conclusion of fact.

The integration of the basic structure of ancient Greek epistemology into Christian doctrine helped create a philosophical basis for orthodoxy. Medieval scholars favored deduction over induction because induction wasn’t ultimately useful to them; it reasoned from experience rather than from principle. Deductive teaching does not encourage students to think for themselves, which is important when you don’t want students to think for themselves. Heresy is not the product of deductive procedure. To say that medieval scholars
were mere tools of the church’s power structure may not tell the whole story, but the role of their work in establishing and maintaining that structure is impossible to ignore. It was the source of the church’s intellectual authority, which was intimately connected with its moral and political authority.

Augustine, “one of the towering figures of medieval philosophy whose authority and thought came to exert a pervasive and enduring influence well into the modern period” (Mendelson, 2012), didn’t have access to Aristotle’s writings, and had no idea how extensive his system of thought was:

**Aristotle’s Works**

Organon
- Categories
- On Interpretation
- Prior Analytics
- Posterior Analytics
- Topics
- On Sophistical Refutations
On Coming-to-Be and Passing Away; On Generation and Corruption
On the Heavens
Meteorology
On the Soul
Little Physical Treatises
- On Sense and Sensibles, On Sense and Sensibilia
- On Memory and Recollection
- On Sleep and Waking
- On Dreams
- On Divination by Dreams
- On Longness and Shortness of Life
- On Youth and Old Age [On Life and Death]
- On Respiration
On Breath
History of Animals; Natural History of Animals
On the Parts of Animals
On the Motion of Animals
On the Generation of Animals
On the Beginnings of Animals, Progression of Animals
Metaphysics
Nicomachean Ethics
Eudemian Ethics
Augustine and the scholars that succeeded him spent eight hundred years trying to make Greek reason conform to and support Christian doctrine. They were never entirely successful; when Aristotle came back on the scene, their failure was assured. Thomas Aquinas, after the reintroduction of Aristotle, was faced with the impossible task of explaining why medieval philosophy, which was supposed to reconcile reason with religion, did not.

The fundamental disconnect is over belief. In the two-tiered system of truth, if reason is to proceed, one must either accept the evidence of experience in the sensible world, or have faith in mystical messages from the other. It can’t be both ways. In Aristotle’s view of science, if first principles are not available, sensible phenomena matter—they lead to working principles, theories which are the best approximations of truth we are able to reach. For the faithful, principles are in the word of God. When God has not directly addressed an issue, the best the faithful can do is to rely on the most authoritative source. But once reason has been integrated with faith, the most authoritative source is often Aristotle. The problem for the faithful is that Aristotle doesn’t believe in their God.

This disconnect is the ultimate reason for the decline of Scholasticism and of medieval philosophy in general. The legacy for education that continued into the Renaissance had two mutually supporting components. First, the basic epistemological consonance between Greek philosophy and Christian theology had been established. Plato’s concept of ideal truth and his
two-tiered vision of reality emerged intact. Second, the deductive mode of reasoning was the model for teaching.

**The Renaissance**

Between “1450 and 1650 there was a vast growth in the numbers of those involved in education at every level from the barely literate to the professional scholar” (Grafton, 1986, p. xi). The attitudes toward teaching and learning of the Renaissance humanists, particularly in relation to their rejection of Scholasticism, can largely be understood via the terms *ad fontes* and *imitatio*. The thinker who best articulated the full humanist educational philosophy of the late Renaissance was Desiderius Erasmus of Rotterdam (1469-1536). Erasmus gives us his assessment of Scholasticism:

> It is by their rashness that philosophy, the great, old, and true, has been reduced to sheer nonsense, mere fantasy. Through them we have lost innumerable works of the early writers; the fact that corrupt textual readings abound, and abound the more learned the author, is something we owe to them; if the fine theology of the old days has so much degenerated, this is their doing and no one else’s; if the grammarians write and teach nothing but sheer barbarism, we have them to thank. And to bring this to a close: it is their doing that in both verse and prose mute and inarticulate authors are prized above the most learned; one among them writes on grammar, another on rhetoric, another on dialectic, another on natural philosophy, another on theology; while this one writes commentaries on the best authors, shedding darkness on them, not light, not adorning but corrupting, and another one tries to emend what he does not understand, and a third turns into bad Latin what was in good Greek, though he knows practically nothing of either language; and so, I say, while they are vying with each other to make an uproar, they have managed to confuse, corrupt, and overturn everything with their futile efforts; and the more industriously each of them tries to do his part, the more ruin he causes. It is like someone trying to wipe a speck of dust off a purple robe with hands smeared with ordure—the harder he tries to help the more harm he does (Erasmus, 1978b, p. 44-45).

As we have seen, the work of Medieval scholars was hindered greatly by the dearth of original ancient texts—if Augustine had known about Aristotle everyone would have been spared a lot of pointless work. Adding to the problem was the lack of authoritative versions of the texts that did exist. The upshot was that much of the writing produced in the Middle
Ages was confused and confusing, and that a great deal of effort was expended in dispute, rather than in the application of classical wisdom.

Michel de Montaigne (1533-1592), from his essay “On Experience:”

Who would not say that glosses increase doubt and ignorance, since there is no book to be found, whether human or divine, with which the world busies itself, whose difficulties are cleared up by interpretation? The hundredth commentator hands it on to his successor thornier and rougher than the first one had found it. When do we agree and say, ‘There has been enough about this book; henceforth there is nothing more to say about it’?….

It is more of a job to interpret the interpretations than the interpret the things, and there are more books about books than about any other subject: we do nothing but write glosses about each other. The world is swarming with commentaries; of authors there is a great scarcity….

Our opinions are grafted upon one another. The first serves as a stock for the second, the second for the third. Thus we scale the ladder, step by step. And thence it happens that he who has mounted highest has often more honor than merit; for he has only mounted one speck higher on the shoulders of the next last” (Montaigne, 1976, p. 817-18).

“Humanism, the cultural and aesthetic movement that dominated the Renaissance, was driven by admiration for the accomplishments of antiquity and a desire to emulate them” (Rummel, 2004, p. 20). One of the earliest defining developments of Renaissance humanism was the treatment of the works of Cicero by Petrarch (1304-1374). Petrarch’s work in finding and disseminating these writings inspired a new interest in the ancients—in particular, in terms of rhetoric and literature, rather than strictly in of logic. Building on the foundation laid by Petrarch, Erasmus emphasized a thorough encyclopedic knowledge of the classics that could only be achieved through extraordinarily hard work. He “believed that to understand the present it was necessary to understand the past… [which] required knowledge of the ancient Greek and Roman contributions in literature, art, law, and philosophy. [Such understanding] could come only as educated persons studied primary sources, particularly the literary works of antiquity” (Gutek, 2005, p. 104).
The scholastics spent their time in logical disputation and interpreting each other’s interpretations. Erasmus says of the humanists: “We are doing our best to rescue the world that has fallen into chasms of hair-splitting scholasticism and summon it back to the true sources of old literature” (Herwaarden, 2003, p. 546).

Hence the term *ad fontes*: “They have long resented the new blossoming of the humanities and the ancient tongues, and the revival of the authors of Antiquity, who up to now were wormeaten and deep in dust, so that the world is now recalled to the fountain-head” (Erasmus, 1974, p. 114).

Access to the original sources could only be achieved if one could read them in their original languages. “Grammar, therefore, claims primacy of place and at the outset boys must be instructed in two—Greek, of course, and Latin... almost everything worth learning is set forth in these two languages” (Erasmus, 1978d, p. 667).

Scholasticism did not disappear easily or quickly from European culture; the rise of humanism took place at different times in different places. An example of the kind of education Erasmus advocated in early sixteenth century Holland can be shown from mid-fifteenth century Italy. At the school of Guarino Guarini,

The boys began with an ‘elementary’ course in which they learned to read and pronounce Latin... We do not have much information about the exercises he used for this elementary instruction, but his pupils probably read in unison from a basic Latin text... We can assume that the exercises were systematic, intensive and highly repetitive.

The second part of his course he called ‘grammatical,’ and (following Quintilian) he divided this into two parts. One, ‘methodical,’ covered the rules of grammar and syntax. The other, ‘historical,’ dealt with history, geography, mythology—all the facts needed to read and write classical Latin in an informed way.
The central text for the ‘methodical’ part of grammar was Guarino's own manual, the *Regulae*. This defines the parts of speech, gives detailed instructions for the inflection of verbs and nouns and formulates the basic rules of Latin syntax. Like its medieval antecedents (on which it draws substantially) it crystallizes these pieces of instruction into hundreds of mnemonic verses.

These verses were decidedly not merely ornamental; the student was expected to spend years committing them to memory, reciting them, being tested on them.

Memorization, repetition, catechism—these are the activities on which Guarino’s humane learning is firmly grounded. Written tests ensured that the student was not mechanically repeating sounds he did not understand, while oral practice gave him a fluency that would not necessarily have come from written drilling alone.

This rigorous grounding in the formal rules was only the first assault. As the pupil advanced he had to learn to write a ‘pure’ Latin—that is, a Latin resembling as closely as possible that of the age of Cicero and Virgil. For this he needed a guide to proper usage, to using only such terms as the Romans had used and only in the senses in which they had used them. (Grafton, 1986, p. 9-11).

One of the problems with learning Latin, and really understanding the ancient literature, was that its literary history was so long; the nuances of allusion, shadings of definitions, contextual usages, and metaphors required an extensive education that went far beyond learning the mechanics of the language itself. Guarino devised a system that combined the mnemonic verses with meticulous lexicons and apt quotations and citations. Guarino’s system achieved what medieval grammar teaching had stopped short of: it turned out students whose grammar and usage were convincingly classical, who could read and write classical Latin with something like the native speaker’s facility and sensitivity. The only wonder is that students were prepared to pay the high price in boredom and fatigue that entitled them to access to these mysteries (Grafton, 1986, p. 14).

Many students (and teachers) were not willing to pay the price. Much of what was intended to convey classical erudition was in fact rhetorical flourish. The term *imitatio* refers to the humanists’ desire to emulate the ancients. “Nothing is more characteristic of educational humanism than imitation [of the ancient Greeks and Romans]. This criterion, idealized by Petrarch, was followed faithfully by the humanists succeeding him… [who] too often missed Petrarch’s meaning and settled for a dull, unimaginative instructional program.
that made a fetish out of attention to linguistic detail…. Petrarch, though, nowhere
recommends mere linguistic accuracy. Following Cicero, he meant for imitation to be used as
a means for improving the human ability of expression” (Power, 1996, p. 55-56).

Erasumus witnessed, and wrote against, the narrowing of humanist ideals into a form
known as Ciceroianism, “which argued that the aim of education was to impart a perfect
Latin style” (Cordasco, 1967, p. 44) of speaking and writing as exemplified by Cicero and his
imitators. “Reproducing exactly and producing something like are different things. So are
imitating one’s exemplar and being a slave to it, always following behind it” (Erasmus,
1978a, p. 379). The goal of *imitatio* is to learn to express oneself in a way that emulates the
integrity of a great orator such as Cicero:

But if you want to express the whole Cicero you cannot express yourself, and if you do not express
yourself your speech will be a lying mirror…. Torturing oneself to reproduce Cicero in his entirety… is
to behave like a fool. It’s impossible, even if it were any use; and it wouldn’t be any use if it were
possible. The only way Cicero can be reproduced in his entirety is if we try not to copy those virtues of
his exactly, but to produce something equally good after the pattern set by him, or, if we can,
something even better. It may well be that the most Ciceronian person is the one least like Cicero, the
person, that is, who expresses himself in the best and most appropriate way, even though he does so in
a manner very different from Cicero’s (Erasmus, 1978a, p. 399).

I welcome imitation with open arms—but imitation which assists nature and does not violate it, which
turns its gifts in the right direction and does not destroy them. I approve of imitation—but imitation of
a model that is in accord with, or at least not contrary to, your own native genius, so that you do not
embark on a hopeless enterprise, like the giants fighting against the gods. Again, I approve of imitation
—but imitation not enslaved to one set of rules, from the guidelines of which it dare not depart, but
imitation which gathers from all authors, or at least from the most outstanding, the thing which is the
chief virtue of each and which suits your own cast of mind; imitation which does not immediately
incorporate into its own speech any nice little feature it comes across, but transmits it to the mind for
inward digestion, so that becoming part of your own system, it gives the impression not of something
begged from someone else, but of something that springs from your own mental processes, something
that exudes the characteristics and force of your own mind and personality… a lifelike portrait of the
person you really are, a river welling out from your inmost being.

Above all, you must make sure you thoroughly understand the matter you undertake to treat. That will
supply you with a flood of things to say, with genuine unassumed emotions. That will make your
speech live, breathe, move, influence, carry away; it will make it express you wholly (Erasmus, 1978a,
p. 441-42).
The concepts referred to by *ad fontes* and *imitatio* support the Erasmian stress on the compatibility of classic thought with Christian piety. Rather than continuing the scholastic attempt to use Aristotelian logic in support of faith, with “careful historical interpretation Erasmus demonstrated the various ways that classical and Christian culture were melded and how, in any final accounting, rather than being hostile (though certainly hostile elements could be identified) they were complimentary” (Power, 1996, p. 57). “‘Piety and Good Letters’—… a union which adds wisdom to faith and reverence to learning, stand opposed to ignorance and wickedness” (Woodward, 1964, p. 73). With a degree of irreverence, in *The Antibarbarians* Erasmus’s character Batt argues against those who attack the use of ancient literature as the work of heathens:

“Is everything which came out of the heathen world always to be bad, and forbidden to Christians? So we are not to be allowed to take over anything discovered by the pagans unless we cease forthwith to be Christian?

“In that case you had better preach to the carpenters and warn them not to dare to use any of their saws, axes, adzes, gimlets, nor their wedges, rules, plumblines, centring, nor straight edges. Should you ask why, I’ll tell you: this carpenter’s art and its tools were invented by Daedalus, a heathen. The blacksmiths had better stop—it was the Cyclops, men-monsters, who discovered how to work iron. Let no one work in bronze—they say this was first taught by the Chalybes; and pottery by Choroebus, so the potters can have a holiday. A certain Boethus was the first cobbler, so let no Christian sew together a shoe; Niceas was the first fuller, so no one must wash the dirt out of his clothes. The Egyptians invented weaving: back we go to dressing in skins. The Lydians invented dyeing, so let no one tint the wool shorn from the sheep. Cadmus the Phoenician found out how to cast metal, so the furnaces had better cool off. As for sailors, we must get them to vow, if possible, that they will not use their customary tackle, and coachmen must be warned not to imitate Erichthonius. Painters, carvers, glaziers, every kind of craftsman, in short, must find some other way of earning their living if they can, to avoid defilement of themselves and their families by these heathen arts; and if they cannot they must starve, rather than give up being Christians” (Erasmus, 1978b, p. 56).

On the subject of theory versus practice, it is a serious mistake, Erasmus writes, “to believe that we can become wise through practical experience, without benefit of education… The teachings of philosophy are, as it were, the eyes of the soul, casting light on
the road ahead, revealing what is the right and what is the wrong path to follow. Varied experience over a long period of time is, of course, quite useful, but only to the wise man who has been thoroughly imbued with the precepts of philosophy… If a captain has to learn the art of navigation from repeated shipwrecks,…what an unfortunate way this is to become wise” (Erasmus, 1978c, p. 311-12).

Erasmus sums up his version of the humanist attitude toward knowledge and language thus:

In principle, knowledge as a whole seems to be of two kinds, of things and of words. Knowledge of words comes earlier, but that of things is the more important. But some, the “uninitiated” as the saying goes, while they hurry on to learn about things, neglect a concern for language and, striving after a false economy, incur a very heavy loss. For since things are learnt only by the sounds we attach to them, a person who is not skilled in the force of language is, of necessity, short-sighted, deluded, and unbalanced in his judgment of things as well. Finally you may observe that none are more given to constant quibbling over the minutiae of language than those who boast that they pass over mere words and concentrate on the matter itself. Accordingly the best in each category must be learnt at once and, moreover, learnt from the best teachers. For what could be more foolish than to learn at great effort something that you are subsequently compelled to “unlearn” at even greater? Nothing to be sure is acquired more easily than what is right and true. But once bad habits get a grip on a character, it is remarkable how they cannot be eradicated (Erasmus, 1978d, p. 666).

When Erasmus says “things are learnt only by the sounds we attach to them,” he makes a fundamental statement about the way knowledge operates. Concerning the educational benefits of the abstract and the concrete, Erasmus comes down squarely on the side of the abstract, the general, the pure, the true. Individual experience is not valuable if not communicated clearly in terms understood by all. Though he balances his position by saying that both categories should be learned at once, his method, like the scholastics’, is primarily deductive, in that it uses agreed-upon principles and definitions to explain specific phenomena.
A significant commitment of resources was necessary to become a humanist scholar—only a select few superior students could devote the time, money, and energy required. Humanism was not concerned with democracy. Still, “[t]he organized life of the civilized community is to Erasmus the only life worth living: his educational aim, therefore, is a social aim” (Woodward, 1964, p. 73). That Erasmus lived in the world of social experience, and acknowledged the place of the scholar in it, is demonstrated in his *Praise of Folly*: “these asses [lawyers] can settle matters large and small if they give the word, and their estates multiply, while the theologian who has combed through his bookcases in order master the whole of divinity nibbles at a dry bean and carries on a non-stop war with bugs and lice” (Erasmus, 1993, p. 52-53).

Erasmus constructed a humanist educational philosophy as an altruistic imperative in which the few privileged with the means, the stamina, and the intellectual tools to fathom the wisdom of the ancients were duty-bound to do so. If given the proper environment and guidance, scholars could begin to seek the truth and wisdom that can only be found through systematic and thorough study of the written works of Greece and Rome tempered with a healthy dose of Christian faith. The result would be more virtuous leadership.

Some historians see Renaissance education in a less idealistic light and contend that even though the humanists were “the progenitors of modern scholarship and modern literature,” it is impossible to accept the traditional claim that [its] solid merits enabled humanism to win its battle against scholasticism. The older system had fitted perfectly the needs of the Europe of the high middle ages, with its
communes, its church offices open to the low-born of high talents and its vigorous debates on power and authority in state and church. The new system… fitted the needs of the new Europe that was taking shape, with its closed governing élites, hereditary offices and strenuous efforts to close off debate on vital political and social questions. It stamped the more prominent members of the new élite with an indelible cultural seal of superiority, it equipped lesser members with fluency and the learned habit of attention to textual detail and it offered everyone a model of true culture as something given, absolute, to be mastered, not questioned—and thus fostered in all its initiates a properly docile attitude towards authority (Grafton, 1986, p. xiv).

Another opinion is that though the “most important political development of the [fifteenth and sixteenth centuries] was the growth of the centralized authority of the monarchies in France and England…. In the main, the Renaissance was the protest of individualism against authority in the intellectual and social aspects of life” (Cordasco, 1967, p. 39, 41). The legacy of the Renaissance in the development of design education suggests that both opinions have validity—as we will see shortly, the ideal of the Beaux-Arts architecture of the nineteenth century exhibited *imitatio* in the sense that Erasmus intended, while in practice it often fell short.

One student, named Edward, who had the means, desire, and ability to complete a successful humanist education was tutored by… two of the most distinguished humanists and Greek specialists Cambridge produced in the sixteenth century…. By 1546, at the age of nine, he was citing Erasmus’ *Colloquies*, by 1547 his *De copia*. Somewhere around the same time he began seriously to study Greek. We should not forget that, in the midst of all his grueling schoolwork, in 1547 Edward also succeeded Henry VIII as King of England…. The twelve-year-old King’s surviving classroom orations bring home clearly to us the amount of arduous and repetitive drilling he was subjected to by his teachers—eager to prove the worth of their pupil (and ensure their own renown as teachers) by the mastery of Greek and Latin he could display in his weekly exercises. They also make it plain that while the themes chosen by Edward’s teachers are gravely moralistic, the exercises he performs are meticulous, dutifully imitative rhetorical compositions, in which the balanced phrase has clearly occupied the pupil’s mind, rather than the weightiness of the issue (Grafton, 1986, p. 154-55).
Even a student with every possible advantage might not achieve the goal of *imitatio* as Erasmus described it. True, the exercises were performed when Edward was only twelve years old; but at what age will he begin to make the language his own, and how will he be taught to do so? And what about the students who didn’t have the advantage of a private tutor and had to find their education in public schools?

In many ways the term humanistic education, despite its original broad, liberally oriented definition, came to mean the narrow linguistic education that dominated European schools from the sixteenth, to the middle of the nineteenth century. This narrowing eventually eliminated most of the more desirable elements of the early humanism… and for children, educational work became a drill of the most formal and laborious kind (Cordasco, 1967, p. 43-44).

How does a person whose education is based on repetitive drill become insightful and creative? How does education drive the character of a society? What do we want the character of society to be? These are questions that thinkers began to ask as the Renaissance gave way to the Enlightenment.

**The Enlightenment**

Francis Bacon (1561-1626) “was one of the leading figures in natural philosophy and in the field of scientific methodology in the period of transition from the Renaissance to the early modern era. [When he] introduces his new systematic structure of the disciplines in the *Advancement of Learning* (1605), he continues his struggle with tradition, primarily with classical antiquity, rejecting the book learning of the humanists, on the grounds that they ‘hunt more after words than matter’ (Bacon, III [1887], 283)” (Klein, 2011). He addresses the theory/practice question when he writes: “if men judge that learning should be referred to
action, they judge well…. [Yet] if any man think philosophy and universality to be idle studies; he doth not consider that all professions are from thence served and supplied” (Bacon, 1824, p. 70). He recognizes the value the wisdom contained in books, but finds that the advancement of learning has been hindered by what he considers the humanists’ error of bestowing “too great a reverence, and a kind of adoration of the mind and understanding of man: by means whereof, men have withdrawn themselves too much from the contemplation of nature, and the observations of experience, and have tumbled up and down in their own reason and conceits. Upon these intellectualists, which are, notwithstanding, commonly taken for the most sublime and divine philosophers, Heraclitus gave a just censure, saying, ‘Men sought truth in their own little worlds, and, not in the great and common world;’ for they disdain to spell, and so by degrees to read in the volume of God’s works; and contrariwise, by continual meditation and agitation of wit, do urge and as it were invocate their own spirits to divine, and give oracles unto them, whereby they are deservedly deluded” (Bacon, 1824, p. 37).

John Amos Comenius (1592-1670) of Moravia (in the present-day Czech Republic), drawing on Bacon’s philosophy, was an “educator whose theory began to blunt the dogmatic assumption that all knowledge worth having is buried somewhere in the books… [he] perceived what educational theorists and schoolmasters of the day either never knew or had forgotten: physical reality is as important and dependable as a source for knowledge as
anything stored in books…. If the senses are trained for discriminate observation, they can be gateways to truth” (Power, 1996, p. 64).

Comenius’s *The Great Didactic* (ca. 1635) is “perhaps the first… attempt to organize and express a comprehensive philosophy or theory of education” (Power, 1996, p. xiv). “As an educational theorist, Comenius’s educational philosophy embraced the broad, overarching goal of Pansophism. Literally meaning ‘all knowledge,’ Comenius’s Pansophism was a synthesis of principles derived from theology, philosophy, and science” (Gutek, 2005, p. 126). Comenius did not advocate a revolutionary break with humanist doctrine. He shared with the humanists a commitment to the primacy of faith: “It is evident… that the ultimate end of man is eternal happiness with God” (Comenius, 1967, p. 36). Concerning pedagogical practice, he referred to the schools of his time, in which “schoolmasters persisted in stressing discipline and memorization,… [as] ‘slaughter houses of the mind’” (Gutek, 1999, p. 12). His ability “to draw upon the thought of earlier philosophers [e.g. Francis Bacon] and educators who were committed to a kind of reconstruction in education that would allow students to capitalize on direct experience, learn from it, and not depend solely upon a vision of reality illustrated in the classics… did not make him an enemy of the classical inheritance and the ancient languages” (Power, 1996, p. 65).

The title page of *The Great Didactic* included the subheading: “A certain Inducement to found such Schools in all the Parishes, Towns, and Villages of every Christian Kingdom, that the entire Youth of both Sexes, none shall be excepted, shall Quickly, Pleasantly, &
Thoroughly Become learned in the Sciences, pure in Morals, trained to Piety, and in this manner instructed in all things necessary for the present and for the future life” (Comenius, 1967, p. 17). “A phrase like ‘equality of educational opportunity’ was not yet part of the vocabulary of educators, but the idea is explicit throughout *The Great Didactic* and implicit in most of Comenius’s writing…. A popularization of the ideal of universal schooling foreshadowed and might well have been a condition allowing… democratic educational sentiments to prosper in succeeding centuries” (Power, 1996, p. 65).

One of the contributions of Comenius “was the device by which one teacher could teach any number of pupils… by dividing them into groups of ten, each under the charge of a leader who acted as a kind of noncommissioned officer under the teacher.” This response to necessity prefigures the industrial mentality of the so-called “administrative progressive” movement in early twentieth century American education, especially in the aspect that “only very mechanical teaching could be done in this way” (Keatinge, 1931, p. 13); this method did not help students build strong conceptual frameworks upon which to build understanding of broader issues and create mental relationships.

Comenius bases his method on his understanding of natural process: “[T]he order, which is the dominating principle in the art of teaching all things to all men, should be, and can be, borrowed from no other source but the operations of nature. As soon as this principle is thoroughly secured, the processes of art will proceed as easily and as spontaneously as those of nature” (Comenius, 1967, p. 53). This acceptance into the classroom of “an immature but
energetic physical science and an equally immature social science put Comenius in the camp of a realist-scientific philosophy of education” Power, 1996, p. 65). To the faith and classical learning of Erasmus, Comenius adds observation and scientific method.

Comenius describes specific methods of the sciences, the arts, languages, morals, and instilling piety. In “The Methods of the Sciences, Specifically” he tells us that “the commencement of knowledge must always come from the senses…. Surely then, the beginning of wisdom should consist, not the mere learning the names of things, but in the actual perception of the things themselves!…. The truth and certainty of science depend more on the witness of the senses than on anything else… we do not trust a conclusion derived from reasoning unless it can be verified by a display of examples” (Comenius, 1967, p. 148-49).

In “The Method of the Arts” Comenius asserts: “Artisans do not detain their apprentices with theories, but set them to do practical work at an early stage; thus they learn to forge by forging, to carve by carving, to paint by painting, and to dance by dancing. In schools, therefore, let the students learn to write by writing, to talk by talking, to sing by singing, and to reason by reasoning. In this way schools will become workshops humming with work, and students whose efforts prove successful will experience the truth of the proverb: ‘We give form to ourselves and to our materials at the same time’ (Comenius, 1967, p. 160-61).

The writings of Comenius were brought to public attention in England by Samuel Hartlib. Hartlib (1600-1662) was a Prussian who emigrated to England in his twenties and became
“the center of a remarkable group of men who, following his lead, and inspired by the new Baconian philosophy, were transforming educational thought of their time” (Bennett, 1926, p. 39-40). “Not known in his own day for his own published writings, Hartlib was virtually forgotten by posterity until the rediscovery of an archive of his personal papers. This discovery revealed his personal correspondence to have been enormous. The 20,000 folios of his archive contain over 4,250 letters written to or (mostly) from some 400 correspondents, or exchanged between third parties. Befitting Hartlib’s own origins, their geographical range was impressive, embracing eastern and central as well as western Europe, Great Britain, Ireland, and New England” (Greengrass). One of Hartlib’s collaborators was “Sir William Petty (1623-1687), statistician, political economist, and professor of anatomy at Oxford” (Bennett, 1926, p. 40), whose work is important because it (at least implicitly) elaborates the connection between mental and manual activity in learning.

Petty’s educational ideas were published in a pamphlet called “The Advice of W.P. To Mr. Samuel Hartlib for the Advancement of Some Particular Parts of Learning.” Therein Petty lists the subjects that should be taught in school, including reading, writing, arithmetic and geometry, and foreign languages, and suggests that “all children, though of the highest rank, be taught some genteel manufacture” such as making watches, carving, glass grinding, oil painting, refining metals, and notably for our purposes, “Botanicks and Gardening” and “Architecture and making Modells for houses” (Petty, 1648, p. 5-6). Petty lists eight reasons for the inclusion of these activities, none of which includes the notion that the use of them
would directly influence intellectual growth. Still, though “[h]e does not seem to recognize the full pedagogical significance of his proposition,… he did grasp the idea that in learning, the object studied—the thing—should precede the symbol of the thing—the written or printed word [and]…. It is noticeable that Petty’s chief aim in placing things and handwork in the school was to further general education and not to produce artisans” (Bennett, 1926, p. 48). He also noted the value of drawing and design, suggesting: “That in no case the art of drawing and designing be omitted, to what course of life soever those children are to be applied, since the use thereof for expressing the conceptions of the mind, seems (at least to us) to be little inferior to that of writing, and in many cases performeth what by words is impossible” (Petty, 1648, p. 5).

John Locke (1632-1704) famously expanded on the idea of the *tabula rasa*, which had been in existence since antiquity: “[M]ind is in a sense potentially whatever is thinkable, though actually it is nothing until it has thought… What it thinks must be in it just as characters may be said to be on a writing tablet on which as yet nothing actually stands written: this is exactly what happens with mind” (Aristotle, 2012, Book III, Part 4). Locke, in “An Essay Concerning Human Understanding” writes:

*All ideas come from sensation or reflection.* Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas:- How comes it to be furnished? Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from experience. In that all our knowledge is founded; and from that it ultimately derives itself. Our observation employed either, about external sensible objects, or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have, do spring (Locke, 1836, p. 51).
Locke’s *tabula rasa* concept with its primacy of sensation and reflection implies that the learning environment is of primary importance and that a person is at least partially in control of their own intellectual destiny. Helping the young achieve that control is part of the responsibility of the educator (maybe the most important part). It is illustrated at the level of method by Locke’s admonition to make the student an active participant in building his intellect: All the time of tutor with pupil “should not be spent in Reading of Lectures, and magisterially dictating to him, what he is to observe and follow: Hearing from him in his turn, and using him to reason about what is propos’d will make the Rules go down the easier, and sink the deeper…. Cases should be put to him, and his Judgment asked. This opens the Understanding better than the Maxims…. This way lets things into the Mind, which stick there, and retain their Evidence with them; whereas words at best are faint Representations, being not so much as the True Shadow of Things, and are much sooner forgotten. He will better comprehend the Foundations, the Measures of Decency, and Justice; and have livelier, and more lasting Impressions, of what he ought to do, by giving his Opinion on Cases propos’d, and reasoning with his tutor on fit instances, than by giving a silent, negligent, sleepy, Audience to his Tutor’s lectures” (Locke, 1968, p. 204).

This interactive teaching method is a way of combating the doctrine of innate principles to which his *tabula rasa* concept stands opposed. “Locke’s attack on innate principles is… an expression of his view of the importance of free and autonomous inquiry in the search for
truth. Ultimately, Locke holds, this is the best road to knowledge and happiness” (Uzgalis, 2010).

Experience for Locke exists in two realms: first, in the observation of the physical world. He was steeped in the experimental scientific method of his time, having been a colleague of Robert Boyle (1627-1691) and Isaac Newton (1642-1727) (Uzgalis, 2010), both of whom he mentions in the “Epistle to the Reader” of “An Essay Concerning Human Understanding” (Locke, 1836, p. ix).

Second, when Socrates says in his own defense: “Perhaps someone might say, ‘Socrates, can you not go away from us and live quietly, without talking?’ Now this is the hardest thing to make some of you believe. For if I say that such conduct would be disobedience to the god and that therefore I cannot keep quiet, you will think I am jesting and will not believe me; and if again I say that to talk every day about virtue and the other things about which you hear me talking and examining myself and others is the greatest good to man, and that the unexamined life is not worth living, you will believe me still less” (Plato, 1966, sections 37e-38a), Locke does believe him. The experience of reflection on our mental processes that today we refer to as metacognition and epistemological development is fundamental to Locke’s views on human consciousness and individual identity.

Sensation and reflection are used to populate the blank white paper of the mind with “that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety.” They are the basic materials of creativity.
Jean-Jacques Rousseau (1712-1778) disagrees frequently with John Locke but is in many ways his intellectual heir. Locke’s famous distrust of authority (and his resulting insistence on the primacy of experience) is one element of the continuing shift away from church control toward the relative secularism of the Enlightenment (the Age of Reason) of the eighteenth century. Locke’s drive toward laissez-faire capitalism as the dominant force in society is founded on the idea that “the duty to obey laws of civil society can be derived from self-interest.” This arrangement, in Rousseau’s view, is unrealistic and engenders the *bourgeois*: a man who is neither the “natural man, who is whole and simply concerned with himself,…. [nor] the citizen, whose very being consists in his relation to the his city, who understands his good to be identical with the common good. The bourgeois distinguishes his own good from the common good. His good requires society, and hence he exploits others while depending on them” (Bloom, 1979, p. 5).

Given this state of affairs in the world, Rousseau was “ready to give all traditional pedagogic practice a thorough housecleaning” (Power, 1996, p. 78). “It is not at all strange that the author of *The Social Contract*, which has been blamed for the French Revolution, should also have written *Emile* which was the cause of an upheaval in educational thinking. Moreover, it is not strange that this same book, which caused its author to flee from France to avoid arrest, should have been just the kind of force that was necessary to break down the walls of educational formalism and make way for the on-coming advocates of a pedagogy
that recognized the nature of the child as the center of pedagogical inquiry. This all resulted from the publication of *Emile* . . . in the year 1762” (Bennett, 1926, p. 77).

Rousseau begins *Emile, or On Education* with: “Everything is good as it leaves the hands of the Author of things; everything degenerates in the hands of man” (Rousseau, 1979, p. 37), and then he attacks this frustrated, cynical view of the world with something that seems naive. He creates an idealized system of teaching that he believes will produce a man who can function in society without the hypocrisy of the bourgeois. In the fictional description of the first twenty or so years of Emile’s life, he and his tutor Jean-Jacques are almost constant companions, living on a country estate hidden away from the corrupting influence of the world. This is necessary because “[i]n the modern world, human beings come to derive their very sense of self from the opinion of others, a fact which Rousseau sees as corrosive of freedom and destructive of individual authenticity” (Bertram, 2011).

The sealed environment Rousseau describes in *Emile* obviously cannot exist, but it allows him to concentrate on an exploration of how teaching and learning might ideally occur.

“Education comes to us from nature or from men or from things. The internal development of our faculties and our organs is the education of nature. The use that we are taught to make of this development is the education of men. And what we acquire from our own experience about the objects which affect us is the education of things…. He alone in whom they all coincide at the same points and tend to the same ends reaches his goal and lives consistently…. of these three educations, the one coming from nature is in no way in our
control; that coming from things is in our control only in certain respects; that coming from
men is the only one of which we are truly the masters…. What is the [goal of education]? It
is the very same as nature. This has just been proved. Since the conjunction of the three
educations is necessary for their perfection, the two others must be directed toward the one
over which we have no power” (Rousseau, 1979, p. 38-39).

Understanding the natural “internal development of our faculties” is therefore a
prerequisite for finding the way to align the three educations. “Our true study is of the human
condition. He among us who best knows how to bear the goods and ills of his life is to my
taste the best raised: from which it follows that the true education consists less in precept
than in practice. We begin to instruct ourselves when we begin to live. Our education begins
with us” (Rousseau, 1979, p. 42).

“The tutor’s responsibility is, in the first place, to let the senses develop in relation their
proper objects; and secondly, to encourage the learning of the sciences as the almost natural
outcome of the use of the senses. Rousseau calls this tutelage, particularly with reference to
the part that has to do with the senses, negative education” (Bloom, 1979, p. 9).

Rousseau is, in agreement with Locke, pointing toward reflection and self-understanding.
He more forcefully makes the claim that the way to achieve an understanding of ourselves is
through reflection on our response to authentic experience, that is, experience that is
connected to utility. A natural man knows how to be useful. “To form this rare man, what
must be done? Very much, doubtless. What must be done is to prevent anything from being
done” (Rousseau, 1979, p. 41).

Teaching, in this model, is not rehearsing the substance of subjects or preaching the
canons of disciplines. It is about creating conditions in which learning might naturally occur.
“In the first place, you should be well aware that it is rarely up to you to suggest to him what
he ought to learn. It is up to him to desire it, to seek it, to find it. It is up to you to put it
within his reach, skillfully to give birth to this desire and to furnish him with the means of
satisfying it.” The teacher is in control of the situation. There must be a plan; the method is
calculated to reveal to the student through experience that knowledge of facts and of
processes can be useful to him if he knows how to use them. “It follows, therefore, that your
questions should be infrequent but well chosen; since he will put many more questions to you
than you to him, you will always be less exposed and more often in the position to say to
him, ‘In what way is what you ask me useful to know?’” (Rousseau, 1979, p. 179).

Rousseau illustrates the contrast between two methods of instruction. Method One: “Let
us suppose that while I am studying with my pupil the course of the sun and how to get one’s
bearings, suddenly he interrupts me to ask what is the use of all that. What a fine speech I
will make to him!…. Politics, natural history, astronomy, even morality and the right of
nations will enter into my explanations in such a way as to give my pupil a great idea of all
these sciences and a great desire to learn them. When I have finished, I shall have made a
true pedant’s display of which he will have understood not a single idea…. That is the way fine educations are given….”

Method Two: “The next morning I propose to him a walk before lunch…. We go up to the forest; we roam the fields; we get lost…. We hurry; we wander in vain in one direction and another…. Very hot, very tired, and very hungry, we accomplish nothing by our racing around other than to get more lost….” Emile knows that at noon the sun’s shadow is cast to the north, and he knows that the forest is north of the town. By gathering his thoughts and reasoning his way through the problem, Emile finds the way back home for lunch. He proclaims: “‘Astronomy is good for something….’ Note if he does not say this last phrase, he will think it. What is the difference, provided it is not I who say it? Now you can be certain that he will not in his life forget this day’s lesson” (Rousseau, 1979, p. 180-82).

Reason is very important, but it doesn’t provide motivation. “It is easy to prove to a child that what one wants to teach him is useful; but to prove it is nothing if one does not know how to persuade him. In vain does tranquil reason make us approve or criticize; it is only passion which makes us act” (Rousseau, 1979, p. 183).

