PAST PAPERS

National Conference on the Beginning Design Student

Batture

vol. 5

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LSU School of Architecture

Vol. 5

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National Conference on the Beginning Design Student

Past Papers

The Louisiana State University School of Architecture is proud of its long tradition of leadership in beginning design education. The School has the distinction of hosting the National Conference on the Beginning Design Student three times over the past twenty five years and is proud that three of the School's faculty have been conference chairs, including one of the conference founders, Nicholas Markovich. The School is particularly honored to host the 25th commemorative conference this year and to accompany the occasion with the publication of *Batture: Past Papers of the National Conference on the Beginning Student*.

Jori Ann Erdman
Director
LSU School of Architecture

For more past papers and proceedings, please visit the Research Office of Novice Design Education at www.novicedesign.org.

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Introduction

Jim Sullivan
Associate Professor
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The Louisiana State University School of Architecture's journal, *Batture*, is honored to present the follow selection of papers from past proceedings of the National Conference for the Beginning Design Students (NCBDS). This volume commemorates 25 years of conferences and provides an apt home for these papers in that *Batture* receives its name from a small strip of land that, like beginning design, appears to reside between categories. Running between a river's edge and a levee, the batture is neither wholly dry land nor wet. It receives rising river water yet has on it trees and other vegetation. Still, the batture is an entity unto itself with its own characteristics and challenging conditions for habitation. Beginning design education too resides between categories, being neither wholly disciplinary nor pre-disciplinary. Beginning design may be the foundation for what follows in a course of study but it is not yet that course of study. Still, like the batture, beginning design is an entity unto itself. It too has its own characteristics and challenging conditions for habitation, so to speak.

This in-between quality was the topic of the past two NCBDS's. These conferences, the 24th and 25th held at Georgia Institute of Technology and Louisiana State University respectively, acted as a diptych of sorts that commemorated a quarter century of conferences by exploring two sides of one topic: the complex and often-contradictory 'relationship between beginnings and disciplinarity.' The 24th conference, *We have Never Been Pre-Disciplinary*, explored 'the ways in which disciplines operate within beginning design education' while the 25th conference, *But Also, We are a Discipline*, explored the ways in which beginning design education operates as a autonomous discipline. In other words, *We have Never Been Pre-Disciplinary* considered the continuities between beginning design and the disciplines that follow, and *But Also, We are a Discipline* considered beginning design as a discrete discipline with its own history, body of knowledge and educational challenges.

Whie the 24th and 25th conferences commemorated twenty-five years of NCBDS conferences, it is important to note that NCBDS's origins are in a small gathering that took place almost four decades ago. This gathering, entitled *Beginnings,* was held in 1972 at the University of Wisconsin, Milwaukee. Just over a decade later, after a second gathering in 1983 (this one at Cranbrook Academy), the first Beginning Design Conference was held in 1984 at Arizona State University. Since that conference in Arizona, the National Conference on the Beginning Design Student has been and continues to be the primary venue for discussion about the practice of and research into for beginning design.

Perhaps the most remarkable aspect of the NCBDS's longevity is that the confernce has no formal organizational structure to perpetuate itself. There is no president, no treasurer, no dues. Instead, the conference has a dedicated community of the beginning design educators. The conference is propelled by this community's interest in the educational challenges and the attendant pedagogies, projects, and curricular strategies that arise in its context.

The papers in this issue of *Batture* informally chronicle this ongoing interest. They are not intended to document the finest papers or the most influential. Rather, they are intended to be a simple representation of the broad range of ideas and practices that this interest in beginning design education has generated.

Preamble: I Love Beginnings

Tim McGinty
Arizona State University

Tenth Conference
Tulane University
1993

Foundation in Architecture
Cappleman, Jordan
Van Nostrand, 1993

The following remarks were made at the opening session by Tim McGinty, Associate Professor of Architecture, Arizona State University

I Love Beginnings[1]

The title phrase belongs to Louis I. Kahn, the honored architect and teacher. He said it often, and he said it with enthusiasm. A wonderful, healthy, optimistic view. A gift to me as one of his new graduate students. A view I hadn't felt deeply since I was a freshman. The message has staying-power; nearly thirty years later, I still love beginnings—at school, in practice, in life. This book shares Kahn's love of beginnings and the projects, the text, the annotations are an offering to everyone who loves teaching beginning students.

College is a beginning that matters. Not every moment is equally a "beginning." Some are more important than others. Beginning college is one of those moments. For our students their first month at college, their first days in graduate school, the first week of a job after graduation, are all special beginnings. But beginning college is a particularly notable event for young adults, as notable and stressful as other life markers such as leaving home for the first time, joining the military, or beginning a marriage. These beginnings are moments when emotions and decisions strike chords which reverberate for many years and shouldn't be wasted. As teachers we are privileged participants in one of these moments, and as their first professors, we automatically become champions of higher education, as well as champions of "the cause of architecture," to use Frank Lloyd Wright's phrase. It might be seductive to think that only architecture matters, that the responsibility of introducing students to the ideals, rigors, and ethics of higher education belongs to someone else, to someone who teaches the required university core curriculum, or to the student's living group, or to the students themselves. But, whether we want to be or not, we are active participants in the drama. We affect student success. Further, we are interested in their success and growth as individuals not because we pretend to be their parents but because we are their teachers.

The very beginning matters. The first semester in college is crucial for most students. In fact, the very beginning, the first five to ten weeks, matter very much for all entering students - not just for recent high school graduates, but for transfer and adult students as well. There are so many questions demanding answers. "How am I supposed to behave?" "How am I supposed to use my time?" "What is really valued by my peers?" "What am I supposed to learn?" "What is really expected of me?" "Which assignments are important, and which are not?" Answers to these questions matter and set the tone for the student's entire college experience.

If, after the first few weeks, the values and habits learned do not match faculty expectations, the student probably won't survive in school. Loosing students, not because of lack of talent, aptitude, or intelligence, but because of a mismatch between their expectations about college learned at college is not acceptable.[2] As faculty we cannot dismiss our responsibility and claim that the student, as a young adult, is solely responsible for charting his or her own course. This is too easy, and when students do not succeed it is too great a loss in an era when the quality of an institution is measured, in part, by retention and graduation rates. Dropping out is painful to the everyone, not just the student, parents, and the institution. We cannot do their work for them but we can at least be frank in explaining our expectations. It turns out that it is more important for students to understand what is expected of them than it is for them to agree. The question for us becomes, "The first ten weeks: How are we doing?", and, "Are we part of the problem or part of the solution?"

First Teachers matter. Patterns have been recognized in studies of the careers of successful young people in sports, music and science that deserve our attention.[3] According to the studies the most important lessons taught by first teachers and coaches is their love and enthusiasm for what they teach. The individual attention they give their students is also critical, but their own mastery is not as important as their ability to share their enthusiasm. It takes a lot of enthusiasm for anyone to persevere given the

drudgery of practice, and the setbacks ahead. The best teachers also know when to "release" their students, and send them on to a more advanced level. A gift to the student as well as the next teacher. Another question: "Is our enthusiasm evident?". "Do our projects nurture enthusiasm in our students?"

Teaching beginners teaches teachers. Teaching beginners is useful to all teachers. Unfortunately at many schools teaching beginners only represents an entry ticket to architectural education. Then, as quickly as possible, many "escape" and presumably rise to the "loftier" mission of teaching more advanced students. A few continue to teach at all levels. Fewer specialize exclusively in teaching at the beginning. We, however, are the lucky ones. Teaching beginners continually tests one's mastery of what is really fundamental in architecture.

Regularly teaching beginners refreshes teachers. Why? Because it is a wonderful position from which to test the wisdom and truth of one's thoughts. The teacher's ethics are tested. Beginning students might actually believe you! The teacher's vocabulary is tested. Beginning students are innocent cynics and suspicious of fancy words. The clarity of your thinking is tested. If your thinking is fuzzy what you say will not make sense to them. But, if you think clearly your insights may last a lifetime. The teacher's powers of communication are tested. Beginning students are still close to "the real world," still close to "mass culture". The jargon and rituals of architecture do not mean anything to them. More questions: "Can our students understand us?" "Are we learning as well as teaching."

A diversity of beginnings. Motivation, learning styles, personality types! Cultural backgrounds, ambitions, ideals, values! Gender, race, nationality, academic preparation, family traditions! Beginning students are a diverse lot, yet, beginning students are also an elite simply because they qualified for college. But they are a very diverse elite. For example, students learn in different ways. Some students may only need to briefly hear an idea explained to catch on. For others, a few vivid examples are all that are necessary to confirm their understanding. For others nothing is clear until they have practical firsthand experience with a concept. Our students represent a variety of learning types both "abstract" and "concrete", to use the jargon of educational psychology. We teach both and, surprisingly, both are valid modes. Experienced teachers know being a "concrete" learner at this stage is no better or worse a predictor of future success than being an "abstract" learner. We also teach different personality types. The student who never speaks or makes eye contact with the teacher may be paying attention and be as committed to the class as the outwardly judgmental cynic asking all the questions.

Managing a diversity of learning styles, personality types, cultural backgrounds, and motivation creates powerful dilemmas for teachers - the ethics of grading for example. As part of teaching we assign grades, we evaluate, we pass judgment on progress. We write our projects to reveal "potential" as well as "performance". Grading studio courses raise special problems. Are our judgments premature? Are brightly burning stars rewarded disproportionately compared to those who slowly reveal steady long term growth? Excellent teachers are skilled in balancing teaching as an encouraging and nurturing endeavor with teaching as a standard-setting judgmental endeavor. "Are our projects and curriculums maximizing growth and understanding or are we rewarding previous experience and current agility?"

More dilemmas. At most schools only a few of the students we see in our beginning classes will graduate in architecture. Also, how do we keep this from making cynics of us all? How do we keep ourselves from taking the shortcut of simply hand-picking those who we think have some chance of making it. How do we keep from taking the shortcut of hand-picking those most like ourselves and our colleagues, instead of seeding, cultivating, and waiting for growth and blossoming? Whom do we anoint and what proof do we have that we have earned this right? I still remember an image from a lecture about architectural education from many years ago. It included a drawing of students being poured in a meat grinder, the old fashioned kind with a crank handle. Instead of hamburger emerging from the sieve, students popped out, each one exactly like the other. Diversity was gone; in its place a "presumably" higher level of homogeneity.[4] "Are we truly cultivating diversity, merely accommodating it, or systematically eliminating it?"

Architectural education as undergraduate education. So how are we really doing? How good of education is an architectural undergraduate education? According to one report we are doing a very good job. In a comprehensive

self-study at the University of Tennessee assessing how much a student grows (or regresses) during college, the architecture program stood out on two counts: first, because their entering students had the highest average rating in the study compared to other entering students, and second because the study showed that their students gained more during college and by the time they graduated, both absolutely and relatively according to their tests, than students in other fields [5]

We are doing a good job according to other studies as well. How we teach fulfills many of the recommendations noted in a Harvard University self-study of quality in higher education. The Harvard report advises that student satisfaction with undergraduate education is tied to "being involved". This includes being involved in campus activities like drama, singing, newspapers, and service but more important they mentioned being involved with peers who are focused on academic projects that the students feel are worthwhile. I remember my delight when, during the first semester in my first architectural history class I suddenly realized that, for the first time, I was in a room with fifty peers, each of whom was interested in architecture! In high school I was the only one who wanted to become an architect. My delight was that I no longer had to apologize for talking and arguing about what interested me! In contrast, according to the Harvard study, students who feel that they have not "found themselves" report that they have not developed academic peer relationships, especially relationships which focus on accomplishing things the students feel are "substantive" and that "stretch" them.[6] This sounds like what we do every day in studio.

The impact of the beginning. One criticism of beginning design educators, and perhaps implicitly of this book, is that by seeking recognition from our peers we are missing a truer measure of our efforts. Our successes shouldn't be measured based on what our peers think, or even what our students think. Instead, the quality of a program for beginners should be measured against the contribution it makes to the curriculum as a whole.7 The building blocks — the individual projects — must be sound, but the gestalt, the whole program, should be considered first. An appropriate measure is the quality of the linking and joining, the reinforcing, the enriching that happens during a student's career at a school. But how do we measure this? A pragmatic measure might be the number of projects regularly offered in advanced courses that expand on projects offered at the beginning. Another measure might be whether or not the vocabulary introduced at the beginning is regularly used by reviewers at all levels. Perhaps the best measure would be the number of senior faulty who regularly teach beginners; the larger the number, the stronger the integration. Can a fifth year critic complain that the students "know nothing" when, in fact, they helped teach the same students as freshmen?

What is important is really quite simple. My father asked me a simple but provocative question as I was packing to drive from St. Louis to Lincoln, Nebraska, for my first teaching job. "Do you know what your job as a teacher really is?" My response was a pedantic "I guess it's to teach the courses I'm assigned to the best of my ability," or something to that effect. "No, it's to get them in the habit of working." Indeed.

A few years ago I had the pleasure of team-teaching with Dick Williams, who headed the graduate program at the University of Illinois for many years. His advice was direct: "It's to get them committed to quality." Yes.

Recently I watched several of the final PBS programs in the series on ethics. The aphorism the moderator used as his closing for the last show of the series stuck in my mind: "Make the agony of the question so intense that the only way out is through thinking." The implication, of course, is "Get them in the habit of thinking."

Perhaps what is really important is quite difficult. As a guest lecturer I was asked, during the open discussion, "What is the hardest thing about teaching beginning students?" A surprising question (I like surprising questions almost as much as I like beginnings) and after a few moments it occurred to me — the most difficult thing is patience.

This book is a beginning. As I remember these questions and answers, I also remember that they are not subtle, and every day in my teaching there are subtleties of diversity that I consider. Still, they make good everyday reminders that I measure my thoughts and actions against.

Finally. The first few weeks count. Setting standards counts. Patience counts. Ultimately, however, teachers and students have to get on with the business of teaching and learning, experiencing, testing, reviewing, applying,

and internalizing lessons. This book celebrates the rigors and satisfactions of orchestrating day-to-day accomplishments. What we must also address are the strategies and politics that maximize each project's contribution to a whole education.

Notes:

1 This paper is a draft (c. Tim McGinty) of the Forward to the forthcoming book *Foundations in Architecture* edited by Owen Cappleman and Mike Jordan. It is scheduled for publication in the fall of 1993 by Van Nostrand.

2 This argument was vividly made by Dr. Harman, professor of psychology at Haverford College, at a lecture given for Danforth Associates at Geneva, Wisconsin, in the early 1980's. As a consultant to colleges and universities he discovered that new students, in the first five weeks, learn values and attitudes that last them through the rest of their undergraduate careers. If these values are at odds with those held by the faculty and the administration then the student and the school end up being unhappy with one another. The consequence for small private colleges can be disastrous. Students drop out of or only marginally succeed, and the school develops a bad reputation and receives fewer and fewer applications from qualified students and faculty.