Motivation comes from within, and is mysterious, but it can be cultivated; therefore: “Let the child do nothing on anybody’s word. Nothing is good for him unless he feels it to be so. In always pushing him ahead of his understanding, you believe you are using foresight, and you lack it. To arm him with some vain instruments which he will perhaps never use, you take away from him man’s most universal instrument, which is good sense…. ‘But,’ you will
say, ‘will there be time to learn what one ought to know when the moment has come to make use of it?’ I do not know. But I do know that it is impossible to learn it sooner, for our true masters are experience and sentiment, and man has a good sense of what suits man only with respect to those relations in which he himself has actually participated. A child knows that he is made to become a man; all the ideas he can have of man’s estate are opportunities of instruction for him; but he must remain in absolute ignorance of ideas of that estate which are not within his reach. My whole book is only a constant proof of this principle of education” (Rousseau, 1979, p. 178).

This principle, the maintenance of the student’s ignorance of ideas “which are not within his reach,” is at the core of the means of building understanding that Rousseau advocates. “In thinking about what can be useful to him at another age, speak to him only about things whose utility he sees right now” (Rousseau, 1979, p. 184). Learning starts with the familiar and proceeds to more distant phenomena and abstract concepts. It is not useful to start with the foreign and frightening: “Is one trying to train Emile to the sound of a firearm? At first I set off a cap in a pistol. The sudden and momentary flash, that sort of lightening, delights him. I repeat the same thing with more powder. Little by little I put a small charge without a wad into the pistol; then a bigger one. Finally I accustom him to rifle shots, to grapeshot explosions, to canons, to the most terrible detonations” (Rousseau, 1979, p. 62).

In Rousseau’s ideal vision the goal of achieving adult consciousness is the main thing, and that attainment happens via a slow, controlled, inductive process that would be
sidetracked by outside influences. “Remember always that the spirit of my education consists
not in teaching the child many things, but in never letting anything but accurate and clear
ideas enter his brain. Were he to know nothing, it would be of little importance to me
provided he made no mistakes. I put truths in his head only to guarantee him against the
errors he would learn in their place. Reason and judgment come slowly; prejudices come in
crowds; it is from them that he is to be preserved” (Rousseau, 1979, p. 171).

One important element of Rousseau’s education of Emile is his learning of a “decent”
trade (“There is no decency without utility”). John Locke also advocated the learning of a
trade by the by the future gentleman upon whom Some Thoughts Concerning Education was
focussed. Such activity would provide physical exercise, would make the gentleman better
able to direct workmen in proper procedure, and would be a means of obtaining “relaxation
and refreshment” (Locke, 1968, p. 315). Locke intended the learning of a trade as more of a
useful diversion than as a means for achieving something essential. Rousseau takes the
lessons learned by developing manual skill far more seriously: “The letter kills and the spirit
enlivens. The goal is less to learn a trade in order to know a trade than to conquer the
prejudices that despise a trade. You will never be reduced to working to live. Well, too bad—
too bad for you! But, that is not important; do not work out of necessity; work out of glory.
Lower yourself to the artisan’s station in order to be above your own. In order to subject
fortune and things to yourself, begin by making yourself independent of them. To reign by
opinion, begin by reigning over it. [In another translation: “To triumph in the opinion of the
world, you must begin by despising that opinion” (Bennett, 1926, p. 97).] Remember that it is not a talent that I ask of you. It is a trade, a true trade, a purely mechanical art in which the hands work more than the head, one which does not lead to fortune but enables one to do without one” (Rousseau, 1979, p. 196). Rousseau is not thinking of providing his pupil with a way of making a living by teaching him a trade; he is considering the thought processes necessary in order to master the trade. “If I have made myself understood up to now, one should conceive how I imperceptibly give my pupil, with the habit of exercising his body and of manual labor, the taste for reflection and meditation…. He must work like a peasant and think like a philosopher so as not to be as lazy as a savage. The great secret of education is to make the exercises of the body and those of the mind always serve as relaxations from one another” (Rousseau, 1979, p. 202). “Reader, do not stop here to view the training of our pupil’s body and the skill of his hands; but consider what direction we are giving to his childish curiosities; consider his sense, his inventive spirit, and his foresight; consider what a head we are putting on his shoulders” (Rousseau, 1979, p. 188).

How does one measure the extent of Rousseau’s success as an educator? He admits: “The great difficulty with this first education is that it is perceptible only to clear-eyed men…. A preceptor thinks of his own interest more than of his disciple’s. He is devoted to proving that he is not wasting his time and that he is earning the money he is paid. He provides the child with some easily displayed attainments that can be showed off when wanted. It is not important whether what he teaches the child is useful, provided it is easily seen. He
accumulates, without distinction or discernment, a rubbish heap in the child’s memory. When the child is to be examined, he is made to spread out his merchandise. He displays it; satisfaction is obtained. Then he closes up his pack and leaves again. My pupil is not so rich. He has no pack to spread out. He has nothing to show other than himself” (Rousseau, 1979, p. 162). This question still haunts teachers and students whose emphasis is more on mastery of subject matter than on test performance.

Rousseau is neither cynical nor naive. His vision relies on a positive, optimistic view of human nature. Locke and Rousseau differ in their estimations of human nature and in their expectations of educational results, but they share these conceptions: that learning most effectively takes place through the active construction of knowledge by the learner; and that the learning environment is of primary importance.

His view of “the value of the manual arts in education place Rousseau ahead of his predecessors and many of those who came after him. His recognition of the fact that the manual arts may be a means of mental training marked the beginning of a new era in education. It prepared the way for the educational methods of Pestalozzi and those who followed in his train. However, his was the vision of a seer, the voice of a prophet; he did not put his theory into practice” (Bennett, 1926, p. 81).
6. THE ÉCOLE DES BEAUX-ARTS

The humanists of the Renaissance institutionalized the logic and literature of classical antiquity in one stream of educational theory. In another stream, the ideas that engendered the apprenticeship system of the middle ages were refined by a number of educational theorists and practitioners over the centuries, eventually leading to the observation that manual work has a positive effect on intellectual acuity, and resulting in an educational movement based on the notion of “learning by doing.” The earliest Italian design schools of the seventeenth century began to connect the two streams with the institution of the project method as their primary means of instruction. At the École des Beaux-Arts in nineteenth century France we see the confluence in a more mature form. “The École des Beaux-Arts in Paris taught architecture from 1819 until 1968. The school was not newly formed in 1819, however; rather it had been transformed between 1793 and 1819 from the schools of the Académie Royale de Peintre et de Sculpture and the Académie Royale d’Architecture. Some of the arrangement of teaching architecture survived from the Ancien Régime” (Chafee, 1977, p. 61).

One of the results of the revolution in France for which Rousseau receives the credit or blame was the dissolution of the royal academies and associated schools that had proliferated during the reign of Louis XIV in the 1660s and 1670s and that had continued though the 1700s. The Royal Academy of Architecture, comprised of the “eminent architects whom the king had named academicians met once a week to share their learning…. So that young
architects of the realm night benefit from its studies, the Academy conducted a school. Public lectures were given, initially two days a week, on theory of architecture, by François Blondel (1617-1686), the first professor and director of the Academy [and author of the Cours d'Architecture published in 1765]…. By 1717 the lectures had become a course lasting two or three years” (Chafee, 1977, p. 61).

“The word ‘academy’ suggests the great philosopher of antiquity, Plato, as well as the academies of the Italian Renaissance with their humanist learning.” Medieval guilds still existed in the 1600s and the royal academies did not entirely replace them. “Academicians continued to have apprentices to whom they taught their art. An élève of the Academy of Architecture learned to design not there, but in the workshop, the atelier [the studio], of his master.” But the academic doctrine was a product of Renaissance Neoplatonism [Marsilio Ficino, “the greatest of the Renaissance Neoplatonists” (Rice Jr., 1994, p. 85-86) published his translation of The Complete Works of Plato in 1484]: “The academy sought to evolve universal principles of architecture…. The touchstones of these principles were what had long been regarded as the best examples: for proportion, the Five Orders; in general, the greatest buildings of Roman antiquity and the Italian Renaissance. All these were reason materialized.” Jacques-François Blondel (1705-1774) (distantly or not at all related to François, of the previous century), following Petrarch and Erasmus, “believed that the masterpieces of antique architecture should not simply be copied, for all the circumstances were different. People’s needs, customs, and politics; construction materials; the climate;
even the gods—all had changed, and consequently architects had to create a different architecture. *To do so they needed to study classical masterpieces to learn logical thought* [emphasis added]” (Chafee, 1977, p. 62-63).

During the first half of the 1700s the Academy was primarily concerned with its disagreements on the proper proportions of the Orders. “Planning was less of an issue and construction still less. In the second half of the century the priority was reversed. The Academy gradually lost interest in theoretical questions and turned instead, at a time when knowledge of physics and chemistry was increasing, to construction. The members heard technical reports on ways of building…, on the behavior of materials…, on plumbing, heating, and lighting. They [even] grew interested in Gothic architecture” (Chafee, 1977, p. 64). Architectural practice in the eighteenth century continued to be far less narrowly defined than it is today. Not only was the architect associated with the painter and the sculptor, architecture was not nearly as strongly differentiated from town planning and engineering as it is now. “The sacred books of Vitruvius and his disciples still remained the architects’ bible in all matters of taste, but the Academy itself had become as much of a school of Engineering and Building as of the Fine Arts. It was consulted on such questions as irrigation, fortifications, road making, canals, and bridge construction; even on technical processes in manufacture” (Briggs, 1927, p. 229).

However, “a special corps of military engineers… was set up in the French army in the late seventeenth century. This took away from architects some of their previous functions
such as the building of fortresses and siege works. In 1716 the first official corps of civil
engineers was formed, the Departement des Pont-et-Chaussées (i.e., Bridges and Highways).
Its responsibility was building bridges, canals, highways, etc., all of which had been
previously built by architects…. The first several engineers-in-chief of the department were
architects but in 1795 the founding of the École Polytechnique [a school of applied
technology, intended to train students for such pursuits as military and civil engineering, the
mines, and shipbuilding—not as academic architects] “took away from architects even more
of their former functions…. From 1795 to 1830 the teacher of architecture courses at the
École Polytechnique was Jean-Nicolas-Louis Durand [who during that period] served as a
link between the École Polytechnique and the more progressive-minded students at the École
des Beaux-Arts” (Egbert, 1980, p. 45-48).

The Enlightenment, with its emphasis on empiricism, experience, and sensation, had
begun at the end of the 1600s, about the same time the French royal academies were created.
One way its influence reached the École des Beaux-Arts was through Durand. He published
Recueil et Parallele des Edifices de Tout Genre Anciens et Modernes (Parallel Collection of
Buildings of All Kinds, Ancient and Modern) in 1800. His interpretation of the lessons of
antiquity and of the Renaissance led him to the belief that “forms and proportions arising
from the inherent nature of materials and methods of construction are much more essential to
good architecture than those proportions which arise when simple habit has created a kind of
need for them—proportions such as those of the edifices of classical Antiquity and of the
classic orders. So free had Durand’s attitude towards classicism become that he had no preconceived idea of form. Hence he could find ‘classics’ in a wide variety of periods and places. [In his book], often called the ‘Grand Durand’ …buildings representing all kinds of programs and a wide variety of styles—Egyptian, Greek, Roman, Gothic, Chinese, Islamic, Italian and French Renaissance, and post-Renaissance—were drawn side-by-side at the same scale” (Egbert, 1980, p. 48-49). Durand had himself competed for the Grand Prix four times, taking second prize twice; one of his private students won it in 1802. His approach helped promote the belief that classicism was beyond style: “Ideally, Beaux-Arts architects were creative eclectics who avoided direct copying of ancient or modern buildings. They tried to make new and appropriate compositions with traditional elements drawn from a wide variety of sources. But whether they looked to Augustan Rome or Elizabethan England for motifs, the composition of architectural elements was governed by the Classical principles” (Draper, 1977, p. 213).

The study of architecture at the school of the Académie Royale d’Architecture and later at “the École des Beaux-Arts did not consist of a series of courses eventually leading to a degree” (Levine, 1982, p. 68). In “1720,… the competition for what became regularly known after the French Revolution as the Grand Prix de Rome began as an annual event. Thereafter, except for a few war years, the competition was the high point of the year in French architectural study throughout the nearly two and a half centuries of its life” (Egbert, 1980, p.
“In 1763… the [monthly] *prix d’émulation* [was created]…. The monthly competitions became practice for the annual competition for the Grand Prix” (Chafee, 1977, p. 64-65).

Paul Cret, a graduate of the École who taught architecture at the University of Pennsylvania from 1903 to 1937, wrote: “As to the *concours* [competitions], a long paper would be required to state the case for or against them. If, as was recently written by an eminent scientist, ‘Education by dictation and regimentation were the worst faults in education,’ the École has for a century avoided these pitfalls. It put in practice the ‘cases system’ a hundred years before it became common in our law schools. For what is the architectural school competition but a case to be conducted as the student sees fit, the jury having the final say?” (Cret, 1941, p. 11). As John Locke wrote in 1693, in “Some Thoughts Concerning Education,” “He will better comprehend the Foundations, the Measures of Decency, and Justice; and have livelier, and more lasting Impressions, of what he ought to do, by giving his Opinion on Cases propos’d, and reasoning with his tutor on fit instances, than by giving a silent, negligent, sleepy, Audience to his Tutor’s lectures” (Locke, 1968, p. 204).

“Whatever the aspiration of the pupils for the prestigious Prix de Rome competition, it was the monthly competitions that were most representative of the teaching of the thousands of architects, French and foreign, who passed through the École des Beaux-Arts during the 19th century… In all, 6,500 students were admitted between 1819 and 1914, a period in which only 100 were to win the Grand Prix” (Jacque, 1982, p. 59). “*Concours d’émulation*
(competitions) were the method by which the students’ designs were judged. The largest number of these concours were in architectural composition, and they were of two kinds: esquisses (sketches) and projets rendus (rendered projects)... Sketch concours required one drawing submitted after twelve hours of study; those for projets rendus usually required three larger drawings, submitted after two months” (Chafee, 1977, p. 83).

The Platonic roots of the philosophical stance of the École was reflected in the plan, elevation, and section drawings required in the competitions: “Perspective drawings...were submitted... in only three competitions in the entire history of the Grand Prix... The characteristic absence of a visually ‘realistic’ approach to architectural design is therefore to be noted because the academic point of view had its philosophical basis in classical ‘idealism,’ especially Aristotelian and Neo-Platonic idealism, rather than in ‘realism,’ ‘naturalism,’ or ‘materialism.’ Plans, elevations, and sections are ‘idealized’ abstractions of the ‘real’ world of nature and the senses, inasmuch as they do not depict architecture ‘realistically’ as it appears to the eye of the beholder” (Egbert, 1980, p. 11-12). This insistence on abstraction is at odds with the empiricist Enlightenment emphasis on sensation and experience. But even though this bias existed, the competition system and the structure of the École’s curriculum insured that learning occurred in two very different ways.

“From the 1820s on, there were lectures in theory of architecture, history of architecture, construction, perspective, and mathematics; by 1900 there were more than twice as many courses, including physics and chemistry, descriptive geometry, building law, general history,
and French architecture…. [But the] École’s teaching of design was limited to lecturing, issuing programs, and judging concours” (Chafee, 1977, p. 82, 88-89). Though the Enlightenment influence did not dominate the overt philosophy of the École, in terms of pedagogical method its presence was strong. During its period of dominance in design eduction, the École was far more dependent on individual instruction and hands-on development of technique than on the assimilation of factual knowledge or abstract theory via lecture.

“[T]he center of the student’s world was the atelier or studio, where competition projects were worked out” (Draper, 1977, p. 211). “An atelier is a studio; an architectural atelier is a drafting room. Every student of architecture at the École des Beaux-Arts learned to design in an architectural atelier. At the École, everyone in the Section d’Architecture was registered as—and thought of himself as—the student of an architect” (Chafee, 1977, p. 88-89), like an apprentice. After 1863, “All but three of the twenty or so ateliers were maintained independently by patrons (design professors) who were practicing architects” (Draper, 1977, p. 211). “Large ateliers were not architectural offices; they were private schools of architecture. [Their purpose] was solely teaching…. The attraction of the ateliers was twofold: an experienced master offering guidance, and a company of students sharing their learning…. Not surprisingly, French students were attracted to the ateliers that were currently capturing the Prix de Rome, if only because those were the ateliers where the best students were exchanging ideas…. Three architectural ateliers were, from 1863 on, in the École’s own
buildings. These... were *ateliers officiels*, whereas the others were *ateliers libre*, free in the sense that they were privately, not officially, controlled. The *ateliers officiels* were in effect if not intent, very much like the *ateliers libre*.... The organization of the *ateliers* was remarkable. Each was governed not by the architect whose name it carried but by the students themselves.... The *anciens* [older students] and the *nouveaux* [younger students] helped one another. The *anciens*,... gave the benefit of their experience to the *nouveaux* by criticizing designs, not in formal sessions but in the endless exchange of ideas about architecture that was the intellectual life of the atelier. The *nouveaux* assisted the *anciens* with presentation drawings: tracing shadows on facades, repeating patterns of ornament, and inking plans. The *nouveaux* usually did this hard work nonstop, day and night, shortly before each *concours* reached its end.... If an *ancien* reached the last stage of the *concours* for the Grand Prix, all the men in he needed would become his ‘assistants.’ Thus, for months, the *nouveaux* would have their hands in the development of a complex project, and the competitor, like an architect with an office, would keep in mind not only his design but also the efficient management of his staff” (Chafee, 1977, p. 89-92). The *ateliers* at the École des Beaux-Arts were nineteenth century examples-in-action of what would be called constructivism by twentieth century educational theorists.

The visits of the *patrons*, however, “were conducted with a formality utterly alien to our current notion of the teacher-student relationship.” Still, the *patrons* “transmitted their theories of architecture in the most effective way, face to face with their students, talking
about those students’ designs. So long as the *atelier* system worked well, the students almost without exception revered the *patrons*, and the term *patron* curiously expresses this relationship. Students did not speak of the architect in charge of the atelier as the *professeur*, the *directeur*, or the *chef*, as they might have done;… Instead they referred to him as the *patron*, a word that suggests, as one student wrote, ‘a bond of friendship’” (Chafee, 1977, p. 95).

The work done in the *ateliers* was in the form of design projects based on programs issued by the École. For the monthly *concours*, “from 1819 to 1914 there were more than five hundred different programmes…. The greater part of the programmes… can be divided, roughly, into three categories: public buildings or buildings to be used by the public, ecclesiastical buildings, and private buildings…. Several subjects were repeated throughout the century; baths, in particular, emerge as a favourite theme, appearing no less than fifty-one times…. Another favourite subject was the school, which was set on sixty-three occasions, to cover the whole range of French education… all branches of the sciences and the arts were… represented, showing how faithfully the École reflected the contemporary concern with education…. A third notable category was the monument. There are no less than seventy-one….” (Jacque, 1982, p. 60-62).

There were rigid procedural rules for the projects:

Because students could progress each at his own speed, a student had to enroll for every *concours* he wished to enter. For architectural *concours* the process of enrollment was remarkable. In a special building,… the student would sign his name in the book of registrations for *concours* and would receive a copy of the program. He then went into a small cubicle-in French, one says he went *en loge-
and there he had twelve hours in which to study the program, and if he wished to draw a small preliminary sketch recording the essential form of his architectural design. All the students en loge for a concours could talk together, but no one else was allowed to join them. If a student wished to take part in the concours, he would when he left the building give his sketch to the guard, who acknowledged receipt in the registration book. Once out, the student could not return. He would take a tracing of his sketch back to his atelier, where, with the criticism of his patron he would develop his idea. Ultimately, if the student wanted to, he would prepare drawings for submission on an appointed date to the school for judgment. The jury compared each student's preliminary sketch with his final entry, for the two had to reflect the same idea. If they did not, the jury declared the submission out of the competition, hors de concours, and for that concours the student would get no credit. The purpose of this complicated arrangement was to insure that each student thought for himself, that he did not have his work done for him by his patron. Students often were judged hors de concours, often they were simply failed by the jury, and often they registered for concours but did not submit final drawings or even a preliminary sketch. Many students found it worthwhile every month to enroll for an architectural concours, get the program, and try that day to conceive of a building, even if there was no time for further study. The very number of esquisses and projets rendus that were offered kept architecture at the center of the second class’s curriculum.

The most important competition at the École des Beaux-Arts was the one for the Grand Prix de Rome. It occupied almost half a year. Early in March came the first trial, which was open to all applicants: twelve hours en loge to draw an esquisse… The second stage of the competition took place within the week: twenty-four hours en loge for another esquisse that customarily required solving a complicated problem in planning,… This second trial was for only thirty people… The architects in the Académie des Beaux-Arts of the Institut de France judged the first and second trials. Immediately after the second, this jury named eight winners (from 1864 on, ten winners) allowed into the third trial, the competition proper, which began at once and lasted until the end of July… The final stage of the concours for the Grand Prix was like the architectural concours conducted by the École in that each competitor was obliged to make a sketch and not digress too far from it…. The winner of the Grand Prix de Rome was marked by the Academy as the most promising student of the year. He was then sent to the French Academy in Rome for four or five years, at the expense of the government, in order to learn the lessons of antiquity. Upon his return to France, he was likely to be made an Architecte du Gouvernement, and thereafter in the employ of the state he would be responsible for a public building, such as the national library or one of the national palaces” (Chafee, 1977, p. 84-85, 87).

“The twenty-four hour sketch tested the student’s intelligence in analyzing the programme and his clarity of purpose in defining a general solution. The problem was to distinguish the significant elements, decide on a parti, or scheme of organization, and then compose the elements into an appropriate form. While certain rules or conventions governing composition were almost always adhered to, there was also quite a large area for individual
choice and variation…. Within the limits of Beaux-Arts conventions, there were usually only
two or at most three possible parti for any given programme…. [t]he académie made its
decisions on a strictly comparative basis by weighing the compositional variations on… [the]
standard types of parti [and usually sought] the expression of variety within unity and the
balance of major and minor elements” (Levine, 1982, p. 83, 94-95).

The four months each finalist spent studying the design and working on the final
renderings in studio was a trial-by-fire. “The sustained effort of studying a project was the
true test of professional promise and reliability, and the renderings provided conclusive proof
of the individual’s power of expression. ‘Everybody can come up with projects, for better or
for worse’, wrote Boutard in 1826, ‘but only the skillful architect can produce a well-studied
project’ that ‘reveals his learning and adequacy’ for the job” (Levine, 1982, p. 121). The
study, of course, drove the design, but the value of the project as a learning experience was at
least as much in the way the design and drawing informed the study. Though we now
question the value of what was being taught, the Grand Prix competition was clearly a prime
example of learning by doing.

The drawings produced in the final stage Grand Prix competitions were the at the apex of
architectural rendering quality for their time or for any other. Certainly they have not been
surpassed since. The skill and confidence necessary to produce the final renderings with
precision and panache was an indication not merely of manual facility; it indicated, to those
who understood the language, sophistication in its use. “There is nothing new in defining
execution and finish as qualities academic artists recognized as pre-eminent. In his review of the Grand Prix competition of 1845, Daly quoted Diderot writing about the salon of 1767: ‘A good sketch can be the work of a young man full of life and inspiration…. A beautiful painting is never anything but the work of a master who has reflected, meditated, and worked a great deal’” (Levine, 1982, p. 121).
7. THE EDUCATIONAL PHILOSOPHIES OF PESTALOZZI AND FROEBEL

Pestalozzi

Johann Heinrich Pestalozzi (1746-1827) was born in Zurich. “The father of modern educational science, he directly inspired Froebel and Herbart and his name was associated with all the movements for educational reform that roused the passions of the nineteenth century” (Soëtard, 1994, p. 1). He tried the ministry, the law, and farming before beginning his career as an educator. He admired the writings of Rousseau (he named one of his sons Jean Jacques), who helped inspire his revolutionary spirit and his educational philosophy. “[H]uman education goes on slowly from exercise of the senses to exercise of the judgment. It is for a long time the business of the heart, before it is the business of the reason” (Pestalozzi, 1898, p. 294). He was known as a man of great generosity, with high ideals, large amounts of energy, and little sense of administrative organization. Pestalozzi was concerned only with basic elementary education; he “took no interest in, and his work is not concerned with, wide fields of culture—literature, music, fine art” (Silber, 1973, p. 275). Nevertheless, his influence has reached a broad spectrum of disciplines at all educational levels.

In Pestalozzi’s time, “formal education persisted in its perennial error of ignoring intellectual and social change” (Gutek, 1999, p. 12), continuing in elementary schools to stress discipline and memorization as the primary means of pedagogy. “The school curriculum, [Pestalozzi] said, should be concerned not with the transmission of the products
of learning but with the active process of search, not with dead letter work but with sensory
intuition, not with parrot-like repetition but with rational thought” (Silber, 1973, p. 141).

In contrast to the prevailing methods of elementary education, Pestalozzi believed that
the “common work of all instruction is to make [the] consciousness [of impressions which
have touched the senses] clear…. Either we lead the children through knowledge of names to
that of things, or else through knowledge of things to that of names. The second method is
mine…. I wish always to let sense-impression precede the word, and definite knowledge the
judgment. I wish to make words and talk unimportant on the human mind, and to secure that
preponderance due to the actual impressions of physical objects… that forms such a
remarkable protection against mere noise and empty sound. From his very first development
I wish to lead my child into the whole circle of Nature surrounding him; I would organize his
learning to talk by a collection of natural products; I would teach him early to abstract all
physical generalizations from separate physical facts, and teach him to express them in
words; and I would everywhere substitute physical generalizations for those metaphysical
generalizations with which we begin the instruction of our race. Not till after the foundation
of human knowledge (sense-impressions of Nature) has been fairly laid and secure would I
begin the dull, abstract work of studying from books” (Pestalozzi, 1898, p. 325-26).

Pestalozzi is well known for his pioneering use of the “object lesson:” “The teaching of
arithmetic must therefore begin with the use of real objects and proceed via substitute objects
(fingers, pebbles, dots) to abstract numbers. The aim of teaching ‘elementary’ arithmetic is
'to raise the child’s natural power of reasoning into an art.’ In going back to the elements, says Pestalozzi, children learn to do their sums more accurately; ‘but besides learning sums they learn how to think, and even their sums they learn by thinking” (Silber, 1973, p. 142).

“With the exception of teaching drawing, all the theorizing of the sixteenth and seventeenth centuries resulted in those centuries merely in a change of educational philosophy and not in a change in school work so far as the manual arts were concerned…. The idea of ‘learning by doing’ was accepted by many, but not put into practice in the school. The school and the workshop were two entirely different spheres of human activity. Manual work was outside the realm of school work because its fundamental educational value was not yet recognized” (Bennett, 1926, p. 72).

In the eighteenth century, Pestalozzi did recognize the educational value of manual work and opened his first school at Neuhof in 1774, taking about twenty poor and/or orphaned children into his home, with “a dual objective: to introduce children to economic realities and at the same time to help each of them to develop his own independent personality within a free and responsible society” (Soëtard, 1994, p. 2). He treated the children as his family members; the curriculum was based on a generally seamless system of learning and working. “From the educational viewpoint this experiment was a complete success…. Pestalozzi believed that children in school should learn to work… because this experience gave sense-impressions which, like the study of objects, became the basis of knowledge. He recognized the fact that ‘doing leads to knowing’” (Bennett, 1926, p. 112, 120).
Financially, the Neuhof school was a failure; Pestalozzi was forced to close it in 1780. “Pestalozzi’s basic objective was, as he wrote in his 1774 diary on the education of his son Jacob, ‘to join together again what Rousseau had rent asunder:’ freedom and constraint, natural desire and the rule of law wanted by all and for all. But this same Rousseau had said that this ideal union was bound to break down at the first attempt to put it into practice. Pestalozzi’s failure bore out the paradox described in Book One of *Emile*, namely that the education of the individual (who must be free) and that of the citizen (who must be of use) can no longer be merged in a single project. Of all Rousseau’s more or less devoted disciples, he at least had the merit of trying to put *Emile* into practice in all its paradoxical vigour, putting himself in a position when the time came to move beyond the fruitful contradictions of Rousseau’s work” (Soëtard, 1994, p. 2-3). In his mature view, he regarded *Emile* an “‘unpractical dream-book’ [which had] dazzled him…. After having experienced, and overcome, the impact of Rousseau, Pestalozzi never let himself be much influenced by any doctrine or any man…. whenever he felt other men’s ideas encroach upon his own, he became wary” (Silber, 1973, p. 10, 140). Neuhof taught him that if “there exists a type of man to be fashioned, even under the banner of freedom, education can only serve an ancillary purpose. Pestalozzi thus refuses education for reproduction of an ideal or real world: he perceives it as a form of action which allows each person to recognize his own individuality and made a ‘creative work of himself’” (Soëtard, 1994, p. 4).
Pestalozzi was a prolific writer. His first educational work was *Evening Hour of a Hermit*, published in 1780: “All the pure and beneficent powers of humanity are neither the products of art nor the results of chance. They are really a natural possession of every man. Their development is a universal human need” (de Guimps, 1890, p. 75). This was followed by *Leonard and Gertrude* (1781-87), *Inquiry into the Course of Nature in the Development of the Human Race* (1797), *An Account of The Method* (1800), *How Gertrude Teaches Her Children* (1801), several other books and many shorter works.

The “most important consequence of the process of reflection that culminated in the *Inquiries* of 1797—a result that Pestalozzi does not specifically formulate but which underlies all his subsequent work—was that he had now taken up a position in which he could understand the way the child really develops. The Neuhof had used the child to fulfill the last adult dream—that of combining a perfect integration in society while maintaining a natural innocence. By making these ideals relative instead of absolute, Pestalozzi was able to apprehend the essential nature of the child, at the point where instinctual desire comes up against society’s demand for rationality, in the very process whereby the child fashions himself through that conflict continuously experienced and continuously resolved. More than that, it is the supposedly established human social order that is destined to be regenerated through the child and through the way in which, by promoting the development of the child as a free and autonomous being, it finds itself with infinite vistas of freedom before it.
Education is the youth to which mankind eternally aspires: ‘Nature has done its work: you must now begin to do yours!’” (Soëtard, 1994, p. 5).

One writer interprets Pestalozzi’s view on the art of teaching—a subject that sounds like design: “‘Art’ (in opposition to nature) is for the teacher a conscious acting according to principles, and for the pupil his methodically cultivated powers… It is the aim of art to bring ‘order’ into nature. Thus it assists nature, but if its assistance is to be effective it must also follow ‘the course of nature.’ Hence art imitates nature and attempts to restore the original goodness of nature by helping it to follow its own course more easily” (Silber, 1973, p. 137).

In An Account of The Method, Pestalozzi explains:

The most essential point from which I start is this:—

Sense-impression of Nature is the only true foundation of human instruction, because it is the only true foundation of human knowledge.

All that follows is the result of this sense-impression, and the process of abstraction from it. Hence in every case where this is imperfect, the result also will be neither certain, safe, nor positive; and in any case, where the sense-impression is inaccurate, deception and error follow.

I start from this point and ask: ‘What does Nature itself do in order to present the world truly to me, so far as it affects me? That is, by what means does she bring the sense-impressions of the most important things around me to a perfection that contents me?’ And I find, she does this through my surroundings, my wants and my relations to others.

Through my surroundings she determines the kinds of sense-impressions I receive. Through my wants she stimulates my activities. Through my relations to others she widens my observation and raises it to insight and forethought. Through my surroundings, my wants, my relations to others, she lays the foundations of my knowledge, my work, and my right-doing.

And now I ask myself:—‘What general method of the Art [The Art of Teaching: our Science and Art of Education] has the experience of ages put into the hands of humanity to strengthen this influence of Nature in developing intelligence, energy, and virtue in our race?’ And I find these methods are speech, the arts of drawing, writing, reckoning and measuring. (Pestalozzi, 1898, p. 316-17).

‘Pestalozzi speaks of a ‘mechanism of nature,’ meaning the ordered arrangement or the laws of nature (the Newtonian concept)... These laws (this is important) are the same for
external nature and for human nature, for man was created in accordance with nature, and his
powers and faculties are, within limits, in conformity with the forces of nature. When
Pestalozzi claims to establish ‘a psychological method of instruction’ he means to say that he
is trying to find a way of teaching which shall be in agreement with discoverable laws of
human nature… Since nature is one, it follows that there can be only one true method of
education, the ‘natural’ or ‘psychological’ method” (Silber, 1973, p. 136). He says the
“mechanism of physical (human) nature is essentially subject to the same laws as those by
which physical Nature generally unfolds her powers. According to these laws, all instruction
should engraft the most essential parts of its subject of knowledge firmly into the very being
of the human mind; then join on the less essential gradually but uninterruptedly to the most
essential, and maintain all the parts of the subject, even to the outermost, in one living
proportionate whole” (Pestalozzi, 1898, p. 131-132). From this point of beginning, Pestalozzi
derives general rules for instruction (here, as published in How Gertrude Teaches Her
Children):

1. Learn therefore to classify observations and complete the simple before proceeding to the
complex. Try to make in every art graduated steps of knowledge, in which every new idea is only
a small, almost imperceptible addition to that which has been known before, deeply impressed and
not to be forgotten.

2. Again, bring all things essentially related to each other to that connection in your mind which they
have in Nature. Subordinate all unessential things to the essential in your idea. Especially
subordinate the impression given by the Art to that given by Nature and reality; and give to
nothing a greater weight in your idea than it has in relation to your race in Nature.

3. Strengthen and make clear the impressions of important objects by bringing them nearer to you by
the Art, and letting them affect you through different senses. Learn for this purpose the first law of
physical mechanism, which makes the relative power of all influences of physical Nature depend
on the physical nearness or distance of the object in contact with the senses. Never forget that this
physical nearness or distance has an immense effect in determining your positive opinions,
conduct, duties, and even virtue.
4. Regard all the effects of natural law as absolutely necessary, and recognize in this necessity the result of her power by which Nature unites together the apparently heterogeneous elements of her materials for the achievement of her end. Let the Art with which you work through instruction upon your race, and the results you aim at, be founded upon natural law, so that all your actions may be means to this principal end, although apparently heterogeneous.

5. But the richness of its charm, and the variety of its free play cause physical necessity, or natural law, to bear the impress of freedom and independence.

   Let the results of your art and your instruction, while you try to found them upon natural law, by the richness of their charm and the variety of their free play bear the impression of freedom and independence.

   All these laws to which the development of human nature is subject converge towards one centre. They converge towards the centre of our whole being, and we ourselves are this centre.

   Friend, all that I am, all I wish, all I might be, comes out of myself. Should not my knowledge also come out of myself? (Pestalozzi, 1898, p. 132-34).

   “The most important and the essentially new principle for his time is that of spontaneity or self-activity. It demands that all knowledge should ‘have its origin in the child himself,’ or in different words, that the fruits of perception should ‘bear the mark of freedom and independence.’ It implies that the child should not be given ready-made answers but should arrive at solutions himself and that, in order for him to do this, his own powers of perceiving, judging, and reasoning should be cultivated, his self-activity encouraged” (Silber, 1973, p. 140).

   Pestalozzi’s writings and reputation helped him gain a position at a school opened by the Swiss government in Stans in 1799. This situation was short-lived—“swept away by the war after only a few months;” (Soëtard, 1994, p. 2). At Stans, “even well-meaning observers began to have misgivings about the lack of organization, [but]…. The lack of a definite plan was by no means due to carelessness but to Pestalozzi’s considered intention.” He soon found another place where he could “continue his experiments:” Burgdorf, where when he had
taught according to his “principles for eight months… a public examination was held before the Burgdorf school board. Their report was very favourable and showed great understanding. It points not only to the remarkable progress of the children of this school but also the suitability of the new teaching method for the simplest domestic conditions; it gives public recognition to Pestalozzi for ‘having already bestowed lasting benefits on the youth and the educational institutions of the country’” (Silber, 1973, p. 115, 121). The institute of Burgdorf did not survive the fall of the government in 1803. Pestalozzi was finally called to Yverdon where, on 1 January 1805, he opened an educational establishment in the chateau that rapidly expanded and became famous throughout Europe. People came from all sides to observe this new educational wonder and trainee teachers arrived in waves (Prussian, French, English) to be instructed in the ‘Pestalozzi Method’” (Soëtard, 1994, p. 5). Ludwig Nicolovius (1767-1839), who Pestalozzi met in 1791, and who was “later Councillor of State… in the Prussian Ministry of Education, was instrumental in introducing the Pestalozzian method into Prussia’s new teachers’ training colleges” (Silber, 1973, p. 79).

“Pestalozzi was now in a position to understand the mistake he had made in the Neuhof. In trying to play two games at once, combining economic rationalism with full human development, he had placed himself, all unawares, in the centre of the storm that was raging in the society of his day. Neither a tough businessman nor a benevolent father of the people, he was from now on to play the role of educator, aloof at once from the claims of society and from the desires of those concerned, seeking to bring the two extremes closer together by
implanting in each individual a spirit of freedom in autonomy, to a freedom involved in society through the learning of a trade and at the same time striving to achieve self-fulfillment in the process. Education thus offered a solution to Rousseau’s paradox, which held that it was impossible to educate natural man and the citizen simultaneously” (Soëtard, 1994, p. 4).

“The task of education, according to Pestalozzi, is to be found not in imposing on the child fixed doctrines and alien concepts, but in helping him to develop his own constructive powers and conquer his own corrupting tendencies. Its way lies in the establishing of his inner security by rooting him firmly in his family and giving him a sure place in society. Its means consist in the training of all his faculties through a combination of moral, mental, and practical activities. The child being, like nature, conceived as an integrated whole, education, too, becomes something single and complete in itself. The aim of a ‘harmonious education’ is, however, not an aesthetic ideal but the morally balanced personality” (Silber, 1973, p. 274).

Perhaps the most fearful gift that a fiendish spirit has made to this age is knowledge without power of doing… and insight without that power of exertion or of overcoming that makes it possible and easy for our life to be in harmony with our inmost nature.

Man! needing much and desiring all, thou must to satisfy thy wants and wishes know and think, but for this thou must also (can and) do. And knowing and doing are so closely connected that if one ceases the other ceases with it. But there can be this harmony between thy life and thy inmost nature only if the powers of doing… (without which it is impossible to satisfy thy wishes and wants) are cultivated in thee with just the same art, and raised to the same degree of perfection, as thy insight into the objects of thy wants and wishes. The cultivation of these activities rests then on the same organic laws as the cultivation of knowledge.

The organism of nature is one and the same in the living plant; in the animal, whose nature is merely physical; and in man, whose nature is also physical, but who possesses will. In the threefold results which nature is capable of producing in me, she is always the same. Her laws work either physically upon my physical nature, in the same manner as upon animals generally; or, secondly, they work upon
me so far as they determine the sensuous basis of my judgment and will. In this respect they are the sensuous basis of my opinions, my inclinations, and my resolutions. Thirdly, they work upon me so far as they make me capable of that practical skill…, the need of which I feel through my instinct, I recognize through my insight, and the learning of which I command through my will (Pestalozzi, 1898, p. 270-71).

Learning by doing is fundamental to Pestalozzi’s program: “The mechanism of activities takes the same course as that of knowledge, and its foundations with regard to self-education are perhaps still more far-reaching. In order to be able, you must act; in order to know, you must, in many cases, keep passive; you can only see and hear. Hence in relation to your activities you are not only the centre of their cultivation, but in many cases you determine their ultimate use (Pestalozzi, 1898, p. 278).

Pestalozzi “asserts that nothing in the world is more important than the physical, mental, and moral well-being of each individual man. His educational aim, the ‘ennobling’ of all men through the cultivation of their own powers, has proved to be of perennial value” (Silber, 1973, p. 277). “All that you know of yourself, you know clearly; all that you yourself know is in you, and in itself clear through you. It follows that this road to clear ideas is easier and safer in this direction than in any other; and among all that is clear nothing can be clearer than this principle: man's knowledge of truth comes from his knowledge of himself” (Pestalozzi, 1898, p. 144).

Froebel

“The direct heir to the educational ideas of Pestalozzi was Friedrich Wilhelm Augustus Froebel (1782-1852). It was he who took Pestalozzi’s idea of organic growth and developed
He took Pestalozzi’s practice of training in observation and sense perception and expanded and systematized it” (Bennett, 1926, p. 162). Froebel was also influenced by Comenius and Rousseau, but characteristically, he transformed their ideas into something of his own. “For example, for Froebel, children's freedom, independence and individuality were achieved by following the eternal law of development rather than, as Rousseau argued, by protecting them from 'unnatural' society” (Walsh, 2001, p. 97). Like Pestalozzi, Froebel worked with, and theorized about the development of, young children; he is credited with the invention of the kindergarten, which he described as “an institution for… self-education and self-cultivation of mankind… through play, creative self-activity, and spontaneous self instruction”’ Walsh, 2001, p. 96).

“In 1805…, the 23-year-old Froebel went to Frankfurt to study architecture, but instead began his career as an educator. Anton Gruener persuaded him to teach in his Model School and to visit Pestalozzi’s Institute at Yverdon. At Gruener’s school, he taught a class of between thirty and forty 9- to 11-year-old boys for two years. In 1807 he left the school to tutor three brothers. He took them to Yverdon and stayed there for two years. Froebel deeply admired Pestalozzi and was particularly fascinated by the boys’ play and the nature walks that Pestalozzi conducted”Walsh, 2001, p. 95).

Froebel’s educational philosophy differed with Pestalozzi’s in one fundamental aspect. Froebel’s method is “speculative and deductive, tracing the development of man ‘as from the
absolute,’ while Pestalozzi the realist, in Froebel’s opinion, ‘takes man as he appears on
earth’” (Silber, 1973, p. 217). As Froebel has it, the “educator should make plain the
universal relations involved in particular acts and the mode in which universal laws find
expression in particular deeds, and should illustrate both from life” (Froebel, 1912, p. 35).
Pestalozzi thought inductively, believing that universal truth would reveal itself through
experience. They agreed on the necessity of illustration “from life” and learning from
experience, but Froebel insisted on the need to clearly enunciate goals and systematically
provide means for reaching them: Man “is in the child; the unity of humanity is inherent in
childhood; so it follows that all that the man shall ever be or do exists in germ in him as an
infant. So if we would raise him aright, so as to develop both his individuality and his
common human nature, we must from the first see him both as a particular human being and
as in essential relations to his surroundings. But the unity of his inner life finds many and
diverse manifestations, which appear successively in time. So it is in diverse particular
experiences that the child learns to know both the world as related to himself and his own
inner life as related to the world. Hence it follows that his powers and tendencies, the
activities of his senses and limbs, should be developed in order, each as it appears in his
life” (Froebel, 1912, p. 44-45).

“There were four basic components embodied in Froebel's mystical philosophy of
education: (1) free self-activity, (2) creativity, (3) social participation, and (4) motor
expression. He contended that free self-activity directed the learner’s growth and allowed
him the active creativity and social participation necessary to merge his personality with the spirit of humanity. To Froebel, motor expression meant to learn by doing, not through verbal communication alone. What is more, individual educational activity was to take place only when the learner felt a need for it. Froebel believed this readiness was a condition of man’s inner nature rather than a mere result of curiosity, interest, or past experience” (Saettler, 1990, p. 42).

The “mystical” element referred to above is revealed in Froebel’s words: “The destiny of every thing is to reveal its essence, that is, the divine spirit dwelling within it. It is the special function of man as an intelligent and rational being to realize his essence fully and clearly, to exercise, practice, and reveal the divine spirit in him, freely and consciously in his own life….The Theory of Education is the body of doctrine derived by thoughtful men from insight into this law, as a guidance in the apprehension and attainment of man’s true calling…. The Art of Education is the free application of this knowledge and insight to the development of rational beings and their training towards the fulfillment of their destiny…. Education, then, must develop the divine spirit in man and make him conscious of it, so that his life may become a free expression of that spirit. Education, in other words, should lead man to a clear knowledge of himself, to peace with nature, to unity with God” (Froebel, 1912, p. 31). Faith undergirds all of Froebel’s work and writing; it does not conflict with his vision of the systematic structure of nature—human or otherwise. “In dealing with objects of nature we often follow the right road, but go astray when we deal with men. And yet, forces
are at work in both which have sprung from one source, and which obey the same law. Hence it is important that man should consider nature also from this point of view” (Froebel, 1912, p. 33).

According to Pestalozzi’s theory, form “and number are categories of thought; they are the foundations of the mathematical sciences. The first stages of geometry, or, as Pestalozzi calls it, the alphabet of form consists in reducing the confused mass of actually existing forms to a limited number of regular forms, the better to comprehend them… (Pestalozzi does not consider a third dimension. Froebel with his better knowledge of mathematics suggests the cube as [one] of his ‘gifts’) (Silber, 1973, p. 142). “To implement his instructional method, Froebel devised a series of materials that he called gifts and occupations. The occupations were activities, while the gifts provided ideas for such activities. Gifts were of two types: geometric shapes, and the basic materials for modeling, drawing, sewing, and coloring. The first gift was a ball, the most universal plaything and symbolic of the unity of the universe. The second gift consisted of a ball, a cube, and a cylinder, which symbolized thesis, antithesis, and synthesis [which points to Hegel, an influence shared with Dewey]. The third gift was formed by dividing a cube into various shapes. These building blocks were specifically designed to illustrate certain relationships and teach form, number, and measurement. They also led children to compare, examine, arrange, and analyze” (Saettler, 1990, p. 43).

The ‘gifts’ were an extension of Pestalozzi’s ‘object lesson,’ and consisted of
1. Six colored worsted balls, about 1-1/2" in diameter.
2. Wooden balls, cylinder, and cube 1-1/2" in diameter.
3. Eight 1" cubes forming a 2" cube.
4. Eight brick-shaped blocks, 2" x 1" x 1/2", forming a 2" cube.
5. Twenty-seven 1" cubes, three bisected and three quadrisected diagonally, forming a 3" cube.
6. Twenty-seven brick-shaped blocks, three bisected longitudinally and six bisected transversely forming a 3" cube.
7. Wooden tablets: squares derived from the faces of the second- and third-gift cubes, also equilateral triangles.
8. Lines: straight splints of various lengths, and circular metal or paper rings of various sizes-whole circles, half-circles, and quadrants.
9. Points: Beans, lentils, or other seeds, leaves, pebbles, etc.
10. Reconstruction: This gift enables the child to reconstruct the surface and the solid synthetically from the point, using sharpened sticks or straws and softened peas or wax pellets (Bennett, 1926, p. 165-66).

The occupations are classified into four groups:

1. Solids: made from plastic clay, cardboard, wood, etc.
2. Surfaces: made from paper, parquetry, paint, etc.
3. Lines: made use of in interlacing, weaving, embroidery, drawing, etc.
4. Points: represented in stringing beads, buttons, etc., and in perforating (Bennett, 1926, p. 165-66).

“Gifts were to exercise and develop intellectual powers and knowledge. Froebel saw the gifts as a whole whose parts explain and advance each other. According to his principle of the continuity of development, each object given must condition the one which follows; each new gift fulfills and interprets its predecessor, by making explicit what it implied.

Occupations were ways of producing skill in the use of knowledge. They were craft activities—clay, cardboard work, wood-carving, paper-folding, paper-cutting, weaving, drawing, and others. Each gift and occupation had its own purpose in accordance with the progress of the
development of children’s minds” (Walsh, 2001, p. 96). Again, in a more systematic approach, “Froebel used objects (gifts) in a uniquely different way from Pestalozzi. While Pestalozzi used a great variety of materials and expected the learner to exercise his sensory powers to become acquainted with each object, Froebel, on the other hand, used fewer formal objects and placed more importance on the symbolic knowledge suggested by the quality of the object than on the immediate knowledge yielded by a sensory experience (observation) of it” (Saettler, 1990, p. 43).

“Perhaps most important to Froebel’s instructional method was his notion of opposites. He believed a plant or animal or child grew by the twofold process of impressing the form of its own life on some external material while developing its inner nature in doing so; or, as Froebel put it, by making the inner outer and the outer inner. Growth was the process of overcoming differences by finding some connection between things that at first appeared opposed” (Saettler, 1990, p. 43). Connection-making requires creative thought; Froebel emphasized creativity repeatedly and in a more developed way than any of his influential predecessors had done, and did so early in the nineteenth century, before creativity became a subject of much psychological study (Runco, 2010).

The primary methodology for accessing creativity was drawing; “the training of the child for the creative activity of freely imagined and inventive drawing is at once the starting-point, and the constant centre to which all else is referred, of true and complete
the child’s joy in drawing is awakened and nourished according to the general law of vital development, by the desire to form wholes, to recognize particulars as parts of a whole, to find the link which connects opposites. In this law the child feels and sees his nascent creative power, and he applies it very early, if not at first in representing living things, yet as a mode of giving vent to his own mental activity; and, so to say, evolving forms out of himself. Here, then, we have another example of the development of true and pervading laws of life from quite simple activities. For, just as in observation the child descended from the whole as a unit, through the parts which compose it, to the lines which bound it, seeing each as a particular thing in a given connexion, so in drawing (1) he represents for himself by means of the lines a definite something existing outside himself, (2) he shows himself to be endowed with a firm will, (3) he indicates by speech that act of will and the deed by which it is carried out, (4) he develops his creative power and proves its reality, (5) he applies intuitively in his observations the simple and necessary laws of formation and life, (6) he thus attains consciousness and knowledge of himself, and to complete the circle and, in a sense, return to our starting-point, (7) he forms himself through knowing, willing, and doing, all centred in the self, to the life of a true man, a part of the universal life. So we see that the child's joyous impulse to draw and create is thus not simply given scope in producing indefinite shapes, but is developed according to the inherent formative laws of his life (Froebel, 1912, p. 228-29).

Here Froebel reiterates the notion previously noted by other theorists of the connection between the act physically making something and intellectual development: “Drawing, though it makes little apparent demand on bodily strength, claims all the energies and trains the whole being. For the right position of finger and hand to secure freedom of movement necessitates a correct and free position of the right arm, and this in its turn demands a suitable position of the other limbs and of the whole body, if what is freely conceived is to be freely expressed. For free and skilled activity of body, and free and skilled activity of mind, involve and condition each other…. Free and true drawing demands also a free and skillful use of the senses…, harmoniously developed soul, a sensitive feeling, a perceiving, comparing, and understanding mind, an educated judgement, a power of correct inference, and a more or less clear idea of what is to be produced, which becomes increasingly precise as the
representation activity progresses. This, further, both demands and trains attentive
observation, the comprehension of the whole, memory, and imagination or the power of
invention and combination. Above all, it opens the way to the whole formative power of
human nature, it enriches the mind and heart, it furnishes the soul with clear concepts, true
thoughts, and beautiful ideas” (Froebel, 1912, p. 226).

Drawing was, for Froebel, at the heart of helping students grow into lives of their own
design. “The fostering of the child’s impulses to draw and to form in accordance with the
laws of nature and life, so that they grow into skill and conscious creation, places him in the
very centre of his whole living experience. Thus is fulfilled the first essential of his education
—that he be fitted to meet all the possible needs and functions of his life in such way that he
is at once most efficient in his particular sphere and a most perfect manifestation of the
general human. Thus is knit the most direct living bond between creation, created, and
creator” (Froebel, 1912, p. 230).

One creative student who benefited from Froebel’s methods was Frank Lloyd Wright,
who wrote:

At the Centennial in Philadelphia,… mother made a discovery…. The Kindergarten!…. She had seen
the "Gifts" in the Exposition Building. The strips of colored paper, glazed and 'matt,' remarkably soft
brilliant colors. Now came the geometric by-play of those charming checkered color combinations!
The structural figures to be made with peas and small straight sticks: slender constructions, the joinings
accented by the little green-pea globes. The smooth shapely maple blocks with which to build, the
sense of which never afterward leaves the fingers: form becoming feeling. The box had a mast to set up
on it, on which to hang the maple cubes and spheres and triangles, revolving them to discover
subordinate forms.

A small interior world of color and form now came within grasp of small fingers. Color and pattern. In
the flat, in the round. Shapes that lay hidden behind the appearances all about. Here was something for
invention to seize, and use to create. These "Gifts" came into the gray house in drab old Weymouth and
made something live there that had never lived there before. Mother would go to Boston, take lessons
of a teacher of the Froebel method and come home to teach the children. When her housework was done mother and the two children would sit at a low mahogany table with polished top, working with these ‘Gifts’ (Wright, 1943, p. 13-14).

Froebel’s oeuvre combined a diverse and unusual set of predilections and conclusions. He was a deeply religious person; his theory of systematic human nature was extremely organized; and his recognition of the fundamental role of creativity in cognition crystallized the notion. “If we envisage from a single point of view what we have said about the dominating purposes of human life we see clearly that they are of three main classes. Men seek peace and spiritual vitality; they try to know and understand the world around them; they aim at expressing what they feel in their own souls…. All human ideas but one are relative, and have only a relatively exact application. For all ideas are interrelated, and are distinct only in their terminal points…. [T]he artistic representation of ideas must take various forms according to the materials used for the purpose. Such material may be invisible but audible motion, or sound, which perishes as it is produced; or visible—as lines, colours, surfaces; or fully extended in space—as mass. Here, again, we find that our ideas are only relative, and that there are countless transitions and combinations…. In all, whether it be life or religion or art—the ultimate aim is the representation of the true nature of man” (Froebel, 1912, p. 152-54).
8. PRE-MODERNIST AMERICAN DESIGN EDUCATION

Design Education in the United States Before 1900

This section will begin with a general overview of the history of American design education from 1860 to 1930, and continue with closer looks at three architecture programs that provide good examples of the pedagogical methods of the era. These examples will be used to explore the implications of each of the methods in terms of how they affected the thought and creative processes of their students.

Before about 1930, there were two fairly distinct periods in American design education. The first period began in the 1860s with the establishment of the first schools of architecture at American universities; the second took shape at around the turn of the twentieth century, when teaching methods became more uniform as a result of greater national organization along with the dominance of a particular stylistic preference.

“Formal architectural education came to the United States in two distinct forms: the French system of the École des Beaux-Arts, which treated architecture as a fine art, and the German polytechnical model, which treated it as a technical science. While each system did address both the aesthetic and technical aspects of building, they placed the emphasis differently: the French student architect stood closer to the world of painting and sculpture, and the German to the world of engineering. As both models were imported into North
America during the second half of the nineteenth century, they created what had not previously existed: an academic architectural culture” (Lewis, 2012, p. 68).

These two forms of design education were used as templates and applied in various combinations at the early schools of architecture. The University of Pennsylvania after 1900 typified the Beaux-Arts method; The University it Illinois was firmly entrenched in the German model from its beginning in the 1870s; and Harvard University took a broader approach, aiming to use the best of both models while searching for a way of teaching that was more attuned to changing American conditions.

Charles Bulfinch (1763-1844) graduated from Harvard in 1781 and went on to become the first American-born architect. When he proposed to the president and fellows that Harvard give instruction in architecture, he was informed that “this ‘ornamental and useful art’ had not yet gained sufficient character to admit it to the company of scholars” (Alofsin, 2002, p. 16-17). The “nineteenth century architect hardly fit the definition of a professional. William Robert Ware [1832-1915]… complained of the situation in 1866…: ‘The profession is at present in the hands of mechanics,’ who might be good at practical matters, but who are ‘ignorant of the higher branches of their calling’” (Draper, 1977, p. 215). “Before the Civil War the few practitioners who possessed any technical training had acquired it in England, and the only method of qualifying for practice available in the United States was by apprenticeship in the office of an architect” (Weatherhead, 1941, p. 13). There were no standards to define what the practice of architecture actually entailed.
A number of German architects emigrated to the United States in the mid-1800s. Most of them had studied at “the Berlin Bauakademie or the Polytechnische Hochschule in Karlsruhe, or both. These schools treated planning and construction as the essence of architecture, and the ornamental embellishment of the facade a secondary matter… The students were introduced to actual design only slowly: a course in farm structures during the second year and one in domestic and commercial buildings… during the third… only in the fifth year was the curriculum entirely devoted to architectural design” (Lewis, 2012, p. 68).

“The first American student to seek instruction at the École des Beaux-Arts was Richard Morris Hunt. [He] studied and worked in France from 1845 to 1855 and, upon returning to the United States, established his practice in New York…. In 1857 Hunt opened an atelier… It was under his influence that architectural education had its beginning in the United States… Many architects of distinction obtained their early training in the atelier; and one of them was…Ware, to whom the United States owes, in a large degree, the organization and character of its early schools of architecture” (Weatherhead, 1941, p. 24).

The American Institute of Architects was formed in 1857, and in “1867, [its] Committee on Education proposed the founding of a great central school under the guidance of the Institute… this interest in education later took the form of encouraging the struggling departments in the universities as they began to spring up over the country. The American universities constituted the established institutions of higher learning in this country, and it was inevitable that architectural training be connected with them” (Weatherhead, 1941, p.
Among the founders of the AIA “the only academically trained architects—with the exception of… Hunt—were [two] veterans of the German system.” One of them, Leopold Eidlitz “chaired the… Committee on Education… The curriculum [for the proposed central school] Eidlitz had in mind was, not surprisingly, that of a polytechnical school…. Ware, who was also on the committee, extracted the most useful ideas from the report and applied them to his new program at MIT (Lewis, 2012, p. 72).

“The distinction of creating the first collegiate program in architecture in fact belongs to Philadelphia, home of the Polytechnic College of Pennsylvania… in 1861…. Histories of architecture education have slighted the Polytechnic College, invariably crediting Massachusetts Institute of Technology with establishing the first collegiate school of architecture” (Lewis, 2012, p. 69). Polytechnic College closed in 1885.

As a university that has remained in continuous operation, Massachusetts Institute of Technology “was the first university in the United States to have an architectural program” (Pause, 1976, p. i). It was founded in 1861 as “one of the four original departments at MIT” (Technology). It accepted its first student in 1868 “under the direction of William Ware… [who] had spent three years studying the architecture schools of Europe before developing the MIT program” (Pause, 1976, p. i). “Unlike Eidlitz, Ware did not consider the polytechnical model entirely appropriate for the United States; in fact, none of the European systems, he argued, could be imported intact.” For one thing, the French and German systems were set up based on the fact that their governments were major employers of architects.
“Neither model quite suited the commercial culture of the United States, where the state was a relatively minor patron of architecture” (Lewis, 2012, p. 74). For another, the English apprenticeship system was not connected with the universities; the English were therefore looking to the United States for pedagogical methodology for the development of professionals.

At MIT, Ware established important principles of architectural instruction:

• Details of a practical nature that can be learned in the office should be postponed until that time

• The courses in construction and history can best be taught by the method of cooperative student investigation and class report

• Architectural design should be conducted by a competitive method

• The study of design should be continuous throughout the four-year period

• Design should be conducted by regular instructors at the school [rather than in independent ateliers]

• In the study of design the problems should not be of too practical a nature

• The study of construction should be emphasized

• Students in architecture should be given some contact with the closely allied industrial arts

• There should be included in the architectural curriculum as much broad cultural study as a professional course will permit

This last “contention always remained one of those most strongly supported by Ware. He had received a thorough cultural education at Harvard, and his major interest lay in the realm of genuine scholarship.” He “believed that the first principle of architectural design was truthfulness and rationality, which, in its higher phases, became more poetical and more
imbued with sentiment [a romantic reading of classicism] and that the great principles of architecture were to be learned from history. It is through study of these principles, which transcend the various periods and are abstract in nature, and not by copying actual precedents of the past, that the student is enabled to solve modern problems” (Weatherhead, 1941, p. 27-29).

Clearly some of Ware’s principles refer directly to German imperatives: the emphasis on construction and collaboration with allied industrial arts. The thought that offices could offer certain experiences that would provide education that the school could not was a nod to the English apprenticeship style. And the idea of student cooperation in history and construction classes reflected and awareness of the value of the progressive ideas beginning to take shape in education at the time.

Many of Ware’s principles can be traced directly to the French view, which held that the “first duty of the architect… was to the client and the programme, not to the materials or methods of construction” (Levine, 1982, p. 123). “The École attempted to teach only the discipline of conservative fundamentals in design, as these had been crystallized throughout its long history. Utilitarian details were ignored… Fads and novelties were resisted, and there was little place for sentimentalism or the picturesque. It was the formal and monumental in design that was always stressed… It was the absolute rule of the classic tradition which remained the great guiding principle of the École” (Weatherhead, 1941, p. 21).
Some of the factors in the organization and educational program of the École that had a definite influence on education in architecture in the United States were: “The instructors at the École were practicing architects of high repute…. Individual instruction…. Student progress was measured by quality of work rather than by periods of time…. Methods of instruction were based upon individual competition…. The incentive of prizes…. The influence of advanced students…. Emphasis on design.” Of particular importance was the theory of the *esquisse*, in which the “general requirements of the building, as laid down in the program, were analyzed and formulated into a *parti* by the student, and emphasis was placed upon the quick grasp of a logical solution. This method… confined each student to the development of a single general scheme. The consistent study of the chosen *parti*, and the overcoming of the handicaps and limitations imposed by an *esquisse*, decided upon without sufficient study to form an intelligent conclusion, were considered to be of greater value than the evolving of the best possible solution of the program. The principle objective was the development of a direct method of attack in any architectural problem” (Weatherhead, 1941, p. 18-20).

The following description of a studio design project in the period of 1870-1910 is from a case study in Michael Pause’s 1976 study of the MIT program. The teacher referred to as Professor David is almost certainly substantially modeled on Eugène Létang (1842-1892), who began teaching design at MIT in 1872. The project described might typically take about three months to complete.
Professor David began his studio with the distribution of a project statement that he had prepared. Depending upon the level of the design class he was teaching, the projects ranged from the simpler parts of buildings (staircases, entrances, etc.) for the beginning students to complex buildings for the experienced students.

The design programs were fabrications created by Professor David without reference to any real on-going or specific project. Professor David had been exposed to a long tradition of acceptable design problems at the École des Beaux-Arts in Paris, and during his years of teaching at MIT. Some of the projects were issued many times over the years while others were given once or twice. Throughout the design exercises, all students would work on the same program at the same time, and were encouraged to be competitive with each other as a means to the end of learning design.

The project statement was brief and usually included the areas to be included in the designs, the materials that would be used, the presentation requirements and the due dates. If the project was to be designed by students who were degree candidates, as well as non-candidates, the requirements would be increased for the degree candidates. Usually the increase was in the form of structural calculations to be presented with the design drawings.

The actual design of the project started with each student's preparation of an initial sketch or parti-solution to the problem. These parts were usually twelve to twenty-four hours in length and were generated by the students without input from the instructor. When the sketches were completed, they were reviewed individually by Professor David and the student who had prepared the design. During this review the student would be directed or coached toward development of the design, based on the strengths and weaknesses of the scheme as perceived by the instructor. The discussion also served as a vehicle to clarify any questions the student may have had about the project and what was expected of him. The students then proceeded to develop their schemes based on the direction established by Professor David.

Some of the students were anxious to follow the styles of the day (Victorian and Romanesque) and not the direction set by Professor David. He insisted on designs based on clear structural principles. Professor David's intensity and steady pressure on the students usually resulted in the students following his directions.

During the development of the designs, Professor David would go from desk to desk giving the students individual critiques of their work. At the board crits much of Professor David's effort was in the form of drawings, sketches, and overlays, which addressed the issues of design in good currency at the time. These included the beauty of the plan, symmetry of masses (horizontally and vertically), importance of axes, proportions, and accurate draughtsmanship. Professor David was a recent immigrant to the United States when he started teaching at MIT, consequently, his command of English and the student's command of French were limited enough to have Professor David rely heavily on graphic communication.

The individual board crits would continue throughout the time of development of the project. Each crit entailed the review by the instructor of the work generated by the student since the last review. As the project progressed, the focus of the crits would proceed more to issues of detail and then to draughtsmanship and the final presentation. Near the end of the project, the largest part of the student's time would be devoted to the preparation of presentation drawings. These usually included drawings which were fully rendered in color. The presentation drawings always included a plan, and usually one or more elevations and one or two sections. For students at an advanced level, thesis level for example, the presentations would include detailed sections and calculations related to the construction of the building.
The students were usually free to select the medium with which to present their drawings, chalk, water color, pastel, pen and ink, etc. The drawings were submitted to the instructor on the specified due date, which was rarely, if ever, extended.

The instructor had the drawings posted in the jury room with the students' names covered. This was done so the jury would evaluate the designs only on their merits as presented in the drawings. Included with the final presentation drawings was the initial sketch parti.

A jury was selected from other faculty members and architects practicing in the Boston area. The jury would assemble on the day of the jury and behind closed doors, with no students present, review the designs and eventually assign awards to the designs judged to be the best. Schemes which were radically different from the initial parti were eliminated before the review started. This was common practice in the design schools at that time. It had to do with the way an architect was expected to operate. The architect, through training, was exposed to the various components of design which would be assembled in the generation of a design scheme. This generation was to take place in a relatively short period of time with considerably more time devoted to development and refinement of the idea.

Each jury member would review the designs independently. Any design considered a failure by all members was given a grade and eliminated from consideration for the awards. Each member would then select one or two projects which he considered most deserving of the highest award. In turn, he would make a statement to the jury of the designs' merits as he saw them. The other jurors would agree or disagree depending upon their perception of the design. Disagreement on the merits of a scheme would result in discussions which at times were very intense. When each member had had a chance to express his views of the design, the chairman of the jury (usually the instructor) would poll the members and determine the grade and the award for the scheme. A simple majority was usually all that was necessary to establish the grade. Once decided, the drawings were marked and the next design was discussed. This process continued until all of the schemes selected by the jurors were graded and given awards, if merited. The remaining designs, those not selected by any jury member for discussion and not considered a failing solution were then graded, and the jury review was finished. At this point the jury room was opened to the students for them to learn the results of the jury's decisions (Pause, 1976, p. 78b-81).

A 1904 graduate of the architecture program at the University of Pennsylvania tells us that the “study and solution of a problem resolves itself, ideally, into a logical sequence of steps; first the careful reading and rereading of the program until the conditions and intentions are clearly understood; second, an analysis of the various elements that are required to satisfy the intention, and a grouping of them in the order of their importance and interdependence; third, an imaginative experimentation with every combination of these elements that seems to offer any promise, and a rigid criticism of each to see wherein it is
good or bad. Then finally, having by investigation, experiment, and reason, decided which
scheme offers the best solution, the student consults authorities to see how his conception can
be most pleasingly presented. Here is a procedure valid for every problem in life. One who
has mastered it by long practice is truly a philosopher. He has developed a mental skill far
more important than any accumulation of facts could be” (Holland, 1934, p. 23-24).

Columbia University established its architecture program in 1881. In beginning that
effort, “Columbia’s Trustees understandably sought advice from the person in New York
most closely associated with the École des Beaux-Arts: Richard Morris Hunt [1827-1895].
He had been the first American to graduate from the École, the first to open an atelier in
America based on those of the École, and was also one of the country’s most distinguished
practitioners” (De Long, 1981, p. 14). Hunt was the designer of a number of notable public
and private buildings, including the Biltmore House in North Carolina and several mansions
in Newport, Rhode Island.

“Hunt’s students were not bound to recognizably academic modes. In the best tradition of
the École, [he] instructed students in a manner that encouraged an orderly approach to
design, yet without strict dependence on French precedents. Hunt’s own work reflects the
stylistic variety that such an approach allowed” (De Long, 1981, p. 15). One of Hunt’s
students was William Robert Ware, the initial leader of the architecture program at MIT. Hunt
recommended Ware to the Columbia Trustees and Ware moved from MIT to Columbia in
1881. “The Columbia University department was the most influential school of architecture
in the United States throughout the eighteen-eighties and early nineties” (Weatherhead, 1941, p. 46).

Ware’s early realization that none of the European models could be transplanted to America had by the end of his time at MIT become even more firmly entrenched. He “had the chance to begin again at Columbia, and he revised his approach from what he had initiated at MIT, evidently in an effort to create a school of architecture more responsive to American needs… As he wrote in 1881: ‘a school cannot so narrow its range, and although, in fact, the French courses of study are mainly artistic, and the German scientific, and the English practical, they all, from this very fact, fail to furnish a model we should wish to follow. The problem before us in this country is to devise a course of study so carefully adjusted that the practical, scientific and artistic studies may receive equal consideration’ [Ware, 1881]” (De Long, 1981, p. 16).

At Columbia, Ware moved away from the Beaux-Arts model based on these points:

- In the United States, working architects rarely had the time or inclination to become patrons of ateliers. The “great designers were busy making a living.”
- Advanced students did not stay in school for several years as did the “anciens” at the École; therefore the culture was therefore not as conducive to the development of the extreme esprit de corps common at the Parisian ateliers.
- “The emphasis on competitive honors… was liable to degenerate into individual jealousy and discontent instead of group cooperation.”

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• “Ware cared little for brilliant and showy drawings, but expected, as Hamlin put it, ‘evidence of serious study, intelligent thought, sound knowledge, and refined taste.’”

Though Ware’s philosophy led to great success for many years, by 1900 the resurgence of Beaux-Arts methods had begun to totally dominate architectural education, Ware’s ideas were increasingly seen as outmoded, and dissatisfaction grew (Weatherhead, 1941, p. 46-47).

“The department of architecture at the University of Pennsylvania opened in the fall of 1890…. From the beginning, Pennsylvania placed great emphasis on design…. An interesting characteristic of the design courses was the spirit of the student body in the Pennsylvania drafting room. Here the students worked together with the utmost freedom. They criticized each other’s work and there was an atmosphere of congenial competition which was, probably, excelled only by the Paris ateliers. The presence of able instructors and brilliant advanced students, combined with the importance placed upon design, established and fostered this tradition. It was impossible to enter the drafting room without sensing this spirit, which is so important to a school of architecture” (Weatherhead, 1941, p. 50-54). The goal of the School of Architecture at the University of Pennsylvania from its beginning was: “the training of young men to take their places in that profession as cultured, free-thinking, self-reliant architects and leaders” (Koyl, 1934, p. 4).

The University of Illinois formally instituted its program in 1873 under the direction of “Nathan Clifford Ricker (1843-1924) [who] has gained recognition as “a seminal figure in American architectural education” (Alofsin, 1990, p. 73). “Illinois took a different course
from the very beginning, drawing its inspiration from German architectural education and contrasting the rigidly structured German curriculum with emphasis on structural and technical studies to the *atelier* system of the École des Beaux-Arts followed at MIT. In this way Illinois introduced an alternative program for the professional education of architects, which, after the turn of the century, was synthesized with that represented by MIT to form the type of architectural curriculum that is still in use today” (Geraniotis, 1985, p. 15).

Following is a summary of the general characteristics of the schools of architecture begun in the United States up to 1895.

The Massachusetts Institute of Technology [1868] was influenced from the first by the principles and methods of the École des Beaux-Arts, although these were very much modified to suit American conditions of the period. Through the broad contacts of Ware and his successors, the school early developed a well-balanced progressive program.

The instructional program at Cornell [1871] was based upon the practical needs of the architectural professional of the time, with some influence from English traditions, until 1896 when it was completely reorganized.

The curriculum at Illinois [1873] was a product of the early Middle West, influenced somewhat by the German system. It was weak in design but strong in construction and architectural engineering.

Syracuse [1873] was a small school with a tendency toward non-professional objectives and a close relation to the fine arts division.

Columbia [1881], through Ware's educational philosophy, emphasized scholarship, and attempted to encourage creative non-competitive student effort. The history of architecture courses were strong and the program well integrated and the school well equipped.

Pennsylvania [1890] was highly professional in its objectives with a strong emphasis upon design from the first. It was early influenced by the Beaux-Arts methods and academic subjects were limited to the first years.

George Washington [1893] was a small and struggling school with a tendency to emphasize the decorative aspects of architecture. It was largely a local institution with some influence from the Beaux-Arts school.

Armour Institute [1895] was a thoroughly professional school situated in a fine-arts atmosphere. It tended to follow the Beaux-Arts methods from the first.

Harvard [1895] was characterized by the background of culture and appreciation of the fine arts included in the professional program, and by the emphasis placed upon a broad scholarship in the
study of architecture. There was at first only a slight influence of the École des Beaux-Arts at Harvard. (Weatherhead, 1941, p. 68-69).

Concerning the early (pre-1900) curriculum as a whole:

Ware had succeeded at Columbia University in freeing the school of architecture from most of the hindering affiliations with other divisions and in unifying the curriculum as far as the varied nature of the subject matter would then permit. In general, however, the early architecture curriculum tended from the first toward that almost complete lack of integration which has typified it to the present time [1941]. The practical needs of the American office of the period, the science of the engineer, the emotional attitude toward the past of the romanticist, the growing emphasis upon the ideals of the paper, Beaux-Arts projet, and the academic approach of the American university were points of view that could not be completely harmonized. The highly segregated subject matter units of the arts college from which the architecture department drew many of its general and cultural offerings was a further disintegrating factor. Under such conditions there was little possibility of providing a well-organized and effectively graded student experience. The schools of the Early Period were experimental and entirely a reflection of current conditions throughout the profession of architecture. In spite of the professional idealism of the leaders in early education, the training prepared the students for little more than work as toilers in the architecture offices of the time. (Weatherhead, 1941, p. 71).

“The University lecture system long dominated instruction in most of the subjects of the early schools. Because of the influence of the École-trained teachers at the Massachusetts Institute of Technology, the design class began from the first to break away from the typical university procedure. Thus began the long struggle to adapt an individual project method [emphasis added] into an academic setting which finally resulted in the elimination of the lecture method throughout most of the professional major subjects” (Weatherhead, 1941, p. 66).

Design Education in the United States 1900-1930

“In 1890… the architectural profession included people from widely varying backgrounds and with diverse objectives. Some architects had been trained at the École des Beaux-Arts in Paris, others had been trained in the offices of practicing architects, and still others had no training whatever” (Pause, 1976, p. 26). “Especially during the post Civil War
period, the man of practical affairs and of action rather than the man of cultural ideas led in all creative activity…. The appreciation of architecture became in a great measure merely gratification of the sense of costliness” (Weatherhead, 1941, p. 10-11).

But two “new and powerful forces which directly affected both the profession and education in the field of architecture came into prominence during the eighteen-nineties. The first force was the greatly strengthened influence of the École des Beaux-Arts, especially in the East, brought about by the increasingly large number of prominent Americans who, after studying at the École, were returning to practice…. The second important force in the Eclectic Period came into prominence during the early eighteen-nineties and the romantic license of nineteenth-century American architecture turned to Neo-Classicism” (Weatherhead, 1941, p. 75, 81).

“Richard Morris Hunt was the first American to attend the École. Henry Hobson Richardson was the second and Charles Follen McKim, the third student from the United States to attend the great Paris school” (Weatherhead, 1941, p. 75). “In the 1860s, ten Americans studied at the École; in the ‘70s, 26; in the ‘80s, 25; and in the ‘90s, 110… most… returned home fired with the missionary zeal to recreate the whole École-atelier system in the United States” (Bannister, 1954, p. 99). “Because of their superior training they were rapidly becoming the leaders both in the practice of architecture and in determining the educational policies of the profession. They imported not only the principles taught by the École, but the Beaux-Arts French architecture, and this influence change the entire aspect of
American architecture during the first decade of the [twentieth] century” (Weatherhead, 1941, p. 75).

Not all architects “were in sympathy with these efforts, nor with the affected elitism of some members of the Beaux-Arts movement. Louis Sullivan, who had studied at the École in 1874, and Frank Lloyd Wright, who turned down Daniel Burnham's offer of four sponsored years in Paris, were the most influential detractors of the school. They called its teachings artificial, superficial, and totally unsuited to American needs…. Despite such opposition, and whatever one might think of their artistic production, the influence of Beaux-Arts architects on professional education was significant” (Draper, 1977, p. 216).

“Because of the fact that the forces which produced the Neo-Classic movement centered largely in the East, it was there that it was first developed. The occasion which brought about its wider acceptance, however, was the World’s Columbian Exposition at Chicago in 1893…. Great expositions which sound a new note exert a powerful influence upon architecture, and this splendid ensemble of white colonnades firmly established Neo-Classicism throughout America. McKim and his school of thought thus succeeded in curbing fantastic originality with formal planning and composition, but they were at the same time instrumental in extinguishing the spark of an indigenous and living American architecture…. Since the [Neo-Classic] movement embraced an educational objective from the beginning, it had a direct effect upon the schools. In fact, education was both a causal and a resultant factor. As the movement spread, designers trained in the principles of the classic tradition were
increasingly in demand. There resulted in an unprecedented expansion in the schools throughout the country” (Weatherhead, 1941, p. 81-82).

In the early twentieth century, design “was the subject receiving principal emphasis in schools of architecture. Fourteen of the twenty schools in 1912 required four years of this subject…. In twelve of the twenty schools, including all of the older Eastern institutions, the advanced design courses were under the direction of an École graduate… The modified French atelier system had become universal” (Weatherhead, 1941, p. 150). “Walter Cook, in the Architectural Record for January 1901, listed the best features of the [Beaux-Arts] system as follows: ‘1st. The division into ateliers. 2d. The tradition of the older pupils helping the younger. 3d. The teaching of design by practicing architects. 4th. The beginning of the study of design as soon as the student enters the atelier. 5th. The system of the esquisse.’” (Esherick, 1977, p. 243).