3 The Talent Development Project, headed by Professor Benjamin S. Bloom, at the University of Chicago.. The New York Times March 30, 1982.

4 This is an image Philip Thiel of the University of Washington - Seattle and others have used to remind teachers of the difference between education and indoctrination.

5 Jon P. Coddington (University of Tennessee), "Architecture and the Liberal Arts: A Case Study in the Acquisition of an Education," in the proceedings of *The Liberal Education of Architects* November 8-9 1990, Dennis Dolmer, Ph.D. and Kent F. Spreckelmeyer, Arch. D., AIA, Editors.

6 Richard J. Light. The Harvard Assessment Seminars: Second Report 1992—*Explorations with Students and Faculty about Teaching, Learning and Student Life*. Harvard University, Graduate School of Education and Kennedy School of Government, Cambridge, Massachusetts.

7 This was essentially the argument made by Professor Juan Bonta, University of Maryland, as the invited respondent for the 1980 ACSA-AIA Teachers' Seminar at Cranbrook.

Past Papers

National Conference on the Beginning Design Student

With Understanding: An Optimum Education for the Beginning Design Student in Architecture

C. A. Winkelhake
University of Illinois, Urbana-Champaign

First Workshop
University of Wisconsin, Milwaukee
1972

MILWAUKEE CONFERENCE ON THE BEGINNING STUDENT

Milwaukee, Wisconsin October 27, 1972

WITH UNDERSTANDING: An Optimum Education for the Beginning Student in Architecture

C. A. Winkelhake, U. of I.,
Urbana-Champaign, Illinois

This conference is concerned with the development of the beginning student in architecture. Accordingly, I will talk on the general question of an optimum education -- or the value of a basic curriculum.

First, I will indicate why this general question is a difficult one to ask. Second, I will set forth the best basis I know for answering the question once it is asked. Third, I will outline an optimum education for the beginning student -- which I take to be our mutual concern.

I.

To begin in a roundabout way: here we are in Milwaukee on the shores of Lake Michigan where the beaches have been closed to swimmers over the past few years. The run-off of fertilizers from the farms of Wisconsin through rivulets and tributaries adds a considerable measure of pollution to Lake Michigan. Now, you all probably know that the new chemical fertilizers contain nitrate which, in turn, promotes water pollution. But do you all know that horse manure also contains nitrate?

Both horse manure and the new chemical fertilizers contain nitrate -- and both are contrary to the optimum well-being of human ecosystems. Whether composed and ministered by man in the interests of a greater yield, or whether dropped by animal -- nitrate is nitrate. Both approaches are less than optimum -- and there's a close parallel to this situation in education for the beginning student in architecture.

Speaking directly: the traditional beaux-arts as well as subjective approaches in architectural education are like animal droppings -- on the order of horse manure. They were and are just dropped on the beginning student, so to speak, from above. On the other hand: modern ad hoc practices (to include "advocacy design" with its excesses of neo-paternalism, etc.) are like the ministrations of man -- on the order of the new chemical fertilizers.

Piecemeal information (some environmental, some behavioral) not closely connected with the values of the people and the sub-cultures directly involved is the basis for the ad hoc approach. Whether you like and use the subjective or the ad hoc approach is beside the point. They are both bad -- that is, less than optimum for the beginning student in architecture.

The Bauhaus and its successors approximated the horse manure approach. The Ulm School of Design fit this mold with more flair when it came to spreading it around -- but it also just dropped on the student from on high. On the other hand: community design centers approximate the chemical composition approach -- pieces of miscellaneous information, often picked up from around campus, are put together and used in an indiscriminate fashion. A number of schools of architecture are following this pattern -- their touch of academia mixed into the new compositions for both ad hoc flair and status.

Now, the general question of optimum development for the beginning student in architectural education is a tough one to ask precisely because the above approaches all make the task look both easy and worthy. Students in the above approaches notice mainly the fun they have "doing it", whatever it is at the moment. Professors also enjoy the fun of "doing their thing" as well as "doing good". I believe the above approaches, overall in the main subjective, are highly questionable.

II.

The best basis I know for working with the beginning student in architecture follows the more recent quest for objective and public understanding of particular behavior-environment relationships. Information on both covert and overt behavior in direct connection with both social and physical environment will more and more provide an intelligent basis for first-rate environmental planning and design. The beginning student educated on this basis would learn to handle, and thereby to value, such information. The advancing student would actually generate new psycho-cultural information-systems.

For instance: new knowledge from recent studies of perception (since 1950, just shortly before the birth of the beginning student in architecture today) adds up to a solid conclusion

on the problem of perception, or "how seeing takes place". In turn, this may solve the problem of conception, or "how learning takes place".

For a long time before the 19th century, perception was a problem in the geometry of the eye. During the 19th century the question of "how we see" became more and more a problem of optics. Towards the middle of the 20th century the study of perception finally broke loose from its age-old straight-jacket when the field of general semantics established the
1 concept of the eye "as an end organ of the brain". Other intellectual developments were instrumental in the transition away from the simplistic problem of optics. For example: the concept of information gained practical importance after
2 Shannon and Weaver wrote The Mathematical Theory of Communication in 1949.

Gibson made the pioneer breakthrough in the study of visual
3 perception in 1950. His publication of The Perception of the Visual World upset the old notion that seeing was a matter of optics in here. Gibson showed in an objective and public way that it was largely a matter of information out there! In 1957 Bruner established that perception depended
4 upon the readiness of information, organized through psycho-cultural experiences, in the form of verbal categories. Accordingly, the problem of optics resolved into the problem of language.

5 In 1960 Ittleson's work on visual space perception further established the contribution of the perceivor's experience in the process of seeing. Ittleson called this behavior-environment relationship a transaction -- a process of "giving-and-taking", a highly dynamic event like "buying-and-selling", "writing-and-reading", etc., where you can not have the one without the other.

Further investigations brought categories and transactions together, and in 1966 Hochberg showed that the structure
6 of meaningful perception was built-up in a certain order or sequence. Thus, today on the basis of recent studies we know that perception is (1) categorical, (2) sequential, and (3) transactive. In terms of the problem of language: seeing and thinking depend upon (1) a vocabulary of verbal categories, (2) a syntax of verbal sequences, and (3) a semantics of verbal transactions.

Based on this new knowledge in the study of perception since 1950: INFORMATION ORGANIZED INTO VERBAL CATEGORIES AND SEQUENTIALLY ORDERED INTO DYNAMIC TRANSACTIONS PROVIDES THE BEST BASIS FOR WORKING WITH THE BEGINNING STUDENT. We (the instructors) and they (the students) see in terms of what we and they already know verbally, what we and they are currently looking for verbally, and what we and they hope to see verbally.

Seeing and thinking are basically verbal. On the other hand -- and I would like to suggest for the optimum education of the beginning student: way over on the other hand -- drawings, architectural models, photographs, and other modes of visual notation merely illustrate our vocabulary of verbal categories, our verbal sequences, and our verbal transactions. I say merely because I want to stress the fact that there is no direct path from visual notations to seeing and thinking and back again. That path necessarily leads through speaking and writing in terms of words and sentences -- that is, in terms of language per se.

Because we deal with many visual illustrations of verbal categories, we may refer to vocabulary in architectural education as visual-verbal. Let's not forget, however, that seeing and thinking are basically verbal. Visual notations can only illustrate verbal categories, sequences, and transactions. If we do not in architectural education and practice becomes increasingly precise, definitive, systematic, and coherently organized in terms of words and sentences -- all else is just so much nitrate.

A picture may be worth a hundred words (or a thousand or just a few) but we still need the words and sentences to understand the picture -- to handle the picture with understanding. The gesture may illustrate the word, but the word can stand alone -- the gesture cannot. Let's move beyond subjective and ad hoc approaches in architectural education, especially for the beginning student.

III.

The key to an optimum education for the beginning student in architecture -- that is, one with understanding -- is

an objective visual-verbal vocabulary. As indicated above:
8 the perceived objects, persons, and events in any conceptual organization have meaning in terms, first and foremost, of words and sentences. The smallest unit of meaning is the
9 word, and a string of words arranged according to certain
10 rules gives rise to the meaningful sentence.

Further, perception always belongs to somebody: we use symbols in the process of architecture for somebody else to use an environmental object in direct connection with a behavioral event. Accordingly, a technical vocabulary in architectural education that handles social and psychological as well as physical information is the fundamental key to the success of the architectural practitioner.

The beginning student starts to learn his professional concepts and categories with understanding through definitive words and sentences. The process of physical problem-solving works today because the technical vocabulary of physical information accommodates both old and new knowledge in construction, structures, environmental controls, etc. This has been the professional architect's legitimate basis for public service -- and, thereby, for public respect. In the area of social and psychological information, however, the architect today uses, and can only use, the layman's vocabulary.

Architectural students, educators, and practitioners are all in the same boat. Yes, architectural students do acquire a limited physical vocabulary from educators and practitioners, namely: Sweet's File, the Steel Handbook, and symbols for working drawings. But students, educators, and practitioners all, by and large, sorely lack a technical vocabulary (visual-verbal categories and concepts) for seeing and thinking with precision and clarity about man-environment systems and
11 behavior-environment relationships. Their subjective and so-called "conventional wisdom" is virtually useless to meet the demand in today's world of environmental problems.

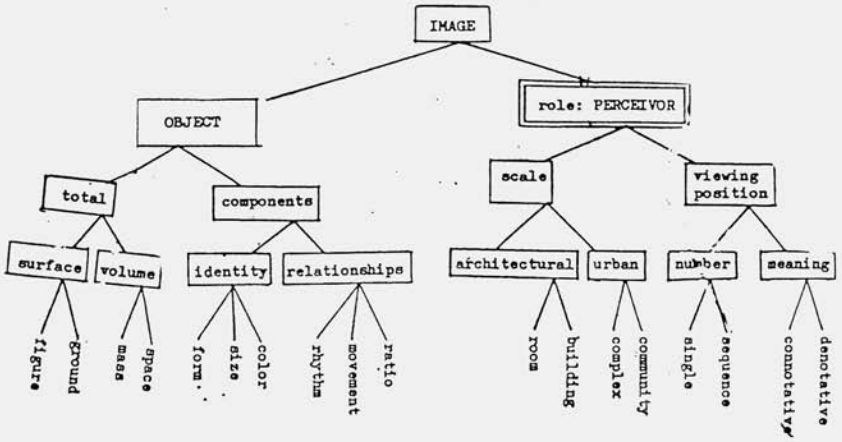
The environmental problem-solving of architects today amounts almost to sheer quackery. Witness the results in low-income housing, for example: Pruitt-Igoe in St. Louis, the wall of

shame in Chicago, and many other failures in other parts
12 of the U.S. as well as in Nigeria, Venezuela, and other parts of the world. When it comes to knowledge of the social and psychological behavior of different groups of people and sub-cultures in direct connection with this or that chunk of environment -- architectural students, educators, and practitioners use, and can only use, the layman's aspirin-tablet vocabulary of window, door, floor, etc.

An optimum education for the beginning student in architecture first and foremost provides a technical vocabulary which can handle visual-verbal information: social and psychological as well as physical. Such a crisp and definitive vocabulary of verbal categories permits the gathering and remembering of behavior-environment relationships -- with visual notations illustrating the verbal categories in a systematic way. As the beginning student builds upon his basic studies and becomes the advancing student, his descriptions and evaluations, along with those of others, add up gradually from situation to situation into useful generalizations: social and psychological as well as physical.

I will now illustrate the major structure of such a visual-verbal vocabulary through the sub-vocabulary of IMAGE which is composed of 30 verbal categories arranged in a hierarchy for the purpose of recording, storing, and retrieving psychological information. Two other sub-vocabularies can plug into the major structure: one for social information (ACTIVITY) and another for physical information (TECHNOLOGY). These three sub-vocabularies or data-structures -- image, activity, and technology -- comprise the conceptual or substantive part of the curriculum for the beginning student.

Two additional sub-vocabularies handle the methodology or process part of the curriculum: one for communication (NOTATION) and the other for decision-making (PROCEDURE). Thus, five sub-vocabularies make up the technical vocabulary for the beginning student in architecture.



Please remember the above sub-vocabulary or visual-verbal data-structure for psychological information and the other sub-vocabularies for social, physical, communication, and decision-making information are experimental. Other categories in each of the sub-vocabularies may be considered more appropriate or more important as time goes by. I have shown the IMAGE data-structure simply to illustrate what the order and hierarchy of a viable vocabulary for the beginning student might become in an education based on objective and public information -- that is, one with the clear-cut understanding that design is not an arbitrary affair.

To sum up: the selected visual-verbal data-structure or technical sub-vocabulary shown above is one out of a total of five sub-vocabularies. It may help to illustrate the suggestions I have outlined in this short talk on the general question of an optimum education for the beginning student in architecture: we are on the threshold of a transition era in architectural education -- from a variety of visual and subjective approaches without understanding to an objective and visual-verbal approach with understanding.

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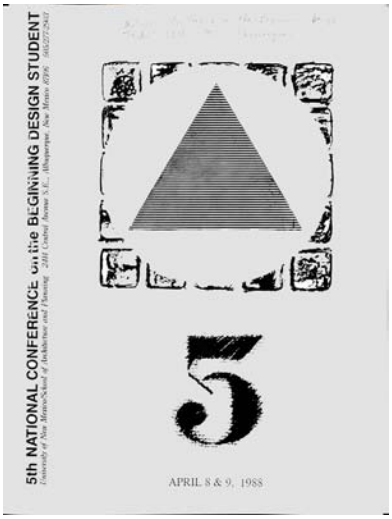


An Approach to a First Building Design Studio

Donald Gatzke, Peter Thaler
Tulane University

Fifth Conference
University of New Mexico
1988

AN APPROACH TO A FIRST BUILDING DESIGN STUDIO

Donald Gatzke, Assistant Professor
Peter Thaler, Assistant Professor
School of Architecture
Tulane University

This paper describes an evolving approach to a second year (first building scale) design studio taught by the authors at the Tulane Univesity School of Architecture. The organization and content of the studio was the result of previous experience with "typical" attitudes and behavior of students in the first studio course concerned with wholistic building design as a whole, and from ongoing observations of student performance and demonstrated capabilities in subsequent design studios.

The following outlines the overall studio objectives and the relationship of projects and project sequence to the achievement of these objectives. Furthermore, the content, activities, successes and failures of a single studio project will be recounted.