“The principles and methods of the École, as disseminated largely through the early school at the Massachusetts Institute of Technology had influenced architectural education in this country from the beginning. At this time, however, they became the universal ideal in the major subjects especially throughout the Eastern schools…. During the first five years of the twentieth century, at every important Eastern school, design was in charge of a Frenchman, assisted in most cases by American instructors who had also studied at the École” (Weatherhead, 1941, p. 75-76). “The first of the imported pedagogues [had been] Eugène Létang, who arrived at the Massachusetts Institute of Technology in 1872. He was
followed by a growing stream of others, which continued unabated until well into the twentieth century and long after the École had ceased to be at the forefront of architectural education in Europe” (Boyle, 1977, p. 319-20). “Another distinguishing feature was the establishment of the Beaux-Arts atelier system as closely as it could be adapted to an American school. During the Early Period there had been no attempt to introduce the atelier method in its entirety” (Weatherhead, 1941, p. 76). Still, typically, “American architectural schools, like other professional faculties, developed under the wings of the growing universities and not into independent entities as in Europe. The situation necessitated compromises. Studio design instruction modeled on the project method of the École, had to be integrated with the university lecture and class systems” (Draper, 1977, p. 217). “The spirit of the Paris atelier, which had been such an important factor in the success of the École, could not be entirely duplicated in American universities… There still necessarily remained something of the attitude of the university classroom… yet any lack of true atelier spirit was to be observed only by comparison with the conditions at the French school. The entire American procedure was patterned after that of the École…. The general routine in these ateliers with the individual method of instruction was characterized by a freedom and lack of academic restraint that was otherwise quite foreign to collegiate education in the United States. The attitude of the cooperation among the members of the class was also unique. Often the younger students learned more [by helping] the older students, being in
turn aided and advised by them, than would have been possible through any other method” (Weatherhead, 1941, p. 150-51).

The Society of Beaux-Arts Architects was formed in New York in 1893. One of its goals was to establish an American school of architecture on the model of the École. It formed three ateliers and administered its first quarterly competition in 1894. Also in 1894, the Paris Prize was established, which provided its winner with funds for travel in Europe and study at the École for two years. By “1912, there were 102 Beaux-Arts ateliers throughout the country with a total registration of 994 students” (Weatherhead, 1941, p. 78-79). “Planning for an American Academy in Rome and a Rome Prize, modeled on the French Academy in Rome and the Prix de Rome, was initiated in 1894 by the group of architects and artists who had worked together on the Chicago Fair. Behind these educational efforts were two basic goals: the establishment of rules which would raise the general standard of taste and produce a vital national style, and the development of special artistic abilities which would differentiate architects from the technicians of the building industry” (Draper, 1977, p. 216). In 1916 the Beaux-Arts Institute of Design (BAID) was organized “in order to extend the work of the Society [of Beaux-Arts Architects] into broader fields” (Weatherhead, 1941, p. 79).

“For more than another decade, the design teaching of American schools continued to be dominated by the BAID. The effects were mixed in value. At its height, with almost all schools participating, interschool competition tended to raise the standards of student
performance. Nevertheless,… abuses soon appeared. Medals, rather than student growth, became a real, if unadmitted goal… The most insidious result, however, was the schools’ surrender of their inherent responsibility to determine, organize, and control their own objectives and methods of design teaching. When the fixing of subject and program was relegated to a central agency, schools lost the initiative to develop a sequence of exercises carefully integrated within itself and with parallel technical courses… This was a task requiring prolonged and continuing study such as only a permanent faculty could undertake” (Bannister, 1954, p. 101).

“The gradual processes of standardization which were such an important characteristic of this period, had matured by 1912 to the extent that this was possible in the United States… Since the best practitioners had by this time received their training directly or indirectly from the École, it was the Beaux-Arts type of graduates that they desired in their offices. It was this essential agreement among the schools as to what constituted an acceptable program in architectural education which made possible in 1912 of the Association of Collegiate Schools of Architecture” (Weatherhead, 1941, p. 88-89). The “criteria were crystallized in 1914 as standard minima which specified general requirements for curriculum, admission, courses, and degree. While this quasi-self-accrediting procedure no doubt strengthened some of the weaker schools, most teachers opposed the standard minima as potential straitjackets which could freeze architectural education in a rigid mold, destroy faculty initiative and responsibility, prevent wholesome variety, and discourage desirable adjustments to new
needs and methods. After years of debate, the standard minima were abandoned in 1932” (Bannister, 1954, p. 101).

During the early years of the twentieth century, the prevailing tendency in architectural design was an eclecticism that often used classical forms as its starting point. “From the freshman year the student was drilled in the elements of Greek, Roman, and Renaissance architecture, the theory being that this crystallized system of forms and proportions embodied the principles of all design, and that by prolonged contact with them the student developed his sense of good design…. From the first to the last of the four-year curriculum the student was taught the theory that he must turn to some monument of the past for his aesthetic form in architecture; that he must not attempt to create, for originality could only come after years of painstaking study of historic precedent” (Weatherhead, 1941, p. 152).

“The trained architect of Eclecticism… chose historic elements with great discrimination, always searching his documents of the past with character and beauty as criteria. He copied, he adjusted, and he reassembled with a scholarly sense of architectural composition. Architecture in the United States at its best became one of the most refined in the world. On the basis of this philosophy, the student of the Eclectic Period was introduced to all of his concepts of architectural design thought the medium of a faithful and plagiaristic study of the monuments of the past” (Weatherhead, 1941, p. 88).

“The department at the Massachusetts Institute of Technology was thoroughly representative of the more conservative ideals of the period. It was entirely eclectic in its
approach to architecture and dominated by the spirit of its great French teachers; yet there was no attempt to adopt in its entirety the École system. It was always in close contact with engineering, but design and drawing were stressed. There was a strong emphasis upon the cultural subjects as these were presented in the best universities in the country. With an American architect at its head and a French school man in charge of its major subject, it was in a very real sense a typical American school of the time” (Weatherhead, 1941, p. 92).

**The University of Pennsylvania**

“The University of Pennsylvania school of architecture was the largest and was rated as the most successful in the United States during [the period of about 1912-1930]. Although it was long a department of the engineering division, the affiliation resulted in no hindrance to its progress. Design and drawing were greatly emphasized and the academic content of the curriculum was comparatively limited. In its conformity to the Beaux-Arts ideals and methods as they had been adopted by the Eastern institutions, the University of Pennsylvania was without doubt, the most completely typical school of the Eclectic Period” (Weatherhead, 1941, p. 103). The architecture program at Penn was headed, beginning in 1891, by “Warren Powers Laird, who embodied a new type of architect-educator: one who devotes himself to teaching and administration without the distraction of a private practice. He would run the program for forty years” (Lewis, 2012, p. 81).
“Pennsylvania became one of the most influential schools of the early years of the twentieth century…. The forms of classic architecture were the medium of expression, exclusively in the elementary classes, and generally in the advanced work. It was believed that the ability of the architect depended upon the resources which were gained through the analytical study of these forms and the discernment of their subtle distinctions. In the advanced years, however, one of the outstanding characteristics of instruction at the University of Pennsylvania was the encouragement given the student toward original thinking in design, and the use of forms of expression other than the classic” (Weatherhead, 1941, p. 53). “One of the most highly developed aspects of architectural education [at Penn] before the Second War was the degree to which all course work, both academic and technical, was coordinated to support the studio effort in design. The program was essentially single-minded, focused, and continuous. It was hard-boiled and demanding, frankly a matter of training in a well-established way of doing things” (Esherick, 1977, p. 243).

The attitudes about teaching and learning expressed by faculty and students of the Penn program during this time demonstrate that the Beaux-Arts process in the United States, at its best, could reveal to a student a facile and creative form of thinking. “Paul Cret was appointed Professor of Design [at the University of Pennsylvania] in the fall of 1903. No event could have been of greater importance to the school. A brilliant designer, with a record of unusual distinction from the École and doubtless the ablest teacher of design America has ever possessed, he has been held in the highest esteem by every student of the
university” (Weatherhead, 1941, p. 102). Cret was the “first Beaux-Arts alumnus of the first rank to teach in America. [He] was that rara avis, a superbly gifted artist who was also a born teacher, and he managed to impart discipline to his students without thwarting their imagination” (Lewis, 2012, p. 81). In Cret’s words, to study design “is first of all to learn to how to think clearly…. Design is the training of creative intelligence, of imagination, of good taste, of the sense of harmony in proportions. It is, by its nature, a matter of slow learning… It involves not the memorizing of data, but the creation of reactions from principles which have become part of the subconscious” (Cret, 1934, p. 30-31). Cret’s definition of a good teacher of design: “The instructor must first of all be a designer and be able to have some insight into the various types of students. He must be careful to guide them without imposing too rigidly his own preferences and mannerisms. All minds ought not to be cast from the same mould. Which amounts to selecting, for this teaching, a good architect, not too pedantic, and able to see someone else’s point of view” (Cret, 1973a, p. 87). “As the fame of the excellent design courses under Cret grew, they attracted the country’s ablest students. The esprit de corps of the school was remarkable, and from about 1910 to the period of the [first world] war, Pennsylvania won more honors in national interscholastic competitions in design than all other schools combined. The class of 1911 alone produced four Paris Prize winners and one winner of the Rome Prize” (Weatherhead, 1941, p. 103).

George Simpson Koyl (1885-1975), 1909 graduate and Dean of the School from 1932-1950, wrote in the 1934 Book of the School: “Education is one of the essentials to a life
of distinguished creation. It involves the absorption of facts, the study of theories and tried methods of procedure under the guidance of a teacher or apart, the development of thinking powers, and the direction of will in creative work. Creative ability varies in intensity with the individual… Education simply gives direction to that energy…. Education is largely self-education through individual effort under guidance; but the school is morally responsible for the type of instruction it offers. The time has passed when the teacher, through coercion and penalties, may with complacency force the student to absorb knowledge. The student’s natural aptitude and attitude of inquiry must be satisfied by teachers who are themselves students, constant in their research for old truths and new developments, alive to the progress of civilization, and forceful in the presentation of information” (Koyl, 1934, p. 5).

Leicester B. Holland (1882-1952), FAIA, and 1904 Penn graduate, wrote in the Book of the School: “Good teaching is that which fosters the power of reason, whatever the subject under consideration, in school or in college… Nothing is more fugitive than dogmatic fact; all but a skeleton of what is learned at school is quickly forgotten or overthrown by later investigation. The ability and will to reason, the consciousness that the world is very varied and that men have said and done most various things, and the curiosity to explore these many worlds, is all there is to a liberal education” (Holland, 1934, p. 22).

“Design occupies the place of greatest value in the technical curriculum because it develops the powers of original thought and creative expression in terms of Architectural Composition or pattern” (Koyl, 1934, p. 8). The Beaux-Arts system of design training, “was
intended to teach… the fundamentals of design and the science of construction. In a logical manner, the student moved from the simple to the complex, the small to the large. In design he began with the analytiques, rendered plates in which he demonstrated his knowledge of the Classical Orders, standard window and door treatments, and small elements of historical buildings” (Draper, 1977, p. 223). “Beauty must be realized not accidentally but through a knowledge of what it is and how it can be achieved… only through the knowledge of fundamental truths may we emerge at the end of this age with an art worthy of our aspirations…. the study of the Greek and Roman Orders… provides a perfect exemplification of the oneness of construction and design in Architecture” (Koyl, 1934, p. 6-7). But the orders were examples of perfection, not perfection itself. In the Beaux-Arts system that Cret used “classical architecture was endorsed only implicitly… the abstract principles of logical and lucid composition could be applied to any style” (Lewis, 2012, p. 81).

The analytiques dominated the first year of instruction. Joseph Esherick, a student at Penn in the 1930s, writes: “The analytique as a teaching device was, at its best, rich, complex, and composed of a wide range of interlocking objectives. Emphasis could be placed in a variety of ways, but generally the problem was one of the assembly of elements, usually specified, sometimes limited… in some orderly and pleasing fashion—in short a study in composition. Proportion was important, as was scale…. To assemble the elements for one’s design meant searching through the library for appropriate examples in books or in a large collection of mounted photographs—‘documents,’ they were called. And one was
required to have a document for everything one proposed. If it hadn’t been done before it couldn’t be done now, at least in Grade D [first year] *analytique*, and that was that…. The *analytique* was the central feature of our activities for nearly a year. The entire process was demanding and time-consuming—quite uncompromising in all respects. There was no way to be suggestive or speculative. Hard and precise commitment was called for, and one was continuously pushed to set forth exactly what one intended; and if what one intended was crude or awkward, the methods of presentation exaggerated rather than covered up this crudeness” (Esherick, 1977, p. 254-56). “We must teach the student that he must think and act for himself; that to try to be different is time wasted—originality being a spontaneous natural growth from within to without” (Koyl, 1934, p. 10).

The “study of Design inculcates an orderly intellectual technique of investigation, apprehension, analysis, logical deduction, and imaginative synthesis, in the solution of all sorts of unfamiliar problems; it provides a repeated drill in philosophic exercise such as is not offered by any other field of study, academic or professional, in our undergraduate curricula today. And the History of Art provides a vivid background for all social history, and a broad emotional sympathy with the cultures of the past. To some extent, of course, both courses are technical and factual, but to a far greater extent they are cultural, in that the student wins from them not so much a certificate of work accomplished, as a passport and compass to guide him along a path of cultural achievement throughout life. They are the primers of studies never to be completed, and when properly taught, do actually assure that culture shall
not stop with college days…. As with the Greeks, the school prepares for life in its fulness, not by the facts that are taught but by the practical development of the mind and senses” (Holland, 1934, p. 24-25).

“Since its early beginning the École has slowly formed the tradition that governs its procedure today [this was originally published in 1926]. The purpose of its training is to impart to each student a method of attacking and studying any problem in architectural design which may be presented. It gives a training in composition and design—and the science of design is necessary to the architect in order that he may express himself clearly” (Harbeson, 2008, p. 1).

In the second year, the esquisse was introduced. In this sort of project, an initial short intensive period of work produced a design that would then be refined over a period of weeks or months. The typical design problem was designed to force the student to think divergently in a quick burst during the esquisse—“without the aid of either the instructor or library documents.” The esquisse “was intended to stimulate his imagination and interest and to present a variety of possible solutions” within a tightly constrained context. Creativity was not its primary goal; it was more geared toward developing “resourcefulness, mental discipline, and the ability readily to grasp a solution” (Weatherhead, 1941, p. 154-55).

The esquisse was “usually a nine-hour continuous process and it was usually ‘en loge,’ with the use of documents forbidden.
The rules were simple. First read and reread the program, analyze it, and perhaps break it apart and rewrite it, but at least take some steps to set forth its various categories and criteria, which you could then organize in some useful way. A major problem to be solved early on was that of finding out precisely what kind of problem you were working on—that is, a plan problem, a circulation problem, a site plan problem, or an interior problem. If it was a site plan problem this would be immediately evident, probably just a matter of distributing buildings or building blocks around the site according to some logic or system. If it was an interior problem this would be indicated by a relaxation of the requirements for exterior elevations. But to sort out whether it was a plan problem or a circulation problem, or to determine which was dominant, was not always so easy. A plan problem would be characterized by that kind of building where the issue was one of arranging large elements in some orderly relationship to one another (a house, a kindergarten, a church), while a circulation problem would emphasize the paths between these spaces (a factory or shipyard, a railway station, a bus depot). Initially we worried simply about what the writer of the program had in mind, but later on, to a large extent because the system was so competitive, we had to try to guess not only what the writer had in mind but how the jury looking at our work would interpret what the writer had in mind. The residue of such second-guessing persists to this day in most competitions.

Having made some preliminary decisions about the program, we would then begin to draw, at some convenient very small scale, rough schematic plans, concentrating on the idea of developing as many distinct alternatives as possible. These then should, we were told, be studied and compared as to the ways in which they satisfied the program. We might possibly rate them but we would certainly group them into types. We should then devise some orderly scheme for eliminating some of the less likely notions and try to reduce the alternatives to three. These should then be refined as much as one had time for, thumbnail elevations and sections drawn, and every effort made to find impossible and unworkable parts, since whatever we produced at the end of the nine hours we would be stuck with for the next four or five weeks. When a final decision was made it was drawn, in ink, on an 8 \( \frac{1}{2} \) - by 11 sheet of tracing paper and turned in. On Monday we were given a print back, but the sheet was retained to be sent forward with our final drawing to the judgment. If the jury felt that the completed project differed significantly (and it was at the jury's discretion to determine what was significant) the project would be declared 'hors de concours;' an HC would be crayoned on the drawing, and the jury would then consider it no further (Esherick, 1977, p. 258-59).

Paul Cret found the *esquisse* valuable for three reasons. First, “The aim of the school competition… is not to arrive at the best solution of any particular problem, but to learn how to study any problem.” Second, “In trying to improve a poor scheme, the pupil makes a greater effort than he would if you gave him from the beginning the right solution.” Third, students working separately and forced to work with their preliminary sketches without major revisions will realize “one of the most valuable benefits of school study, which is to see the different solutions possible under the same program” (White, 1973, p. 27).
“The process of study in the solving of an architectural problem, although the conditions imposed were largely artificial, was considered of greater importance than a more consistent attempt on the part of the student to discover the best possible solution. Since the instructor labored along with the student to overcome the handicaps of a faulty esquisse, this constituted one of the most typical of the educational devices of the system…. The learning of the student was accomplished largely through two processes: first, by the constructive criticism of the student’s own efforts, and second, by the inspiring example of the master as he created for the student a suggested solution to a problem with which the student had struggled” (Weatherhead, 1941, p. 155-56).

If the Beaux-Arts/Penn model is implemented well, according to its adherents, there is “no academic course that gives such unremitting attention the practice of speculative reason as does the study of Architectural Design. For the teaching of this subject proceeds in a manner differing from that of most collegiate work, but closely resembling the method of training of the ancient Athenian youth.” In this formulation, the method is deductive; theory precedes practice: the “first step in the teaching of Architectural Design, is to familiarize the student with an architectural vocabulary of forms and construction, and then promptly to set him at exercises, architectural problems, to be solved in friendly competition with his fellows, so as to bring his ‘theories into closer touch with the occasions for applying them’ [quoting Isocrates (436-338 BC)]. As the problems increase in complexity, the proper
solutions demand increasingly close analysis and critical reasoning, together with free play of
the imagination” (Holland, 1934, p. 23).

“We met in the drafting room every afternoon. Daily criticism was more or less the rule; in a week there would usually be three crits of about an hour each and two shorter ones. To keep up with this pace, that is, just to carry out the work that the critic had laid out, to advance it and refine it to a level where another criticism was warranted, was demanding and meant that all one’s spare time was spent in the drafting room” (Esherick, 1977, p. 254-55). Design “can be mastered through practice only, that is, by designing… We learn through our own mistakes much more than through the best advice of others. All education in Fine Arts… has for its main object the development of the artist’s personality… such a result can be accomplished only through personal effort and not through a perusal of textbooks. Whatever the science of the instructor, his part cannot be more than that of an experienced fellow traveler who may at times warn of pitfalls ahead, and now and then show a short cut. But each of us has to travel the road on his own two feet” (Cret, 1934, p. 31). When the project neared completion and it was time to lay out the final presentation sheet, “[we] would be given the same rigorous drawn criticism on the sheet layout as we had on the building itself” (Esherick, 1977, p. 255).

“Above all, the student sought to give the sketch design a suitable character which could be further developed in the weeks to follow. Caractère, as introduced in the eighteenth century,… was an important concept in French Neo-Classical theory. The term was never
strictly defined, but it generally meant the expression of the qualities of a building. Through manipulation of plan, proportions, and decorations the architect could express the nature of the building’s function and site” (Draper, 1977, p. 224-25). “As the student turned his attention to the architectural character of his study he was led by the instructor to the library documents where was to be found his authority for all architectural decisions” (Weatherhead, 1941, p. 156).

In the third year at Penn, “Our design courses, although now focused on buildings that could be conceived of as having real and current use, still followed Beaux-Arts criteria. Character was important—not just the character of the facade or ornament but also the character of the plan. The manner of drawing plans was so well established, and had been for such a long time, that the drawing could indicate to the initiated such notions as hospitality or dignity or lightness or gaiety; and we were taught, in our handling of poche and the ‘mosaic’ treatment of plans, to express such ideas. That such notions could only be inventions coming from within the system and have little relationship to any external or communicable reality didn't seem to occur to anyone. Nevertheless it was just such an insistence that contributed to the ‘paper’ quality of Beaux-Arts architecture—and ‘paper architecture’ became one of the dominant issues in a developing concern about the system” (Esherick, 1977, p. 263).

“One of the great weaknesses of the education of the period was its continual emphasis upon paper techniques with little check upon whether the student actually visualized to any extent the three-dimensional architecture which his drawings were supposed to
represent” (Weatherhead, 1941, p. 165). “It would be unfair to imply that we were working in
a kind of vacuum, protected by the shell of the Beaux-Arts… We were to… try as much as
possible to be familiar with the functional and operational side of what we were doing….
Curiously though, we were never given problems with real sites. The nature of the site, its
physical characteristics and general appearance, might be described, but it was never a real
site one could go to and look at and stomp around on” (Esherick, 1977, p. 264).

Cret’s stance was that the process of development within a strict set of constraints was the
real issue, rather than the specifics of those constraints. “It has been said that designers are
born, not made. The same thing has been said about almost every calling in life, from poets
to cooks, and it is true with this restriction, that inborn talent is but a factor of artistic
superiority… The most gifted have had to work as much as others to develop their talent, and
in the particular case with which we are occupied, I should say that the main difference
between the good designer and the poor one is that the one has the possibilities and the
willingness to study the problem a longer time than the other. It is the importance of study
that we find as a foundation of design…. We see at once that superiority in design is mostly
in knowing how to study, that is to say, to give form to an idea and make it constructable, and
to improve it by good proportions” (White, 1973, p. 26-27, quoting “one of Cret’s papers on
education”).

“Toward the end of each project the student’s interest in his own solution of the class
problem was built up to such an intensity that it overshadowed that of every other phase of
his school life. It accounted for the all-night *charettes* and the traditional periodic slighting of all other subjects by the architectural students. A more positive pedagogical instrument could scarcely be devised than this competitive-jury method of the Beaux-Arts system” (Weatherhead, 1941, p. 151).

The rigor of the design courses at Penn did not preclude the realization that, at least other than near the time for the final presentation, there were other activities of importance in a student’s education: “All the faculty urged us to read widely, to visit the museums and galleries, to attend the symphony, the opera, and the ballet regularly. Their urgings worked and we all did. Were it not for this the school could have become a technical-professional wasteland. But happily it didn’t…. [For the freehand drawing courses,] I recall work in the studio as always being pleasant and relaxing, in part probably because of the relaxed and witty attitude of our drawing critics. Their criticisms were not mere criticisms in techniques of drawing but were packed with discussion of philosophical or ethical issues, or talk about books or about history or the theatre. I had the feeling that right from the start our drawing and painting critics were trying to expand our point of view and liberate us from what they perhaps regarded as a too-narrow technical existence in the design courses. The studio was a curiously separate world” (Esherick, 1977, p. 245-47).

The architecture program at the University of Pennsylvania in the first thirty years of the twentieth century was based on the balance of theory and practice suggested by Vitruvius 2000 years earlier. “Every graduate should have the opportunity to develop a mature
conception of Architecture—his own philosophy through continuous exhaustive courses in Theory, since without it he is certain to founder on the rocks of indecision. Running through the whole gamut of architectural achievement, theory rounds out that analytical, critical conception of Architecture as a craft, to the end that that student upon graduation will be equipped with a realization of the vitality of Architecture as an Art and Science” (Koyl, 1934, p. 7).

The development of this mature conception was not expected to occur overnight. Concerning the patience necessary of the teacher whose student is slowly approaching the solution to a problem, Paul Cret wrote: “To be really deep and effective, this (slow) passage through successive stages in which one learns how to appreciate some new things and despise others, must be a personal one, else the intellect only, and not the feelings will be touched and permanently influenced” (White, 1973, p. 28). “The four-year course, properly divided among the subjects which form a valuable basis for architectural education, should be long enough for the average student to acquire that training in fundamentals on which he will build his personality [emphasis added] (Cret, 1973b, p. 59).

The University of Illinois

“The ascendance of the Beaux-Arts did not occur everywhere at the same pace, and in the Midwest it lagged. There the building culture was shaped by a dynamic, speculation-based real estate economy, as expressed the swift growth of Chicago, Kansas City, St. Louis, and
other boomtowns. This seemed to suit the rational and methodical approach of the polytechnical system better; after all, the Prussian government had originally established the Bauakademie in 1797 in large part for purposes of preparing efficient and methodical designers to work in the underdeveloped regions of Poland it had recently annexed. This helps to explain why Ricker at Illinois and Babcock at Cornell remained pragmatic in their approach and their programs retained the polytechnical model long after their colleagues in the East had gravitated to the Beaux-Arts” (Lewis, 2012, p. 84).

“Dr. Nathan Clifford Ricker taught at [the University of Illinois] from 1872 until 1917, chairing the Department of Architecture between 1873 and 1910 and serving as dean of the College of Engineering from 1878 to 1905” (Kruty). When he first arrived at Illinois as a student, it “was left to Ricker to institute the architecture program by being the first student to request it. He devised his own course of study” (Charney, 1986, p. 258-59). At “the end of the 1870–71 school year, architectural instruction was taken over by the Swedish-born Harold Hansen, who had studied in Berlin at the famous Prussian school, the Bauakademie. Ricker found Hansen a stimulating mentor, and he responded well to the practical, if rigorous, course of instruction based on the German model” (Kruty). In the aftermath of the Chicago fire of 1871 Ricker worked in the office of a Chicago architect. He “returned to school in the fall of 1872 but faced the prospect of having no instructor. Hansen had decided to stay on a bit longer in Chicago, so Regent Gregory allowed Ricker to take a most unusual course of action. As strange as it may seem, Ricker became his own instructor. He directed
his own studies, taught classes to three other students, wrote his own exams, studied for them, took them, graded them, and then reported his passing marks. By the end of the winter term, Ricker had completed the requirements for graduation and received his certificate on March 12, thus becoming America’s first graduate in architecture” (Charney, 1986, p. 259).

“President Gregory had additional plans for Ricker. He offered to send the thirty-year-old to Berlin to study at the Bauakademie during the remainder of the spring and for the following summer, on the condition that Ricker would return in the fall and take control of the Illinois university’s architecture program. Ricker agreed. And so Illinois’s first architecture graduate became the guiding force in creating the school’s curriculum. By late March, Ricker was on his way to Europe, where he made visits to England, Belgium, and France. Study in Berlin was followed by a European tour to the Vienna Exposition of 1873, where Ricker was particularly impressed with a demonstration of the Russian system of incorporating “shop” practice into design studies. Ricker’s vision for the new Illinois program in architecture drew on his travels and studies abroad, as well as on his personal mastery of the critical literature and his innately pragmatic and persevering approach to life itself” (Kruty).

The teaching method that Ricker eventually developed “was diametrically opposed to the more popular French system being taught in Paris at the École des Beaux Arts, with its emphasis on design, representation, and rendering, a system followed at MIT and the majority of new American architecture schools created in succeeding decades” (Kruty).
“Ricker chose the Bauakademie over the École des Beaux Arts in Paris because he considered the quality of its program and pedagogy superior to the individualistic and competitive French system. The influences of Ricker's travel abroad reverberated throughout his career” (Urbana-Champaign). “The Bauakademie, he said, was ‘based on individual attainments and examinations… and not on pure competition of students with each other.’ It emphasized a methodical approach, not the bravura and facile presentation encouraged by the École. The German process was very rigorous and strict, even severe” (Charney, 1986, p. 260).

“Architectural education at the Bauakademie was influenced by the ideas of the leading German architect of the first half of the nineteenth century, Karl Friedrich Schinkel (1781-1841)… [who] believed that the artistic value of a work of architecture was determined by the degree of expression of this ideal of functional expediency; but if a building were to become a work of art, its design ought to incorporate other elements, as well, such as the ‘historic, artistic, and poetic’…. [Ricker’s] notions of functionalism in architecture and of organic design, and a strong awareness of the need to study the works of the past and to exploit the new materials and building types derived in part from the Bauakademie; in any event, these ideas became an integral component of his thinking, as well as of the contents of his curriculum” (Geraniotis, 1985, p. 16).

Ricker designed several buildings on the Illinois campus. His commitment to learning by doing is illustrated by one of these projects; he “was able to incorporate the creation of
Altgeld Hall into his teaching. Not only did his students produce presentation drawings for the various versions of the building presented to the trustees, but the actual working drawings for the final version were produced as a class project” (Kruty). “Years before there was a Bauhaus method, or even a Walter Gropius, Ricker had achieved something of the same sort. To complement instruction in design theory, Ricker instituted shop practice for architecture students in 1874. Provided with a workbench and his own set of tools, each student was urged to acquire skills in the use of materials by constructing scale models of building components. This system was adapted, in part, from Russian shop practices in mechanical engineering, which Ricker had observed firsthand at the Vienna Exposition of 1873” (Charney, 1986, p. 261).

“During the early 1890s Ricker instituted the nation's first four-year curriculum in architectural engineering, although he candidly admitted the shortcomings of his students: ‘[F]ew men were very competent in both design and mathematical studies, and some in neither…. [M]ost students could be divided into two classes, good in one or the other, but not in both kinds of studies. Most architects are either ignorant of higher mathematics or never have occasion to use them in their practice…. Therefore, it seemed a waste of effort to compel all the promising students in design to struggle through higher mathematics and mechanics in order to see dimly the origin of formulas in strength of materials’” (Charney, 1986, p. 262).

“In 1899 Ricker explained his pedagogical goal in Inland Architect magazine as creating builders of ‘good architecture,’ which he explained, ‘must largely consist of good and honest
construction, obtaining the best results possible for the purpose, employing all improvements in the system of construction and materials, and in the protection of the life and health of inmates of the buildings.’ Regarding the relative importance of aesthetics in design, he noted, ‘The highest perfection of style is demanded by comparatively few buildings’” (Kruty).

“While he differed from other architectural educators in his reliance on German models, Ricker held the generally accepted belief that instruction in design and instruction in history were inseparable, although offered in different courses. Realizing that he was training architects at a state school, Ricker stressed learning by doing and the science of construction. With an emphasis on pragmatism and building, his pedagogy involved three basic principles. First, imitation and ‘slavish’ copying were prohibited in the design of modern buildings, even though history provided a necessary guide to modern design. Ricker emphatically believed that to design a modern building, an architect should first understand an appropriate style of history, becoming ‘thoroughly imbued with it.’ Only then could he proceed to analyze contemporary building materials, conditions, and methods” (Alofsin, 1990, p. 74). “He was convinced that the objective and methodic study of all past architecture with the peculiarities of each style pointed out, with the relation to the material, social, historical, local, and climatic conditions and the process of stylistic evolution elucidated, would be of great help to the future designer. Pointing out the successes and failures of each style was the best way to
sharpen the student’s feeling for real architectural achievement and to protect him from indiscriminate eclecticism” (Geraniotis, 1985, p. 16).

“Ricker’s approach to architectural history, with its emphasis on construction and German theory, found a receptive audience among architects in Chicago, a city rich in German culture yet aspiring to create a new culture of the American West. They were receptive to independent thinking. There was as well a Midwestern resistance to the influence of the École on the Eastern architectural establishment, something particularly evident in The Western Architect. The author of an anonymous article in 1913 attacked the student work at Columbia for blatant copying and an incoherence between program and building expression. A prize-winning project for an administration building of a national academy of design, the critic pointed out, was a replica of a railway station recently completed in Minneapolis; a public bath and a public library were identical to a gymnasium; and the exterior of a French half-timbered house resembled another project for a church interior. Student work, the writer charged, followed ‘accurately (one would hate to say slavishly), the highest types of Beaux-Arts traditions in design. Yet to one with the highest respect, veneration even, for academic instruction in arts as well as letters, the cramped, unimaginative and absolute sameness in this student work is appalling… To train the student in the principles of design it does not seem necessary to kill his imagination by copying French Renaissance’ [Western Architect 21 (May 1914), p. 42]” (Alofsin, 1990, p. 76).
“Architectural aesthetics was the course that prepared the students for architectural design. For Ricker the aesthetics of architecture comprised the ‘fixed principles underlying all successful architectural work, which may be definitely stated and clarified,’ and were identical with the ‘grammar of architectural design.’ Their purpose was to educate the taste, rather than to provide a set of rules… when it came to choosing a textbook his students, Ricker turned to Rudolf Redtenbacher…. The essence of Redtenbacher’s ideas was a functionalism that was sometimes organic, sometimes mechanistic, but dominated by the notion of formal appropriateness to function and construction…. Ricker believed that design consisted in the harmonious synthesis of previously acquired ideas of form and structure and that ‘If the power of inventive design is wanting in a pupil, it cannot be implanted by any course of training, but if it exists, in even limited degree, it may be greatly developed,’ which was precisely Redtenbacher's opinion: ‘The ability to make independent designs can only be awakened, the inventiveness only trained, imagination only stimulated, but never injected through education.’ Moreover Ricker believed that

In a state school of architecture the course of study must be arranged for the entire body of students to carry the more gifted tenth as far as possible in architectural design, and also to make of the less able nine tenths competent instructors, office assistants, architectural engineers, foremen and even educated contractors. This larger portion certainly have equal rights in the school and they cannot be treated by the French method of keeping them out in the first place, or by neglecting their interests afterwards.

These are consequently my reasons, for the fact that the University of Illinois has never been in any manner an imitation of the Ecole des Beaux-Arts, and why it has always been my sincere belief that all architectural students should be trained to safely and economically construct and in the elements of design, while the gifted few should at the same time be thoroughly instructed in the arts of architectural design (Geraniotis, 1985, p. 17).

“Ricker’s step-by-step educational methods in design sound familiar even today.

Instruction in drawing and sketching was followed by a series of programs for buildings
increasing in size and difficulty. In each problem, small-scale sketches came first with great pains taken over the plan. Next, full sets of colored and shaded working drawings were prepared with slightly less attention paid to ‘fine’ or presentation drawings. Ricker believed that his first responsibility was to produce graduates fit for office work and well grounded in the science of construction. Cultivation of ‘taste’—although allowed as much of the remaining time as possible—was, admittedly, less fully developed. For the final term thesis, students designed a large building; they were to approach the project as if it were a real problem in professional practice requiring plans, details, and specifications” (Charney, 1986, p. 261). “The students’ final assignment was to combine every aspect of the profession, from initial conception to construction documents, in a single project. Clearly, the entire method was derived from Ricker’s personal values and his exposure to the Germanic principles, as taught by Hansen and espoused at the Bauakademie” (Kruty).

“The educational contribution of the architectural program at the University of Illinois has rarely been understood or assessed. Yet it was of paramount significance for the creation of the modern architectural curricula. Following the waning of the Beaux-Arts predominance in the [third decade of the twentieth] century, there was again a shift toward the well-structured and methodic program that Illinois had initiated. Moreover, the advances in building technology and a new sophistication in architectural design and construction obliged the other schools to include numerous technical and scientific subjects in their curricula, to the detriment of the excessive emphasis on design or the humanities. At the same time the
University of Illinois enriched its own program under the influence of other schools. And there is no doubt that the successful blending of all these schemes, developed in the course of the nineteenth century in a long process of continuous effort and experimentation, have largely created the system of architectural education that is in use today” (Geraniotis, 1985, p. 19).

Harvard University

At Harvard, Herbert Langford Warren (1857-1917) establish the Department of Architecture in 1895. “Warren’s theoretical viewpoint… was synthetic: he defined architecture as a fine art whose greatest works express civilization, transform its citizens, and observe the practical necessities of building and the requirements of human need” (Alofsin, 1983, p. 4). Under his leadership, “the accomplishment of the students gave evidence of a finer artistic sense than any other school of the period. Scholarship and good taste in design were emphasized from the first…. Warren was convinced that the student should build his technical training on a firm foundation of the knowledge of the history of architecture; that this should not be merely a superficial knowledge of period forms, but an understanding of their meaning in relation to the times in which they were brought into being and a sense of the aesthetic principles they embodied” (Weatherhead, 1941, p. 60-61).

Warren was born in England; at “the age of twelve he accompanied his father to Germany where he attended the venerable gymnasia at Gotha and Dresden. His facility with the
German language would later allow him to rely in his teaching on the work of German scholars. Furthermore, Warren’s exposure at the gymasia to the atmosphere of German nineteenth century philosophy must have created a receptivity to the concepts of Kulturgeschichte and Zeitgeist in which culture is integral with history and art” (Alofsin, 1983, p. 2). He then studied at “Owens College in Manchester, where he was greatly influenced by Ruskin” (Alofsin, 2002, p. 17-18), and “where it is probable that he pursued his interests in architecture on his own and absorbed the thought of Owen Jones whose Grammar of Ornament had been published in 1856. Jones attempted to show with examples of decorative design that forms of beauty exist in every style—an attitude similar to Warren’s—and that a limited number of rules of nature form the basis of beauty. According to Jones, creativity springs from these rules without the need of imitation; Warren would have shared this idea and many of Jones’s propositions on design, particularly the second proposition: ‘Architecture is the material expression of the wants, the faculties, and the sentiments of the age in which it is created. Style in Architecture is the peculiar form expression takes under the influence of climate and materials at command’” (Alofsin, 1983, p. 2). “‘Great architecture expresses the needs of its own time,’ Warren contended, and ‘form has developed as an expression of structure and through the working out by architects and craftsmen [of] the problems of their own day in direct fashion’” (Alofsin, 1990, p. 78). “Warren’s basic teaching approach was to establish a cultural-historical setting by discussing
buildings as part of a tradition that either adhered to, or deviated from, models, and analyzing them in terms of construction, materials, and visual appropriateness” (Alofsin, 2002, p. 23).

In 1879 Warren “entered the office-atelier of Henry Hobson Richardson, where he worked for five years until 1884. Warren learned the craft of architecture under Richardson and became one of his chief office assistants” (Alofsin, 1983, p. 2). After a year of European travel, in 1885 he opened his own office, which remained open until his death.

Warren had “a progressive vision for the future of the architectural profession. He began the architecture program not just as a response to the practical need for architectural training but also for the lofty purpose of helping to fulfill the cultural and social destiny of America…. Warren viewed architecture as ideally representing a synthesis of art and science in the service of a new American society… ‘In our day and country we almost without traditions, and, however much we deplore the fact, we cannot change our circumstances. We must take our birthright as we find it…. There is only one thing which can be substituted for tradition, and prevent our architecture from running, as it so often has, into parrot-like imitation of bygone styles or hopeless and vulgar extravagance, and that is Scholarship’” (Alofsin, 2002, p. 18, Warren quote from “Architectural Education at Harvard University,” Harvard Engineering Journal 1:2 (1902), p. 78). Warren’s assessment of the value and necessity of the study of history is expressed in the introduction to his The Foundations of Classic Architecture:

We cannot, if we would, escape the influence of all the art of the past which is brought to our doors and, as it were, thrust into our hands. Our choice lies simply between really knowing it and using it...
wisely in the fulness of knowledge, or knowing it only superficially and misusing and misapplying it ignorantly… We must seek to combine scholarship with artistic impulse and enthusiasm, must seek to give that impulse and enthusiasm the sure basis of knowledge. For the support which the architect of the past received from tradition, we must substitute scholarship. Not the scholarship which is concerned with facts merely, with archaeological study of outward forms; but the scholarship concerned with principles, which studies the art of the great epochs of the past in order to understand if possible those fundamental qualities which made it great, which penetrates to the meaning of the forms used, which analyses and compares for the purpose of gaining inspiration, in order that it may create by following consciously the principles which are seen to have been followed unconsciously in the great art of the past, developing if possible by degrees a tradition of what is best in all past forms, because it understands what to take and what to modify in order to meet the conditions of the present. Such a scholarship, we may hope, will produce an art which will not, on the one hand, change a significant and established form merely for the sake of novelty; but which, on the other, will freely mould and shape form to meet more expressively new and changing conditions… Such a study, it is clear, can be no superficial study… The history of each period must be so far studied as to make clear the conditions under which and as an expression of which the forms came into being, so that the study of architectural history becomes the study of the history of civilization as expressed in architecture… Such a study, under the conditions that exist today, is essential to those architects who would be in any real sense leaders of their profession, who are ambitious to guide their art onward to higher things (Warren, 1919 p. vii-viii).

Two aspects of the Harvard program were particularly different from other programs of the time. First, in 1900, Harvard became the first university to offer a degree program in landscape architecture. “With the creation of the Department of Landscape Architecture, the Department of Architecture now had a partner in its efforts to create a philosophy of modern design… the interconnection established during these early years set the pattern for the future of the school…. [The departments] shared a single curriculum, faculty, and resources, with special courses required of each field” (Alofsin, 2002, p. 23, 28). Second, in 1906, the disciplines of architecture and landscape architecture “became departments of the newly established Graduate School of Applied Sciences” (Simo, 2000, p. 4). Harvard thereby became the only university in the country to offer design as a purely graduate curriculum, since “both design programs now offered master’s degrees exclusively…. To enter the design
programs at Harvard, students now needed a four-year bachelor’s degree which provided a broad general education. Graduate work implied advanced study dealing with complex professional issues” (Alofsin, 2002, p. 40).

At Harvard, from “1895 to World War I, the teaching of architecture, fine art, and the history of art and architecture was a highly collaborative effort… that recognized no division between the practice and study of art and architecture…. Courses in the history of the fine arts helped students understand the relationship of the art of different periods to social and political life—‘a knowledge without which the architect is not likely to use the forms of his art in an intelligent and scholarly manner” (Alofsin, 2002, p. 20, 26). Landscape architecture, while sharing the exposure to art and history, early on introduced the earth sciences (and later the social sciences) to the mix.

“Warren exposed his students to a method instruction that established a cultural historical setting, discussed buildings as part of a tradition that either adhered to or deviated from models, and analyzed them in terms of expression of construction, materials, and a visual appropriateness whose highest synthesis was the aesthetic realm common to all the arts” (Alofsin, 1983, p. 5). At Harvard, “innovative and significant… was this ideal that the fields of architecture and landscape architecture could benefit from the mutual support and fertility found in collaboration. The founders of design education at Harvard actively sought collaboration between architecture and the fine arts, landscape architecture and eventually, city planning” (Alofsin, 2002, p. 51).
Of the twenty-seven references to be used in Warren’s courses ten would be by Germanic authors… In general, these writers either followed one of two traditions or combined aspects of both. One tradition emphasized the expression of building structure as a rational method of design. The other tradition was classicizing, and its adherents advocated the study and emulation of Greek architecture. (Alofsin, 1983, p. 4).

“In [an 1899] speech to the American Institute of Architects in Pittsburgh, Warren spoke directly about the conflict in architecture. He acknowledged the considerable American debt to the École and outlined the principal strengths of its training and practice: its insistence on composition, its excellence of proportions and mass, and particularly its mastery of monumental planning. On the one hand, he felt that the École had formerly taught that a building should express its purpose and produce one rhythmic whole from inside to outside in an architecture based on principles. On the other hand, Warren felt that training at the École had begun to be limited to the teaching of ornament accompanied by a desire for sensation from ‘a jaded and sated palate.’ As a result the excesses of the École were interfering in the development of the American public’s taste in art. Warren advised the American architectural profession to be discriminating and to reduce its reliance on the École in order to allow the development of a truly American architecture” (Alofsin, 1983, p. 7).

Warren searched for a professor of architectural design for seven years. “Throughout his efforts,… he reiterated his distaste for the influence of the École des Beaux-Arts: ‘…the undiluted French influence seems to me to have done great harm to the development of
Architecture in this country…. But in maintaining an independent position we are clearly
going against the current” (Alofsin, 2002, p. 46, Warren quote from memo to Charles W.
Armand Duquesne as professor of design. Duquesne’s previous position (since 1908) had
been “government architect in charge of the restoration and repairs of the palace and gardens
of Versailles and the Trianon” (Editor, 1911, p. 19).

Duquesne was “was part of a new breed of École student. Trained under the influence of
theoretician Julian Guadet, these students began to take seriously questions of social need, to
emphasize principles of construction and rational circulation, and to allow programs to affect
the forms of buildings. When Duquesne described his principles of design, he mirrored
Warren’s belief in rationality and artistic invention” (Alofsin, 1990, p. 80-81). In further
agreement with Warren, Duquesne said that: “Through all my studies and wide opportunities
for observation I have come to be more and more impressed with this idea: that a fine work
of art has never been created without a purpose—that the saying “art for art’s sake” has no
foundation in reason, least of all in architecture which, as its name implies, is the art of good
building…. every form in architecture should be, above all, the expression of a
need” (Lloyd, 1913, p. 11, 14, quoting Duquesne).

Another reason “Harvard wanted Duquesne [was] precisely because he both practiced
and taught. At Harvard—ever pragmatic—this judicious principle of assigning French
teaching methods to practitioner-teachers was a cornerstone of the program. Duquesne was a
true believer in this mode of education…. “There is no better teaching in architecture than
that which is given by one who is himself applying in actual work the principles laid down in
a course of teaching…. I believe that from the day the students realize that the theories of the
professor receive their complete expression in the work which he executes, from that day
they acquire the conviction that the art of architecture is above all the art of constructing
well, and consequently that of composing always with construction in view” (Alofsin, 2002,
p. 48). In Duquesne, Warren had found a design professor with impeccable École credentials
whose outlook reflected his own in many ways. “‘Buildings then are the aim and end of
architecture, and although in an architectural school one does not actually build, everything
that is designed there should be capable of being constructed…. One creates or one chooses,
first of all certain combinations, one arranges their proportions, then science is called in to
verify the stability of a part or the whole. Architecture is thus at once a fine art and a science,
a fine art by invention, combination and foresight; a science by analysis and the rigor of
verification. Consequently art without science is insufficient, just as science without art is
sterile’” (Lloyd, 1913, p. 11, quoting Duquesne).

“Warren succeeded in bringing together opposing attitudes first in his courses by
searching for principles in every style. Then, by bringing Duquesne to Harvard to teach
design he attempted to unite basic approaches to architecture: the rational expression of
structure, avoidance of excessive ornament, and incorporation of plan principles of the École
The Legacy of Pre-Modern Design Education

In the years before about 1930, design education in the United States went though an evolution of thought, based on European precedent, but with the goal of developing an American way of proceeding. The beginning of the era, just after the Civil War, coincided with the height of the power and influence of the École des Beaux-Arts with its extreme emphasis on design. The German method with its technical bent also appealed strongly to the practical American psyche, but its intellectual and artistic dimensions were limited. H. Langford Warren at Harvard “sought to analyze conflicting ideologies and extract their viable principles in architecture and unite them in his teaching” (Alofsin, 1983, p. 7). Warren did this in various ways and is a particularly notable example, but he was not alone in the effort; design educators at the time typically employed some version of this strategy. The attempt to synthesize the French and German influences illustrates the perennial conflict between theory and practice in design education first identified by Vitruvius in the first century B.C., reiterated by Alberti in the fifteenth century, and still with us today.

By the end of the nineteenth century, the ideals of the École had devolved into dogma: the school had begun to lose sight of the purpose of using physical forms as a language of
design and had begun to attach the forms to truths, making a fetish out of attention to architectural detail.

Professor of Design Julien Guadet, in his 1890s lectures at the École and in his Cours, offered “‘that basis of logic which can only be acquired by studying the classics’…. a unified view of theory and practice, in which he spoke for the whole of the École. His legislation was tyrannical and absolute… The four volumes of the Cours… are a summary of his views…. It presents to the student as well as to the practitioner only that which is absolute and beyond any doubt. No controversial material is included between its covers. That is Guadet’s boast. He is a self-confessed enemy of speculation” (Rykwert, 1982, p. 10-11).

One of Warren’s tenets for the proper study of the history of architecture was “that certain great principles underlie the best architecture of all styles” (Alofsin, 1983, p. 4). The architects who advised the Academie judges of the rendered drawings at École competitions often provided short comments on the plans and elevations. “The plan was most often cited for the ‘simplicity,’ ‘unity,’ or ‘clarity’ of its overall appearance along with the ‘judiciousness,’ ‘ingeniousness,’ or ‘ease,’ with which it fulfilled the programme…. The qualities the Academie most often noted in the best elevations were similar: a ‘simplicity,’ ‘nobility,’ ‘unity’ or ‘beauty’ of appearance combined with a ‘judiciousness’ and ‘suitability’ of character in style and decoration…. Beyond the particular appropriateness of the decoration to its subject, the Academie might praise the winning designs for ‘correctness.’
‘good taste.’ ‘fine proportions’ and ‘purity of style.’ based on well-chosen models, careful study, and close attention to detail” (Levine, 1982, p. 108-09).

The epic nature of this undertaking was enunciated by the dean of the University of Pennsylvania School of Architecture at the late date of 1934: “Our objective is the universal rather than the particular. In reaching this goal our men will qualify as able artists in their Profession, capable of understanding and achieving the ultimate” (Koyl, 1934, p. 10). In the estimations of many subsequent thinkers, the dean’s sentiment reflected an absolutist view of the world that was no longer tenable: “A universal past, free from any value except an abstract excellence, is chimerical” (Rykwert, 1982, p. 10).

A contrasting opinion: “The competition for the Grand Prix presents the École’s elitism and concern for pure design in the most glaring light. These were the two points on which the École was most often criticized by proponents of more liberal methods of education and by those who those who either wanted to return to the medieval craft traditions or to create an architecture more in tune with modern technology. The École and the Grand Prix were subjects of criticism because they worked so well. They provided a solution to the problem of in an age in transition between the death of craft techniques and the birth of modern technology and in the process made ‘Beaux-Arts’ architecture an international style and Paris a model city well into the 20th century” (Levine, 1982, p. 123).

Another aspect of the argument against the École’s method was egalitarian. Rudolf Redtenbacher, who influenced Nathan Ricker at the University of Illinois, was “convinced
that the school should aim primarily at training the person of average abilities and insisted that ‘If the school has done its duty, it can leave it… to the future to determine who is a genius and who is not. The school should not, as it has long been the case in Paris, try to produce exemplary individuals, who were excelling in examinations while the mass remained undeveloped, nor wish to produce geniuses. Individuals will attain maturity only in struggle with real life…; it is equally wrong to desire to promote it in the school forcibly, as is to leave it unattended’” (Geraniotis, 1985, p. 17-18).

Finally, the otherworldliness of the Beaux-Arts competition programs administered in the United States by the Beaux-Arts Institute of Design, the “way the BAID saw the world from its Olympian heights,” led to a feeling among the students that the projects assigned had little relationship to their lives. “I cannot avoid the feeling that at least one of the reasons for our disenchantment lay simply in the kinds of problems we were given. It is impossible to understand now and it was difficult to understand then how anyone could, in 1937, become deeply concerned about a building to enshrine the chalice of Antioch” (Esherick, 1977, p. 272-73).

Dewey points out the philosophical basis of this concern when he writes: “If classic philosophy says so much about unity and so little about unreconciled diversity, so much about the eternal and permanent, and so little about change (save as something to be resolved into combinations of the permanent), so much about necessity and so little about contingency, so much about the comprehending universal and so little about the recalcitrant
particular, it may well be because the ambiguousness and ambivalence of reality are actually so pervasive. Since these things form the problem, solution is more apparent (although not more actual), in the degree in which whatever of stability and assurance the world presents is fastened upon and asserted” (Dewey, 1958, p. 46). Dogma in its last gasp becomes pathetic.

Weatherhead gives us an unvarnished assessment of the graduate of an American design program that was strongly influenced by the École des Beaux-Arts:

1. The successful graduate possessed a sense of monumental design and taste especially within the limits of the historic styles of architecture.
2. He had developed resourcefulness in the solving of architectural problems from given sets of largely artificial conditions.
3. He was thoroughly versed in the logic of the formal Beaux-Arts plan.
4. He was skilled in the techniques of Beaux-Arts drafting, sketching and rendering on paper. He thought largely in two dimensions.
5. He had some foundation in the engineering theory of building construction.
6. He possessed a reverence for the great styles of the past and a romantic love for the old in architecture.
7. He had become an habitual plagiarist rather than a creative artist.
8. He had developed a sense of superiority over the practical, the economical, and the small in detail in the architectural requirements of modern American life.
9. He was trained in theory but he had received almost no practice in the detailed routine of a professional office.
10. He usually possessed a respect for the high ethical ideals of the profession of architecture.

(Weatherhead, 1941, p. 173-74).

At the end of his career, reflecting on the fact that the way of designing and teaching that had been his life’s work was becoming a thing of the past before his eyes, Paul Cret wrote:

There is no universally accepted principle in the art world, and no demonstration without its weak point. How could the educator escape questioning his own faith, wondering if it has a stronger foundation than personal prejudice? Is it the reflected image of his own temperament, he asks, or merely the dregs of his youthful enthusiasm for contemporary trends, uncritically accepted originally and since retained through indolence? This uneasiness of mind, unpleasant as it may be to self-esteem, has its advantages. It helps us to get our bearings, to gauge our beliefs through comparison, to probe
more carefully into what was taken for granted. Theologians condemn doubt, but they rank mental sloth a mortal sin; so ought over-confidence to be in our artistic creeds. Any complacency of the kind we might have once entertained about standards and theories of Architecture have been rudely shaken during the last ten years. Not that a sudden revelation was granted to the elect, upsetting the established order. What took place was more in the nature of a return swing of the pendulum, bringing to the fore problems and views somehow refreshed through their temporary eclipse. If not fully sharing in the enthusiasm, we had nevertheless to take notice of the chorus lustily hailing the new era. It held the usual proportion of notoriety seekers or professional advanced thinkers; its real strength came from those architects who had constantly disagreed with the doctrines in vogue and felt that a much-needed revolution was at last underway (Cret, 1973a, p. 83).

But the goals of American design education in its early years, at least as conveyed by some writers, sound remarkably modern. At Beaux-Arts Penn, the “architectural student learns what the academic undergraduate should learn but rarely does, for his is truly a creative education. If the four year academic course could follow that in Architecture it would be fine indeed, for the architectural graduate has usually acquired an uncommon capacity for it. But if architects are not yet accustomed to enroll as college freshmen when they graduate, they can and do enter into the free world of culture around them, as freshmen in an endless continuity of student days” (Holland, 1934, p. 26). Twenty years later, the language hadn’t appreciably changed: “In its fullest scope… education, far from being limited to formal schooling, continues as long as experience teaches. Its ultimate goal is understanding, judgment, wisdom, foresight, and culture…. The objective of architectural education becomes the development of architects, who, as enlightened individuals, responsible citizens, and resourceful professional men, well serve their society in attaining a worthy architecture” (Bannister, 1954, p. 81).

Even Dean Koyl, whose absolutist thinking was revealed above, quotes the Pennsylvania Gazette, quoting Antioch College: “‘The leader is he who most fully understands the nature
of things, so that his plans are not doomed to ultimate failure; who possesses an active, far-ranging imagination which can see many possibilities; who has a sense of values, so that among possibilities he is able to choose the most excellent; who has a sense of order, to give form, design, and program to the values and purposes he elects; who has practical sense and judgment, and so uses the most feasible means to accomplish his ends; and who has the energy and enthusiasm to carry his plans persistently towards fruition” (Koyl, 1934, p. 8).

The dilemma that arises for the Beaux-Artist is how to reconcile the absolute truths embodied in the classic forms, and the way of thinking they represent, with the relative values of the “free world of culture” that Penn’s graduates, if they indeed live an “endless continuity of student days” will encounter.

In Duquesne at Harvard we begin to see a transformation in thinking. “In all this you can see the purposeful liberality of the master to which he attaches the greatest importance. For with consideration for the individuality of the student which he may already have shown, and intending always to respect it, the master tries above all to show the pupil that he need not be a votary at any shrine or slave to any doctrine, that truth alone is beautiful, for him who knows how to seek and find it” (Lloyd, 1913, p. 13, quoting Duquesne).

**Thinking for One’s Self**

As Harbeson wrote in 1926, the purpose of the École’s “training is to impart to each student a method of attacking and studying any problem in architectural design which may be
presented” (Harbeson, 2008, p. 1). “The Beaux-Arts persuasion, with all its faults, with all its devotion to symmetry in the grand manner and with all its extravagant disregard for basic function, nevertheless stimulated our imaginations, and those who were able to glean the good probably found that the Beaux-Arts precepts have stood them in good stead. That is, they were taught to look for the major elements of any problem, to analyze and to solve the principle factors first and to attend to the details later” (Noffsinger, 1955, p. 80-81, quoting Journal A.I.A., December, 1950, p. 244-245). “Design, although not now given the emphasis it had in the thirties, is taught in a manner not, I suspect, quite so radically new and different as might be comforting to think. Careful analysis, the development of alternatives, the devising of criteria to select among alternatives, sometimes thought of as latter-day inventions, are cases in point” (Esheirick, 1977, p. 274-75).

Teaching One’s Self

“It is not an exaggeration to say that one of the important contributions made by France to architectural training in this country was the idea that the student should teach himself. Few of us recall with sufficient accuracy the place the critic had in the Paris scheme of things. The glamour of the patron’s personality made us forget that he seldom spent more than a moment over our own board, that he came only one morning a week, and that his architectural wisdom was given us in the phrase, ‘Continuez, mon enfant, continuez’” (Bosworth Jr., 1932, p. 54). Though the “‘school at Harvard will furnish him
with all the means,” the student “should understand in advance, that a school can only teach those who can teach themselves; and can give students an amount of knowledge very limited compared to that which they can acquire for themselves. It is then by continuous attention, by perpetual and conscientious efforts that he will get the most from his work. If teaching gave everything, all industrious pupils would be equal, but they should understand what Guadet has said so well: “If there are natural talents which are a source of happiness, there are also and above all acquired talents which are a recompense, and everyone as an artist will be that which he deserves to be”” (Lloyd, 1913, p. 14, quoting Duquesne).

**Learning from Each Other, Intrinsic Motivation, Creativity**

“If the schools of architecture are successful, not necessarily in preparing their students for the minutiae of practice, but rather in having them graduate with a certain degree of intellectual curiosity, of enthusiasm and joyousness, then the one thing about all else responsible for that result is this very thing that the students themselves contribute—their own attitude towards work when in school, the fun, the revolt against too rigid academic rules and regulations, even the love of noise and confusion when working, and above all the desire to work with little or no ulterior motive as an urge or incentive. Go through, of an evening, any university campus containing an architectural school. That school can be spotted without fail. It is the one brilliantly lighted attic. It is always an attic, usually in the oldest and least desirable building” (Bosworth Jr., 1932, p. 109). Concerning his architectural
education, the “thing that helped me most, was the association with the other students” (Noffsinger, 1955, p. 79-80, quoting correspondence from Francesco Montana of April 13, 1955).

In not a few of the American universities [the architectural] student is conceded by outside opinion to be slightly crazy. His ways and habits are hard to understand. He goes back to his drafting room at night, he makes an infernal racket when he works, he rather enjoys having a victrola or radio blaring forth ragtime or ‘Amos and Andy’ when he attempts to concentrate. That he really works is seldom acknowledged. That he plays with great gusto is heartily conceded. Why he enjoys the process of ‘getting an education’ is for some people difficult to explain. Education ought in their minds to be a serious matter. There is something of the Puritan in most of us which holds as suspect anything which is pleasing… All this is true of the architectural student in not merely one school or a small group of schools. It is true of him in virtually every school in Canada and the United States and for that matter in Paris or London (Bosworth Jr., 1932, p. 107-08).

“In [Beaux-Arts] academic theory composition was considered a faculty similar to imagination or intelligence. ‘Composition cannot be taught’, wrote Julien Guadet in [his Cours]. He described composition as ‘utterly personal, and owing a great deal to luck: he who hits upon a very fortunate composition for a given programme one day might not hit upon anything the day before or the day after.’ ‘And as for the parti, the lucky find,’ Guadet concluded, ‘is a mysterious working of the intelligence.’ It is a matter of ‘inspiration’ and therefore ‘cannot be fruitful unless it is served by knowledge.’ What the student could learn was the vocabulary, the method, and the taste needed to study and refine the composition and execute it with care. If the sketch was indication of innate ability, then the execution of the renderings took on a specifically moral value because they showed learning and work” (Levine, 1982, p. 121). One factor that Guadet does not take into account in his rather pessimistic view of the teachability of creativity is the effect of his own day-to-day method.

The reason [often given for the student’s enthusiasm] is that the subject matter of architecture is fascinating in itself. There may be some truth in this statement, but it fails to see the architectural
curriculum as a whole, being based, when probed, almost entirely upon the single item of design. In many schools the complaint is made by the faculty that the students are prone to neglect construction, or it may be graphics or history, in favor of design. Only in a comparatively few schools is it felt that the proper emphasis is placed by students upon each item of their curriculum. In some schools, the students give what is considered an undue amount of time and interest to history of architecture, in others to construction, and in still others to drawing, modeling, or painting. In every case where this has happened it is found that the particular course in question is approached along creative lines, as in the case of historic ornament at Ohio State. At Carnegie Institute and Armour, to mention only these two, drawing is taught essentially as exercises in creative analysis, becoming for the student a series of problems in original interpretation. Modeling at Massachusetts Institute of Technology or Armour Institute is again a series of original problems in decorative design. Alabama and Columbia in the teaching of construction might be said to have a strong leaning towards original and creative work. These few cases are cited as examples where interest and enthusiasm are voluntarily given by students to courses which they ordinarily neglect; the sole reason being, apparently, that the work has been made creative. It should be said, of course, that in other places interest in some of these courses is kept up by the respect which the students have for a particular instructor. That interest, however, is of a slightly different nature—it is not so voluntarily given (Bosworth Jr., 1932, p. 110-11).

The Project Method

“By the early twentieth century, the trend in most architectural schools was to introduce design at the very beginning of architectural study, with the ‘problem method’—i.e., project-based exercises—as the ongoing focus of the curriculum” (Simon, 2012, p. 277). In 1954 the Department of Education and Research of the American Institute of Architects published a lengthy report focusing on education and practice called The Architect at Mid-Century, which included a historical sketch of the history of architectural education. Concerning the early competitions administered by the French Royal Academy of Architecture: “In 1701, these competitions were placed on a monthly schedule and a jury of members awarded gold and silver medals for the best performances. In 1720, this system was extended to the selection of students to be sent at royal expense to pursue advanced studies at the French Academy at Rome. This use of the project method [emphasis in original] soon developed into the
dominant feature of architectural training [emphasis added]. Two centuries later, the principle was again ‘discovered’ by modern progressive educators, who proclaimed its advantages for all types of training” (Bannister, 1954, p. 84).

Arthur B. Gallion, Dean of the School of Architecture at the University of Southern California stated in 1955: “I believe that the basic contribution of [the Beaux-Arts] program was the establishment of the “project method” in education. Whereas we do not view the project method today as a novel educational procedure, it is interesting to realize its subsequent adaptation in such fields as law and some other professions which identify a similar method as “case studies.” The Beaux-Arts program thoroughly established this as a method of architectural education” (Noffsinger, 1955, p. 79-80, quoting correspondence from Gallion of April 14, 1955).

In 2012, the design studio “in the American university is… project-oriented, with each project serving as a vehicle for specific learning objectives. Students undertake design problems of increasing complexity that introduce them incrementally to the knowledge and skills of the discipline. Instructors respond critically to, rather than deliver, the primary coursework, which is produced by the students. This fundamentally exploratory learning process distinguishes architecture from other practice-based disciplines such as medicine, where practice follows observation of standardized procedures, or the performing arts, where it revolves around rehearsal and performance of a preexisting work…. the centrality [in the
Beaux-Arts model] accorded to the design studio within the architecture curriculum remains one of its enduring legacies” (Simon, 2012, p. 276-77).

“If one looks for an answer to the original question, the question as to why the average architectural student works long and with enthusiasm, the reply that it is only in design, whose subject matter is attractive, hardly seems adequate. Whenever, in any course, the problem method of teaching is present, this same enthusiasm is present. One is almost forced to the conclusion that it is not necessarily the problem method only, but that method combined with the teacher who sees in it the opportunity to reverse the usual process, to put the initiative of learning upon the student rather than of teaching upon the teacher. The problem method opens the eyes of the student to as wide an aspect of a given subject as possible, and the wider they are opened the more eager he becomes. As John Dewey says, ‘No one gets far intellectually who does not “love to think” and no one loves to think who does not have an interest in problems as such.’ The problem method, properly handled, comes closer to putting the emphasis on thinking methods and processes rather than on the acquisition of a storehouse of facts. In the same way that the problem method in beginning design or drawing allows the acquisition of a skill as a by-product to an intellectual exercise, so too in the general curriculum the problem method encourages the accumulating of factual knowledge as a by-product of the acquisition of thinking habits and methods” (Bosworth Jr., 1932, p. 112-13). In the early years, design education in America was characterized by various French/German syntheses, fights over style, and the ossification of conviction into
dogma. In the face of all of this, the practical, hands-on, learning-by-doing project method survived in the design studios of the universities of the United States.

By the 1920s “the academic monopoly on architecture education was not to be stopped. Yet the rise of formalized architecture programs did not substantially change the content of the architect’s education. Whether in an office or a classroom, students still learned about drafting and rendering, materials and construction, planning and composition. And there were always the imaginative and talented ones who rose above the great mass of diligent plodders. What did change may be called the culture of education. This was previously a vertical affair, in which knowledge passed from master to apprentice. Now it became much more horizontal, with the critical exchange of ideas especially occurring among the students themselves. To group fifty or sixty students together, each with considerably different experience in travel, reading, and work, was to multiply by a magnitude the creative stimuli to which they were exposed” (Lewis, 2012, p. 89). From Austin Willard Lord’s inaugural address as Director of the School of Architecture at Columbia in 1912: “I do not believe that the best results can be obtained where an architectural department is an adjunct to a university, for the simple reason that the methods which must necessarily be applied in the teaching of an art are so absolutely different from the method employed in teaching any other subject” (Strauss, 1981, p. 88, quoting *Columbia Alumni News*, 4 (November 15, 1912), p. 145). Though the issues around it have changed, the basis for Lord’s concern still exists today.
9. EARLY 20TH CENTURY EDUCATION REFORM: OBJECTIVISM AND CONSTRUCTIVISM

The educational landscape of this country has changed dramatically over the past century. In 1900, eight percent of youth in the United States graduated from high school (Tyack, 1995, p. 48). Then, as now, there were many educational philosophies and imperatives being advanced. The viewpoints of the era are often generalized into two major categories: the conservatives, who favored the strict discipline and rote memorization traditionally thought of as staples in American schoolhouses; and the progressives, whose beliefs were influenced on the one hand by an awareness of the vast scale of the problems of educating a huge country and on the other by the realization that the older methods did not produce students who were adept and facile thinkers. The early 20th century progressive movement in education can be said to have generally defeated the conservatives. The two strains of progressive education later separated themselves into camps respectively known as objectivism, often identified with Edward L. Thorndike (1874-1949), and constructivism, which shares many characteristics with, and nominally flows from, the educational theories of John Dewey.

In 1893, the Committee of Ten, led by Harvard president Charles Eliot, was the first group to assess the state of American high school education. Eliot and his colleagues, who were primarily concerned with raising the standards of high school curricula to make them better able to prepare students for college, “saw the high school as an agency for honing
intelligence for its own sake but also as an institution for preparing students for careers in a complex and interdependent society” (Tyack, 1995, p. 50). Their recommendations included standardizing the curriculum at twelve years, including four years of high school.

By the early 20th century, public education was becoming a business, it was increasingly being seen as a determinant of the political future, and it was beginning to be framed in terms of industrial efficiency. In 1918, the Cardinal Principles of Secondary Education were published by a group generally comprised of professional educators who are referred to by some as “administrative progressives,” and whose goals largely had to do with the systematic and efficient socialization of youth. Of the seven Cardinal Principles, only one had to do with what would be considered the traditional role of education—Command of Fundamental Processes (the three R’s). The other six were: Health, Worthy Home Membership, Vocation, Civic Education, Worthy Use of Leisure, and Ethical Character (Commission on the Reorganization of Secondary Education, 1918).

“Ellen Condliffe Lageman has argued that ‘one cannot understand the history of education in the United States during the 20th century unless one realizes that Edward L. Thorndike won and John Dewey lost’” (Tomlinson, 1997, p. 367) the battle for the future of progressivism. Thorndike “shaped the curriculum, pedagogy, and organizational structure of the American school as well as the basic aims and methods of university-based inquiry… it is Thorndike’s conception of human nature and the social good, rather than Dewey’s, that permeates [the] century’s mainstream literature and continues to generate what Henry Giroux
has called ‘a culture of positivism’ within American educational thought and practice” (Tomlinson, 1997, p. 366). Both Thorndike and Dewey embraced the scientific method, but their interpretations differed wildly. Thorndike took an approach that assumed that quantitative measures used in the hard sciences could be directly applied to psychological questions. He performed a number of notable studies and introduced new statistical methods into the interpretation of data. His findings led him to a sort of pre-Skinner proto-behaviorism in which all human action could be reduced to cause and effect sequences. Thorndike believed that statistics held the keys to understanding human nature. This mechanistic view lent itself conveniently to a scheme for education that was based on the model of industrial efficiency, and that was easy for the administrative progressives to adopt.

Thorndike was the intellectual descendent of Francis Galton, who was fiercely positivist in his conception of knowledge, and who pioneered psychometric studies. Galton also embraced eugenics, as did Thorndike, who was still advocating selective human breeding in the 1940s and was sure that heredity was the most basic determinant of a person’s worth. “The concept of growth was simply not part of Thorndike’s vocabulary” (Tomlinson, 1997, 1997, p. 373). Thorndike was enormously influential: he wrote the seminal Educational Psychology as well as Introduction to the Theory of Mental and Social Measurements. He had a forty-year long career at Teacher’s College of Columbia University (“the Sears,
Roebuck of learning” (Rice, 1942, p. 318)) and influenced large numbers of educators at all levels.

The basic tenet of educational constructivism is that “learners construct or build their own knowledge and meaning as opposed to having it ‘given’ or ‘delivered’ to them” (McColluch, 2008, p. 125). This fundamental assertion leads to teaching practices that create conditions conducive to the building of knowledge by students: curricular content that relates to students’ experience outside the classroom; an emphasis on “learning by doing;” encouragement of social interaction among learners; enhancement of students’ awareness and control of their mental processes through metacognition and self-regulation; and the introduction and reinforcement of the idea that learners are in control of, and responsible for, their educations.

“The educational literature on constructivism is enormous, and growing rapidly” (Phillips, 1995, p. 5); it is widely recognized as an important body of knowledge about teaching and learning. Still, though more in evidence at the elementary and secondary levels (No Child Left Behind) than in college teaching, Thorndike’s way of thinking is the dominant force in education today. A constructivist opines that the “behaviorists succeeded in eliminating the distinction between training (for performance) and teaching that aims at the generation of understanding” (Glaserfeld, 1995, p. 4).
The Epistemologies of Objectivism and Constructivism

In general terms, the objectivist educational theory associated with Edward Thorndike holds that “knowledge exists outside of individuals and can be transferred from teachers to students…. Students learn what they hear and what they read. If a teacher explains abstract concepts well, students will learn those concepts…. Learning is successful when students can repeat what was taught” (Thanasoulas, 2001, p. 3). This mode of thinking is based in an epistemological position that views knowledge rationally. In this mode, the truth is eternal, pure, and independent of human experience. There is one Truth. Observers are enjoined to do their best to see it more clearly.

In the constructivist educational theory broadly related to the work of Jean Piaget (1896-1980) and Lev Vygotsky (1896-1934), knowledge “has personal meaning. It is created by individual students…. Learners construct their own knowledge by looking for meaning and order; they interpret what they hear, read, and see based on their previous learning and habits. Students who do not have appropriate backgrounds will be unable to accurately ‘hear’ or ‘see’ what is before them. Learning is successful when students can demonstrate conceptual understanding” (Thanasouls, 2001, p. 3). A constructivist view of learning “suggests an approach to teaching that gives learners the opportunity for concrete, contextually meaningful experience through which they can search for patterns; raise questions; and model, interpret, and defend their strategies and ideas” (Fosnot, 2005, p. ix). The epistemological basis for constructivism is empirical; its epistemology is closer to the
subjective idealism championed by George Berkeley in the early 18th century in which there are as many truths as there are observers.

Piaget recognized the fact that the relativism of his position might invite criticism and doubt; his solution to the issue is dialectic, in that it seeks to reconcile or synthesize his essentially empirical position with rationalism by insisting on rigorous scientific method. On the one hand “Piaget’s psychology bears a strong subjective orientation and is especially interested in cognitive development in the individual” (Reich, 2009, p. 48). On the other, as Piaget tells us, “[w]e believe that… only in the real development of the sciences can we discover the implicit values and norms that guide, inspire, and regulate them. Any other attitude, it seems to us, reduces to the rather arbitrary imposition on knowledge of the personal views of an isolated observer. This we want to avoid” (Piaget, 1970, p. 4).

Constructivism is therefore forever in the position of having to balance mutually exclusive views of knowledge. Pragmatism bypasses that problem, but does so by requiring a way of seeing knowledge that throws many people’s basic beliefs about the nature of knowledge into question.

The early 20th century administrative progressives’ philosophy and methods were far more attuned to Thorndike’s way of thinking than they were to Dewey’s. It is not difficult to see how this might happen. Thorndike “saw educational science as a storehouse of objective knowledge… Dewey viewed it as a method of rational problem solving” (Tomlinson, 1997, p. 367). Thorndike’s epistemology was based on a view of truth as a fixed entity—a basic
characteristic of the rationalist viewpoint that had been a cornerstone of thought since the
time of Plato and that had dominated the positivist science of the 19th century. Dewey’s
transactional paradigm challenged the foundation of 2,500 years of western philosophy.
10. PRAGMATISM

What is Pragmatism?

There is no clear and simple definition of pragmatism. Generally, pragmatism:

- applies the method of scientific inquiry to other areas of life such as ethics, morals, politics, education, and art.
- recognizes that objects in the world have real characteristics independent of any observer, but that observers can only know about the world through perception and experience.
- is based on an epistemological stance in which knowledge is seen as an ongoing process; truth is a relationship between object and observer within a particular context.
- defines truth as “warranted assertability;” something that can be relied upon, verified, and replicated.
- posits that truth, i.e. warranted assertability, leads to belief; beliefs generate habits; people’s beliefs are exhibited in their actions.
- asserts that shared experience is the basis for morality, communication, learning, and art.
- concludes that truth and knowledge are valuable to the extent that they lead to useful, practical consequences.
Paradigm Shift

If a tree falls in the woods and there’s no one around to hear it, does it make a sound? Whether the answer to this question is “yes,” “no,” or “it depends” depends on the epistemological stance of the answerer. The classical answer to the question, based on the rationalist stance (the origin of which is generally attributed to Plato (427-347 BC)), is that objects in the world are independent of any observer. Their properties are pure and unchanging; the more precisely we study, the closer we come the ultimate truth about the object in question. The truth, however, always resides in the object, and is remote from the observer.

The empiricist’s stance is annunciated by George Berkeley (1685-1753): “It is indeed an opinion STRANGELY prevailing amongst men, that houses, mountains, rivers, and in a word all sensible objects, have an existence, natural or real, distinct from their being perceived by the understanding. But, with how great an assurance and acquiescence soever this principle may be entertained in the world, yet whoever shall find in his heart to call it in question may, if I mistake not, perceive it to involve a manifest contradiction. For, what are the fore-mentioned objects but the things we perceive by sense? and what do we PERCEIVE BESIDES OUR OWN IDEAS OR SENSATIONS? and is it not plainly repugnant that any one of these, or any combination of them, should exist unperceived?” (Berkeley, 1710). The truth, therefore, resides in the mind of the observer, and there are as many truths as there are observers.
If Plato and Berkeley argue the point, they disagree on where the truth resides, but they agree on a more fundamental point: the complete independence of the object from the observer. Plato says “yes.” The tree makes a noise when it falls, because the existence of the phenomenon is independent of whether or not it is observed. Berkeley says “no.” No sound exists if there is no perception. If one does not strictly subscribe to either of the diametrically opposed epistemological paradigms, the rational or the empirical, there is no way to satisfactorily answer the question about the tree falling in the woods. Attempts to reconcile the two views by saying “it depends” on how you look at it lead to philosophic “systems” that end up diverting attention from the initial question to explanations of their own machinery.

In a public lecture given in 1909, John Dewey said: “the conviction persists—though history shows it to be a hallucination—that all the questions that the human mind has asked are questions that can be answered in terms of the alternatives that the questions themselves present. But in fact intellectual progress usually appears through sheer abandonment of question together with both of the alternatives they assume… we do not solve them; we get over them” (Dewey, 1951, p. 19). His statement leads us to ask: once we abandon the old questions and their assumed alternatives, what do we replace them with? The process of answering that question leads us toward the core of Dewey’s philosophy.