There are three pedagogical concerns that govern the studio organization:

1) the fundamental responsibility of the first building design studio is to broaden the range of design and building issues confronted by the student. This is achieved, in part, by working from general concerns to specific proposals (program needs to building design) and from specific elements to general application (construction details as an influence on building form);

2) the development of critical thought is best achieved through insightful analysis and discussion of design alternatives and choices generated by the student.

3) Carefully designed graphic exercises resulting in significant alternative concepts are a necessary part of the studio activities for two reasons: One, it is very difficult for beginning students to generate truly distinct alternatives that can support critical evaluation and, two, there is a need for a greater appreciation of drawing as an integral part of design.

At the School of Architecture at Tulane University, the second year design studio has traditionally been the point at which the fundamentals of building design methodology has been introduced. From the second year on, the desk crit and jury system has been the sole pedagogical device for imparting content and directing the student's design process. Generally dissatisfied with the traditional design studio and in particular suspicious of it as an environment for real learning by students still at the beginning of their design education, we are attempting to re-organize and redirect our approach towards the teaching of the design studio and are experimenting with several pedagogical techniques.

Our approach was influenced not only by experiences with our own students but also by observations of student work in subsequent design studios. At the third year level in particular, students still seem to have difficulty in organizing information in coherent, manageable hierarchical groupings and in handling the multiple intentions of complex programs. Design proposals tend to be heavily image based and exclusive of significant programmatic and technological requirements. Students pick those issues they prefer (or know how) to satisfy and try to ignore the remainder. Technical naivete is evident, not only in the absence of sophisticated technological knowledge but more in the lack of a fundamental appreciation for technology. Students simply avoid confronting the material aspects of building. While increasing facility with drawing and image related design issues areclearly evident, comparable development of a inclusive design methodology seems to be lagging.

Observations on the Second Year Student:
Students entering second year exhibit a set of typical characteristics. First year has given them a basic set of graphic skills and a fundamental conceptual vocabulary with which they are quite comfortable. They are confident in their ability to design "real" buildings. However, they also possess a nebulous notion of how to perform "architecturally". Not yet familiar with the broad range of issues to be addressed in the building design process, the students tend to rely upon the graphic imitation of projects seen in the professional periodicals or by "skimming" from their favorite architect without an understanding of how the work was generated. Of primary concern is that in looking for all-encompassing ideas that will result in perfect solutions, students are reluctant to commit anything to paper that doesn't have the graphic pizzazz of a finished proposal. The difficulties are further compounded when complexity of form is highly valued in both the initial concept and in the final product and not understood to be the result of forces influencing the design through its development.

In addition, first year has prepared them for quick leaps from project beginning to end, both in concept and time. First year projects are usually one to three weeks in duration and proceed very quickly from the development of an initial proposal to its execution in drawing or model presentation. Interest and enthusiasm is kept high through projects of singular focus, in contrast to second year where extended critical evaluation and development is part of the schedule. A frequent student malaise in second year is a sudden self-perceived lack of interest and involvement in the project at about mid-point when the design concept has been established but is not yet developed enough to start the final presentation charrette. Some students begin to lose momentum and withdraw while others become extremely self-critical of their work, starting over again and again in an attempt to regain the rush of the initial insight. Progressive development of an idea is confused with starting over when the initial idea does not seem perfect in all respects. A conflict has been created between a need for action at a time when objective critical evaluation is desired. Simply stated, many of the students do not have the ability or intellectual discipline to sustain interest over the extended course of a project.

A related characteristic is a tendency to react rather than initiate. Unless specifically set into action by an assignment or, as the project proceeds, a desk review, little development of the design will result; what movement does occur is typically the repetition of the same minor variations of the fundamental idea. A brief period of intense activity may occur immediately after a review or discussion with the studio instructor which then rapidly declines until the

student is wound up again. In this respect, the traditional design studio setting and its curriculum organization consisting of project assignment, individual desk crits and final review, contributes to the problem. Typically, at any one time, one or two students are receivng individual attention from the studio instructor/s, a few others are still energized from the recently completed desk review, and the remainder are impatiently waiting for the next crit, or worse yet, have disengaged from their work, drifting away entirely. A major share of the studio period is devoted to a wide variety of activities by the students, many of which have little to do with the enterprise at hand. The tendency is for students to be over-reliant on the instructor for verification of each step before proceeding on to the next one. Worse yet is the desire for verification of an idea before committing it to paper.

The desk critique itself as a pedagogical device is less than successful at the beginning student level. For a crit to be meaningful it must be a substantive discussion of the architectural merits in a student's proposal. However, at this level many students do not have the expertise to initiate a substantial proposal. Crits then are reduced to mini-lectures by the instructor on design fundamentals, which the instructor will repeat again and again as he/she moves down the row. Students are often left to draw up the discussion and await the next crit. The results are rather similar and conventional solutions to the design problem and are more a indicator of the instructor's mood and enthusiasm than an exploration of architectural thought by the student. The desk crit alternates between hand holding and hand slapping...

Studio Objectives

Studio objectives were developed in response to these observations of student ability and performance. The fundamental assumption that guides the development of the course content is that at a beginning design level breadth of exposure to knowledge, procedures, and methodologies is more appropriate and useful than proficiency and false mastery of any particular aspect of the overall design process. Through no fault of their own the students are simply unaware of the range of issues that have to be addressed in architectural design.

Furthermore, oblivious to these questions, they tend to concentrate on image at the expense of program, material or tectonics and substitute a graphic complexity for developed design proposals. The first intention of this studio is to widen the range of issues to be confronted in design, even at the expense of the complete, co-ordinated design proposal, in preparation for greater depth at the third-fifth years.

Second year is seen as a closely directed sequence of activities leading to the generation of architectural proposals for the purposes of critical evaluation and discussion. The objectives of the first building design studio have been organized under four broad categories:

Site: A real place with understandable and informative conditions which include contextual relationships, spatial and functional zoning and questions of urban form.

Program: consisting of user needs, patterns of activity, spatial organization, and architectural form generated by activity and use.

Architectonics: which introduces a concern for materials, technological support systems, and construction, the influence of these on form and their relationship to architectural intentions.

Form: Conceptual structure vs appearance of order; form vs image. A three dimensional manifestation of the issues of site, program and architectonics.

Each studio project addresses these broad areas althought individual projects are designed to emphasize a particular category:

A small elementary school project on a rural site included studies of spatial organization through the analysis of precedents, introducing the generic concept of typologies, specific types of spatial organization and the use of precedents as a design tool.

A small factory project, discussed in detail below, focussed on form as derived by a manufacturing process (program) and issues of materials, technological integration, and building construction.

The current project in the studio, a public library, again addresses the various library processes as form determinants, but also concentrates on qualities of interior space.

An intention of the particular studio assignments is to initially equalize the students with varying degrees of experience and skill. While the "typical" student profile has been described, there are extremes of student capabilities which can often undermine the studio environment -- ideally a place of shared learning through individual effort. Weak students require an inordinate amount of attention which still does not compensate for their undeveloped graphic skills. Above average students either receive less attention because of their strengths, coasting through the project, or receive an inordinate amount of critical attention in response to the relative success of their work. Neither situation is appropriate when the intention is to promote a broadly based discussion of architectural principles across the studio. To establish a common datum every student needs to produce work that (a)looks pretty much the same as everybody else's and (b)with enough architectural content to support a critical stance. Another intention is to promote the generation of a broad range of alternative design concepts and proposals. It is difficult for beginning students to generate true alternative solutions to design problems that support critical evaluation. Any initial concept acceptable to the student becomes too precious for the student to see with critical objectivity, inhibiting the investigation of other possibilities. Typically, the mandate to develop alternatives as part of the project requirements results in the student's repetition of the same assumptions that led to the initial, and often weak, first conceptual proposal, or in perfunctorily created filler, camouflaging the "real" idea, which is then presented as an alternative but without serious intent.

The intention of the sketch exercises that generate alternative proposals is not to produce all the possible solutions but rather two or three intelligent choices that respond to the exigencies of the problem. It is important that these are developed by the student, not by the instructor during a desk review. Only in this way can the student critically evaluate his/her own work according to the project criteria.

Narrowing choices to a few significant ones for each student throughout the design process leads to clearer understanding of the fundamental principles, less confusion on the student's part and greater assimilation of the relevant information. A distinction between two clear concepts provides the basis for a critical comparison of qualities and success of each. Especially for the less mature student, the clarity resolves some of the many ambiquities of the design studio and fosters the development of a critical thought process.

Project Description:
The most recently completed project in the studio was for the design of a new manufacturing facility for a frozen yogurt chain headquartered in New Orleans.

The project and building type was introduced through the analysis of precedents. Prior to issuing detailed project information, slides were used to illustrate significant aspects of industrial building design. In particular the relationship of building form to the industrial process, functional zoning, structural planning, and construction materials were shown. In addition daylighting was a important focus of this project and, in fact, had suggested the selection of the factory as a building type. All second year students were concurrently enrolled in a required technology course which addressed daylighting. That we expected their technical understanding of daylighting to inform their design intentions was made very explicit.

The students were also required to select major structural components/materials and enclosure systems from the precedent analysis to be used in their own proposals. From the very early stages of the design, the choice and use of materials was a discussion issue. Students were allowed to modify their material choice but the question of materiality was developed concurrent with spatial and formal qualities. A collection of readings on the factory as a twentieth century building type (Banham, Le Corbusier, Salvadori) was also assigned.

Students were issued a project description modeled on an existing facility which briefly described the manufacturing process and the requirements for the physical plant. A field trip to the existing factory enabled students to

see the facility in operation and document the manufacturing procedure in detail.

The class also made a trip to the site which they extensively documented in slides. As both a graphic exercise and for visual reference, students were required to make large drawings of the site by tracing the projected slides in detail. These drawings were displayed in the studio space and provided a continual reference to the site context. They were also used as base drawings for the final design presentation. Issues of responsibility to the larger urban context as well as the specific formal implications of the site (corner of two major arterials, adjacent industrial and residential, etc.) were discussed as a group.

Shortly after the trip a definitive program was developed and the manufacturing process diagrammed by the class again as a group. A discussion of formal implications particularly spatial organizing typologies (a focus of an earlier project) grew out of the programming process. Various organizational strategies were identified and evaluated. In these group sessions principles of analysis and critical thought were introduced.

Following a brief period of individual design work, the class was assigned an in-studio project that became known as "blind model building". Prior to the class, the students were instructed to bring a selection of model making materials that were supplemented in class by additional diverse, scavenged materials. They were given forty-five minutes to fabricate a kit of building parts. Each kit contained four elements: a roof system, a floor system, vertical supports, and a space enclosure. Variations on the basic four parts were allowed. Later in the afternoon they were allowed to make additional copies of their parts as required. Then, temporarily putting aside the model parts, a 10 minute blind contour drawing of their plan was assigned. The drawing was to contain as much detail as possible.

The blind drawings grew out of weekly graphic sessions. Originally intended as pure drawing practice, the life and feel of the blind drawings (draw outline of object/s without looking at the page) that the students made during these sessions suggested their use as a design tool. While very loose and highly distorted, blind drawings typically are highly legible and convey a stronger sense of graphic intention and visual understanding than the rather clumsy, stilted drawings of most beginning students. The lack of precision has been an advantage because the notational character of the information lends itself to alternative interpretations.

Rather than building a model of their own building with the kit of parts, as the students assumed, the drawings were collected and randomly redistributed. They then became the basis for the construction of a model with the kit of parts. At the end of the period, each student had interpreted someone else's plan and designed a building using his/her building parts. For each student essentialy three alternatives were created: one, a new drawing of their own building through the blind exercise; two, an alternative interpretation of their plan in model by another student; and three, a building designed through the interpretation of an inherited plan with their own kit of parts.

Four objectives had been accomplished: the generation of distinct alternative proposals; the use of drawings in a notational and exploratory sense; the use of study models as an early design tool; and confrontation of building structure and construction as a design issue. Generally, the models that were built were more exuberant and exploratory conceptual proposals than in prior projects. The lack of risk to the ego by having had no responsibility for the plan drawing they were working with and the interpretations they were forced to make of the drawing seems to have had a liberating influence.

The discussions that followed between the originator and interpreter of the plan drawing concerning the reading and execution of the plan intentions, while not anticipated, furthered the objective of critical dialogue.

In subsequent weeks, similar blind contour drawings of building sections and elevations were made, again as a way of using imprecise, notational drawings as design tools. The drawings and models were used as the basis for discussion and it was not until after this stage that we began talking with students on an

individual basis . As students continued to work, other documentation was added to their collection, and we limited discussion to ideas that had been drawn instead of tentative ideas they were thinking about developing.

The next requirement was a small structural framing model which was used for discussions of the relationship between structure, function of spaces and building form. We did not expect a sophisticated understanding of structure, but rather common-sense and intuitive insights supported by the precedent analysis and assigned readings. The model, however inaccurate, supported a discussion of structure and form that was based on an proposal developed by the student. Additional freehand drawings of construction and connection details at full scale assigned during the same time period further reinforced the project objectives. This occurred about halfway through the project schedule.

The next stage was the construction of a larger scale, bas relief (a thin slice mounted to a backing board) sectional model through the entire building, constructed of accurate model pieces representing the actual constructional component. Abstraction of the model was specifically discouraged. Spatial enclosure, daylighting strategies, and conceptual integration of mechanical systems were shown.

With these constructional models, the approach to the design process had been intentionally reversed. At the beginning of the project "large" general issues of urban form, resolution of programatic requirements and spatial qualities were the points of departure for the design process. With the focus narrowed to construction and details, very "small" scale and specific influences on building form could be examined. The sometimes endless cycle of insignificant plan and elevation revisions that students see as design development was avoided. Students discovered how a specific design component, such as a skylight detail, could inform the design process in a much larger context, such as at the scale of the site. For many students, this model resulted in a conceptual breakthrough and was the highpoint of the project. The number of building elements to work with because of the requirement for detail, expanded their design vocabulary. Seeing a part of the building at a larger scale allowed them to make design judgements that are not possible at typical drawing or model scale.

After the section model the class was allowed to develop their design and prepare plan, section and perspective presentation drawings and a small site massing model or axonometric. By design there was not enough time left to redo the entire project. A few significant drawings were redone and revisions to the earlier drawings and models were handled through supplementary drawings or overlays. All the significant artifacts of the process were presented at the final review: blind drawings, structural models, etc. The result was not a complete, coordinated design proposal but an assemblage of distinct views of a building design at several scales and vantages.

This overall picture of the design process supported a more sophisticated final project review than typical in second year. The discussion, which included outside critics, ranged over the entire breadth of design issues. Critics and students alike focused predominantly on the quality of the architectural thought rather than the refinement of the execution, which we feel to be appropriate at this level and a conscious objective of the studio organization.