“Pragmatism is… an effort to unhitch human beings from what pragmatists regard as a useless structure of bad abstractions about thought” (Menand, 1997, p. xi). Dewey went
beyond the reconciliation or the synthesis of the rationalist and empiricist paradigms; he made the revolutionary step of ignoring them. The transactional paradigm that he eventually developed and articulated is a view of knowledge that renders the objective/subjective dichotomy meaningless.

**Dewey’s Early Life and Study**

John Dewey was born on October 20, 1959, the son of Archibald and Lucina Dewey, in Burlington, Vermont. Archibald was a grocer known for creative and humorous advertising. Lucina was a serious and pious soul, dedicated to self-examination, personal morality, and social causes. “She was the enemy of all frivolity—drinking, playing pool, gambling, playing cards, or dancing… She continually asked her [sons]: ‘Are you right with Jesus?’” (Martin, 2002, p. 21). Dewey’s mother’s views differed from his own nascent view of reality; the interaction caused mental and emotional conflict.

At the University of Vermont, Dewey studied Aristotle with H.A.P. Torrey. A couple of years after graduating, with Torrey’s counsel, he applied and was accepted to Johns Hopkins to study philosophy. His main instructor at Hopkins was George Sylvester Morris, who introduced Dewey to the philosophical system of Georg Wilhelm Friedrich Hegel (1770-1831). Hegel “held that everything is interrelated within one vast, complex system or whole which he called the Absolute…. The whole is continually changing and its development takes place through a process of dialectic.” The dialectic process consists of
three stages: thesis, antithesis, and synthesis, whereby synthesis “reconciles the two previous positions and then becomes the basis of a new thesis” (Collinson, 2006, p. 148-49).

Dewey writes: the “sense of divisions and separations that were, I suppose, borne in upon me as a consequence of a heritage of New England culture, divisions by way of isolation of self from the world, of soul from body, of nature from God, brought a painful oppression—or, rather, they were an inward laceration. My earlier philosophic study had been an intellectual gymnastic. Hegel’s synthesis of subject and object, matter and spirit, the divine and the human, was, however, no mere intellectual formula; it operated as an immense release, a liberation. Hegel’s treatment of human culture, of institutions and the arts, involved the same dissolution of hard-and-fast dividing walls, and had a special attraction for me” (Dewey, 1930, p. 19).

He eventually moved beyond Hegel’s dialectic synthesis, but Dewey tells us that “I should never think of ignoring, much less denying… that acquaintance with Hegel has left a permanent deposit in my thinking… Were it possible for me to be a devotee of any system, I still should believe that there is greater richness and greater variety of insight in Hegel than in any other single systematic philosopher—though when I say this, I exclude Plato, who still provides my favorite philosophic reading” (Dewey, 1930, p. 21).

Dewey arrived at Hopkins in 1882. A member of the Philosophy faculty at that time was Charles Sanders Peirce (1839-1914). Though Dewey took Peirce’s logic class, the two never connected at Hopkins, and it took a long time for Dewey to understand how important
Peirce’s philosophical views were to him. When he did finally see, Peirce became perhaps his strongest influence.

**Early Pragmatism**

Ten years before, Peirce had been a member of a “metaphysical club” in Cambridge, Massachusetts along with William James (1842-1910), Oliver Wendell Holmes (1841-1935), and several others. Peirce and James are commonly considered the patriarchs of American pragmatism, the philosophy that Dewey inherited, expanded, and brought to maturity. “Now quite the most striking feature of the new theory was its recognition of an inseparable connection between rational cognition and human purpose” (Dewey, 1916b, p. 710).

Peirce tells us that the “essence of belief is the establishment of a habit, and different beliefs are distinguished by the different modes of action to which they give rise” (Peirce, 1878). Paraphrasing Peirce, Dewey writes: “pragmatism identifies meaning with formation of a habit, or way of acting having the greatest generality possible, or the widest range of application to particulars” (Dewey, 1916b, p. 711). Therefore people’s beliefs guide their actions, and actions speak louder than words in revealing people’s beliefs. James: “The true is the name for whatever proves itself to be good in the way of belief, and good, too, for definite and assignable reasons” (James, 1978, p. 40). The truth is something you have a good reason to believe in.
James began his 1906 lecture entitled “What Pragmatism Means” with a simple conundrum. If there is a squirrel on a tree and a man moves around the tree trying to see the squirrel, but the squirrel always keeps the tree between his belly and the man, does the man move around the squirrel? James’s answer: it depends. “If you mean passing from the north to the east, then to the south, then to the west, and then to the north of him again, obviously the man does go round him, for he occupies these successive positions. But if on the contrary you mean being first in front of him, then on the right of him, then behind him, then on his left, and finally in front again, it is quite obvious that the man fails to go round him, for by the compensating movements the squirrel makes, he keeps his belly turned towards the man all the time, and his back turned away.” This “it depends” differs from the one about the tree falling in the woods in that what is depended upon is not an epistemological position, but a practical choice. The question is not about truth and knowledge; it’s about “what you PRACTICALLY MEAN by ‘going round’ the squirrel” (James, 1910, p. 26).

Peirce wrote in around 1904: “The word pragmatism was invented to express a certain maxim of logic… The maxim is intended to furnish a method for the analysis of concepts… The method prescribed in the maxim is to trace out in the imagination the conceivable practical consequences,—that is, the consequences for deliberate, self-controlled conduct,—of the affirmation or denial of the concept” (Peirce, 1997, p. 56). Dewey’s interpretation of this fundamental tenet of pragmatism in Peirce’s formulation: “a conception, that is, the rational purport of a word or other expression, lies exclusively in its bearing upon the
conduct of life; so that, since obviously nothing that might not result from experiment can have any direct bearing upon conduct, if one can define accurately all the conceivable experimental phenomena which the affirmation or denial of a concept could imply, one will have therein a complete definition of the concept, and there is absolutely nothing more in it” (Dewey, 1916b, p. 710). The argument about the location of the truth—whether it is in the object or in the mind of the observer—is moot. The entire truth is in the consequences of belief.

“The ‘principle of Peirce’ states that if we want our conception of an object to be meaningful—or as Peirce put it, ‘clear’— then we should limit that conception to the real-world behavior that object will exhibit under all possible conditions…. James’s idea was to extend this way of understanding scientific concepts to all our beliefs” (Menand, 1997, p. xiii-xiv). Peirce ties the basic requirements of rationalism and empiricism together without resorting to epistemological synthesis. Dewey quotes Peirce’s fundamental hypothesis of science: “‘There are real things, whose characters are entirely independent of our opinions about them; those realities affect our senses according to regular laws, and… by taking advantage of the laws of perception, we can ascertain by reasoning how things really are, and any man, if he have sufficient experience and reason enough about it, will be led to the one true conclusion.’” There are real things with real properties in the real world. Our way of knowing about them is through perception and reason, both of which are governed by rules that, at least potentially, we also know. “‘Our idea of anything is our idea of its sensible
effects,’ and if we have any doubt as to whether we really believe the effects to be sensible or no, we have only to ask ourselves whether or no we should act any differently in their presence. In short our own responses to sensory stimuli are the ultimate, or testing, ingredients in our conception of an object.”

Everything “ultimately turned, for Peirce, upon the trustworthiness of the procedures of inquiry…. The appeal in Peirce is essentially to the consensus of those who have investigated, using methods which are capable of employment by all. It is the need for social agreement, and the fact that in its absence ‘the method of tenacity [constant reiteration, dwelling upon everything conducive to the belief, avoidance of everything which might unsettle it—the will to believe]’ will be exposed to disintegration from without, which finally forces upon mankind the wider and wider utilization of the scientific method” (Dewey, 1916b, p. 712-15). The enforcement of faith gives way to systematic inquiry.

The logic of Platonic rationalism is the fundamental method of the scientific revolution and therefore has a well-established and clearly understood intellectual heft. Its assertion of the singular truth of the existence of objects and their properties is simpler and far more intuitive than the radically subjective empiricist position of Berkeley. Empiricism is, however, the catalyst for nagging doubt about the absolute truth that rationalism requires, aspires to, and claims to be able to ultimately realize.

Pragmatism was never to intended to argue the issue of which paradigm was correct or how they should be synthesized. Its point was that the alternatives implicit in the argument
were insufficient; neither offered a clear explanation for the way the world really works. Both “Peirce and James are realists. The reasonings of both depend upon the assumption of real things which really have effects or consequences. Of the two, Peirce makes clearer the fact that in philosophy at least we are dealing with the conception of reality, with reality as a term having rational purport, and hence with something whose meaning is itself to be determined in terms of consequences. That ‘reality’ means the object of those beliefs which have, after prolonged and cooperative inquiry, become stable, and [that] ‘truth’ [means] the quality of these beliefs[,] is a logical consequence of this position. Thus while ‘we may define the real as that whose characters are independent of what anybody may think them to be… it would be a great mistake to suppose that this definition makes the idea of reality perfectly clear’” (Dewey, 1916b, p. 715).

One way in which the rational view fails to explain reality is in its treatment of change and development. In the paradigm that dominated western science since antiquity, change “as change is mere flux and lapse; it insults intelligence. Genuinely to know is to grasp a permanent end that realizes itself through changes, holding them thereby within the metes and bounds of fixed truth. Completely to know is to relate all special forms to their one single end and good: pure contemplative intelligence” (Dewey, 1951, p. 5-6).
Responses to specific conditions that result in change and development are fundamental to the pragmatic paradigm of Peirce and James (and later, Dewey). Charles Darwin (1809-1882) published *The Origin of the Species* in 1859. The metaphysical club began meeting in the early 1870s. It is nearly impossible to think of the genesis of pragmatism without considering the affect of Darwin on the logic of science.

In the ancient Greek conception of reality, changes observed in plants and animals are orderly and cumulative; they lead to a pre-ordained true final form.

This formal activity which operates throughout a series of changes and holds them to a single course; which, leaping the boundaries of space and time, keeps individuals distant in space and remote in time to a uniform type of structure and function: this principle seemed to give insight into the very nature of reality itself. To it Aristotle gave the name, ἐῖδος. This term the scholastics translated as species. [Species was] a fixed form and final cause, [and] was the central principle of knowledge as well as nature. Upon it rested the logic of science.

When Galileo said: “It is my opinion that the earth is very noble and admirable by reason of so many and different alterations and generations which are incessantly made therein,” he expressed the changed temper that was coming over the world; the transfer of interest from the permanent to the changing. When Descartes said: “The nature of physical things is much more easily conceived when they are beheld coming gradually into existence, than with they are only considered as produced at once in a finished and perfect state,” the modern world became self-conscious of the logic that was henceforth to control it, the logic of which Darwin’s “Origin of the Species” is the latest scientific achievement. [Before Darwin, the logic had been applied only to the inorganic sciences: physics, chemistry, astronomy.] The gates of the garden of life were barred to the new ideas; and only through this garden was there access to mind and politics. The influence of Darwin upon philosophy resides in his having conquered the phenomena of life for the principle of transition, and thereby freed the new logic for application to mind and moral and life (Dewey, 1951, p. 5-9).

In particular, it freed William James to write *Psychology*, in which he attempts to approach his subject as a natural science. Concerning the influence of James on him, Dewey writes: “As far as I can discover one specifiable philosophic factor which entered into my thinking so as to give it a new direction and quality, it is this one. To say that it proceeded from his *Psychology* rather than from the essays collected in the volume called *Will to
Believe, his *Pluralistic Universe*, or *Pragmatism*, is to say something that needs explanation. For there are, I think, two unreconciled strains in the *Psychology*. One is found in the adoption of the subjective tenor of prior psychological tradition; even when the special tenets of that tradition are radically criticized, an underlying subjectivism is retained, at least in vocabulary… The other strain is objective, having its roots in a return to the earlier biological conception of the psyche, but a return possessed of a new force and value due to the immense progress made by biology since the time of Aristotle. I doubt if we have as yet begun to realize all that is due to William James for the introduction and use of this idea… I do not think that he fully and consistently realized it himself.” Dewey seems to be saying that James was on the verge of the introduction of a new epistemology with *Psychology*. The step that James was not quite yet able to take was to make the implicit transcendence an explicit paradigm shift. “Anyway, it worked its way more and more into my all my ideas and acted as a ferment to transform old beliefs.”

Looking back after forty years, Dewey can see that if the “biological conception and mode of approach had been prematurely hardened by James, its effect might have merely to substitute one schematism for another. But [James] had a profound sense, in origin artistic and moral, perhaps, rather than ‘scientific,’ of the difference between the categories of the living and of the mechanical; …the most distinctive factors in his general philosophic view, pluralism, novelty, freedom, individuality, are all connected with his feeling for the qualities and traits of that which lives. Many philosophers have had much to say about the idea of
organism; but they have taken it structurally and hence statically. It was reserved for James to think of life in terms of life in action” (Dewey, 1930, p. 23-25).

Though he was certainly not universally revered, it is hard to imagine that many intellectuals in Cambridge in the 1870s were outside the range of influence of Ralph Waldo Emerson (1803-1882). Dewey wrote of “Emerson as the one citizen of the New World fit to have his name uttered in the same breath with that of Plato” (Dewey, 1903, p. 412). Questioners of Emerson’s status as a philosopher may be nearly right because “he is more than a philosopher. He would work, he says, by art, not by metaphysics, finding truth ‘in the sonnet and the play.’ ‘I am,’ to quote him again, ‘in all my theories, ethics, and politics, a poet;’ and we may, I think, safely take his word for it that he meant to be a maker rather than a reflector” (Dewey, 1903, p. 406).

Whatever the ratio of creation to reflection, Emerson’s work helped shape the intellectual climate of Cambridge in which a metaphysical club could be born. The profound “artistic and moral” sense that Dewey attributes to James is a result of many intrinsic characteristics and external influences. But “truly the population of the globe has its origin in the aims which their existence is to serve; and so with every portion of them. The truth takes flesh in forms that can express it; and thus in history an idea always overhangs, like the moon, and rules the tide which rises simultaneously in all the souls of a generation” (Emerson, 1929). It is a pertinent fact that James grew up in an environment that, two generations earlier, produced an Emerson.
To “Emerson all ‘truth lies on the highway…’ [The] Idea is no longer either an academic toy nor even a gleam of poetry, but a literal report of the experience of the hour as that is enriched and reinforced for the individual through the tale of history, the appliance of science, the gossip of conversation and the exchange of commerce. That every individual is at once the focus and the channel of mankind’s long and wide endeavor, that all nature exists for the education of the human soul—such things, as we read Emerson, cease to be statements of a separated philosophy and become natural transcripts of the course of events and of the rights of man” (Dewey, 1903, p. 410-11). Dewey here makes a clear connection from the pragmatists back through Emerson to Jefferson and Rousseau, who wrote: “‘It is the common people who compose the human race; what is not the people is hardly worth taking into account’” (G.C.M.S., 1883, p. 76). Pragmatism is a philosophy of democracy; it helps provide the moral foundation for Dewey’s thinking and writing on democracy and community and for his social activism.

Emerson said things in way that others did not attempt. His lyricism provided a connection to the depths of emotion necessary to drive the introduction of a new way of thinking about how the intellectual world works. It follows that his language also provides inspiration for new ways of thinking about teaching and learning: “Whilst thus the world exists for the mind; whilst thus the man is ever invited inward into shining realms of knowledge and power by the shows of the world, which interpret to him the infinitude of his
own consciousness—it becomes the office of a just education to awaken him to the knowledge of this fact” (Emerson, 1929).

Concerning the philosophy of the future, it “is as true today as when [Emerson] said it: ‘It is not propositions, not new dogmas and the logical exposition of the world that are our first need, but to watch and continually cherish the intellectual and moral sensibilities and woo them to stay and make their homes with us. Whilst they abide with us, we shall not think amiss.’ ...From out of such reverence for the instinct and impulse of our common nature shall emerge in their due season propositions, systems and logical expositions of the world. Then shall we have a philosophy which religion has no call to chide and which knows its friendship with science and with art” (Dewey, 1903, p. 412-13). One way of looking at pragmatism is as an attempt to bring the scientific method to bear on religion, politics, morals, education, and art in a particular way: They all become contexts for inquiry.

Louis Menand writes that “pragmatism was a variant of many strands in nineteenth century thought but by no means their destined point of convergence” (Menand, 2001, p. 370-71). Darwin and Emerson were certainly not the only influences on early pragmatic thinking, or maybe even the most direct. They do, however, represent the larger movements of thought driving the epistemological revolution that resulted in Dewey’s transactional paradigm. Their modes of inquiry helped create the intellectual environment in which Peirce, James, and Dewey could begin to ask: “Do not a large part of our epistemological difficulties arise from an attempt to define the ‘real’ as something given prior to reflective inquiry
instead of as that which reflective inquiry is forced to reach and to which when it is reached belief can stably cling?” (Dewey, 1916b, p. 715).

The Transactional Paradigm

In his description of his early years as a philosopher Dewey says that as “my study and thinking progressed, I became more and more troubled by the intellectual scandal that seemed to me involved in the current (and traditional) dualism in logical standpoint and method between something called ‘science’ on the one hand and something called ‘morals’ on the other. I have long felt that the construction of a logic, that is, a method of effective inquiry, which would apply without abrupt breach of continuity to the fields designated by both of these words, is at once our needed theoretical solvent and the supply of our greatest practical want” (Dewey, 1930, p. 23). As we have seen, the epistemology of pragmatism is based on the notion that alternative answers to questions are embedded in the way they are asked. Dewey’s “particular mode of intelligence… is the strategy he used in approaching every problem: expose a tacit hierarchy in the terms in which people conventionally think about it” (Menand, 2001, p. 330). The critical step in the development of the transactional paradigm was Dewey’s rejection of the subject/object dualism implicit in both the rational and empirical paradigms.
familiar by use, between subject and object. The assumption consisted in holding that the subject matters designated by these antithetical terms are separate and independent; hence the problem of problems was to determine some method of harmonizing the status of one with the status of the other with respect to the possibility and nature of knowledge.

In pursuing this line of inquiry, it proved to be a natural affair to take as a point of departure the physiological connection and distinction of organism and environment as the most readily observable instance of the principle involved in the matter of the connection and distinction of ‘subject and object.’ Consideration of the simpler physiological activities which significantly enough already bore the name ‘functions’ served to indicate that a life-activity is not anything going on between one thing, the organism, and another thing, the environment, but that, as life-activity, it is a simple event over and across that distinction (Dewey, 1949, p. 322-23).

Dewey’s inquiry led him to the epistemological position that truth is a process of discovery; the result of the relationship of the observer and the observed within a specific environment. It is an ecologic model of knowledge.

Dewey’s philosophy is based on the rejection of the traditional dichotomy and the questions it dictates. It is an adjustment of the fundamental view of knowledge supporting western thought. Paradigm shifts are revolutionary and traumatic. An epistemological shift is particularly so, because it demands new thinking about knowledge, truth, and about thought itself. Dewey here is speaking about religious fundamentalism, but the message is just as applicable and pertinent to the present subject: “The craving of human beings for something solid and unshakable upon which to rest is ultimate and unappeasable. Many philosophers have made the search for a principle of certitude their chief quest. They sought certainty, however, not because they were philosophers but because they were human. Certainty merely happened to be the name given to the object of their particular human desire for a harbor that cannot be troubled, a support that cannot be weakened. Fundamentals are the answer to
man’s cry for security, living as he does a life of uncertainty in a world that is always on the move” (Dewey, 1983, p. 3).

The rejection of the dichotomy is not an indictment of the philosophers that operated using it. Dewey is simply building on prior work, making progress, and trying to make philosophy useful. “Upon the whole, the forces that have influenced me have come from persons and from situations more than from books—not that I have not, I hope, learned a great deal from philosophical writings, but that what I have learned from them has been technical in comparison with what I have been forced to think upon and about because of some experience in which I found myself entangled” (Dewey, 1930, p. 22). Dewey has enormous respect for both Plato and Hegel, but he has found a new way of looking at things that allows him to see differently. Dewey’s transactional paradigm is a mode of operation based on conclusions derived from systematic inquiry into how knowledge functions. It is a statement of warranted assertability based on experience. It is also an immensely creative invention.

This conceptual step is important to design education because it has direct bearing on the theory/practice dichotomy established by Vitruvius in the first century BC; the establishment of the correct balance between these opposing elements has been the problem of design education ever since. The question “How can theory and practice be properly balanced?” predetermines a possible range of answers based on the implicit assumption of a
dichotomous relationship. If the relationship is seen as other than dichotomous, it leads to other questions.

**Pragmatism and Education: The Laboratory School**

In the context of the history of the philosophy of education, the principles of pragmatism catalyze the development of a theory and set of methods based on earlier thought, particularly that of Rousseau, Pestalozzi, and Froebel. The introduction of the concept that scientific method could be introduced into daily life had become possible after Darwin. The establishment by Dewey of a functional new epistemological paradigm provided the means to ask new questions about learning (though not many people understood how these questions were generated or their real implications). The artfully expressed by Emerson notion of shared experience formed the foundation for the method of teaching and learning. Finally, the concept developed by Peirce and James that the value of truth and knowledge is tied to its useful, practical consequences not only helps develop a pragmatic pedagogical method, the theory reinforces itself: the actual practice of day-to-day education at the Laboratory School, which he established at the University of Chicago in 1896, gives Dewey real-world experience to test his theory and from which to abstract his philosophy.

“To call Dewey’s vision a dream… is actually unfair, for it was not at all dreamlike in its day-to-day functioning. Dewey would have called it an end-in-view and so it was at the time: an ideal that served as a guide to action, one whose realization occurred by degrees and
whose perceivable form and shape were themselves being constantly modified by the actual
course of events. The school Dewey dreamed of (again that inappropriate word intrudes) was
one in which old divisions and separations had been overcome or had otherwise disappeared.
Gone were to be the barriers and artificial hindrances that long had separated school and
society, the child and the curriculum. Gone to were to be the compartments of work and play,
thought and action, cognition and volition, and of all the other dichotomies we so commonly
use to categorize and ultimately to isolate the polarities of human experience. His was to be a
school whose inhabitants—students and teachers alike—were invited to find both personal
fulfillment and social well-being in their daily activity, a place where the ultimate test of
knowledge was to be its usefulness but where the usefulness was to include the aesthetic, the
contemplative, and what some would call the spiritual aspects of human
experience” (Jackson, 1990, p. xxxvi).

John Dewey’s name has often been associated with the phrases “progressive education,”
“learning by doing,” and “the project method.” Much of what the early 20th century
administrative progressives accomplished has been attributed to the influence of Dewey’s
educational philosophy, but “what Dewey meant by progressive education has been so
distorted by generations of well-meaning but ill-equipped educational administrators that its
original significance has been almost entirely lost” (Kloppenberg, 1986, p. 374). Many of the
results of the so-called “child-centered” methods of progressive education were so awful that
John A. Rice, a Dewey devotee and the founder of Black Mountain College, wrote:
“Progressive education, when it is stupid, is much more stupid than the other kind” (Rice, 1934). Dewey’s philosophy and resulting vision for education has been misunderstood by both educational objectivists and constructivists (and by extension, by both political extremes). He is quoted out of context to accuse him of socialism and atheism on the one extreme (Smoot, 1962) and to justify patently misguided schemes on the other.

His thought is nuanced and he approached his subjects from multiple perspectives. His writing style is sometimes awkward and/or convoluted. He bases everything he writes on an epistemological position that most people don’t even recognize, much less understand or agree with. From the preface to Knowing and the Known (with co-author Arthur Bentley): “The reader’s attention is called to the Appendix containing a letter from John Dewey to philosopher friend. He who fails to grasp the viewpoint therein expressed may find himself in the shadow as respects all else we have to say” (Dewey, 1949, p. vii). In the last seventeen pages of his last book, he attempts for the last time to define the paradigm that forms the foundation of everything he has written: The transactional (sometimes “instrumental”) paradigm, according to which, knowledge is an ongoing process and truth exists within a particular context as a relationship between observer and object. “Upon the basis of this view the metaphysical problem which so divided Berkeley from Sir Isaac Newton, and which has occupied such a prominent place in philosophy ever since the rise of new physical science, is not so much resolved as dissolved” (Dewey, 1949, p. 327).
Perhaps the best (at least the pragmatic) way to examine Dewey’s beliefs about education is to look at his most concentrated attempt to put them into action. Dewey “joined the faculty of the University of Chicago in 1894 as professor of philosophy, psychology, and pedagogy, [and] founded the University Elementary School, as it was first called, in 1896. It was officially renamed the Laboratory School in 1902” (Jackson, 1990, p. xii). He remained at its helm until his resignation from the University of Chicago in 1904, when he moved to Columbia University.

He “incorporated in his system of education many ideas first expressed by Rousseau, Pestalozzi, and Froebel and made them common knowledge to all Americans interested in education” (Silber, 1973, p. 315). Those writers, along with “numerous other educational thinkers long before the emergence of modern psychology” expressed the “dual notion, 1) that humans, and especially young children, are active and curious by nature and 2) that educators need to take cognizance of that fact” (Jackson, 1990, p. xxii). But Dewey did not simply accept the theories or methods of his venerated predecessors. He used their generally agreed-upon philosophy as a starting point and developed it into theory and method that were calculated to reflect his time, place, and culture. He therefore differed with them on certain key points.

Pestalozzi wrote: “Anyone who adopts the Method—child, adolescent, man or woman—will always, in practice, come to a point where very special demands will be made on his individuality: by seizing that opportunity and exploiting it, he will most certainly bring into
play powers and resources that will enable him largely to dispense with the assistance and
support in his education that will still be indispensable to others, and he will make himself
ready to follow up and complete the remaining portion of his education, in a self-assured and
independent manner. Were it otherwise, my institute would collapse, my whole enterprise
would have failed” (Pestalozzi, 1972, p. 35, cited by Soëtard, 1994, p. 6).

The emphasis on individual development and self-direction continues with Dewey, but
within the context of community. In a 1914 lecture “Dr. Dewey showed that the great
importance of Rousseau in educational theory is due to his emphasis upon the principle of
growth according to nature…. We find, he says, some things in Rousseau vital and operative
today, and also others that are false and misleading…. Rousseau confuses, as we do today,
two unrelated ideas of nature: one meaning of native unlearned capacities and an order of
development; the other meaning opposition to social life and to culture. Both of these
confusions persist to this day” (Dewey, 1979, p. 377-78).

“Dewey’s extended argument [on] education contains three primary elements: the school;
a dynamic, evolving society; and the children, who can pass through the right kind of school
to become a part of the community, contributing their own inner development to the growth
of society (as members of a community) and to the progress of politics (as citizens). Many
people—including many educators—misunderstood Dewey to mean that instead of a
traditionally institution-centered aim, education should become child-centered… [But]
Dewey insisted that education be society-centered, for the children are destined to become
not isolated individuals but members and citizens of society. He saw and stated clearly that children’s inner nature and mind grows from within but must be completed through relationships… Dewey’s logic was at work here, not a romantic notion that children’s impulses were natural and were needed to alter society” (Martin, 2002, p. 199).

Valuable members of society have defined themselves as individuals; the way they reach their personal definitions is through comparison and relation with other members of their community. Pestalozzi based his method, in part, on this concept. He “believed that Nature educates for social life and by means of social life. First and foremost he believed in the educational power of the family circle. Another one of Pestalozzi’s best contributions is that intellectual development comes through social activities” (Dewey, 1979, p. 378). Dewey developed the idea further in the context of the United States: “In this work—and indeed in all his future work on education—Dewey assumed that children’s need to develop coincided with a democratic culture like America’s… This assumption that child-nature and democracy were parallel separates Dewey from the educational theorists that preceded him or were his contemporaries” (Martin, 2002, p. 201).

Another difference, from a methodological perspective, is in the conception of how learning naturally takes place: As Dewey sees it, “Pestalozzi and his followers, strange to say, have forced upon elementary education almost as great an incubus as they have relieved. This principle of proceeding from the simple to the complex led him to analyze and arrange graded series in language lessons, in form, in drawing, which are unnatural, unnecessary and
unchildlike…. In drawing he used various combinations of straight and curved lines. In
music and arithmetic similar reductions to the elements supposed by him to be simple. This is
what Pestalozzi called ‘psychologizing education’ — that is reducing all subjects to elements.
It was poor psychology for the child. It was imposing upon the child the adult point of view,
which is not simple, but difficult for the young mind… It is natural teaching when the child
deals with much more complex things, as in home life. The child gradually analyzes things
into parts by finding their uses. In reality Pestalozzi did put things to social uses, for his
children worked in the home and in the field” (Dewey, 1979, p. 381). This is a fine
distinction; Dewey does not abandon Pestalozzi’s inductive structure—learning still begins
with concrete objects and proceeds to abstract concepts. “Pestalozzi shared with Rousseau
the theory of innate powers which unfold in an intrinsic order; we educate for good or ill
according as we facilitate this order; if we interfere, we weaken the natural sources of
power” (Dewey, 1979, p. 378). Josef Albers noticed the same phenomenon—that of being
drawn to complexity—in design students: “It has been observed, both here and abroad, that
beginning students in design like nothing better than to select as their first problem the most
complex task, namely, another new chair” (Albers, 1944, p. 689).

One reason Pestalozzi had the children work was to help finance the school. Another was
that he recognized the connection between manual, intellectual, and social facility. Dewey
criticized progressive methods that miss the social constituent: “We talk about ‘education by
doing’ but select the remote. We do not put the children in social relations and get their
judgments in these social groups. The child loses the sense and feeling of reality” (Dewey, 1979, p. 379). Thus, “learning by doing,” in Dewey’s formulation, was meant to be a simulation, at small scale, of everyday life in society. It was never an abandonment of the traditional aims of early childhood education—the acquisition of skills such and reading, writing, and arithmetic—it was a different method of developing those skills. “A certain discipline of the reasoning powers can be acquired through lessons in science and mathematics; but, after all, this is somewhat remote and shadowy compared with the training of attention and of judgement that is acquired in having to do things with a real motive behind a real outcome ahead” (Dewey, 1990, p. 12). This element of intrinsic motivation is the key to the functional success of the project method.

In the dynamic environment of Chicago in 1896, Dewey adapted and built upon the methods of his predecessors to reflect the enormous, revolutionary shifts in the workings of society brought about in the 19th century. “The change that comes first to mind, the one that overshadows and even controls all others, is the industrial one—the application of science resulting in the great inventions that have utilized the forces of nature on a vast inexpensive scale; the growth of a world-wide market as the object of production, of vast manufacturing centers to supply this market, of cheap and rapid means of communication and distribution between all its parts… this change is not much more than a century old… One can hardly believe there has been a revolution in all history so rapid, so extensive, so complete… that
this revolution should not affect education in some other than a formal and superficial way is inconceivable” (Dewey, 1990, p. 9).

In a swipe at Thorndike and the administrative progressives, who used industrial and statistical methods directly as models for modern education, Dewey says: “Education requires a natural, social environment which… creates a direct feeling for reality. It is an immediate, close environment, and enforces particular immediate relations adapted to future situations. Nature’s road leads to reality. This is vital. It is not an idea which lends itself to mechanizing” (Dewey, 1979, p. 378-79). He continues:

“Are we aiming,” Dr. Dewey asked, “at social conformity or social transformation? Should the educational authorities take it for granted that the present social status is accepted finally and educate for it? or, should they take the more imaginative, more ideal [route] and recognize the possibility of changes in the future?” We must not forget that persons are effective agents in bringing about transformations in social matters. Unless we intelligently consider, are we not likely so to educate as to fit persons into narrow niches?

This leads to a two-fold evil. First, it tends to perpetuating class distinctions which our democratic ideals strive against. It is a movement away from democracy. Second, it educates on the basis of a static society, whereas the forces of science and invention bring about changes in industry and society, and even in political institutions themselves. The narrower point of view in education would not pay even in dollars and cents. For example, there is no longer a building made as in the past. Steel construction has altered everything; so the use of cement and concrete is coming to make new possibilities in building.…

Then to take the narrow and the static view in educating industrially is not to be permanently efficient. We must recognize society as a rapidly-changing society. No education is competent that does not turn out pupils able to meet changes. It may seem, at first sight, more practical to take the narrow view, the lines of least resistance. It is easier to stir up an interest in trade schools, in vocational schools, in continuation schools than to attend to a more general reorganization of the school curriculum, but the latter is what is needed. Such a reorganization should aim to make all individuals more capable to take care of themselves because of general equipment (Dewey, 1979, p. 384).

The project method became the basis for Dewey’s experiment at the Laboratory School.

“We must conceive of work in wood and metal, of weaving, sewing, and cooking, as methods of living and learning, not as distinct studies. We must conceive of them in their social
significance, as types of the processes by which society keeps itself going, as agencies for bringing home to the child some of the primal necessities of community life, and as ways in which these needs have been met by the growing insight and ingenuity of man; in short, as instrumentalities through which the school itself shall be make a genuine form of active community life, instead of a place set aside in which to learn lessons.”

Reading, writing, and arithmetic cease to be subjects to be lectured about, memorized, and parroted. They become means of helping the children complete a project that they care about. Teaching children math by teaching them to cook may seem at first circuitous at best, but Dewey and the teachers at the Laboratory School at least were able to get the children interested and stimulate them to engage in creative activity. “The difference that appears when occupations are made the articulating centers of school life… is a difference in motive, of spirit and atmosphere. As one enters a busy kitchen in which a group of children are actively engaged in the preparation of food, the psychological difference, the change from more or less passive and inert recipiency and restraint to one of buoyant outgoing energy, is so obvious as fairly to strike one in the face” (Dewey, 1990, p. 14-15). Dewey credits Froebel with the introduction of the notion that children “should be busy in their play and free in their work. Development equals active creating and is new at each stage” (Dewey, 1979, p. 382-83).

“Wherever Dewey’s students entered an occupation, they came out on the other side in interest-saturated reflection” (Martin, 2002, p. 200). If we see a group of children “sewing on
buttons and making patches, we get a narrow and utilitarian conception… But if we look at it from another side, we find that this work gives the point of departure from which the child can trace and follow the progress of mankind in history, getting an insight also into the materials used and the mechanical principles involved. In connection with these occupations the historic development of man is recapitulated…. You can concentrate the history of all mankind into the evolution of the flax, cotton, and wool fibers into clothing. I do not mean that this is the only, or the best, center. But it is true that certain very real and important avenues to the consideration of the history of the race are thus opened—that the mind is introduced to much more fundamental and controlling influences than appear in the political and chronological records that usually pass for history” (Dewey, 1990, p. 22). The history that Dewey is talking about here has to do with building an image of another time by finding a way to gain access to some particular aspect of real people’s lives. From the resultant perspective, more general historic events and movements begin to have a chance at relevance. Otherwise they are just dates to memorize.

There is an experimental element to the project method; it is up to the learners to determine the direction of the project; no one knows exactly what will happen. Working in teams on projects that everyone has a personal stake in means that the process is communal and direct; shared experience is the basis for communication, art, and teaching. The practical consequences of working through a project together lead to a belief, intrinsic or explicit, that the worth of truth and knowledge is measured by the quality of the results they inform. All
these elements are dependent in some way on relationships, between individuals and groups of people, between beliefs and results, between theory and practice. In each instance, each side of the relationship is affected by the other, and neither makes sense without the other. The school develops into a network of relations; it becomes a society and, metaphorically, an ecological system. All of these attributes of the Laboratory School are relate directly to tenets of pragmatic thought. The main thing is that the project method makes school a lot more interesting—maybe even fun.
11. THE BAUHAUS: GROPIUS, ITTEN, ALBERS

Gropius and Itten

When the Bauhaus opened in 1919 under his leadership, Walter Gropius was certainly aware of the concept of “learning by doing.” The nineteenth century work of Pestalozzi and Froebel was still important in German educational philosophy and method. Though it is not clear that it had a direct impact on the teaching at the Bauhaus, John Dewey’s *Democracy and Education* appeared in German in 1919; whether or not its influence was explicit, its publishing was indicative of the attitudes about teaching and learning that had momentum at the time, and many statements by Gropius and other Bauhaus teachers reflect opinions shared with Dewey. Gropius’s belief in the forming of the Bauhaus “was that the principle of training the individual’s natural capacities to grasp life as a whole, a single cosmic entity, should form the basis of instruction throughout the school” (Gropius, 1965, p. 52).

“Much of the basic philosophy behind… reform principles of child education was by the beginning of the century already familiar, even in detail, to those modern artists and designers who were concerned with the problems of teaching art: the ideal of suiting education to the abilities and temperament of the pupil, of first searching out the young student’s natural talents through an informal master-pupil relationship, the doctrine that true education requires ‘doing’ rather than mere learning—all these, and especially the last, were as much the direct heritage of Ruskin and the English Arts and Crafts Movement as they were of more narrowly pedagogical traditions” (Franciscono, 1971, p. 181). Ruskin:
By a large body of the people of England and of Europe a man is called educated if he can recite Latin verses and construe a Greek chorus. By some few more enlightened persons it is confessed that the construction of hexameters is not in itself an important end of human existence; but they say, that the general discipline which a course of classical reading gives to the intellectual powers, is the final object of our scholastical institutions.

But it seems to me, there is no small error even in this last and more philosophical theory. I believe, that what it is most honorable to know, it is also most profitable to learn; and that the science which it is the highest power to possess, it is also the best exercise to acquire.

And if this be so, the question as to what should be the material of education, becomes singularly simplified. It might be matter of dispute what processes have the greatest effect in developing the intellect; but it can hardly be disputed what facts it is most advisable that a man entering into life should accurately know. I believe, in brief, that he ought to know three things:

First. Where he is.
Secondly. Where he is going.
Thirdly. What he had best do, under those circumstances. (Ruskin, 1851, p. 215-16).

“In his natural readiness to grasp life as a whole a student should first get a comprehensive view of the vast field of possibilities for expression lying before him” (Gropius, 1955, p. 50).

Another part of the legacy of the Arts and Crafts movement that helped drive the genesis of the Bauhaus was its concern with the poor state of manufactured products. On that front, in Germany, the Deutscher Werkbund had been founded “in 1907 by a hundred artists, designers, architects, and factory owners. The goals of the Werkbund were inspired by those of the British Arts and Crafts movement, which believed that artists should serve society by bringing good design to articles of daily life. The Werkbund, however, rejected the Arts and Crafts emphasis on handmade objects and instead concerned itself with improving the quality of mass-produced goods” (Horowitz, 2006, p. 84); the Bauhaus tried to address the same issue.
Dewey was also aware of, and disturbed by, the problem: “Plato somewhere speaks of the slave as one who in his actions does not express his own ideas, but those of some other man. It is our social problem now, even more urgent than in the time of Plato, that method, purpose, understanding, shall exist in the consciousness of the one who does the work, that his activity shall have meaning to himself…. How many today are mere appendages to the machines they operate!” (Dewey, 1990, p. 23). The Bauhaus Manifesto did not explicitly state democracy as one of its goals, but it was clearly concerned with the relationship of the craftsman/designer to his or her work and community, and the furtherance of the autonomy of the individual.

In a theme that is repeated often, Gropius states that the “idea of the fundamental unity underlying all branches of design was my guiding inspiration in founding the original Bauhaus” (Gropius, 1965, p. 51). The primary goal of the Bauhaus was revealed in its Manifesto: “The ultimate aim of all visual arts is the complete building!” (Gropius, 1919).

The means for achieving the unification of the arts, and for developing architecture that responded to the conditions of the modern world, was to be a way of thinking that allowed designers to re-establish their connection with making in the wake of the age of the machine. “Architects, sculptors, painters, we all must return to the crafts! For art is not a ‘profession.’ There is no essential difference between the artist and the craftsman. The artist is an exalted craftsman. In rare moments of inspiration, transcending the consciousness of his will, the grace of heaven may cause his work to blossom into art. But proficiency in a craft is essential
to every artist. *Therein lies the prime source of creative imagination* [emphasis added]” (Gropius, 1919).

In Dewey’s view, the dualisms of western culture and thought have manifested themselves in unproductive social structures: “While the training for the profession of learning is regarded as the type of culture, or a liberal education, the training of a mechanic, a musician, a lawyer, a doctor, a farmer, a merchant, or a railroad manager is regarded as purely technical and professional. The result is that which we see about us everywhere—the division into ‘cultured’ people and ‘workers,’ the separation of theory and practice” (Dewey, 1990, p. 27).

Gropius blames the rarefied environment of higher education for the phenomenon. “It was with the introduction of the academies that the world of production and the artist began slowly to drift apart. Meant in the beginning as a scholarly supplement for the work done in the so-called ‘State manufactures’ of France—a forerunner of our modern factories—they gradually became isolated and their relationship to the life of the community as a whole ceased to exist. Unfettered by practical considerations, they withdrew the artist entirely from the workaday world and lulled him in a dream of genius, leaving him totally unequipped for the struggle of existence. His skill became merely a graphic and pictorial one and was therefore doomed to end in aesthetic speculation. Preoccupied with the making of the ‘genius,’ the Academy forced the majority of her pupils, who could not hold this highest rank, to become social drones. True national art, pulsating through every branch of human
activity, gradually died.” His solution: “The history of artistic education shows that in the middle ages a close contact existed between the artist and the working life of the people, craftsmen and artists of all grades had a common training ground: the workshop” (Gropius, 1937, p. 26-27).

Dewey seems at first to disagree with Gropius on the state of education in the middle ages when he says that our present education “is highly specialized, one-sided, and narrow. It is an education dominated almost entirely by the mediaeval conception of learning. It is something which appeals for the most part simply to the intellectual aspect of our natures, our desire to learn, to accumulate information, and to get control of the symbols of learning; not to our impulses and tendencies to make, to do, to create, to produce, whether in the form of utility or art” (Dewey, 1990, p. 26). But Dewey is writing here about education in a general sense; the mediaeval conception of learning he refers to is the Aristotelian scholasticism practiced in the monasteries. Gropius is concerned solely with artistic education. As we have seen, when the Roman empire fell, the theoretical, higher liberal arts half of the educational program for architects described by Vitruvius was lost. The schism that ensued—a period of roughly a thousand years—led to the unsatisfactory conditions described in both the general and artistic realms of education by Dewey and Gropius in the early twentieth century. Both Dewey and Gropius are saying that one way of restoring a complete developmental process is through the reinstatement of the workshop as the locus and means of education and training.
“Art rises above all methods; in itself it cannot be taught, but the crafts certainly can be. Architects, painters, and sculptors are craftsmen in the true sense of the word; hence [at the Bauhaus], a thorough training in the crafts, acquired in workshops and in experimental and practical sites, is required of all students as the indispensable basis for all artistic production” (Gropius, 1919). Learning is predicated less on structured lessons and more on providing a conducive environment for exploration.

The imperative of basing artistry on craft, the idea of the artist as an “exalted craftsman,” runs counter to the Beaux-Arts ideal of the architect as a conveyor of timeless truth, which Gropius attacks as a creativity-killer: “Our great heritage seems to have left us stunned and bereft of original impulse and, from being participators and creators, we have changed into connoisseurs and scholars. If we investigate the vague feelings of the average man toward the arts, we find that he is timid and that he has developed a humble belief that art is something which has been invented centuries ago in countries like Greece or Italy and that all we can do about it is to study it carefully and apply it. There is no natural, eager response to the works of modern artists who try to solve contemporary problems in a contemporary way, but, rather, a great uneasiness and a strong disbelief that they can turn out something worthy of the great works of their forefathers” (Gropius, 1955, p. 38-39).

The Beaux-Arts style of architecture has done little or nothing to address the social implications of the machine age. “For the last century the transition from manual to machine production has so preoccupied humanity that, instead of pressing forward to tackle the new
problems of design postulated by this unprecedented transformation, we have remained content to borrow our styles from antiquity and perpetuate historical prototypes in decoration” (Gropius, 1965, p. 24).

Because of the way conventional institutions teach art and design, complains Gropius, “the average youngster often does not [have] any clue toward contemporary problems and contemporary tasks. He emerges from school and college filled to the brim with knowledge, but he has rarely been engaged in the task of meeting himself. I think we have been exceedingly successful so far in working out ways of acquainting our children with the achievements of the past, but I do not think we are as successful in stimulating them to come forth with their own ideas. We have made them study art history so hard that they have found no time to express their own ideas. By the time they have grown up they have developed such fixed ideas of what art is that they have ceased to think of it as of something to be freely approached and recreated by themselves. They have lost the joyful, playful urge of their early youth to shape things into new forms and have become, instead, self conscious onlookers” (Gropius, 1955, p. 39-40).

Further, the purported “artistic” values promoted by the Beaux-Arts schools are empty. “Emotional faculties cannot be trained by analytical methods but only by creative disciplines as in music, poetry and the visual arts. Making is certainly not a mere auxiliary to thinking. It is a basic experience indispensable for the unity of purpose within the creative net. It is the only educational means which interrelates our perceptive and inventive faculties… If we
compare teaching the arts of design in the past with our present methods of training, the
discrepancy becomes apparent at a glance. In the past, design was developed from
apprenticeship in workshops—today, from the platonic drafting board. What used to be an
auxiliary only for the maker of things—paper design—has become the central discipline of
the designer. This shift of emphasis from learning by doing to intellectual discipline is typical
of the present educational methods in design” (Gropius, 1955, p. 49).

Often, the Bauhaus (and modernism in general) is thought of as being thoroughly
opposed to the study of any historic precedent. Gropius dispels that notion: “Studies in the
history of art and architecture, intellectual and analytical in character, make the student
familiar with the conditions and reasons which have brought about the visual expression of
the different periods: i.e., the changes in philosophy, in politics and in means of production
caused by new inventions. Such studies can verify principles found by the student through
his own previous exercises in surface, volume, space and color; they cannot by themselves,
however, develop a code of principles to be valid for present creation in design. Principles
have to be established for each period from new creative work. History studies are therefore
best offered to older students who have already found self-expression. When the innocent
beginner is introduced to the great achievements of the past, he may be too easily
discouraged from trying to create for himself. As soon as he has found his bearings, however,
through self expression in workshop and studio, history studies are a welcome means of
refining his thinking without luring him into an imitative attitude. These studies should be
started in the third year, instead of in the first year of training” (Gropius, 1955, p. 53).

History can be dangerous; it is full of “right” answers to questions the world no longer asks. Only after one has begun to build a creative identity, found a sense of how one wants to approach the world as a designer, and developed an elementary understanding of one’s social and cultural context is it safe to examine the great design work of the past. Only with a broad understanding of the real drivers of creative excellence can one recognize it, examine it in depth, and learn something useful. Otherwise, one can copy or adapt form, but without its intellectual and emotional foundations—a trivial undertaking.

Therefore, at the Bauhaus, a “breach has been made with the past”—not with the history of civilization or of architecture, but with the Beaux-Arts—“which allows us to envisage a new aspect of architecture corresponding to the technical civilization of the age we live in; the morphology of dead styles has been destroyed; and we are returning to honesty of thought and feeling.” The forms that result are not reflections of “the personal whims of a handful of architects avid for innovation at all cost, but simply the inevitable logical product of the intellectual, social, and technical conditions of the age” (Gropius, 1965, p. 19-20).

These Bauhaus attitudes about the proper use of history and the development of meaningful responses to current conditions also reflect the influence of Pestalozzian thinking. “According to Pestalozzi’s definition, [education] will involve applying a particular system that does not merely transmit to the young the knowledge that civilization has already accumulated but is conceived in such a way as to make them able to build up their own
freedom as autonomous beings. Neither a mere extension of the family system nor a centre for reproducing the social order, the school will create its own order through educational activity—which is the whole point of the Method” (Soëtard, 1994, p. 4-5).

“Successful teaching of creative design cannot therefore be handled by historians but only by a creative artist who is a ‘born teacher.’ The architect of the future should create through his work an original, constructive expression of the spiritual and material needs of human life, thus renewing the human spirit instead of rehearsing thought and action of former times. He should act as a coordinating organizer of broadest experience who, starting from social conceptions of life, succeeds in integrating thought and feeling, bringing purpose and form to harmony” (Gropius, 1955, p. 43). Rather than inculcating a thorough knowledge of historical forms in the Beaux-Arts manner, at the Bauhaus the “first task was to liberate the pupil’s individuality from the dead weight of conventions and allow him to acquire that personal experience and self-taught knowledge which are the only means of realizing the natural limitations of our creative powers” (Gropius, 1965, p. 71). How was this to be accomplished?

“The success of any idea depends upon the personal attributes of those responsible for carrying it out. The selection of the right teacher is the decisive factor in the results obtained by a training institute. Their personal attributes as men play an even more decisive part than their technical knowledge and ability, for, it is upon the personal characteristics of the master that the success of fruitful collaboration with youth primarily depends” (Gropius, 1937, p. 255).
One of the first instructors recruited by Gropius for the Bauhaus, and the first teacher of
the first-year preliminary course (also called the basic course, the foundations course, or the
Vorkurs) was Johannes Itten.

Itten writes: “The Basic Course presented me with three tasks:

(1) To liberate the creative forces and thereby the artistic talents of the students. Their own experiences
and perceptions were to result in genuine work. Gradually, the students were to rid themselves of all
the dead wood of convention and acquire the courage to create their own work.

(2) To make the students’ choice of career easier. Here, exercises with materials and textures were a
valuable aid. Each student quickly found the material with which he felt the closest affinity; it might
have been wood, metal, glass, stone, clay, or textiles that inspired him most to create work…

(3) To present the principles of creative composition to the students for their future careers as artists.
The laws of form and color opened up to them the world of objectivity. As the work progressed it
became possible for the subjective and objective problems of form and color to interact in many
different ways” (Itten, 1975, p. 7-8).

It should “not be overlooked that his pedagogy was not a fundamentally new approach
but had models and precursors that can be concretely defined. Itten’s real contribution to arts
pedagogy consisted in being one of the first to combine these trends into an effective and
productive form for arts education. It is obvious that his pedagogy was not nourished on the
spirit of the academic training for artists or on the sources of orthodox drawing but rather
stood in the tradition of the liberal pedagogical reform movement of Rousseau, Pestalozzi,
Froebel, Montessori, and others” (Wick, 2000, p. 114). This tradition “had as a basic tenet
that education is essentially the bringing out and developing of inherent gifts through a
guided process of free and even playful activity and self-learning. This tenet lies behind
much of the Vorkurs. It is behind the practice of allowing the students themselves to help
judge classwork; and it is, above all, behind Itten’s famous intention to ‘liberate the student’s
creative powers’ and to retrain him from the beginning by means which initially include bypassing the intellect in order to reach what is conceived to be his natural, unlearned creative center” (Franciscocono, 1971, p. 180-81). “Cramming a student with irrelevant knowledge and not giving him enough time for taking stock of himself forms an obstacle to personal growth” (Itten, 1975, p. 8-9).

“Karl Ritter (1779-1859), the great German geographer, tells us that it was from Pestalozzi that he learned the pedagogic principles of his science. ‘Pestalozzi did not know as much geography as a child in our primary schools,’ wrote Ritter, ‘but, none the less, I learned the science of geography from him; for it was in listening to him that there first awakened in me the idea of a natural method. He showed me the way’” (Monroe, 1907, p. 19). Along similar lines, Itten writes: “‘From the very beginning, my teaching was not directed toward any particular fixed, external goal. The human being itself, as a creature capable of improvement and development, seemed to me to be the task of my pedagogical efforts. Developing the senses, increasing the ability to think and experience spiritually, relaxing and developing the bodily organs and functions—these are the means and the paths available to the teacher concerned about education’” (Wick, 2000, p. 102).

According to Anni Albers, the Bauhaus “‘is now thought of as an educational institution that was firmly directed, had definite educational principles, which was absolutely not true at my time. It was all in a very fluid stage, and everybody was trying to find his way, including the great painters Kandinsky, Klee… Everybody was searching… looking back to it, I think
that the greatest contribution that the Bauhaus made in my mind was that it created… what I call now a creative vacuum, where you tried to find your way. There was nothing set, as you expected to find it in other schools and institutions… and that… contributed to this richness of invention that came out of that time’’ (Horowitz, 2006, p. 18).

As a practical matter, the student “should be introduced first… to three-dimensional experiments; that is, to the elements of ‘building,’ i.e., composition in space with all sorts of experiments in materials. For example, observing the contrast between rough and smooth, hard and soft, tension and repose, will help the student to discover for himself by exercise of his hands the peculiarities of materials, their structure and textures” (Gropius, 1955, p. 50-51). “According to Itten, everything perceptible is perceived through difference, and so a general theory of contrast formed the basis of the entire course” (Wick, 2000, p. 104); this theory can be traced directly to Froebel’s notion that growth is “the process of overcoming differences by finding some connection between things that at first appeared opposed” (Saettler, 1990, p. 43).

Finding and listing the various possibilities of contrast was always one of the most exciting subjects, because the students realized that a completely new world was opening up to them. Such contrasts are: large-small, long-short, broad-narrow, thick-thin, black-white, much-little, straight-curved, pointed-blunt, horizontal-vertical, diagonal-circular, high-low, area-line, area-body, line-body, smooth-rough, hard-soft, still-moving, light-heavy, transparent-opaque, continuous-intermittent, liquid-solid, sweet-sour, strong-weak, loud-soft, as well as the seven color contrasts. All these contrasts had to be studied in detail… The students had to approach the contrasts from three directions: they had to experience them with their senses, objectivize them intellectually, and realize them synthetically. Contrasts such as black-white, large-small, and cold-hot are particularly powerful examples of this complex. As life and beauty unfold in the regions between the North Pole and the South Pole of our planet, so life and beauty of the world of contrast are to be found in the graduations between the poles of contrast. In the light-dark contrast, the artistic possibility of application lies in the many hues and tone values between black and white. Black and white are points of reversal, not end points of the light-dark character. The poles of all the other contrasts have the same significance (Itten, 1975, p. 12).
By extension, “feeling and thinking, intuition and intellect, expression and construction are the poles that define not just Itten’s artistic oeuvre but also his practice as a teacher of art. (They also mark the domain within which Bauhaus pedagogy as a whole operates. This needs to be emphasized separately, because the Bauhaus has all too often been reduced to the merely functional and its pedagogy to the merely rational)” (Wick, 2000, p. 110). This sense that one pole in any continuum is meaningless without the other, this striving for unity, is indicative of Itten’s underlying search for a way of thinking that does away with the dichotomies even as he celebrates the polarities and the graduations of the spectra between them. Itten exhibits an implicit belief that resonates with the epistemology Dewey articulates in his transactional paradigm. This belief drives the characteristic of “Itten’s teaching… that intensive exercises in the geometry and construction of design caused design to be experienced as a fundamental dialectic of subjectivity and objectivity, of spontaneous self-expression and a rationally determined choice of form” (Wick, 2000, p. 113). Itten tried to live it and to teach it by example; it was up to Dewey to speak it clearly.

**Josef Albers at the Bauhaus**

Josef Albers was born in 1888. He “grew up in the small, conservative, Catholic town of Bottrop in the industrial Ruhr region of Westphalia in the northwest of Germany, close to the Dutch border. His father, Lorenz Albers, was a *Meistermaler*—a house painter and decorator. He ran his business from the large house at 18 Horsterstrasse where his young apprentices
lived with the Albers family. Side by side with the apprentice artisans, Josef learned from his
father how to paint doors and walls with the utmost care, the art of stone cutting, and the craft
of carpentry. This legacy of fine craftsmanship would silently brand all his future
endeavors” (Horowitz, 2006, p. 9).

Albers studied at the Teachers College in Büren from 1905 to 1908 where he was granted
a teachers certificate. For a while, he taught basic subjects to all ages in a small school in his
home town. “I took my teaching job very seriously… I was put in a school in the country
where I had [children of varying ages]… all in one room. I had to prepare myself so
thoroughly at home that I declared in writing at that time that homework is first for the
teacher… every pupil learns from their own age level easier than from a teacher who is a
generation ahead of them” (Barker).

Westphalia was a region in the Kingdom of Prussia (which was part of the German
Empire) as it was configured during most of the nineteenth and early twentieth centuries. In
1808, official recognition of Pestalozzi’s method “came from the government of Prussia. The
collapse of that country brought about by the Napoleonic wars necessitated an entire
reorganization of the State, and this was to be based on a new education of the people.
Pestalozzi was among the spiritual leaders approached for guidance. Fichte in his Addresses
to the German Nation advocated the self-activity on which the Pestalozzian method of
instruction was founded as the starting-point of a new national education. Freiherr von Stein
in his Political Testament recommended the reanimation of the German spirit through ‘a
method based on man’s inner nature’… Teachers’ training colleges and elementary schools for the whole nation were planned, and the method to be adopted was to be the Pestalozzian…. Of all the countries interested in Pestalozzi’s method it was Prussia which made the greatest effort to understand its true significance and to put it into practice; and in many cases it was through its realization in Prussia that the Pestalozzian method became known overseas” (Silber, 1973, p. 217-19). Thus, Albers grew up and received his earliest training in the region that most thoroughly accepted the theories and methods of Johann Heinrich Pestalozzi.

From 1913 to 1915 Albers studied at the Königliche Kunsthochschule (Royal Art School) in Berlin. “After graduating as an art educator, he continued his studies at the School of Arts and Crafts in Essen from 1916 to 1919, and for a short time at the Munich Academy... This was the preparation Josef Albers had had in 1920—at thirty-two—when he entered the [Bauhaus] preliminary course at Weimar as an apprentice” (Neumann, 1993, p. 179).

“Even today I am convinced that the invention of this name, the invention of the word ‘Bauhaus,’ [literally, ‘house of construction’] was a particularly happy and important action of Gropius. This happened at a time when art was written with a capital A, after a much too retrospective nineteenth century, when one talked too frequently of the golden age of the Renaissance…. the more we studied the old memories, the more certain we became that analyzing and dissecting was no goal. It was even more significant that the so called masters there did not look back toward even older masters, but intentionally opposed what had
already been done and said, in order to dedicate themselves more intensively to their own
development. We therefore preferred to watch new and living masters who were determined
not to follow others, and Gropius was the man who bravely introduced us to such

Albers demonstrated the determination to not blindly follow when early in his career at
the Bauhaus the masters “told [him] he had to study wall painting. He refused. At the end of
his second semester, Gropius ‘reminded me several times, as was his duty, that I could not
stay at the Bauhaus if I persisted in ignoring the advice of my teachers to engage first of all in
the wall-painting class.’ Albers, however, continued to work with bottle shards on flattened
tin cans and wire screens, and showed them in the required exhibition of his work at the end
of the second semester. ‘I felt that my show would be my swan song at the Bauhaus…. But
soon thereafter I received a letter from the Masters’ council informing me, first, that I could
continue my studies at the Bauhaus and, secondly, asking me to set up a new glass workshop
for them” (Weber, 1988, p. 22).

The episode does not illustrate an inability to observe and absorb useful ideas. “In the
preliminary course taught by Johannes Itten—who was Albers’s age—Albers acquired a new
view of things, the view of ‘materials not noticed before; the assemblages of discarded
materials interested him; the teaching method of allowing students to develop on their own
inspired him…’ Albers would later introduce elements of Itten’s course into his own
instruction, though admittedly in modified form” (Wick, 2000, p. 166). Albers taught the
preliminary course with Moholy-Nagy from 1923-1928 and alone from 1928 until the Bauhaus ceased operation in 1933.

Anni Albers writes of the early years of the Bauhaus: “In a world as chaotic as the European world after World War I, any exploratory artistic work had to be experimental in a very comprehensive sense. What had existed had proved to be wrong; everything leading up to it seemed to be wrong, too. Anyone seeking to find a point of certainty amid the confusion of upset beliefs, and hoping to lay a foundation for a work which was oriented toward the future, had to start at the very beginning.

“At the Bauhaus, those beginning to work in textiles at that time, for example, were fortunate not to have had the traditional training in the craft: it is no easy task to throw useless conventions overboard. Coming from Art Academies, they had felt a sterility there from too great a detachment from life. They believed that only working directly with the material could help them get back to a sound basis and relate them with the problems of their own time” (Albers, 2000, p. 3). Here Anni Albers turns the remark Erasmus made four hundred years earlier on its head: “For what could be more foolish than to learn at great effort something that you are subsequently compelled to ‘unlearn’ at even greater?” (Erasmus, 1978, p. 666).

Josef Albers agrees with Erasmus that “once bad habits get a grip on a character, it is remarkable how they cannot be eradicated” (Erasmus, 1978, p. 666), but is diametrically opposed to him on what constitutes a bad habit. He tells us that: “school should allow a lot to
be learned, which is to say that it should teach little. (Let everyone test out his possibilities in many different directions, so that he may find his proper place in active life)” (Albers, 1924). “In contrast to the official opinion at the Bauhaus (as stated in the founding manifesto) that art cannot be taught, Albers took a somewhat modified standpoint on the issue. In his view, although art ‘cannot be taught directly,’ it can be ‘learned’” (Wick, 2000, p. 175). “In critical moments we all realize that the only discipline that stands by us, the only training that becomes intuition, is that got of life itself. That we learn from experience, and from books or the sayings of others only as they are related to experience, are not mere phrases” (Dewey, 1990, p. 17). “In Albers’s classroom, ‘[n]othing was presumed to be known, everything had to be self-sought, -discovered, -analyzed and -represented, so that it would truly be one’s own.’ The object was ‘to gather experience for oneself.’ The results were sometimes meaningful ‘but also ended sometimes with slices of liverwurst.’ ‘He emphasized the uselessness of reading anything (except possibly his own articles)... sometimes the things we made were objects with some aesthetic content. Whatever we produced, Albers appraised it for what is was worth without reference to established art canons... we discovered value in unexpected places... Language played only a minor role... doing was what counted... and he never used the word “art”’” (Horowitz, 2006, p. 25-26, quoting Meyer-Waldeck and Dearstyne). “Albers in reality shunned theory and rejected orthodoxy: Bauhaus, modernist, or otherwise... students remember him as a lively and flexible teacher who cautioned them to ‘stay off the bandwagon,’ especially his own” (Horowitz, 2006, p. 6). Albers says: “‘For me
education is not first giving answers, but giving questions. And if a student comes to me with
a question, I consider it very carefully whether I should answer him or not. When I give him
the answer to an execution, then I take away from him the opportunity to invent it himself
and discover it himself” (Barker).

“Hannes Beckmann, a student at the Bauhaus from 1928 to 1931, described his first
impressions of Albers’s preliminary course as follows:

Josef Albers entered the room, carrying with him a bunch of newspapers, which were distributed
among the students. He then addressed us, saying something like this: ‘Ladies and gentlemen, we are
poor, not rich. We can’t afford to waste materials or time. We have to make the most out of the least.
All art starts with a material, and therefore we have first to investigate what our material can do. So, at
the beginning we will experiment without aiming at making a product. At the moment we prefer
cleverness to beauty. Economy of form depends on the material we are working with. Notice that often
you will have more by doing less.

Our studies should lead to constructive thinking . . . . I want you now to take the newspapers you got
and try to make something out of them that is more than you have now. I want you to respect the
material and use it in a way that makes sense—preserve its inherent characteristics. If you can do
without tools like knives and scissors, and without glue, the better.’ And with these words he left the
room, leaving us quite flabbergasted. He returned hours later and asked us to put the result of our
efforts on the floor.

There were masks, boats, castles, airplanes, animals… little figurines. He referred to all this as
kindergarten products, which could have been made better in other materials. He pointed then at a
study of extreme simplicity, made by a young Hungarian architect. He simply had taken the newspaper
and folded it lengthwise so that it was standing up like a folding screen. Josef Albers explained to us
how well the material was understood and utilized—how the folding process was natural to paper,
because it resulted in making a pliable material stiff…. He further pointed out to us that a newspaper
lying on the table would be hidden. Now that the paper was standing up, both sides had become
visually active. The paper had lost its tired look—its lazy appearance. After a while we caught on to his
way of seeing and thinking. Fascinating studies in all kinds of materials, like paper, corrugated
cardboard, kitchen matches, wire, metal, were produced” (Wick, 2000, p. 181).

Using everyday materials and constraining the use of tools and treating the students’
figurative work as uninteresting seems on the surface to be discouraging and restrictive of
creative effort, but in fact the opposite is true. The student works produced in the preliminary
course as taught by Albers demonstrate

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that for creative people, despite external restrictions... the number of possible solutions is almost unlimited. Moreover, Albers, who on principle offered no model solutions and was wary of correcting his students’ work (another ideal from reform pedagogy that Albers shared with Johannes Itten, who was born the same year), believed there was no ideal solution. Rather, in his view there were a number of different solutions, with different advantages, all of which were equally justified as long as the criteria he had set were strictly followed: ‘relation of effort to effect is the measure for judging the result. One element plus one element must at least exceed their sum by producing an interesting relationship (Wick, 2000, p. 173, quoting Albers, “Werklicher Formunterricht,” p. 4).

In Albers’s inductive method of teaching, he never confronted “his students with an elaborately worked-out theory that was abstract and often remote from the student’s range of experience... rather he let the students—freed from all theoretical ballast—accumulate primary experiences with the simplest materials of the sort that had traditionally been considered unworthy of art: paper, cardboard, wire, glass, straw, rubber, cellophane, matchboxes, razor blades, phonograph needles, and so on. Uninhibited experimentation with these materials, with an eye to their technical and aesthetic possibilities, led directly to experience with elementary forms that—in the classic manner of reform pedagogy—were reflected on in the process of self-control and collective discussion of the results... In this way, the students inductively achieved through ‘precise observation and new vision,’ not only a basic technological understanding but also knowledge of universal formal principles like harmony, rhythm, scale, proportion, and symmetry” (Wick, 2000, p. 175). In his 1929 prospectus for the basic course, Albers goes so far as to describe it as “‘inductive learning experiences/without professional guidance, to achieve personal experiences through self chosen and assigned tasks’” (Horowitz, 2006, p. 102).

In his paper “Werklicher Formunterricht,” Albers emphasizes the “‘activation of the negative elements (the remainder, intermediate, and subtractive). If the positive and negative
elements are considered and valued equally, then nothing is ‘left over.’ We no longer essentially distinguish between load-bearing and load; we no longer separate things into serving and served, decorating and decorated. Every element or component of the structure must aid and be aided at the same time, be supporting and supported. Thus pedestal and frame disappear, and with them the monument that uses an excess of substructure to support a paucity of load”’ (Wick, 2000, p. 173, quoting Albers, “Werklicher Formunterricht,” 1928, p. 45).

In the same paper, Albers clearly demonstrates that the idea of producing and interpreting relationships between formal elements is fundamental to his teaching and philosophy. “Beyond their sum, one element plus one element must produce at least one interesting relationship. The more various the relationships that arise and the more intensive they are, the more the elements intensify one another, the more valuable the result, the more fruitful the work [emphasis added]” (Horowitz, 2006, p. 82, quoting Albers, “Werklicher Formunterricht,” 1928). In an extension of this concept to the working of the studio, Albers observes that experiences “from handicraft are often more easily passed on from pupil to fellow pupil than by the older, more remote teacher. For that reason the results are examined in shared discussion and responsibly communicated. This gives rise to the adoption of separate, but neighboring and simultaneously related experiences. The more different relationships arise and the more intense they are, the more the elements increase, the more valuable is the result, and the more generous the work [emphasis added].” In these two
instances, Albers speaks of the formal relationships in the work and the experiential relationships in the community using almost precisely the same language. “The activation of negatives (residual, intermediate and minus values) is perhaps the only entirely new, perhaps the most important element in contemporary formal innovation, but this has gone unnoticed by many—it hasn’t been much discussed—because the sociological parallels are not noticed. ([We must] perceive the opportunity to examine the sociological reasons for the form aspired to in the present day)” (Albers, 1928). “Werklicher Formunterricht” was published in 1928—Albers’s realization of the structural metaphor relating art to life was clearly in place by then. Developing this basic connection gives purpose to his subsequent work and is an essential key to understanding the philosophical relationship between Bauhaus modernism and American pragmatism.

Albers built on the foundation provided by Itten’s contrast studies. Many years later, a student’s class notes quote Albers: “Life exists between polarities… life happens between wet and dry, hot and cold…. Creative life happens between moment and permanence—endurance” (Peterson, 1945b, p. 47). He began to develop a way of seeing the world based on what the contrast studies revealed. The recognition by Albers of the ability of relationships between forms to function metaphorically later developed into a more explicit way for him to express his beliefs about more fundamental issues; his exercises and works of art seem to have helped him find ways of exploring, understanding, and speaking clearly about his own way of seeing the world.
12. ALBERS IN AMERICA

In July 1933 the Bauhaus, under pressure from the Nazi regime, officially went out of existence. In September 1933 Black Mountain College opened in North Carolina. In November 1933 Josef and Anni Albers arrived at Black Mountain, where they lived and taught for the next fifteen years.

Black Mountain was not an art school; it was a liberal arts college that operated based on the understanding that art was a fundamental element of education. It was led by John A. Rice, an iconoclastic scholar who had been banished from Rollins College (itself a progressive school) in Florida the previous spring. With the help of like-minded teachers and donors, Rice had been able to establish Black Mountain College in only a few months.

Another aspect of the Black Mountain experience was its attempt to create a thoroughly democratic environment. “If there was a single unquestionable assumption underlying the college’s structure and philosophy, it was a belief in democracy as a way of life. In education, this meant the opportunity of every person to realize the full development of his or her abilities; in a political system, the right of each person to have a voice in the decision-making process. At a time when many prominent educators, artists, intellectuals, and politicians were looking to totalitarian systems and when even many progressive educators were advocating indoctrination of socialist theories in the schools, Black Mountain College reaffirmed the democratic, experimental spirit that had earlier characterized the Progressive Era” (Harris, 2002, p. 7).
Both students and faculty helped with the daily tasks necessary to make the community operate. There was no external governing board; the faculty were owners of the corporation. “An Advisory Council of eminent educators, scientists, and artists was appointed to increase the college’s credibility to the outside world and to offer advice… Its members included John Dewey, Walter Gropius, Carl Jung, Max Lerner, Walter Locke, John Burchard, Franz Kline, and Albert Einstein” (Harris, 2002, p. 6). But this board had no legal authority; the governance of the school was by the faculty and students.

Albers: “I made true the first English sentence on education that I uttered (better stuttered) on our arrival at Black Mountain College in November 1933 (right after the closing of the Bauhaus in Berlin). When a student asked me what I was going to teach, I said ‘to open eyes.’ And this has become the motto of all my teaching” (Holloway, 1970, p. 459).

More fully, “‘Learn to see and to feel life… cultivate imagination, because there are still marvels in the world, because life is mystery and always will be. But be aware of it…. Art means you have to believe, to have faith, that is, to cultivate vision” (Horowitz, 2006, p. 76, quoting Albers “The Meaning of Art,” May 6, 1940, paper presented at Black Mountain College). Albers here is suggesting that the transcendence of the dichotomous relationship—the polarity—of subjectivity and objectivity, of faith and reason—is necessary for the creation of art. “We have to learn that everything has form, and that every form has meaning. The artist has the task of selecting the forms and of showing them in their highest quality, their greatest intensity. Art is not a beauty shop nor an imitation of nature. Art is spirit, and
only the quality of spirit gives the arts an important place in schools, in education, in life” (Albers, 1936, p. 233).

But, Albers asks: “‘How can you make art if you don’t know how?’” (Horowitz, 2006, p. 73, quoting Albers). In his Black Mountain, drawing course, “Albers’s goal was ‘a disciplined education of the eye and the hand:

> Drawing we regard as a graphic language. Just as in studying language it is most important to teach first the commonly understood usage of speech, in drawing we begin with exact observation and pure representation. We cannot communicate graphically what we do not see. That which we see incorrectly we will report incorrectly. We recognize that although our optical vision is correct, our over-emphasis on the psychic vision often makes us see incorrectly. For this reason we learn to test our seeing, and systematically study foreshortening, overlapping, the continuity of tectonic and of movement, distinction between nearness and distance (Harris, 2002, p. 17, quoting Albers’s course description).

In his design class, Albers introduced “‘Werklehre… a forming out of material (e.g. paper, cardboard, metal sheets, wire), which demonstrates the possibilities and limits of materials. This method emphasizes learning, a personal experience, rather than teaching. And so it is important to make inventions and discoveries. The idea is not to copy a book or a table, but to attain a fingertip feeling for material. Therefore we work with as few tools as possible and prefer material that has been infrequently used, such as corrugated paper, wire, wire netting. With well-known materials we seek to find untried possibilities’” (Harris, 2002, p. 17, quoting Albers’s course description). One student at Black Mountain reports: “The Werklehre [i.e., design] classes were always a series of surprises. He was on his toes all the time, and willing to pick up on all kinds of things. You didn’t know, and he didn’t know, beforehand what would set off the spark of excitement. But he used everything to get us going and get us looking. So if suddenly somebody made a discovery, or saw something in a
different way, it was highly exciting to him, and he had to point it out and make a thing of it” (Horowitz, 2006, p. 87, quoting Claude Stoller). Seeing things in a different way—students and teacher—was the point of the entire endeavor. Albers rehearses one of his most basic principles when he recognizes that in “the experimental results supposed innovations in application or treatment are often recognized in retrospect as already existing procedures. But the result is experienced and owned, because learned and not taught. Learning is better, because more intensive, than teaching: the more that is taught the less can be learned” (Albers, 1928).

“When you completed an Albers course, you learned, you could apply what you learned, and you viewed your work and that of others in an entirely new way” (Kelly, 2000, p. 4). From Black Mountain class notes: “Mr. Albers’s Credo: Since art is documentation of human mentality through visual form, art is fundamentally concerned with the relationship of appearance to behavior. In other words with the emotional meaning of form. The artistic mind—either passive or active—that is of the layman or spectator as well as of the practicing artist, does study, compare, recognize, judge form in its psychic effect. To produce form with psychic effect… form with emotional content, makes an artist” (Peterson, 1945b, p. 74).

Albers taught his color course at Black Mountain for many years, and continued it when he went to Yale in 1949. It is in this course, documented in his magnum opus, *Interaction of Color*, that we begin to see his epistemology most clearly. “As I prefer to begin without theories, my book *Interaction of Color*, for instance, does not present a theory to be followed,
nor a system to be applied. It is a report on a logical sequence of class exercises aiming at the

The book *Interaction of Color* is a record of an experimental way of studying color and of teaching color.

In visual perception a color is almost never seen as it really is—as it physically is. This fact makes color the most relative medium in art.

In order to use color effectively it is necessary to recognize that color deceives continually. To this end, the beginning is not a study of color systems.

First, it should be learned that one and the same color evokes innumerable readings. Instead of mechanically applying or merely implying laws and rules of color harmony, distinct color effects are produced—through recognition of the interaction of color by making, for instance, 2 very different colors look alike, or nearly alike.

The aim of such study is to develop—through experience—by trial and error—an eye for color.

This means, specifically, seeing color action as well as feeling color relatedness.

As a general training it means development of observation and articulation.

This book, therefore, does not follow an academic conception of “theory and practice.” It reverses this order and places practice before theory, which, after all, is the conclusion of practice.


Again, we see the inductive thinking common to practically everything Albers says and writes about teaching. “The knowledge about visual arts cannot be learned from books. Must develop an eye and develop our emotional and associative reactions. Not possible in 4 or 10 weeks, but all life…. We should be aware of color qualities not only in our work but also as it appears in our life.” For instance, in Coca-Cola advertising graphics, the designers “tried
hard to get difference between hot hand and cold bottle. Used to have warm reflections with silver outline—making [the bottle] look warmer still. Now have bluish reflections on bottle making it look much colder” (Peterson, 1945a, p. 3, 7, 10).

The study of color’s effect on us (and its ability to deceive) is about far more than learning its graphic capabilities and vagaries. The interaction of color, for Albers, is nothing less than a metaphor for the workings of human social community. Ati Gropius Johansen, in a 1995 interview with Fred Horowitz, said “‘I don’t think that there was one single comment he made that pertained to the visual world that he didn’t intend also to the human world…. He told us over and over that there is no meaning to teaching art unless it is a teaching for how to live your life. This was not a little side note. It was fundamental to his teaching’” (Horowitz, 2006, p. 80).

Imagine in front of us 3 pots containing water, from left to right:

WARM   LUKEWARM   COLD

When the hands are dipped first into the outer containers, one feels—experiences—perceives—2 different temperatures:

WARM (at left)         (at right) COLD

Then dipping both hands into the middle container, one perceives again 2 different temperatures, this time, however, in reversed order

(at left) COLD—WARM (at right)

though the water is neither of these temperatures, but of another, namely

LUKEWARM

Herewith one experiences
a discrepancy between physical fact and psychic effect called, in this case, a haptic illusion—haptic as related to the sense of Touch—the haptic sense.

In much the same way as haptic sensations deceive us, so optical illusions deceive. They lead us to “see” and to “read” other colors than those with which we are confronted physically.

To begin the study of how color deceives and how to make use of this, the first exercise is to make one and the same color look different.

On the blackboard and in our notebooks we write:
Color is the most relative medium in art. (Albers, 2009, p. 8).

“‘Developing art depends on developing oneself…. This means a most intensive work based on continued self-criticism, for years, for many more years, for a lifetime…. True individuality—personality—is not a result of forced individuality or stylization, but of truthfulness to oneself—of honesty and modesty’” (Horowitz, 2006, p. 81, quoting Albers).