Scheduling

The project has been described above in a more or less linear sequence. However, in reality, there were always at least two tasks assigned and on going at any time. By overlapping start and due dates for assignments some of the lag time between the completion of one task and starting the next was eliminated. Students often began to think ahead to the next activity while completing the current one, often alternating between activities as their insight or enthusiasm varied.

Very little of the studio time was left to the students to schedule for themselves. Frequently, graphic assignments were made and completed in the same class period, or at latest by the next meeting. The work habits and design techniques of second year students are not sufficiently developed for them to make efficient use of studio time without close supervision.

Evaluation

Conclusions are difficult to draw at this point. We have only begun to redefine, for ourselves, the nature of the design studio and are experimenting with some teaching techniques. We hope that the substantial benefit will occur in subsequent years in the student's education. However, we do have the following observations.

Successes:

*The range of issues and the breadth of experience made it possible for each student to present a project which they understood in depth and which sustained a substantive discussion at the end of seven weeks. Under the probing of the reviewers, the students proved that they understood what they were presenting, including the technological information.

*Substituting a variety of techniques and tactics for a linear design approach enabled each student to participate in a critical evaluation of real alternatives which they had developed.

*By emphasizing process over product the greatest distinction in student performance was between those who worked and those who didn't, rather than between levels of "ability". Those students who had expected to make up for a lack of effort and discipline with a tour de force performance at the end were unsuccessful and presented obviously incomplete projects in comparison to the other students. Grading was also simplified. Issues of effort, attendance, and discipline became secondary concerns; evidence of growth, process and learning were quite evident in the projects themselves.

*The students themselves, in post-project discussions, professed a high level of satisfaction with both the studio method and their individual results.

Concerns:

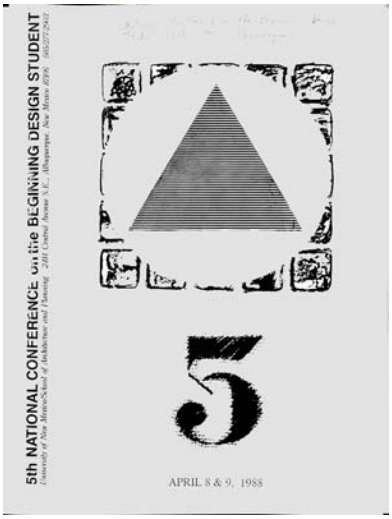
Of course, there were variations in the results of some of the methods and in the work of the students. Refinements of the studio objectives and ways of achieving them are evolving. The following, in particular, are of concern at this point:

*Not all students were able to suspend disbelief of the studio methods. Our ideas of studio organization and particularly of final "product" ran contrary to already deeply fixed notions of architectural design.

*Two seemingly paradoxical conditions arose common to students at the extremes; both the least capable and most mature students were uncomfortable with the lack of a "complete", coordinated set of drawings and models as a final product and in general with the overall project conduct. Both student types were concerned with their lack of complete authority over their projects. The weaker student seemingly out of frustration with not being able to stick with their first idea, laboriously developing it, in a clear, linear progression; and the more capable student unhappy without the opportunity to fully develop the building to its envisioned potential. The former students felt that they had not received enough attention, the latter felt they had received too much.

*It was difficult to tailor the studio content to the individual needs of students. Although we gained a sense of each student's capabilities, it was a great deal more difficult to modify the assignments and the evaluations to the special needs of each student than it would have been in a less structured studio situation.

*In a sense, by fragmenting the design process with the various graphic and modeling tasks, we are providing a smorgasboard of design techniques at least some of which we hope are useful to the student in the future. However, we are questioning whether the lessons learned are useful in a broad context. By purposely avoiding a specific "this is the way to design buildings" approach, have the students been prepared to function without the structure of this studio?



Basic Design: A Teaching Method Based on Visual Thinking

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Basic Design: A Teaching Method Based in Visual Thinking

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Learning visual linguistics comes most easily through an on-hands manipulation and analysis of the vocabulary of design, i.e., point, line, shape,form, color, texture and light. In beginning architectural design the construed meaning of these more general elements can transfer easily in concept to the more specific architectural connotations of column, beam, wall, form, etc. Well formulated, open ended exercises exploring the visual vocabularies, introduce the student of design to the language system, albeit visual system, that will become their mode of communication in their life's work. Often, design activity, which explores the basic elements of design is talked about in terms of being abstract. In fact, this work in visual linguistics is the experimentation and discovery of a very real and concrete system of communication which happens to be visual, rather than verbal. For the design professional, this language is no less important than ones own written and verbal communicative skills. It is through visual linguistics that architects and designers the world over communicate, without barrier. It is essential that this language is taught first in the sequence of a students design education in order that they can acquire necessary skills in the most basic necessity for them, the visual language.

A series of exercises have been designed which provide the beginning student of design with a basic understanding of visual terms and methodologies. It is our obligation, as design educators, to provide the students with that basic visual knowledge in order to allow him\her the most basic conversational tools. Very often programs of architecture, which are based in scientific and non-visual methodologies, forgoe the education of vision in lieu of substitute technical, analytical and/or rational processes. This attitude omits the recognition that geometry is the primary intellectual fabric of architectural thought, providing a substantive basis for all other theoretical conception, and that the event of making architecture is a visual exercise and that the event of making architecture is a visual exercise. Is it any wonder that in the late twentieth century, oftentimes we hear third of fourth year architecture professors from programs based in scientific modes, complaining of the students inadequacy in generating concepts related to form and space, except in naive ways? In order to provide the basis for other theories of design, whether those be historicist, rationalist, modernist, scientific or deconstructivist, a basic course of fundamental study in rational and fractal properties of geometry as applied to design is essential, starting with the most pure and simple of shapes , the square, the triangle and the circle and building up an understanding through visual exercise. Paraphrasing Hegel's thoughts, Picasso said of visual learning "..they can know only what they already know. So how do you go about teaching them something new? By mixing what they know with what they don't know. Then they see vaguely in the fog something they recognize, they think, 'Ah, I know that." And then its just one more step to "Ah, I know the whole thing." And their mind thrusts forward into the

unknown and they begin to recognize what they didn't know before and they increase their powers of understanding." (Huffington, 1988, p.110)

Having observed new students perform visual tasks for some twenty years, it is still fascinating and exciting to see the varying degrees of complexity and diversity that can be achieved in a relatively short period of time. Leaving projects open ended and relatively non-restrictive at first provides the student with a canvas for action on which to develop their imagination. Motivation may become a difficult factor in that students at times find it difficult to enter a world in which they are not familiar and the visual world is often very unfamiliar territory for the student of design. Nonetheless, if the educator approaches the beginning studio with a sense of acceptance and openendedness, the creative juices flow freely and the students learn first to think openly and freely on these overwhelmingly important issues.

The study of simple visual geometric principles can set the foundation for creative activity in first exercises oriented toward the beginning design students. As mentioned earlier, it is truly an understanding of visual geometries that provide the foundation for ordering in the design fields and the establishment of order should be one of our principle goals. Types of order are myriad in nature. There are rigid interpretations based in Bauhausian and Beaux Arts methodologies, that provide geometric interpretations on definitive vertical, horizontal grid patterns and spactial organizations. There are more recent developments in design thinking that provide much more complex bases founded in fractal geometry and concepts of chaos. At the early stage of a students experience, in the first semester, it is my contention that there is so much to be learned in solely learning the vocabularies of visual linguistics that the student should be set free to interpret at will. The overriding factor that must be maintained at this level is the production of a creative thinker, one who can make visual manipulations and work with visual entities in creative ways. For the teacher who fears too much diversity, may I also offer a word of caution. Too restrictive an experience in early visual learning will, I believe, offer the student a highly limited experience from which to draw from and produce a certain level of fear in the individual's ability to proceed with confidence. It is my contention that one should work at the beginning level from the more open and general then to the specific. Open ended frameworks for creative action slowly are replaced by more closed interpretations with greater sets of rules and regulations as one progresses through the creative experience. The sequence of projects in basic visual studies should contain a progression of exercises that feed one into the other. In the language of vision, point makes line, line defines shape, shape then defines form and then color, texture and light help us to perceive the qualities of the other elements. This is a natural progression that can easily be maintained in the sequence of offered studio experiences. Some call these visual exercise 'abstract' in fact they are abstractions but of a very real language. For the purposes of this essay, I would like to concentrate on the education of the basic elements of point, line, shape and form.

Point\Line

Teaching point and line configurations can be handled in many interesting ways, but I do think it is essential to present the student with exercises that are both two and three dimensional. One can work with many different media in this regard, ranging from the technical pen used on illustration board or vellum to the use of balsa wood and wire elements and spheres in space. Exploring three dimensional spatial volumes with point and line can be extremely interesting, asking the student to define a visual structure within the confines of a given space using these elements, exploring that 'structure' with the visual entities of point and line. Other factors should enter into the discussion about the placement of elements in space, such as the more intuitive and analytical properties that give qualities to the design such as dynamics, statics, balance, etc.

Shape

Teaching figure\ground studies further explores the realm of geometric principle in that it is the students initiation to the manipulation and intelligent placement of shape. The figure\ground studies (2d, black on white and vice versa)should be those which are centered around the creative manipulation of shape with other shape and their subsequent interrelationships. The explanation of such an endeavor occurs similarly to the type of discourse which would take place in a language course regarding sentence syntax and structure. The difference is that rather than restrictive initial rules which are resolved through rational and established means, producing correct answers which pre-exist, the creative process would allow for a different perception of teaching in that there may be many absolutely correct answers that become new models to be either followed or extrapolated from. Shapes can make a visual, geometric language that can be discussed interpretively as well as creatively.

Initiating the student to shape manipulation, comes first with the explanation of pure shape, the square, the circle, the equilateral triangle. Shapes can be added to shapes. Portions of shapes can be subtracted from other shapes in order to formulate new shapes. The intersection of two shapes can evolve entirely new shapes. All shapes, whether original and pure or newly concocted, can enter into the creative game depending on the formulative rules. One can then interact these shapes with each other and the given background in order to formulate relationships of shapes to shapes on two dimensional surfaces. The resultant design will also have the very deliberate properties of various types of chosen organization, based in two dimensional grid structures, juxtaposed grid systems, etc. The student is then discovering and defining rules as one plays the game. This activity constantly reinforces the students confidence in design making or visual activity. Even when the results are not sophisticated, the process

After learning about the interactive properties of shapes with other shapes, the second phase of the problem is then the eventual organizational possibilities in a two dimensional field. The design and architectural implications are clear in that the shapes may represent spaces or voids as they do when concocting an architectural plan or elevation. Structural conception is also fostered subliminally in this manner through the patterning of elements. If the

teacher is non-restrictive and willing to look at and develop with the student all intuitive and methodological approaches the students may take, the possibilities will be endless and the ability to percieve, many different types of organization will occur. Proportioning systems such as the golden mean should also be discussed at this point, opening the world of possibility for the student. The teachers goal in this teaching system is to open the doors freely and then work individually with students to develop their choice systems. The critique at the end of the exercise becomes a critical educational tool where he comparison and explanation of all the different choices made by the student occurs.

Form

The principles applied to the two dimensional shape studiesare next in sequence applied to three dimensional form studies. In order to intellectually connect the two dimensional visual concepts to the three dimensional, the next progressive step would be to mover slowly from the two dimensional plane into the three by using low relief studies of form. Say. for example, if the earlier formats of the exercises was a 12" by 12" board then this exercise would move som 2 and 1/2" off the board at maxinmum. The eventual project would also be hung on the wall as the two dimensional project has been.

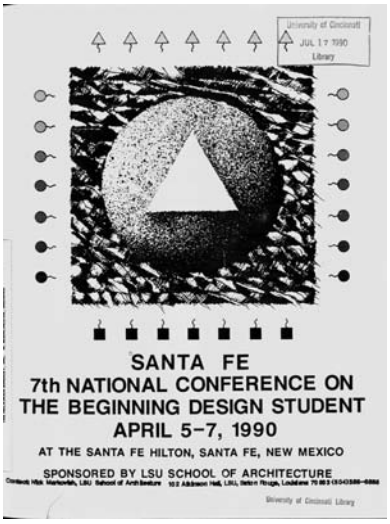
Interaction of forms with other forms can occur as it has with the interaction of shape with other shape. The forms can be added to each other to make larger and diffeent forms. Portions of forms can be subtracted from other forms to create new forms. the intersections of forms can create new forms. In addition planar elements can also be created from this process. It is encouraged that the student begin with smaller pure forms, a 1" by 1" cube, a 1" tetrahedron, a sphere. (the spher can be most difficult and frustrating for this experience and at this stage of visual development and is not encouraged) Once the student has worked within thes geometric properties of the relationship of form, the student is then asked to order the experience within a given field of three dimensional action. Like the two dimensional project rigid subliminal grid structures may be developed or more random ordering of form elements may occur. In either case quite exciting examples will be developed. The scale is an issue in that the geometric principles discussed, addition, subtraction and intersection lead to a personal choice as to the size of elements and voids in the compostion. The exercise should be initially completed white on white so that shadows appear and form is clearly accentuated. Other interpretations in color may take place as secondary studies.

The next phase in the sequence is to then interprest form in a full volumetric study, concentrating on form, plane, line (column), and space in the overall composition. If the two dimensinal study has been executed in a 12" by 12" format then it is logical and desired to contain this exercise within a volume that measures 12" by 12" by 12" high. The idea would be now to take all principles expored in the visual language to this point and to utilize them within this volume of space, expressing the full volume of space and dividing the full volume of space in either rational formats or extrapolated fractal formats. In addtion the more intuitive occurrences of balance and dynamics will be developed. A full formal study then sets the tone for s future step into architectural conception. The studentis encouraged to

again complete the exercise in white only so that the nuances of form can be depicted through the subsequent shadows and play of light. Color interpretation can be excellent extrapolations of the initail idea, set within guidelines. At all times the most precise of craftsmanship should be encouraged and expected in order to reinforce the precision aspects of design in the built environment.

Having experienced this process the student of design is learning to experience visual entities and elements within set peramters of space. this is an elemental definition of their intended professional activity and sets in order the overall educational concept that one will be dealing with column. plane, form, space and light within certain given spatial limitations- a very basic conception of architectural activity. The student who performs this sequence of basic design projects is exploring the language of form and space without the confine of architectural constriction. The third face of basic education in design would then introduce the student to architectural problems by the addition of human scale and behavior within simple functional perameters. This would be executed after the second phase of basic design development which would explore the values of texture and color, the qualititative factors which add a rich dimension to the study of line, plane and form.

Reference: Huffington, Arianna Stassinopoulos; Picasso Creator and Destroyer; Avon Books, New York, NY, 1988



Playing with Blocks: An Overview from Underneath

Jonathan Friedman
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PLAYING WITH BLOCKS: AN OVERVIEW FROM UNDERNEATH

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Some rank teaching beginning design in architecture at the bottom of a very big heap.

To the public, the architect is ranked below doctor, lawyer, even engineer, among professions. To many practicing architects college teaching is an easy hobby--a gift of wisdom bestowed upon the misguided academics, gained from years of "real-world" experience. The professional architect may teach the "difficult" subjects--structures, materials, systems, and of course professional practice, and regard the studio course as the easy stuff--the chance to "grow" with the students through exploring the making of a building, without any need for curriculum content or direction. Within architecture schools design studios are often hierarchically viewed--the stars get to teach thesis, while the tyros are assigned to the earlier years, where the architectural problems will not be so "advanced".

So... teaching beginning design in architecture is in one sense the lowest of the low: at the bottom of the rank in instruction in studio, which is lowest in the architecture school program, which has little status within the profession, which itself stands low in the eyes of the general public.

I think we all share many aspects of this situation. How many of us, here in this conference, have heard our studios or year levels referred to as "down there?" How many of us have actually taught beginning studio in the basement, while thesis studios were on the top floor of the building? But the firmest footings support the tallest structures. As both strategy and frame of reference, often "the plan is the generator."

THE BOTTOM IS THE BASIS, THE FOUNDATION.

We can read a plan from below as well as above. We, as teachers of beginning design studio, stand at the foundation--the basis of our whole profession. When you dig deep enough, you may find the root of things--the origin from which all the rest derives. Understanding (standing under) is sometimes the way to wisdom. It is from this point of view, from underneath, that I wish to attempt an overview of who we are and what we do. Sometimes things make the most sense when seen from the ground up. There are some buildings, like Bramante's Tempietto, that make sense only from below, rather than above.

If, as beginning architecture studio instructors, we are seriously committed to our vocation--yet if the rest of our realm regards us with just a bit too much patronizing indulgence-- still we must ask ourselves--what are we good for? What is it that we do, exclusively, that no one else does or can do? In what sense does the buck stop here?

What We Do That No Others Do

In fact, I suggest that as design studio instructors we practice architecture more than the practicing professionals. Consider it thus: for each student, we must suggest not one, but many alternate solutions for every project. We feel the pressure to articulate and demonstrate effective principles, not just new shapes, although we also feel the pressure to invent new shapes as appropriate. So this means that in every hour of studio, we must come up with perhaps six new buildings (or rooms, details, or cities) for each of 3 or 6 students, 18 to 36 an hour, about one every two minutes, day in and day out. And this is true for juries as well as board crits. Whereas in the profession, an architect is all too often involved in "professional practice" --contracts, variances, billing, bill-collection, negotiations, bids, liability insurance, payroll, benefits, job-hustling, not to mention ordering new plotter points, calling AutoCad, etc.etc... And when it is time to design a project, how rare is it to spend more than a few days on preliminary and schematic design, which may precede months or even years of production drawings (how often is the design development phase already part of working drawings?). So the invention and manipulation of formal configurations, of ordering space, really occupies very little of a professional's daily life. Whereas we must continue to this every moment of our teaching life. Surprisingly then, we actually practice architecture more than most "practitioner's."

There is a nobility to what we do.

This is from E.L. Doctorow's remarkable commencement speech at Brandeis in May 1989, noted in *The Nation*, October 2, 1989.

> And if your teachers here have seemed to you at various times to possess commanding intellectual presence, and I trust they have, the truth is that they are itinerants, like you, having given their lives over to the strange, species-grooming that is particularly Homo sapient-- the modest, exhausted instruction in mind-survival of the generations that will succeed theirs.
>
> And everything impractical they have given you, lines of poetry, phrases of music, and philosophical propositions, and ancient histories, and myths and dance steps, is terribly practical--in fact the only means we have of defending the borders of a magnanimous, humanist civilization--just that civilization which is today under such assault.

Our Discipline

I suggest that we can and do establish a discipline--not just in the sense of rigor, but in the deeper sense of a whole realm of human thought. Just as science is a discipline, as is history, literature, etc... so is architecture. But the essence of architecture is the articulation and realization of ideas in the medium of (habitable) three-dimensional space. It is not just that such ideas are about 3D space, but rather that they are made of 3D space. A thesis called 'centrality' or 'movement' or even 'junior high school' is still only about space rather than the form(s) that space takes. The means for this are always the same--the distribution of solids and voids to make an order in space. And it is our unique mission, as teachers of the beginning college level course in this field, to make this position clear while at the same time enabling our students to begin to master the means for both formulating and communicating such ideas.

The buck stops here, in beginning design. Therefore: We can and must determine means to cultivate the evolution of spacial/plastic ideas.

We can and must articulate the rules for the discourse on issues regarding the art of making 3 dimensional form and habitable space. We cannot assume too much, nor take too many steps at once.

The only difference between a beginning studio project and an advanced project or "real building" design, is, I submit, merely a question of an increasing set of rules. The means and medium remain the same--configuring mass in space--but new parameters like zoning, codes, budget, program, politics, etc. must be accommodated. As Le Corbusier says, we must be able to dance in our fetters. In architecture schools, every other design studio level can blame the fundamentals teacher (and often does)-- but for us, the buck always stops here. This is our strength and our opportunity. We are the first to introduce the notion of resolving a number of problems or issues simultaneously through this strange activity of putting different stuff in different places, looking at the ensemble, and rearranging all or part of the work until the result makes sense as a whole.

I suggest that we can communicate this best through the time-tested methods of education--clearly presented problems and boundaries, repetition and cumulative experience. Or as the old joke about Carnegie Hall goes --practice, practice.... If I come to you as a beginner wanting to learn to play the piano or violin, first I want to know where and how to put my fingers. I am not yet ready for a full analysis of Shostakovich's 8th Symphony. Too often I have seen students presented with "easy" design problems to start with-- a meditation space, a bus station, a house. But the AIA contract guides speak of designing a house as requiring consummate skill of an architect. In fact it is one of the most difficult design problems. So beginners will copy suggested moves, and make pictures of buildings, through pictures of plans, sections, etc. But these drawings often reveal no real spacial sense of what they purport to describe.

Architecture is not drafting, which will disappear soon.

Our post-adolescent/adult students come to us more or less trained in language, numbers, images, music, even science, politics, philosophyetc. They have been developing these skills since infancy, learning refinements and applications throughout primary and secondary school. So typically they come to us knowing that they want to design better cities, their own dream house,etc... but without a clue as to the means to do it. Quite simply, since the kindergarten days of playing with blocks, American students rarely get the chance to continue the explorations of the plastic 3D medium within the bounds of formal education. And even if they have a clay period or shop class, how often do these emphasize formal invention and resolution rather than training of known skills and how often are such activities structured to develop an understanding of principles of design, structured in the same sense that we understand learning trigonometry cannot precede learning subtraction? Too often our beginning students in architecture are illiterate in the very medium they seek to master.

When lessons in drafting or working drawings precede training in space-making, we may train technicians but we do not educate people--we do not provide them with the judgement to make informed decisions from complex choices. With the advent of CAD, drafts-men and -women will soon go the way of Melville's Bartleby the Scrivener, the legal copyist in the days before typewriters, carbon paper, or xerox. Drafting ability is not the skill of spatial composition and

planning. A legal secretary knows grammar as well as a lawyer, but may not know the law--precedent, courtroom manner, etc. I would not ask a cosmetologist to do brain surgery.

Architecture is essentially useless

Let's make it clear. Architecture, as opposed to the design of buildings, is essentially useless. A symphony won't sell soap, although the musical skills for writing one may be applied to advertising jingles. But as Le Corbusier says of the sculpture at Chartres, such pure creation of the mind, and of the spirit, is "the eternally permissible product."

What and how do we teach?

What do we teach, then, when we teach architecture, as opposed to practical hints for the sizing of beams, placement of doors and furniture for efficient circulation patterns, and reading *Sweets* for Windowalls. How do we encourage students to recognize, identify, and generate form, simple yet tending to complexity, complex yet tending to simplicity? How do we get students to generate alternative spacial configurations, and to understand the effects of the orders they select?. How do we get them to be critical of the aspects of their designs which don't work, and to learn how to move on to make their solutions clearer, more vivid, more resolved? How do we teach them to articulate such criticism, and share it with their peers? How do we show them that principles of formal organization, and a sensitivity to the possibilities inherent in parti and in three dimensions actually work-- and can make a building better, more in scale, more economical, more beautiful, more sensible? In short, how do we get them to master the medium of space?

Our Program at NYIT

Well, that is what we have been attempting to deal with at New York Institute of Technology. Our conditions, as some of you know, are perhaps uniquely difficult and demanding. But as Dostoyevsky suggests, perhaps there is wisdom in suffering. I expect that many of you will recognize some of these difficulties-- but if anyone else recognizes all of them, please let me know, so that we can commiserate.

NYIT has open admissions. Anyone with over an 835 combined verbal and math SAT can enter our studios, even if remedial high school English and math are needed. We have hot studios-- no permanent design stations for beginning students, and 3 sessions in each studio room, twice a week. We only meet our students 7 1/2 hours a week, rather than the more standard minimum of 12 hours. We have as many as 18 students per class, and only occasional teaching assistants. We are on three campuses, with morning, afternoon, and evening sessions, on two different weekly schedules-- Monday/Thursday, Tuesday/Friday. We must offer both the first semester and second semester design courses each academic semester, so that some faculty and students are always out of phase. And we are large. NYIT has over 1500 architecture students-- there are over 700 students, and 35 faculty teaching 39 sections of our Design Fundamentals course alone. Added to this are the usual problems-- an administration who sometimes does not sympathize with or understand the special needs of an architecture school-- a very high proportion of adjuncts as instructors, with a very high rate of employee turnover, no doubt in part due to combined low pay and high living costs-- we have had over 100 instructors in the Fundamentals program in a four year period. In addition we have severe limitations in our plant-- no shop or darkroom, limited computer facilities, a library budget which must be split over three campuses, a largely commuter student body, many first-generation college families, etc....

So we are squeezed from both ends. The profession, NAAB and the AIA expect us to produce highly qualified graduates for the profession, while NYIT expects us to take all comers and make them students.

From this adversity, we evolved our program. The advantage was that I had to assume the lowest common denominator at every step. I could take nothing for granted, from either student or faculty. Every project, every drawing technique, every formal issue had in some way to be made explicit. Since the faculty were largely creative architects themselves, every design problem had to be specific yet open-ended-- particular in techniques and issues to be mastered, but general for concerns of style and point of view. The problems had to stated in such a way that problems could be solved, but in many diverse ways. More importantly, the problems had to be stated in such a way that it was clear to both student and instructor when a problem was not solved. [Example of 1, 2, 3, 4 vs. numbers from 1 to 80 expressed as four fours-- ie 1 =44/44; 2 = 4/4 + 4/4; 3 = 4+4+4/4 and so on, and perhaps more important 1 = 4+4/4+4, 1=4x4/4x4, 1 = 4 - 4/4 - \/4].

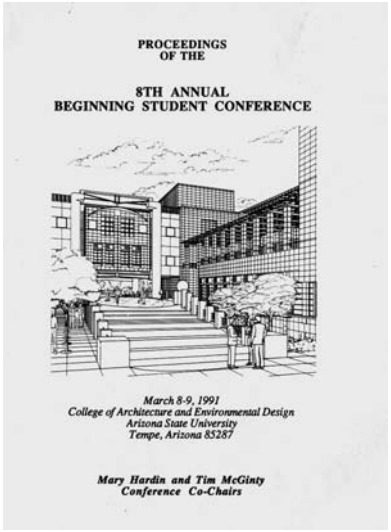
When I first came to NYIT, I saw that even thesis students couldn't think clearly about three dimensional design. Their projects were flat, with at most elevations and the rare section, but even then the east face might have little to do with the south facade, and neither might come from the plans presented. And rarely did they take advantage of plastic and volumetric opportunities.

And my colleagues (the coordinators of the other years) had a specific request for me-- put in such terms as "these damn kids don't know how to draw (when we get them... what have you been doing down there!?)!!" And in a sense I agreed with them, but only in my sense, that is, that they didn't know what to draw, as much as how to...For me this meant that they really had no feel for, sense of, familiarity with the medium of space.

Symphony in which students build a program of small volumes placed in a larger volume-- like stones dropped in a pond, making intersecting and perhaps differently shaped patterns of ripples.

There are still a number of technical problems with our program, but it is gratifying to see the enthusiasm with which both students and faculty are working. One example of an "invention" that spontaneously arose from several sections--making our own zip-atone of the meshes and grids. Another is the use of exploded views and color to make a shorthand notation of the scheme. Other students are seeking to put these elements on computer. Some of the problems include the difficulty of rearranging "bag of tricks" compositions, and the relatively weak emphasis on plan composition (vs. volume composition). But I take as my critics the works of Wright, Euclid, Michelangelo, Aalto, Le Corbusier for Architectonics-- and the works of Fuller, Mandelbrot, Brunelleschi, Leonidov, and Freiotto for Dynamics. This is the direction we are working toward. I expect that in about a year volume 2-- Dynamics-- will be published. I do not presume to suggest that this is the essential discipline for architecture, although I admit to coming close to that. Rather I would suggest to you here today that the specificity of this program is one attempt at formulating a consistent and effective approach to what we uniquely do. As with my own faculty, I suggest to you here today that this is a skeleton, a backbone, on which to hang our debate. Presumably we can finally determine the success or failure of an approach by how well it works. Do the students learn architecture? Does the rest of the world understand architecture better because of our clarity? I tell my students when they first put together 12 cubes and 12 rods on their 8" base that they are truly doing architecture. The only difference between them and the business practitioner, the designer of skyscrapers or hospitals, of chairs or cities, is the number of rules that are added to the game. But in the end, both are arranging solids and voids in intentional patterns-- creating habitable, 3-dimensional, meaningful space. Musicians play with sounds, painters play with drawing and color, poets play with words. Architects play with blocks, solid and hollow. That is our unique medium, and that is is our glory and our challenge.

Thank you.



Parti: New Paint for an Old Lady

William R. Benedict
California Polytechnic State University

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PARTI: NEW PAINT FOR AN OLD LADY

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Introduction

"Parti" is a part of the English language. According to Webster it is "the basic general scheme of an architectural design." (*Webster's Third New International Dictionary*, 1981) There is little debate over the importance of a scheme or concept in architectural design and functionally any term could be used. However, parti with its unique architectural association presents the opportunity to have a term for a concept with a specific architectural meaning. The goal of this paper is to describe parti's historic meaning, note some of its contemporary meanings and synonyms, and then propose a definition.