The relativity of color, the relationship of each color to all the others, is not unlike the relationship of the individual to the community. Learning how color works is a way of learning how life works.

Challenging examples of very surprising color changes are shown. Then the class is invited to produce similar effects but is not given reasons or favorable conditions. It starts, therefore, on a trial-and-error basis.

Thus, continuing comparison—observation—“thinking in situations”—is promoted, making the class aware that discovery and invention are the criteria of creativeness.

(Albers, 2009, p. 9).

“At Black Mountain education was to be a preparation for life. This required that the students learn to make intelligent discriminating decisions and that they develop a capacity for initiative and independence. It meant that the emotions as well as the intellect had to be
educated, that values needed testing as rigorously as ideas. The measure of education was to be qualitative, not quantitative; its method, an active process rather than the passive absorption of a prescribed body of information to be parroted back on exams culminating in the accumulation of a required number of quality points and course hours and ultimately in a degree. Those artificial distinctions separating education from life and creating false goals and motivations were to be eliminated” (Harris, 2002, p. 7).

Albers told his students: “Relationship stands above all our studies here” (Peterson, 1945b, p. 53). In material, in form, in texture, in color, and in the arc of a person’s life, Albers tells us: “Design means conscious choice” (Peterson, 1945b, p. 71).

In the end, teaching is a matter not of method but of heart. Therefore, the most decisive factor is the teacher’s personality. His enthusiastic concern with the student’s growth counts more than how much he knows. It is well known that “the teacher is always right,” but rarely does this fact elicit respect or sympathy; even less often does it prove competence and authority.

But the teacher actually is right and always will gain confidence when he admits that he does not know, that he cannot decide, and, as it often is with color, that he is unable to make a choice or to give advice.

Besides, good teaching is more a giving of right questions than a giving of right answers.

(Albers, 2009, p. 70).

“Graduates of Yale carried the color course to art schools and departments throughout the United States, where it became a staple of foundations education” (Horowitz, 2006, p. 200). In a 1968 BBC Radio interview, Albers says about instruction at the Bauhaus: “That the teachers worked according to a plan from some higher direction, it’s absolutely not true… we
were independent… we were left alone in what we taught… Klee, Kandinsky and Schlemmer… were masters in this sense, that they didn’t give a damn for their old masters. They did not look backward or read books before they went to the class. They had developed themselves and therefore they were able to develop others…. In that direction… I never taught art, I think. What I have taught is philosophy… I have never taught painting. Instead I have taught seeing”’ (Horowitz, 2006, p. 22).

As William James has told us: “The true is the name for whatever proves itself to be good in the way of belief, and good, too, for definite and assignable reasons” (James, 1978, p. 40). Albers rejects outright the deductive application of theory to practice. Instead he favors an inductive development of belief based on practical application. This is one of the most important aspects of Albers’s legacy and it is pragmatic to the core.
13. PRAGMATISM AND DESIGN EDUCATION

Pragmatism engenders an attitude about design education that allows instruction to provide the framework for a way of thinking that goes beyond the discipline’s specific goals and techniques. The design studio is the archetypal example of the project method and learning by doing. In studio classes, projects are assigned that may demand the development of any number of techniques and skills. Technique is not taught with the thought that it might come in handy some day. About early childhood education, Dewey writes: “The great thing to keep in mind,… regarding the introduction into the school of various forms of active occupation, is that through them… the school… has a chance to affiliate itself with life, to become the child’s habitat, where he learns through directed living, instead of being only a place to learn lessons having an abstract and remote reference to some possible living to be done in the future” (Dewey, 1990, p. 18).

The applicability of pedagogy at one level based on principles developed at another might demand some adjustment. But concerning the Laboratory School’s location on the University of Chicago campus: “The school was… to be ‘a working model of a unified education,’ an elementary school nested within the confines of a university that itself aspired to become one of the great research institutions of the world. Such an arrangement, Dewey felt, would ‘break down the barriers that divide the education of the little child from the instruction of the maturing youth, [thus demonstrating] to the eye that there is no lower or higher, but simply education’” (Jackson, 1990, p. xix-xx).
Design education at the college level is concerned with helping students open their eyes to the world, and about helping them find a way to define themselves in the face of the multiplicity they find there. The basic requirements for design students to have educational success—the talent, the intelligence, the personality, the motivation—are for the most part beyond the control of the teacher. What the teacher can do is provide the environment in which growth can occur. The main thing is to ask questions that require students to examine their own beliefs—to demand that they say why they answer as they do, to force them to orient themselves in relation to what others believe. The reason for doing this is to reveal to the student that they have a choice in the matter. "Everything James and Dewey wrote as pragmatists boils down to a single claim: people are the agents of their own destinies" (Menand, 2001, p. 371). We are capable of designing our lives, once we realize it.

The thought of Henry James Sr. (William’s father) stood on the pillars of “monastic belief in the unchanging reality of an unseen world, indifference to temporal moral distinctions, and anti-individualism,” which “belong to the conception of a closed and predetermined universe—the ‘block universe’—that William James designed pragmatism to subvert” (Menand, 2001, p. 88). William James went beyond the standard reaction of the rebellious son—he didn’t merely take the opposing philosophical stance—realism in defiance of his father’s idealism—he took things a step further by denying the dichotomous logic that underpins both. He refused to even acknowledge the moral sense of having the discussion. He didn’t attempt to show his father’s position to be wrong; he rendered it meaningless.
Whether one subscribes to the rationalist vision of reality as did Henry James Sr., or to its empirical inverse, one must accept a world that is divided by the distinction between the observer and the observed. At one extreme the world exists in pure form independent of the observer; at the other, the world exists only in the observer’s mind. But for William James, “the knower is not simply a mirror floating with no foothold anywhere, and passively reflecting an order that he comes upon and finds simply existing. The knower is an actor, and co-efficient of the truth” (James, 1878, p. 17).

This conception of the observer and the observed as a relationship was a complete transcendence of the epistemological arguments that in John Dewey’s view stood in the way of philosophy providing useful tools. It eventually opened the door for him to write: “Philosophy recovers itself when it ceases to be a device for dealing with the problems of philosophers and becomes a method, cultivated by philosophers, for dealing with the problems of men” (Dewey, 1917, p. 65).

The epistemological position upon which pragmatism is built is the view that truth is the result of the relationship of the observer and the observed within a specific environment. Truth comes in small packages, is a local phenomenon, and is not necessarily generalizable. Truth is particular, inseparable from its circumstances.

This conception is important to design and to design education because designing a good solution is akin to finding a truth. Often people don’t know how to describe it; they just know it when they see it. People feel good design before they think about why it’s good. Though
they may find rational or moral arguments to support their feelings, no one loves a place
because of its logic or its ethics. People love a place because it matters to them—because it
allows them to bring something of themselves to it, something that helps them create
personal meaning. Abstractions matter only as they relate to palpable personal relationships.

But it isn’t any good for a design student to say that they don’t know why they made a
decision other than because it felt right. “When we are happy with a decision, it doesn’t feel
arbitrary; it feels like the decision we had to reach. And this is because its inevitability is a
function of its ‘fit’ with the whole inchoate set of assumptions of our self-understanding and
of the social world we inhabit, the assumptions that give the moral weight—much greater
moral weight than logic or taste could ever give—to every judgement we make. This is why,
so often, we know we’re right before we know why we’re right. First we decide, then we
deduce” (Menand, 2001, p. 353). That process of deduction is a tactic of a mature thinker.
The successful design instructor induces the student to develop those inchoate assumptions
into mature positions.

Another element of the pragmatic project that appeals to and informs the designer
(particularly a landscape architect) stems from the notion that the object and the observer are
elements of the environment in which they exist, parts of an integrated system; the
epistemology of pragmatism is ecologic. Context is key—for obvious reasons in landscape
architecture, where natural process is always part of the equation, and human activity is
intimately related to nature. “The unity of all the sciences is found in geography. The
significance of geography is that it presents the earth as the enduring home of the occupations of man… Human industry and achievement, apart from their roots in the earth, are not even a sentiment, hardly a name. The earth is the final source of all man’s food. It is his continual shelter and protection, the raw material for all his activities, and the home to whose humanizing and idealizing all his achievement returns… It is through occupations determined by this environment that mankind has made its historical and political progress. It is through these occupations that the intellectual and emotional interpretation of nature has been developed. It is through what we do in and with the world that we read its meaning and measure its value” (Dewey, 1990, p. 18-19).

The concept of system connotes more than a conglomeration of functionally interrelated parts. While the rationalist’s object is fixed, permanent, and unchanging, the system is in motion, alive, capable of and dependent upon adaptation, and agile. Pragmatic holism is beyond the whole being greater than the sum of the parts. Dewey’s “particular mode of intelligence… is the strategy he used in approaching every problem: expose a tacit hierarchy in the terms in which people conventionally think about it” (Menand, 2001, p. 330). Dewey’s thinking defies temporality and denies the existence of cause independent of effect. An act (or a phenomenon) “has to be indivisible before it can be divided” (Menand, 2001, p. 329). It doesn’t make sense in this paradigm to think of stimulus without response, individual without community, knowing without doing, art without partaker.
One of the clearest characteristics of John Dewey’s body of work is its consistency of thought—he never strays from the solid foundation provided by adherence to fundamental principles. At the heart of his philosophy is the debunking of false dichotomies. The most basic philosophical issue is his rejection of the subject/object distinction, along with its resultant two-level view of reality, that provides the essential framework for both the rational and empirical philosophical families. His complaint about philosophers quibbling over intractable epistemological differences forms a constant refrain that permeates his work. He wants philosophy to be a tool that helps people in their everyday lives rather than a game for pointy-headed intellectuals. The difficulty in achieving that aim lies in the failure of philosophy to see that the subject/object dichotomy is utterly false; acceptance of it leads to an array of erroneous implicit assumptions about the nature of knowledge. These bad assumptions undermine logic and engender conclusions that are at best not useful, and often harmful: “Philosophic systems in their opposed theories of knowledge present an explicit formulation of the traits characteristic of these cut-off and one-sided segments of experience—one-side because barriers to intercourse prevent the experience of one from being enriched and supplemented by that of others who are differently situated” (Dewey, 1916, p. 187).

Dewey’s argument is multi-faceted; one of the ways he builds it is in terms of historical development, beginning with the ancient Greeks, of different ways of viewing the world based on the viewer’s social station. Separations between the privileged thinker whose ideal world of pure thought and immutable truth is contrasted with the sensual, immediate,
personal, and “real” existence of the working stiff. This social distinction not only reinforces logical fallacy, it stands in opposition to the workings of democracy. “The problem of education in a democratic society is to do away with the dualism and to construct a course of studies which makes thought a guide of free practice for all and which makes leisure a reward for accepting the responsibility of service, rather than a state of exemption from it” (Dewey, 1916, p. 143). Education is a matter of producing good citizens who understand the value of community. Related to this notion in the fields of environmental design and planning is the movement, beginning fifty years ago, toward community-based decision making exemplified by works by Jane Jacobs (The Death and Life of Great American Cities, 1961), Clare Cooper-Marcus (Housing As If People Mattered: Site Design Guidelines for Medium-Density Family Housing, 1988), Christopher Alexander (The Oregon Experiment, 1975) and in the work of academic design researchers Henry Sanoff, Randy Hester and many others.

As a broad generality, design education in the United States has changed dramatically in one major aspect since its inception just after the Civil War. The Beaux-Arts model of instruction used at the majority of design schools up until the 1930s was based on a dogmatic belief in the truth embodied in classical forms. Its methodology was dominated by rote repetition and its range of projects was generally limited to monumental public statements. Its paradigm was firmly rooted in the ideal rationalism of the ancient world, with the attendant dual vision of reality that Dewey sought in all of his work to transcend. In the
1930s, modernism, with its emphasis on materials and process, revolutionized design and design education in this country. Still, though they sought truth elsewhere, many of its main proponents were no less dogmatic in their view of the world than their Beaux-Arts predecessors had been. Nevertheless, there were signs of epistemological change and points of agreement among the American pragmatists and the European modernists, one of which had to do with the vision of a system that “would give those who engage in industrial callings desire and ability to share in social control, and ability to become masters of their industrial fate. It would enable them to saturate with meaning the technical and mechanical features which are so marked a feature of our machine system of production and distribution” (Dewey, 1916, p. 175). This statement sounds as if it could have been written by Walter Gropius about the aims of the Bauhaus.

Dewey sees one of the most important roles of education as the means for the continuance of culture. As such, history and geography, the study of the story of a people and their physical place, commands emphasis in his view. But he tells us that the “development within the young of the attitudes and dispositions necessary to the continuous and progressive life of a society cannot take place by direct conveyance of beliefs, emotions and knowledge. It takes place through the intermediary of the environment [which is] truly educative in its effect to the degree in which an individual shares or participates in some conjoint activity” (Dewey, 1916, p. 16).
Teaching is a matter of creating conditions in which students come to their own conclusions. As the venerable landscape architecture professor Norman Newton says: “I, for one, am especially interested in helping you to develop a way of designing—or of viewing design—that will be uniquely yours” (Newton, 1951, p. 77). The teacher is there to help the student find his or her own way within the setting defined by the work being done. The particular work, the details of each student’s decisions have meaning within the culture of the educational environment. The process is from the bottom—the technique—up to the abstraction of ideas. Abstraction is meaningless unless it is an abstraction of something.

The studio model of teaching exemplified by Josef Albers’s method, beginning at the Bauhaus, continuing through his career at Black Mountain College and thereafter as head of the Design department at Yale, and which has been the model for innumerable art and design courses, is a virtually archetypal instance of Dewey’s educational philosophy in action. Albers’s most basic tactic was to assign simple, highly constrained tasks that forced students to look at their materials and subjects in the most basic, fundamental terms. It might be expected that the results of such exercises would be uniform—that every student’s depiction of an object would be essentially the same—that a universal truth about the essence of the subject would be revealed. But of course that’s not what happens. Students don’t learn to see The Truth, they begin to learn how they see in relation to other students’ visions, within a particular cultural context. Reality is a system of object, observer, and environment in
relation to one another. Truth is momentary and particular. Shared truth—meaning—is dependent upon the abstract mapping of shared concrete experience.

The process that mediates the relationship between theory and practice is based on what Newton calls an extensional attitude, which “concentrates on the uniquely individual variables of anything under scrutiny, and looks for differences rather than similarities. It avoids identification. It rejects a two-valued outlook for a multi-valued one” (Newton, 1951, p. 74).

“Thinking is the method of an educative experience. The essentials of method are therefore identical with the essentials of reflection” (Dewey, 1916, p. 90). These essentials are:

• A continuous activity that genuinely interests the student
• A problem within the activity or situation that stimulates thought
• The information and observational ability necessary to understand the problem
• The development of, and personal responsibility for, orderly solutions
• The communication of the student’s ideas and the testing of their validity

This is a description of the typical, normal, everyday project in a design school studio course as taught at least since the middle of the 17th century. It could also be seen as the underlying structure of a design process. If we cannot point to an airtight isomorphism between design and reflection, we can see a strong analogy. Science, art, design, philosophy
are not all the same thing, but the distinctions we draw between them point at least as much to the underlying similarities of process as to their differences.

I would not make hard and fast lines between philosopher and poet, yet there is some distinction of accent in thought and of rhythm in speech. The desire for an articulate not for silent, logic is intrinsic with philosophy. The unfolding of the perception must be stated, not merely followed and understood. Such conscious method is, one might say, the only thing of ultimate concern to the abstract thinker. Not thought, but reasoned thought, not things, but the ways of things, interest him; not even truth, but the paths by which truth is sought. He construes elaborately the symbols of thinking. He is given over to manufacturing and sharpening the weapons of the spirit. Outcomes, interpretations, victories, are indifferent. Otherwise is it with art. That, as Emerson says, is ‘the path of the Creator to his work;’ and again ‘a habitual respect to the whole by an eye loving beauty in detail.’ Affection is towards the meaning of the symbol, not to its constitution. Only as he wields them does the artist forge the sword and buckler of the spirit. His affair is to uncover rather than to analyze: to discern rather than to classify (Dewey, 1903, p. 407).

The operative issue in design that separates it from the hard sciences is its constant situational uniqueness, its non-generalizability. Given this state of affairs, how do we test the validity of design solutions? Newton’s answer: “Our only measure of ‘goodness’ or ‘badness’ in a work of design is the ultimate balance, so far as we can judge it, between the helpful and harmful effects it will have on living men and women and children… under the given conditions, at the given time, for the given purpose…. There does not exist any such dogmatic, unrelated, invariable fixity as ‘good’ design or ‘bad’ design. Design can only be good insofar as it does good” (Newton, 1951, p. 78). This attitude is patently pragmatic—reminiscent of William James’s definition of truth: “the name of whatever proves itself to be good in the way of belief” (James, 1975-88). Newton’s view is also clearly influenced by Dewey: “we have come to realize that a strong parallel exists between the structure of design and the biological notion of the organism-as-a-whole-in-an-environment-as-a-whole… that both through organism and environment there flows a continuing transactional [emphasis
added] stream as each of them, acting through as well as on the other, affects and modifies it in manifold ways (Newton, 1951, p. 86).

**Design Thinking and Creativity**

Nigel Cross identifies three strategic aspects of design thinking that seem to be common among many studies of creative designers: a broad, “systems” approach; “framing” the problem in an idiosyncratic way; and using “first principles” as a starting point (Cross, 2011, p. 75).

1. In the example Cross uses of the systems approach, he describes a designer thinking about the big picture: the goal is not to design a car (much less a component of the car); the goal is to win the race. The main thing, as we know, is to keep the main thing the main thing.

2. Good designers are not looking for an absolutely right answer to a discrete and well-defined issue; the design process is a relationship between an externally-imposed set of parameters and a personal vision—leading to something Dewey might call a transactional relationship between the designer and the designed: “the brain not only enables organic activity to be brought to bear upon any object of the environment in response to a sensory stimulation, but this response also determines what the next stimulus will be” (Dewey, 1916, p. 183).
3. The emphasis on “first principles” engenders a constant awareness of the fundamental laws of how the physical world works—the kind of knowledge one obtains by learning early in one’s career how to see clearly and maintain focus—the kind of knowledge upon which Josef Albers based his teaching methodology (and a reflection of Dewey’s mode of operation).

Beyond the three strategic principles, Cross identifies another characteristic of designers: they thrive on conflict—or more precisely, they seek conflict and thrive on its resolution. Designers cannot be comfortable for long in a state of equilibrium. Their natural inclination is not to remain in balance, but to find new situations that require their unique abilities to establish balance. Dewey’s vision in this regard: “The process of growth, of improvement and progress, rather than the static outcome and result, becomes the significant thing… The end is no longer a terminus or limit to be reached. It is the active process of transforming the existent situation. Not perfection as a final goal, but the ever-enduring process of perfecting, maturing, refining is the aim in living” (Dewey, 1948, p. 177). The primacy of process leads to Dewey’s conclusion, in agreement with Gropius, that whenever “conditions are such as to prevent the act of production from being an experience in which the whole creature is alive and in which he possesses his living through enjoyment, the product will lack something of being esthetic. No matter how useful it is for special and limited ends, it will not useful in the ultimate degree—that of contributing directly and liberally to an expanding and enriched life” (Dewey, 1934, p. 27).
This tendency to seek disequilibrium extends beyond design as vocation; it is a characteristic that helps form the personality and lifestyle of a creative person. In a 45-year longitudinal study of personality traits of Harvard graduates, high creativity levels showed a correlation of .27 (p < .01) with the trait of “openness to experience.” (Soldz and Vaillant, 1999). Dollinger, et al also showed a correlation between openness and creativity (Dollinger, Urban, James, 2004). “One cannot share in intercourse with others without learning—without getting a broader point of view and perceiving things of which one would otherwise be ignorant. And there is perhaps no better definition of culture than that it is the capacity for constantly expanding the range and accuracy of one’s perception of meanings” (Dewey, 1916, p. 69).

Creativity is notoriously difficult to define, but often, creative acts are characterized as “novel, good, and relevant” (Kaufman, Sternberg, 2010, p. xiii). “Inference is always an invasion of the unknown…. In this sense, a thought (what a thing suggests, but is not as it is presented) is creative,—an incursion into the novel…. Only silly folk identify creative originality with extraordinary and fanciful; others recognize that its measure lies in putting everyday things to uses that had not occurred to others. The operation is novel, not the materials out of which it is constructed” (Dewey, 1916, p. 88). All real thought is creative thought. The implication of this premise is that the mode of operation called design thinking is not an element of a mystical, specialized realm of creative genius but an essential quality of everyday experience. Design education is the promotion of a way of seeing the world that
allows for unexpected connections to be perceived. “Regarding freedom, the important thing to remember is that it designates a mental attitude rather than external unconstraint of movements” (Dewey, 1916, p. 167).

The study of creativity as a phenomenon accessible via scientific inquiry shares many of its modern roots with the pragmatism of James and Dewey. Speaking of the “highest order of minds” James writes: “Instead of thoughts of concrete things patiently following one another in a beaten track of habitual suggestion, we have the most abrupt cross-cuts and transitions from one idea to another, the most rarefied abstractions and discriminations, the most unheard-of combinations of elements, the subtlest associations of analogy; in a word, we seem suddenly introduced into a seething caldron of ideas, where everything is fizzling and bobbing about in a state of bewildering activity, where partnerships can be joined or loosened in an instant, treadmill routine is unknown, and the unexpected seems the only law. According to the idiosyncrasy of the individual, the scintillations will have one character or another…. But, whatever their differences may be, they will all agree in this,—that their genesis is sudden and, as it were, spontaneous. That is to say, the same premises would not, in the mind of another individual, have engendered just that conclusion” (James, 1880).

Francis Galton is generally credited with the initiation of the psychological study of creativity. Like the pragmatists, Galton was strongly influenced by Darwin (Runco and Albert, 2010); his Hereditary Genius (1882) and Inquiries into Human Faculty (1883) (Becker, 1995) also used early statistical methods. Subsequently research efforts have
proliferated, and include inquiry into many facets of creative activity, such as the questions of whether creativity is a general tendency or a domain-specific phenomenon, its relationship to cognition, the role of personality, how creativity contributes to culture, how it can be assessed, its neurobiology, its relationship to motivation, and many other areas. Studies often fall into two categories: those that stem from a positivist paradigm (the predominant academic type) and that rely heavily on testing and statistics; and those that are more anecdotal and personal (Creativity: Flow and the Psychology of Discovery and Invention, Mihaly Csikszentmihalyi, 1996). A remarkable study from 1926 by Catherine Cox combines elements of both paradigms, thereby giving the work scientific rigor and rendering her subjects “more alive” (Runco, 2010)—an approach that seems more in line with the definition of inquiry espoused by Dewey. It is noteworthy that the great majority of work in the mainstream of creativity research that has been done by psychologists rather than by design researchers, and very little research has taken place in design schools.

**Epistemological Development**

One line of inquiry that could have seriously important implications for design education (and that has been given essentially no attention in the area of design education research) is the work begun by William Perry in the 1950s and detailed in his Forms of Ethical and Intellectual Development in the College Years: A Scheme. Perry, who was the head of counseling at Harvard, began his inquiry in search of an understanding of the range of
personality types he thought he saw in his work. What he found instead of an array of types was a progression of views about the nature of knowledge, and he was able to elucidate a general sequence of epistemological positions undergone by college students at a liberal arts college. A brief and oversimplified explanation of Perry’s scheme: The sequence begins with a student arriving at college with a Dualist view of learning and knowledge, conditioned by years of schooling, in which “All knowledge is known, there is a certainty that Right and Wrong answers exist for everything, and knowledge is a collection of information.” Early Multiplicity (“most knowledge is known, all is knowable”) and Late Multiplicity (“certainty that there is no certainty except in a few specialized areas… all opinions can be just as valid or invalid as all others”) are followed by Contextual Realism (“all knowledge is contextual and disconnected from any concept of Absolute Truth… right and wrong can exist within a specific context”) (Perry, 1999, p. xxxi—table by Cornfeld and Kneffelcamp).

Eventually (often later in life) a state is reached in which a commitment to a position can be established in the midst of a relative world. Different facets of a person’s life may exist at different positions, and the progress through the positions is neither linear nor irreversible; there are instances of retrenchment and backsliding. This is unavoidable—“things of ordinary experience contain within themselves a mixture of the perilous and uncertain with the settled and uniform” (Dewey, 1958, p. x).

A similar process is is outlined by Plato in The Republic:

Now, when a man is in this state, and the questioning spirit asks what is fair or honourable, and he answers as the legislator has taught him, and then arguments many and diverse refute his words, until
he is driven into believing that nothing is honourable any more than dishonourable, or just and good any more than the reverse, and so of all the notions which he most valued, do you think that he will still honour and obey them as before?….. And when he ceases to think them honourable and natural as heretofore, and he fails to discover the true, can he be expected to pursue any life other than that which flatters his desires?….. And from being a keeper of the law he is converted into a breaker of it?….. Now all this is very natural in students of philosophy….. Therefore… every care must be taken in introducing them to dialectic….. There is a danger lest they should taste the dear delight too early; for youngsters, as you may have observed, when they first get the taste in their mouths, argue for amusement, and are always contradicting and refuting others in imitation of those who refute them; like puppy-dogs, they rejoice in pulling and tearing at all who come near them….. And when they have made many conquests and received defeats at the hands of many, they violently and speedily get into a way of not believing anything which they believed before, and hence, not only they, but philosophy and all that relates to it is apt to have a bad name with the rest of the world….. But when a man begins to get older, he will no longer be guilty of such insanity; he will imitate the dialectician who is seeking for truth… and the greater moderation of his character will increase instead of diminishing the honour of the pursuit (Plato, 2012).

Perry’s position of Commitment—here is the fundamental disagreement with the dialectic of Socrates and Plato—is not to be confused with adherence to a fixed Truth. Rather, it is a sense that one is comfortable enough with one’s beliefs to be capable of adapting one’s position in the event of changing conditions. Faith requires the honest facing of doubt. As Dewey terms it: “Maturation and fixation are polar opposites” (Dewey, 1934, p. 42). For education, the criterion of value “is the extent in which it creates a desire for continued growth and supplies means for making the desire effective in fact” (Dewey, 1916, p. 32). Gropius says it this way: “The true aim of all education—too often forgotten, however—is to stimulate enthusiasm toward greater effort” (Gropius, 1955, p. 41-42).

Perry’s sequence outlines a paradigmatic shift from a purely rational view of the world (Dualist) through an empirical view (Multiplicity) to one (Contextual Realism) that exemplifies the transactional model proposed by Dewey. (Dewey describes his own development in “From Absolutism to Experimentalism,” 1930—not, interestingly, one of the nine Dewey citations in his Perry’s bibliography). The sequence is a process of change in
which students become aware of the forces that drive their views about knowledge and their resultant decisions, a transformation of implicit belief into explicit epistemological stance that enables an aim in life. “An aim denotes the result of any natural process brought to consciousness and made a factor in determining present observation and choice of ways of acting. It signifies that an activity has become intelligent” (Dewey, 1916, p. 62). This transformation is the essence of successful higher learning; it is hard to imagine a topic of greater importance in the study of design education than gaining a better understanding of how it occurs.

The block universe of Henry James Sr. is the worldview of the dogmatist, the person who needs the stability of an unchanging polestar upon which to orient himself. William James “believed that a risk-assuming decisiveness—betting on an alternative even before all the evidence was in—was the supreme mark of character…. He also thought that certainty was moral death” (Menand, 2001, p. 75). Put another way, by John Rice, the founder of Black Mountain College: “I began to quote myself, sure sign of decay” (Rice, 1942, 1942). This “risk-assuming decisiveness” that James admired is the daily mode of operation of the designer, for whom the evidence is never all in. The designer functions on the edge of belief: he or she needs to know where they stand in relation to design principles and the design issue, but they can never allow their stance to become rooted to the extent that it freezes them in place. Design demands mental agility, and designers must frequently reinvent themselves. This is the condition that Perry (Perry Jr., 1999) refers to as “commitment,” the balance of
belief and openness to the knowledge that belief is not wholly accurate or precise. Dogma and good design are virtually mutually exclusive.

Design is intimately concerned with creativity, and in Dewey’s view:

The doctrine that intelligence develops within the sphere of action for the sake of possibilities not yet given is the opposite of a doctrine of mechanical efficiency. Intelligence as intelligence is inherently forward-looking; only by ignoring its primary function does it become a mere means for an end already given. The latter is servile, even when the end is labeled moral, religious, or esthetic. But action directed to ends to which the agent has not previously been attached inevitably carries with it a quickened and enlarged spirit. A pragmatic intelligence is a creative intelligence (Dewey, 1917, p. 63).

The primary function of intelligence is creative action. This attitude stands in contrast to the more common belief that creativity is a special case separate from regular everyday brainpower. To repeat a theme that has been and will continue to be recapitulated here, the conventional standpoint is supported by an outmoded dichotomous epistemology. To distinguish creativity from intelligence diminishes our understanding of both. In the pragmatic view, there is a very good reason why the scientific method resembles the creative process and both resemble learning.

Design, and particularly landscape architecture, sits on the fictional fault line between art and science. There is no real separation between theory and practice; it doesn’t make sense to consider either without the other. Theory without practice exists in a vacuum of abstraction. Practice without theory is pointless. The (perhaps eroding, but still prevailing, habitual) positivist paradigm in education and research assumes that the dichotomy is real; it concentrates its resources not only on measuring the quantifiable aspects of phenomena, but on finding ways to quantify qualities.
“Dewey, at an eightieth birthday celebration, is reported to have corrected his tribute by saying that his philosophical effort had been to intellectualize practice, not, as the tribute had it, to practicalize intelligence” (Xu, 2010). The early positions of Perry’s scheme of ethical and intellectual development are termed “Dualism” (Perry, 1999). Later positions involve an evolving, heightened understanding of one’s epistemological stance in a relative world—a more nuanced view of context and how truths are dependent on particular details of specific situations. If we can make an analogy between the personal development described by Perry and the potential for an evolution of a culture of teaching and research, positivism stands at the dualistic beginning point. Pragmatism represents a more mature and useful way of looking at the world. Even if one cannot accept the analogy straight, cannot agree that positivism is a simplistic and primitive sort of viewpoint, at the very least it can be recognized that pragmatism allows for a different perspective. Shining light from this point, the point where intelligence equals creativity, will allow us to see things better. When designers really begin to understand where they stand, they may find that they are uniquely positioned to hold the lamp.
On one of the plates in Josef Albers’s *Interaction of Color* there is a light gray flap with two rectangular openings in it lying flat on the page. Through the rectangular openings we see a medium gray printed on the page below. The page therefore appears to show two medium gray rectangles on a lighter gray field. When the flap is raised, two more fields of color are revealed. The medium gray rectangles are now shown to be set in fields of dark blue and light green. The two gray rectangles no longer appear to be the same color. The one surrounded by dark blue seems lighter; the one surrounded by light green seems darker.

Albers’s explanation of this phenomenon: “The colors know about each other. They’re playing with one another. They’re a community” (Horowitz, 2006, p. 224). Dewey “believed that individual fulfillment could be achieved only through participation in the collective life; for outside of the collectivity, no such thing as the individual is possible” (Menand, 1997, p. xxiv). Each person defines him- or herself in relation to other members of their community.

In an interview first published in 1960, Albers says: “I think art parallels life… Color, in my opinion, behaves like man—in two distinct ways: first in self-realization and then in the realization of relationships with others. In my paintings I have tried to make two polarities meet—indep...
all this, you may conclude that I consider ethics and aesthetics as one” (Kuh, 2000, p. 11-12, quoting Albers).

In his illustration of the change in color as it responds to its surroundings, Albers visually expresses the epistemology Dewey articulates in the transactional paradigm. Truth is a process of discovery; it results from the relationship of the observer and the object in a particular environment. The medium gray is not absolute, nor does it exist only in the mind.

Factual-Actual:

In dealing with color relativity or color illusion, it is practical to distinguish factual facts from actual facts.

The data on wave length—the result of optical analysis of light spectra we acknowledge as fact.

This is a factual fact.

It means something remaining what it is, something probably not undergoing changes.

But when we see opaque color as transparent or perceive opacity as translucence, then the optical reception in our eye has changed in our mind to something different. The same is true when we see 3 colors as 4 or as 2, or 4 colors as 3, when we see flat, even colors as intersecting colors and their fluting effect, or when we see distinct 1-contour boundaries doubled or vibrating or just vanishing.

These effects we call actual facts.

…. “actual” is related to “action.” It is something not fixed, but changing with time.


When Albers “explained what he meant by ‘factual facts and actual facts,’ he would famously say, ‘[in vision] more important for us is what happens beyond the retina, in our mind… Because only there occur such important changes (reactions, results)…, as, for
instance, that gentlemen prefer blondes”” (Horowitz, 2006, p. 13). This is the statement of a pragmatist.

Albers’s teaching “was so influential that it had repercussions for almost all significant schools in the country over the course of the decades to come” (Kentgens-Craig, 1999, p. 96). The methodology brought its implicit epistemological stance along with it.

In the first century B.C., in the first paragraph of the first chapter of the first book of his Ten Books of Architecture, Vitruvius established the theory/practice dualism that haunts the thinking of design education to this day. The purity of Truth and the separation of object and observer dictated by rational paradigm under which he functioned did not allow him to see things otherwise. Twenty-five hundred years later, John Dewey exploded the subject/object dichotomy, and soon after, in Interaction of Color, Josef Albers expressed the new paradigm in design terms.

Once the subject/object dichotomy is toppled, others fall. If we look at science and art from this perspective, the need for synthesis evaporates as the distinction between the two is transcended. We see that theory and practice are inseparable because it is meaningless to talk about one without the other. Teaching and learning are a matter of common experience. “All communication is like art.” It is “a process of sharing experience till it becomes a common possession. It modifies the disposition of both parties who partake in it.” (Dewey, 1916a, p. 7, 9).
“Peirce sets out, in his article on the ‘Fixation of Belief,’ with the empirical difference of doubt and belief expressed in the facts that belief determines a habit while doubt does not, and that belief is calm and satisfactory while doubt is an uneasy and dissatisfied state from which we struggle to emerge; to attain, that is, a state of belief, a struggle which may be called inquiry. The sole object of inquiry is the fixation of belief” (Dewey, 1916b, p. 712). The fixation of belief, the establishment of “warranted assertability,” the realization of a truth-in-process, is analogous to the creation of a design solution. But the establishment of a truth cannot imply that it remains static. As Albers told his students: “We are in the habit of symmetry and that is no merit” (Peterson, 1945b, p. 37).

“Intellectual prophecy is dangerous; but if I read the cultural signs of the times aright, the next synthetic movement in philosophy will emerge when the significance of the social sciences and arts has become an object of reflective attention in the same way that mathematical and physical sciences have been made the objects of thought in the past, and when their full import is grasped…. In any case, I think it shows a deplorable deadness of imagination to suppose that philosophy will indefinitely revolve within the scope of the problems and systems that two thousand years of European history have bequeathed to us. Seen in the long perspective of the future, the whole of western European history is a provincial episode. I do not expect to see in my day a genuine, as distinct from a forced and artificial, integration of thought” (Dewey, 1930, p. 26). Dewey might have had more cause for optimism than he realized.
Walter Gropius writes: “One of the U.S. Supreme Court Justices once discussed the substance of democratic procedure and I was highly interested to hear him define it as ‘essentially a matter of degree.’ He did not base his decisions on abstract principles of right and wrong, but wanted to consider every case in its particular circumstances and relative proportion, because he felt that it was the soundness of the whole social structure that mattered and that what might contribute to its detriment today might be inconsequential tomorrow under changing conditions, and vice versa” (Gropius, 1955, p. xx).

The justice to whom Gropius refers appears to be none other than Oliver Wendell Holmes, Peirce and James’s fellow member of the Metaphysical Club in 1870s Cambridge. Holmes wrote in the 1919 opinion of the court in Schenk v. United States (a first amendment case): “We admit that, in many places and in ordinary times, the defendants, in saying all that was said in the circular, would have been within their constitutional rights. But the character of every act depends upon the circumstances in which it is done… The most stringent protection of free speech would not protect a man in falsely shouting fire in a theatre and causing a panic. It does not even protect a man from an injunction against uttering words that may have all the effect of force… The question in every case is whether the words used are used in such circumstances and are of such a nature as to create a clear and present danger that they will bring about the substantive evils that Congress has a right to prevent. It is a question of proximity and degree [emphases added]. When a nation is at war, many things that might be said in time of peace are such a hindrance to its effort that their utterance will
not be endured so long as men fight, and that no Court could regard them as protected by any constitutional right” (Holmes, 1919). Here Gropius points to the relative nature of truth in law as a corroboration of his beliefs about knowledge in design—and without explicitly stating it, he is speaking as a pragmatist.

The foundational epistemological tenet of pragmatism, as expressed in Dewey’s transactional paradigm, is a fundamentally different view of knowledge than the rational or empirical paradigms that preceded it in western thought. This newer view of the world permeates design. It is one of its most important aspects, one of the things that sets design thinking apart from thinking in other disciplines, one of design’s main sources of strength, and one of the most valuable characteristics design brings to the academic and professional arenas. This view of knowledge in design is primarily intrinsic, but as Peirce has told us: “The essence of belief is the establishment of a habit, and different beliefs are distinguished by the different modes of action to which they give rise” (Peirce, 1878, II). Designers habitually put themselves into situations of disequilibrium—where order is desired, but where habitual solutions are inadequate—where novel, creative resolutions are necessary. The transactional paradigm defines truth as a process of discovery, a relationship between an object and an observer in a specific environment. Design can be seen as the discovery of an appropriate truth for a given situation. People’s beliefs guide their actions, and the actions of design are largely pragmatic.
Though Albers says that he can no longer agree with much of what John Ruskin said, in class he recites (from *Modern Painters* Volume III, part IV, chapter XVI (1856)) nearly word-for-word: “The greatest thing a human soul ever does in this world is to see something and tell what it saw in a plain way. Hundreds of people can talk for one who can think, but thousands can think for one who can see. To see clearly is poetry, prophecy and religion, all in one” (Peterson, 1945b, p. 51). Dewey and Albers, looking from different vantage points, saw something, and they told about it plainly enough if we make the effort to listen. We can see if we open our eyes.
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Appendix A—timeline 500 BC - 2000

- Plato 427-347 BC
- Vitruvius, *Ten Books on Architecture* ca. 50 BC
- Fall of Rome 440
- Alberti, *On the Art of Building in Ten Books* ca. 1450
- Berkeley 1685-1753

Intellectual education
Craft tradition

500 400 300 200 100 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000
Appendix B—timeline 1400 - 2000
Appendix C—timeline 1800 - 2000