Parti's French Roots

The word parti was part of the French language long before its use in the Beaux-Arts. It is derived from the Latin word *partitus*, a form of the root word *partio* which means (Glare 1982) to share, distribute, divide up, or apportion. Contemporary French definitions of parti include (Collins 1987); to take a stand; a course of action; to make a decision; a good match; to get the most out of a situation; and a political party.

Parti's first use in the Beaux-Arts context (Gallimard, 1986) of art and design occurred in Stendhal's *History of Italian Painting* published in 1817. In it, Stendahl referred to the artist's parti or choice as to the style in which the musculature of the human body was to be expressed. The earliest reference I have found in an architectural context was by the theorist Quatremere de Quincy in 1825 who "defined *parti* as 'choice' in his dictionary, *Architecture*." (Bacon 1986, 42)

"Composition" and parti (Van Zanten 1977) were associated terms that evolved and became prominent in the vocabulary of the professors of the Ecole in the second half of the nineteenth century. "Composition," addressed a building as a three-dimensional entity and concerned the presentation or detailing of the architectural ideas. Parti addressed the generation of the ideas themselves and was the basic scheme and fundamental solution of the building's functional program. These ideas were choices "from *prendre parti*, to make a choice, take a stand." (Van Zanten 1977, 115)

The issue of choice seems particularly relevant because of the expansion of choices that occurred during the Eighteenth and Nineteenth Centuries. These included the emergence of many new building types, the availability of many styles with Eclecticism ultimately sanctioning their mixture, Durand's proposal that buildings be systematically assembled from "combinations of basic irreducible elements" (Vidler 1977, 107), and the availability of concrete, iron and steel that broke the tie between structure, material and form and its system of articulated load and support. To define a parti was to take a stand amidst the choices—a situation that has not become any easier with the passage of time.

Parti's Place and Meaning in the Ecole

An emphasis on abstract ideas and clarity of presentation were a hallmark of the academic tradition in France. The academic architects (Egbert 1980) saw themselves as artists, and therefore, viewed drawing as the essential act of expressing or making visible their thoughts or mental conceptions. The parti was one element in this visualization process which began at the Ecole with the problem statement or program. Based on the student's analysis of the program and general knowledge of the building type, partis were conceived and typically

noted through diagrammatic plans. The chosen parti was then presented in the form of a sketch or esquisse.

Ernest Flagg said,

> [that the] *word parti . . . means the logical solution of the problem, and as every true architect must have two natures, the practical and the artistic, the parti must be the logical solution of the problem from his dual standpoint as constructor and artist.*
> Ernest Flagg (Bacon 1986, 43)

In his definition, Flagg brings together "the rational and the intuitive, the pragmatic and the ideal." (Bacon 1986, 43) Arriving at a parti "was an act of reason, but the ability to 'grasp' it was an act of intuition." (Bacon 1986, 43) In bringing these together, Flagg was joining the rational use of compositional principles with the intuitive choice of a direction.

Paul Cert said,

> [that] *selecting a parti for a problem is to take an attitude toward a solution in the hope that a building developed on the lines indicated by it will give the best solution of the problem.*
> (Harbeson 1926, 75)

He believed that,

> *the* parti *was a kind of conceptual outline for the building that first established the ideal hierarchy of interior spaces and then their disposition. It was not, as it might appear, merely a two-dimensional plan. The parti established the point, or dominant element of the building and the marche, or route, through the building to the point. Thus, the parti guided the entire composition from the plan to section and finally to elevation.*
> (McMichael 1983, 44)

The parti was able to communicate a richness of meaning because of the context in which it operated. The Ecole's system of composition which included the use of unity, symmetry and balance, clear hierarchies, axis, and reference to precedents underlay the parti's form. This system of rules and conventions meant that a very few lines could carry a great deal of information. Given this context, the meaning of a parti was clear and rich.

In summary, the parti established the abstract layout of the plan as separate from the specific form of the design. It directed the layout and relative importance given to the elements in response to the functional requirements of the problem. However, the parti was not a single-minded response to function. It also addressed the artistic, emotional and experiential qualities of the building as a three-dimensional whole. The parti held within it a vision of the experience of being in and moving through the building. It was the taking of a position—the making of a choice—as to what the building should be.

Concepts

Many terms in addition to parti are used to identify design ideas. Of these "concept" is the most commonly used. Concepts (McGinty 1979) suggest specific ways that requirements and beliefs can be brought together—they integrate elements into a whole.

Paul Laseau (1989) states that the "basic concept" or parti at its best, provides:

> *1. The first synthesis of the designer's response to determinants of form (program, objectives, context, site, economy, etc.).*
> *2. A boundary around the set of decisions that will be the focus of the designer's responsibility.*
> *3. A map for future design activities in the form of a hierarchy of values and responding forms.*
> *4. An image that arouses expectations and provides motivation for all persons involved in the design process.*
> (Laseau 1989, 155)

Although concepts occur at all scales and in all phases of the design process, the basic concept, big idea, superorganizing idea—the parti—refers to the most important and inclusive. This is reflected in the definition of parti presented by Clark and Pause in *Precedents in Architecture* (1985) who define it as,

> *the dominant idea of a building which embodies the salient characteristics of that building. It encapsulates the essential minimum of the design, without which the scheme would not exist, but from which the architecture can be generated.*
> (Clark & Pause 1985, 3)

Concepts, however, do not just appear out of the problem but are perceived as a result (White 1975) of the individual designer's world view, general philosophy, design philosophy and view of the problem. Concepts are a statement of what we value. As such, they take a stand and impose a hierarchy. Those issues that we see first in a problem are those we value most and solve first. Furthermore, "the concepts generated early in the planning process tend to solidify our perception of the problem and thus influence and even govern the concepts that follow." (White 1975, 19)

Contemporary examples and definitions of parti (Friedman 1989, Clark & Pause 1985) tend to present it as a diagram without an accompanying interpretation or explanation. They appear as distilled logical diagrams whose meaning is ambiguous because unlike the parti within the Beaux-Arts there is no commonly held compositional system with its rules and conventions. If a parti is to be understood today there must be some explanation or interpretation that accompanies the diagram.

Parti: A Definition

A Parti is an inclusive geometry, and its interpretation which identifies and articulates the essential elements, relationships and intended meanings of a design.

If design is the process that transforms ideas into things then the parti provides the link. It is the fundamental move in the transformation of words into form. Human beings have the ability to formulate concepts and transform them into symbolic representations through "two principal media: verbal language and visual images. . . . What links these two forms of expression is the concept" (Lynch & Marche 1990, 128)—the parti. If a parti is to stand alone as the abstract representation of the essential architectural concept it must do so by employing both drawing and its interpretation—both visual and verbal representations.

To further develop what I am proposing, the implications of key ideas from the definition will be explored.

Inclusiveness

The more inclusive and mature the parti, the greater its gathering power—the larger the number of ideas it is able to accommodate. A parti is more inclusive if it simultaneously addresses more issues and interrelationships, meets more requirements, includes more elements and affects more decisions.

Geometry

The visual representation of a parti is its geometry or formal structure. The nature and beauty of language is that each word or sentence can carry many meanings. Physical things however, afford a more limited range of meanings. The geometry is a commitment to a more specific direction. It is a circle vs. a square, close vs. far, straight vs. crooked, identical vs. different, one vs. nine, light vs. heavy, simple vs. complex.

Historically, the parti was associated with a plan view representation of the idea. However, the parti should use any means that allows it to communicate its three dimensional essence. It may be a drawing, model or computer image; orthographic, axonometric or perspective; figural, diagrammatic, or gestural; in any combination or form.

A parti's geometry should be an efficient, clear and complete visual representation that communicates the rational and experiential or expressive intention of the design.

Interpretation

Juan Bonta proposes an interpretational model of architecture in which the meaning of architecture is "removed—and sometimes even dissociated—from what architecture actually *is*. The real functions of a building . . . [can] be quite different from those expressed in its design and perceived by different people." (Bonta 1979, 14) "When a designer discusses his work, he is behaving as an interpreter, not as a designer." (Bonta 1979, 226) She is expressing what she believes to be the meaning communicated by the design.

The parti includes an interpretation of the geometry—a verbal representation of the concept. The interpretation makes manifest the designer's intended meanings, beliefs and priorities and describes the parti's implications for the elements of the problem. Once stated, it launches a dialogue over meaning. Within the studio the dialogue brings out the fit between the student's and other's interpretation and the consistency between the verbal and visual representations.

Elements

The inclusiveness of a parti is related to the number of problem elements or determinants it is able to address. Each design problem brings together a set of factors or determinants. These may be grouped for example under the categories of:

Technology (structures, environmental controls, and construction)
Context (the natural and manmade environment)
Function (physical, psychological and social needs)
Aesthetics (the perception of things as beautiful or pleasurable).

A parti must identify and address a problem's essential elements and establish the relationships between them.

Relationships

The nature of relationships is of central concern in transforming ideas into things (the relating of physical qualities and structures to conceptual qualities and structures). In the process of design we search for and create three fundamental types of relationships:

Pattern (repeated or predictable relationships)

Hierarchy (relationships of relative importance)
Disruption (relationships of variation, contrast, or the unpredictable).

The parti must describe these relationships. It must establish what is to be expected, what is most important and what is a surprise. It gathers and locates essential problem elements and establishes their patterns and hierarchies against which the disruptions can be seen. It affords the perception of (Friedman 1989) the ordering principles, logic or rules which guide the development of the design.

Intended Meanings

Meaning is read from and attributed to a thing through its affordances and the personal, social and cultural filters or schemata each person has constructed through the process of learning. Each thing affords or supports a certain range of meanings at any given point in time for each observer. A designer's decisions relating physical qualities to ideas are made with the intention of communicating certain meanings. These intended meanings are based on the designer's interpretation of the form and his understanding of the users.

Meaning, according to Hershberger (1974), is both presentational and referential. Presentational meaning is based on the form of the thing itself. "We separate the object from its context (field), perceive its shape, texture, color, and so on, realize its status relative to us and other objects, and categorize it according to known objects and events. (Hershberger 1974, 149) Referential meaning results from connections between things and our memories and includes both association (meaning based on intellectual memories which find their reference in human culture) and empathy (meaning based on bodily memory). In turn, from presentational and referential meanings feelings, emotions, values, attitudes and ultimately behavior is constructed.

In other words, meaning is both rational and intuitive, mind and body, abstract and experiential. If the parti is to be the fundamental concept, it must have the capability of addressing and communicating this full range of meanings.

Conclusion

What has been proposed is a parti employing two forms of communication—a geometry or visual representation and an interpretation or verbal representation. Furthermore, these address the essential elements, relationships and intended meanings of the design. In my thinking and teaching, two issues have become pivotal. First, partis should include both visual and verbal representations; and second, partis should contain both rational and experiential information.

The verbal/visual combination is particularly important for students who usually have a word orientation. The parti provides a link or bridge between the verbal and graphic systems and each can be used to understand and critique the other. The dialogue that grows out of this juxtaposition can develop an awareness of the relationship between ideas and form and build an understanding of the meanings afforded by form and its representation.

The expression of both thought and feeling—the rational and intuitive—in the parti is equally important but more difficult. It is important because previous education has usually emphasized the logical. It is difficult because students have had little experience in translating emotional or bodily centered experience into form and because the logical and experiential are usually addressed through separate means. If the parti is the essential architectural concept then it should address architecture as a whole—it should communicate its rational and expressive content.

I began with the goal of learning what a parti was. The result has been a renewed interest in the nature and use of concepts in design and design education. I have presented a definition for parti that acknowledges both its historic and contemporary meanings. In one sense, any term could be assigned this

definition. Parti's value lies in its unique architectural association. However, regardless of whether you are comfortable with repainting an old lady, the definition and representation of the essential architectural concept is a powerful tool in design and design education.

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Against the Humunculus

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AGAINST THE HOMUNCULUS

The education of the beginning design student may appear to be an uncomplicated time of mutual innocence and sharing, of discovery and inspiration, pure and clear. And it is, in fact, all these. But this moment also sits at the cusp of knowledge, at an instant in which the disordered and intuitive become markedly less so. It is thus the period of maximum student receptivity, born of naivete and the inevitable enthusiasm generated by novelty, the point at which ideology is most readily transferred, the boot camp of architectural education.

Consequently, this ideologically fraught time is particularly vulnerable to emphatic doctrine and insistent positions. That which may seem elementary is complicated by the biases of those extremely non-innocent individuals, ourselves, who determine curricula and exercises. Just as with the professional registration exam, accreditation criteria, and school course requirements and content in general, the methods evident in the first teaching of design express the powerful convictions of those who determine them, though they are often put into effect with less commitment by those who must adhere to these methods in their teaching without having participated in their formulation. But the passive acceptance of, or actual obliviousness of much beginning design faculty to, the profound ideological content of their instructional program does not lessen the force of the covert lessons that accompany overt exercises.

This paper will argue that beginning design curricula, as practiced in many schools of architecture, are indeed highly tendentious and are based on debatable definitions of the parameters and issues that the profession faces and that school work consequently might address, issues responding directly to the greater culture architecture serves and to our role, as designers, in representing that culture. This definition finds architecture to be figural by nature and necessarily compromised by history and by the physical arena in which it expresses itself and of which it becomes part.

To be more specific, this paper will argue that the first teaching of design as a primarily compositional endeavor, with the implied agenda of unleashing innate creative genius in the young designer, rests on an epistemology that is now highly questionable. I refer to the primarily formal exercises - cube transformations, nine-square manipulations, color studies, etc. - that characterize many elementary design courses. Their roots lie in the interdisciplinary routines of the early Modern design education as exemplified by those of the Bauhaus, and they indeed suffer from some of the easy presumptions and strident dogma of that era.

These exercises are largely indistinguishable from similar courses taught in art schools, and they display an analogous attitude toward education both in the fine arts and in architecture. This attitude is primarily formal. I will characterize the current architectural period, following conspicuous post-modernism, as one of neo-expressionism and a partial return to codes of abstraction and autonomy, though enthusiasm for these attitudes seems to be winding down, as must unavoidably be the case in the fashion-based climate in which we find ourselves. They have emerged in conjunction with the rejection of historical discussions and urban issues and, in fact, with the rejection of all catholic external criteria for design in general. Concurrently there has been an entirely logical revival of the popularity of formalist teaching programs.

Not surprisingly, these exercises remain mostly compositional. The cube is their perfect vessel. While professing to offer some relation to conditions that are architectural, conditions of "spatiality" or "inhabitation", the cube remains as mute as possible. It is non-hierarchical in its proportion and it has no sides, top or bottom. It is the consummately disengaged object and transformational exercises applied to it, by nature, stay sculptural. The messy issues are avoided and beguiling form is arrived at. The products look good and, given their universal source and the typically reductive rules for their alteration and material, they look good together. Students and professor feel good and a sense of accomplishment leads to the notion that success has been attained, design accomplished.

It is indeed important that some sense of achievement accompany early design work, for it can readily appear insurmountably complex and intimidating, but it must also be recognized that the restrictive criteria for formal production that is usual in so many architectural programs, while generating instant fulfillments, also are promoting

powerful notions of what are the important issues to further pursue in an architectural education.

These concerns are often presented as somewhat abstract problems allowing a certain, extremely limited, palate of "moves", assuring again an attractive product almost guaranteed by the intractable rules, but at the same time implying a doctrine of "design as game" that seems to be calculated to avoid the tougher issues that face our troubled art. The nine-square, with its limited rubric of possible formal permutations, becomes the gameboard of composition.

It can be inferred that architectural design is a contest to be won through the clever manipulation of its rules. It is a riddle to be decoded, a set of problems to be solved. A possible "perfect game" is proposed and its parameters sought. The closure of systems and the implication of the "end of the game" are everywhere evident. The search for a "solution" employs a terminology linked to mysteries and puzzles, and implys a definite teleology. The promise of a moot finality, of success in a gaming process, seems evasive and strange. Architectural education, and potentially practice as well, actually seems much more about means than ends.

This lexicon continues in the formalist discourse characterized especially by the Cornell School, in the intricate lexicon of "moves" and "pieces", in the habitual identification of gambits and strategies. Military action, so often domesticated on the gameboard, here again finds safe expression in the terms of design. Always form is made irresponsible and the difficult but inevitable friction of cultural concerns is avoided. The maintenance, in subsequent architectural education, of an ongoing discussion of design primarily at the parti stage and in plan projection continues to stem from a specifically compositional bias. While often complicating the play by presenting a vocabulary of architectural elements - walls, windows, doors, stairs, etc. - as game pieces, these elements are dematerialized to the point of intangibility, adhering finally to the formal inclinations of this approach. Rather than representing an array of spatio-sensual experiences, they become incorporated into the sculptural inquiries that have preceded them.

The nature and intent of these exercises is evident. They are unrepentantly compositional and their inventors seem either to believe or to ignore that they make the armature for later architectural pursuits for which the ideology is put in place in the first years of education, that the making of buildings continues to be a sculptural activity, that object predominates over field. Several other beginning approaches, however, seem to make different arguments while in fact encouraging the same conclusion.

Often functioning quite similarly, while suggesting that they do the opposite, are beginning design investigations that profess, through the actual construction of objects, to investigate the nature of making or the materiality of things made. These exercises stay predominately removed and sculptural however, and they are profoundly romantic in their ideological content. They substitute an illusion of craft or an impression of tactility for the sort of culturally engaged architectural discussion that might actually confront these conditions from the position of our trade's interaction with and dependence upon them. I am not, of course, saying that real making is bad for students. But the crafting, out of precious materials, of often beguilingly useless forms seems to avoid the sort of constructional experience that might in fact contribute to an understanding of our art, while promoting the glib nostalgia for craftsmanship that can lead to anti-intellectualism and the most banal of pastoral cliches. A craft-material fetish avoids the crucial interaction of these very properties with our discipline and its production, while indulging in the pleasure of finishes and the delicious illusion of labor.

Likewise a preoccupation with educational "process" can move toward a rich methodological discussion or towards the sublime emptiness of exponential possibilities arriving at near-pure form. The latter seems of greater interest now. Here there is a difference however, for, if the compositional exercises first discussed in this paper are reductive and propose finally a "solution" that is the inevitable result of limiting possibilities, then process arrives at an equally disengaged formality by always expanding them. The fear of closure is so intense and the desire for lavish form so insistent that the operations are ever expanding, offering variables at every design turn and arriving at, or perhaps just halting arbitrarily at the brink of, infinite representation - complicated, graphic, exciting, but as uncommitted as any of those so far discussed.

Process values the intrinsic possibilities of the permutations of depiction. These are often automatically con-

nected, with little rigor, to the actions or mechanisms of the body. With the same ease with which the creation of crafted objects is thought to imply automatic access to modes of production and mastery of material, reference to "the body" is intended to instantly and uncritically resonate, merely at its invocation, with the same instant charge that mention of the body has recently been universally generating. Such popular concepts arrive at a sort of intellectual short-hand that obviates the need for rigorous discourse. They glow on their own. Like all such notions this one has become both a bit tired and, as so often happens in this information-saturated time, has begun itself to arrive at the pure uncritical formalism that one associates with words chanted over and over by children. This is indeed tragic, as it was for previously resonant and now unfashionable references to "history" and "the city", for there is much there that can enrich our dialogue. As fascinating as consequent critical discoveries can be in this line of investigation, the focus on the body is by definition internalized. The extremely externalized concerns of architecture are turned inward. This disengagement serves several purposes. It objectifies the product and the designer and makes both available for appropriation. It also tends toward formal study. Generally, given the contemporary exhaustion of terminology and affection for the compositional, "the body" and "process" verge on the muteness of total familiarity and infinite form.

Whether the instructional technique is to encourage compositional panache through formal exercises, to foster a romantic notion of construction through primarily sculptural production, or to arrive at a formal entropy through the "exquisite corpse" of process, the result for the beginning design student is often a continuation of the implied formalist ethos in further investigations in school and later as a professional.

The bias toward formal exercises as device to begin architectural education derives from an heroic view of design genius, a view that has to be seriously in doubt today. The student is homunculus. In his or her tiny form is the curled creative force, whole, and waiting to be released. Opening, flowering - these are the goals of these formal lessons. We do not teach, we passively nurture that which already exists to reach fruition, to emerge. It would prejudice genius to present students with given conditions. Reality, as nebulous as it is, might spoil them.

That it is enough to encourage formal exploration that will lead to a blossoming of latent creativity is indeed questionable, both on the grounds of an automatic connection between the two, pure form and the demiurge, and further contesting the innate primacy of the latter as the main focus of an architectural education. This paper will argue instead for an ontogenetic, not homuncular, beginning design curriculum.

It is indeed true that we make a lot of exciting shapes this way. This is satisfying for student and professor, and, if "cool form" were the goal of architectural investigation, then the logic of this approach would be irrefutable, and perhaps appropriate to a commodity based culture hungry for new consumable market images. But further study of the role of building in culture seems to indicate that, when it is architectural, form is deeply compromised by forces outside itself - by historical understandings, by the realities of contemporary culture, by nostalgia for the future, by the actual physical conditions of the realm that buildings find themselves part of and contribute to, by the perceptions of the collective, by the proscriptions of the powerful, by the insistent argument for space over shape, by aesthetic concerns, theoretical concerns, technical concerns, economic concerns, political concerns, environmental concerns, by matters codified in allusion to the body and the city, by the burden of received meanings and their shadowy and shifting nature, by the possibilities and limits of reference, by the whole complicated gamut of information and sensibility that implys that form is in fact much more than just form, that it is deeply engaged in discussions outside its own pristine envelope.

How then does one go about providing access to these discussions, assuming that it is not a good idea to suppose that they will come later, after the student has become comfortable with simple form, assuming that this comfort will persist as design dogma? To continue this argument, this paper proposes an architectural model that is figural, communicative primarily as space and material at a level of detail that can present these phenomena. Architecture is assumed to be an engaged expression of history, societal value and collective sensibility.

This is an argument against neither imagination nor inspiration. In fact it is one for them, but as implicitly informed by observation and learning. One cannot "forget" what one does not know. One cannot reconfigure an unknown field.

And this may be the point, that the role of school in the preparation of young designers to practice our art is as much about reconfiguration as pure creation. Not that the latter is of no importance to the process of making buildings. Obviously it is central, but intuitive creativity itself is a nebulous and synthetic process largely relying on techniques of transformation and cross-reference and, given its visceral properties, it remains largely inaccessible and unquantifiable within the framework of conventional architectural education.

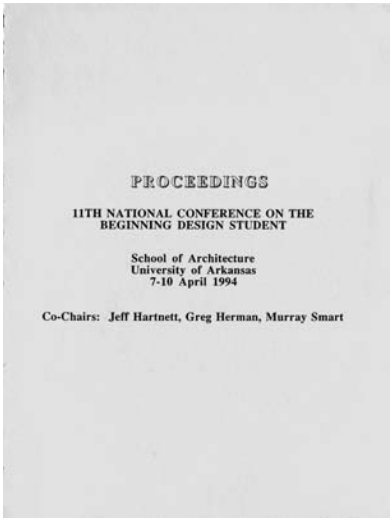
Conversely, the acquiring and metabolization of information and the intense dissection of the methods of design, in other words, the more conventional aspects of accepted didactic practice, seem very available in this conventional academic milieu that we staunchly maintain. These are the services schools have classically provided. This is for a reason other than the conservatism inherent in current university structures. The rich process of interpretation and invention that constitutes the creative act cannot occur in a vacuum. There must be material, and the gathering of that material is largely a process of inquiry, of learning in the most ordinary of senses occurring simultaneously with the most extraordinary of critical actions, combining as the design act.

Analysis seems an essential component in this process. This term used here encompasses the dissection of actual buildings and their constituent parts and of ensembles of building at the urban scale, also of cultural material outside the autonomous realm of architectural production - films, paintings, literary texts, etc. Analysis also identifies the quite limited basic palate of architectural elements that we reinterpret and recombine. It can be as finely focused as the individual detail or as broad as the city, but it seems crucial that it be engaged in, with real rigor, immediately by the beginning student. He or she should start to gather and understand given cultural conditions as they begin to transform and emulate them in the design process. Critical inquiry is necessary in seamless conjunction with, and informing, composition. Georgio Grassi insists that there is no break between the moment of analysis and that of design and an architect as antithetical in his formal and stylistic enthusiasms as Rem Koolhaas seems to concur in his design method.

The simple description of forms and their interrelation is not the end of analysis. It should also consider the collective understanding of cultural artifacts and their representation. This is best begun by the identification of diagram and the similarities and differences between diagrams, but these formal comparisons should then be understood as figural, as significant and tactile. Through this means the issue of typology, in the European semiotic sense, enters into the discussion.

Albeit typology smacks uncomfortably in the current climate of rationalism, categorization, systems and logic, of pitched roofs and Aldo Rossi, of history itself. And the proposition is indeed flawed that typology is a precision tool for quasi-scientific architectural work. But as an appáratus for interpretation and metamorphosis, as an active design tool with all the possibilities for misprision, for creative misreading, that such a tool should incorporate, typology may span the breach between the existing and the proposed, between the learned and the imagined, between the known and the dreamed.

That the study of the relation of forms both manifests similarities and reveals differences seems a given, and that these then represent arbitrary and shifting codes of significance also seems elementary. That this study should accompany the first tentative attempts at design seems desirable. In fact desire is nurtured through experience. The presentation and critique of experience seems the primary role of schooling. Therefor, the plea here is for an early education that, while striving to inspire, is rigorous in its attempt to inform, its encouragement to observe, and its incitement to critique the complex vectors that bear on architecture and the information-rich culture that architecture both forms and serves.


PROCEEDINGS

11TH NATIONAL CONFERENCE ON THE
BEGINNING DESIGN STUDENT

School of Architecture
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7-10 April 1994

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Between the Walls Lies a Space

Bruce Lonnman
Syracuse University

Eleventh Conference
University of Arkansas
1994

BETWEEN TWO WALLS LIES A SPACE

The Parallel Wall Problem: Origins and Pedagogic Intentions

> *"If I were to define architecture in a word, I would say that architecture is a thoughtful making of spaces."* Louis Kahn

The design problem presented in this paper is based on the belief that the first and foremost lesson in architecture is the comprehension and design of space. To be able to design space, the beginning design student must first be able to perceive it as form. Making the conceptual void/solid reversal that allows space to be visualized as if solid is an important step towards acquiring this new way of seeing the physical world. A shift in perception towards seeing space, as opposed to the physical elements that define it, is the goal of this reversal process. Exercises that have the student draw or model as solid a space with which they are familiar (perhaps the main hall of the architecture building they occupy) can be an effective means of attaining this goal.

The nature of the exercise requires that the space has a clear and unambiguous form. Space that is perceptually clear has two important characteristics. First it has well defined boundaries. For example, in the case of a cube, the identification of eight points in space corresponding to the corners of the cube is a minimum requirement necessary to establish the precise envelope or boundary of the volume. Further delineation of the edges and surfaces of the cube increases the completeness, and hence the legibility of the form. Secondly a space gains perceptual clarity if its three dimensional form possesses a strength of figure in relation to its context or ground. [1]

In order to introduce concepts of space making in a progressive manner, a series of short design exercises were devised to focus a student's investigation on a particular issues, for example the nature of figure-ground reversibility and its implication on three dimensional form (fig. 1). The exercises move from purely graphic studies to three dimensional models which explore ordering concepts in wall structured compositions (fig. 2 & 3). The concept of a wall used as an organizational datum is the focus of an exercise that requires the student to first invent the wall as an object of specified length, width, and height. The articulated wall object is then treated as a datum in organizing a composition of elements within a square field (fig. 4). In each of the exercises the initial ground or base is a square and throughout the sequence an emphasis is placed on field organization which recognizes the compositional strategies inherent in the properties of the square.

The final exercise in the series is of longer duration and is a version of a problem type sometimes referred to as the Parallel Wall Problem. It is a didactic exercise in the manner of the Nine Square Grid Problem [2], the design exercise developed by John Hejduk at the Cooper Union School of Art and Architecture. Like the Nine Square Grid Problem, the intention of the Parallel Wall Problem is to introduce the beginning design student to the basic elements of architecture and the logic of formal ordering systems. As John Hejduk explains:

> "The *Nine Square Grid Problem* is used as a teaching device to introduce new students to architecture. By working on this problem, the student begins to discover and to understand the elements of architecture: lattice, grid, pile, beam,

> flooring, center, periphery, field, edge, line, plane, column, extension, compression, tension, translation, etc... The student begins to become aware of plans, elevations, sections, and details. He learns to draw. He begins to assimilate the relationships between two-dimensional drawings, axonometric projections, and three dimensional shapes (models). He studies and designs his scheme in plan and in axonometry, looking for its three dimensional implications in the model. In this way he arrives at an understanding of the elements. He begins to get an idea of how to build."[3]

A sense of the autodidactic nature of the exercise comes through in the description by Hejduk and is one of the intrinsic virtues of the problem. It is achieved in part by the imposition of certain requirements and parameters; namely the grid frame with its modular nine square subdivision of the square field and the celebrated kit of parts, a designer's tool box of abstracted building components and elemental solids. These restrictions have the beneficial effect of giving the young designer something to react against and, at the same time, providing well defined limits within which the work is to be carried out.

The Parallel Wall Problem likewise employs a regulating structural system and a set of additive elements. In place of the precise and fixed armature of the Nine Square Grid frame, a system of parallel walls is assumed (fig. 4). The wall system is specified in number, height, and orientation, but the designer is allowed certain freedoms which are critical to the development of a spatial gridding that runs counter to the direction of the walls. By removing sections of walls and introducing portal openings, a cross grain spatial layering can be obtained (fig. 5). It is important to note that both of these operations are subtractive. This introduces the beginning student to a design process which is the conceptual opposite of the additive and infilling process which characterizes the Nine Square Grid Problem. Such a reversal has significant implications on the conception and forming of space. Since the problem prescribes at the outset a fairly dense, compaction of walls (eight in number evenly distributed on the square field), the designer is compelled to selectively cut away and carve out of the fabric voids in order to achieve the desired spatial composition satisfying the goal of the problem statement: the transformation of the neutral and non-hierarchical wall system into a gridded composition that defines a series of spaces and creates a well articulated spatial sequence. Approached in this way the spaces tend to be more positively formed: the action of carving and cutting being focused on the shaping of the spaces and not the structural walls or secondary elements which ultimately define the spaces.

The potential for spatial design that is possible through wall subtraction is augmented by two additional transformative operations: variation of the wall spacing and the introduction of secondary elements. The elements consist of horizontal roof planes, non-structural partitions, and a specific set of elemental objects. Like the wall planes and prismatic solids in the Nine Square Grid kit, these elements are used as infill and can assume one of two roles; that of space definer or space occupier. As space occupiers the elements of the kit (cube, cylinder, prism, and plane) can function with strategic intent, for example marking a center or terminating an axis. As space definers the elements serve to create spaces or offer a greater degree of enclosure and definition to the spaces made by the process of wall subtraction. The allowance for a variation in the wall spacing gives the designer an alternative means to adjust spatial

dimensions. Restriction placed on the maximum distance between structural walls that support horizontal planes is motivated by an underlying assumption of appropriate span.

While the emphasis of the exercise is an investigation of pure form and the principles of formal organization, which lends itself to the abstraction of the work, tangible relationships to architectural built form are nonetheless embedded in the design of the problem. For example, the scale of the project is stipulated as eighth inch, which makes the dimensions of the components realistic as actual building elements (structural walls of 1 foot thickness and 12 feet in height, non-structural partitions of 4 inch thickness and 8 feet in height, etc.). The program, although nonexplicit in the traditional sense, requires that a series of spaces be formed and connected by a sequential circulation, initiated at a point of entrance to the "site". The presumed purpose or function of the design is thus left up to the designer for speculation. Is the construct a public place, such as an art gallery, or a private residence? These questions of programmatic use are unavoidable and offer an opportunity to discuss the design in relation to known precedents. Examples of architecture and urban design are introduced and serve as a bridge between the hypothetical nature of the exercise and the occurrence of similar formal relationships in work that is built.

The exercises so far described are preparation for a design project that again poses the parallel wall structural condition. Site, program and explicit criteria for the construction elements are introduced simulating real design constraints. Faced with the demands of the new building project, the role of precedent takes on increasing importance. Two precedents, the Villa Sarabhai and the Maison Jaoul of Le Corbusier, are adopted as paradigms on the basis of the parallel wall system which they both employ, and the mastery of the system by Le Corbusier, especially with regard to the dialog between space and construction.

The concept for this problem type was developed by Werner Seligmann for the first year design studio at Cornell University, about 1971.[4] The design of a single family detached residence with parallel wall construction, was the culminating project of the first semester of design. It was preceded by model studies such as the Cube Exercise in which three perpendicular, non-parallel planes positioned orthogonally inside a cube define a hierarchical subdivision of space with solid and void expression on the exterior surfaces (fig. 6).

The Cube Exercise was a design exercise originally developed in Austin, Texas, at the University of Texas where Bernhard Hoesli with other faculty including Seligmann, Colin Rowe, John Hejduk, Lee Hirsche, Robert Slutzky, Lee Hodgden, and John Shaw, sought a teaching methodology that would be rigorous in its examination of the principles of Modern Architecture and objective in its critique. An account of this collaboration is recalled in the essay by Werner Seligmann, "The Texas Years and the beginning at the ETH Zurich 1956-61", written as a preface to the book documenting the teaching career of Bernhard Hoesli, *Teaching Architecture: Bernhard Hoesli at the Department of Architecture at the ETH Zurich.*

Briefly, a new approach was initiated by Hoesli and his Texas colleagues in reaction to the prevailing basic design teaching based on the Bauhaus model. This model had replaced the long lasting Beaux Arts educational system in most schools of architecture by the 1950's. An important premise of the Bauhaus method was the 'tabula rasa' concept in the design process.

As Seligmann explains:

> "Basic Design, taught in this country by the former students and teachers from the Bauhaus, was based on the assumption that basic design training in architecture would free the student's innate creative sensibilities, unencumbered by precedents or critical debate, free of bias and formal prejudice. Basic Design was thus not just another method of teaching, but a proclamation of faith. This method was to protect future generations from contamination by history and artistic scholasticism. To be creative, therefore, according to them, required a childlike innocence, and a belief that each problem contained its own solution, easily discovered, if one only asked the proper questions."[5]

One result of such a process, which divorced student work from a dependence on established design principles and reference to precedent (both important tenets of the Beaux Arts system), was criticism of a largely subjective nature. As Seligmann points out,

> "Comments and criticism in reviews were mostly limited to 'I like it' or 'I don't like it', and subjective terms such as 'dynamic, static, tension, movement, character, clean lines, flowing space', etc."[6]

Additionally, the importance of architectural history was devalued in the Bauhaus model.

> "According to the premises of the new teaching (since all problems were to be addressed as new), young students were not to be contaminated by contact with the past. It introduced into American teaching a contempt for architectural history. Too much knowledge of history, it was claimed, would inhibit the inventive processes and the creative mind."[7]

As the story goes, Walter Gropius upon his arrival at Harvard, had all the plaster casts of statues and classical building fragments destroyed. Furthermore, it is said that he placed a moratorium on the use of the library. A war was in progress against the eclecticism that had become prolific under the Beaux Arts system and architectural history was perceived as the main enemy.

Against this background it was the intention of Bernhard Hoesli and his Texan colleagues to restore a more rigorous approach to the teaching of modern architecture. This involved a careful examination of the best examples of modern architecture with the objective of discerning its identifying characteristics and basic organizing principles. To accomplish this goal the important works of modern architecture were subjected to an extensive and detailed analysis. The work of Le Corbusier, Frank Lloyd Wright, Mies Van der Rohe, and others was examined through models and diagraming in order to establish principles through "a generalization of the organization of the buildings."[8] This investigation was incorporated in studio work, thus becoming a teaching model that advocated design principles obtained through historical precedent research.

A second aspect of the approach was based on the desire to establish a more definite basis for the conception of space as well as its critical evaluation. Reacting to the vagueness in the characterization of space as "flowing" and "abstract", which was prevalent at this time, Hoesli

believed that space should be seen as having "quantity as well as quality"[9]. This implies a conception of space as having discernible form, as discussed earlier. To address with greater precision the conception and forming of space, short design exercises were formulated that focused on key issues concerning spatial design. The Cube Exercise is one such example. Programs were written that stated clearly the issues, requirements, and objectives, followed by an explanation of the particular principles or methods to be applied. This technique, referred to by Hoesli as the "lesson of the day", enabled the discussion of the student work to be made with reference to the specific intentions of the program, thereby establishing a basis for objective criticism.

The Parallel Wall Problem is an exercise that extends the investigations of spatial design described above. The redundancy of wall structure provides a neutral and regular datum within which an exploration of spatial layering might occur. This possibility, derived from a cubist vision of space, is powerfully demonstrated in the Sarabhai House of Le Corbusier (fig. 7). Despite a dense wall spacing of less than ten feet (9'-8 1/2") the Villa Sarabhai obtains an openness of plan through the calculated subtraction of the wall structure. The spatial gridding that results is a product of the directionality of the vaulted spaces parallel with the walls and the cross grain spatial layering developed laterally (reinforced by the floor pattern). As Le Corbusier writes:

> "The composition serves to create openings in these walls, all parallel, playing solids against voids-- but playing intensely the architectural game."[10]

While there are other lessons to be learned from Villa Sarabhai (responsiveness to climate, economy of construction, etc.) the approach to spatial design is fundamental and enduring.

The various ways in which the system of parallel walls has been adopted and reformulated as a beginning student design problem, and the successful results of these attempts, attests as well to its versatility. For example, the use of the parallel wall structure for a repetitive one story housing unit design in a first year studio at Columbia University in 1979 (fig. 8). In this problem the designer faces familiar questions. Which way to orient the walls? How to use the walls to accommodate the spatial hierarchies of the program and to provide for distinctions between public and private realms? And as the description accompanying the illustrated student work states, "How best to exploit a given situation to pragmatic and abstract advantage."[11]

In this last statement is a suggestion of how the Parallel Wall Problem has additional value beyond the investigations of space and form, construction system, or program. The limitations imposed on the designer by the problem's constructional requirements will hopefully encourage a search for strategies that exploit the situation for "pragmatic and abstract advantage". In doing this the problem's restrictions serve to provoke a solution of accommodation, one that derives strength from the creative resolution of conflicting aims. This situates the Parallel Wall Problem in the context of architectural design in general as it is most often a process of reconciling the ideal and the circumstantial.

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Footnotes:

1 The conditions that govern figure-ground relationships in two dimensions and their extension to three-dimensional form are explained in Chapter V: *Space* of Art and Visual Perception by Rudolf Arnheim. This reading is assigned in studio and discussed in relation to the design exercises.

2 Raphael Moneo describes the Nine Square Grid Problem and its pedagogical intentions in the essay, "The work of John Hejduk or the passion to teach" in Lotus international 27, 1980 II.

3 John Hejduk, Education of an Architect: a point of view, Catalog of the exhibition by the Cooper Union School of Art and Architecture at the Museum of Modern Art, New York City, November, 1971, p. 7. As quoted by Raphael Moneo.

4 Werner Seligmann, "The Texas Years and the Beginning at the ETH Zurich 1956-61", in Teaching Architecture: Bernhard Hoesli at the Department of Architecture at the ETH Zurich, Zurich, 1987.

5 Ibid., p.7.

6 From discussions with Werner Seligmann. Other critics co-teaching in the first year included Alan Chimacoff, Henry Richardson, and Klaus Herdeg.

7 Ibid.,Seligmannn, 1987, p. 7.

8 Ibid., p. 9.

9 Ibid., p. 9.

10 Le Corbusier, Oeuvre Complete 1952-57, p. 115.

11 Klaus Herdeg, Lotus International 27, p. 108.

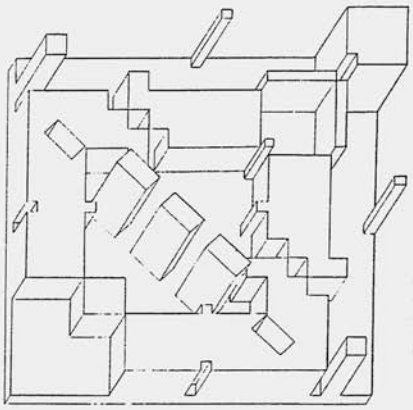


Figure 1: Figure Ground Exercise

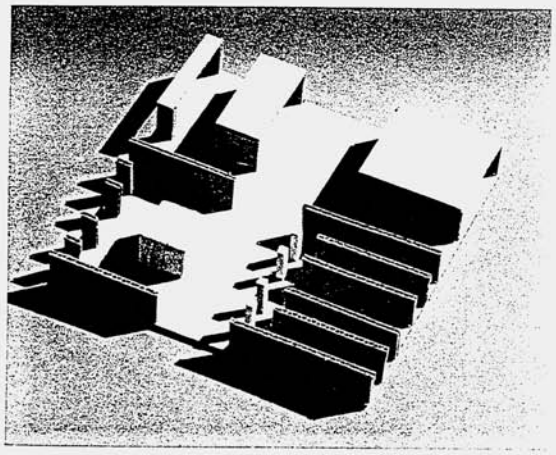


Figure 2: Wall and Object Exercise

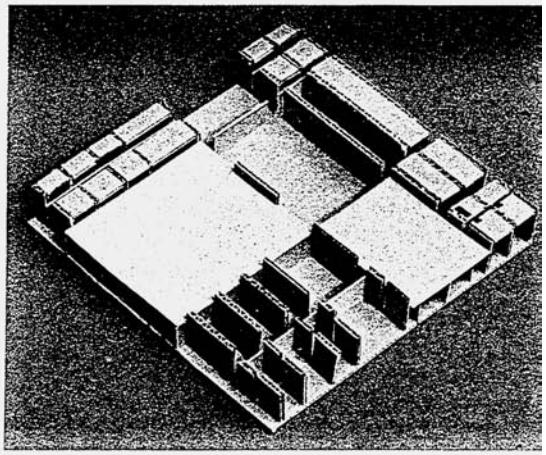


Figure 3: Wall and Grid Exercise

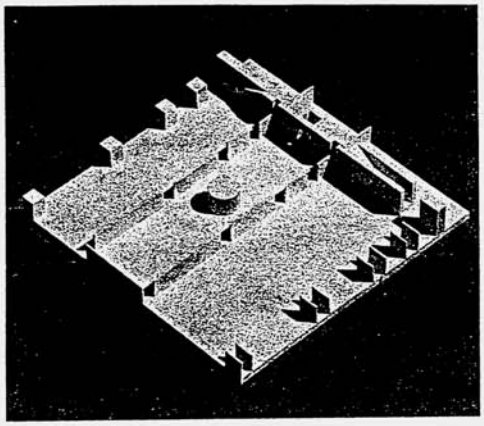


Figure 4: Datum Wall Exercise

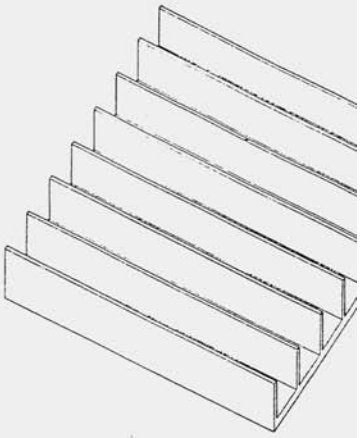


Figure 4A: Parallel Wall Exerc

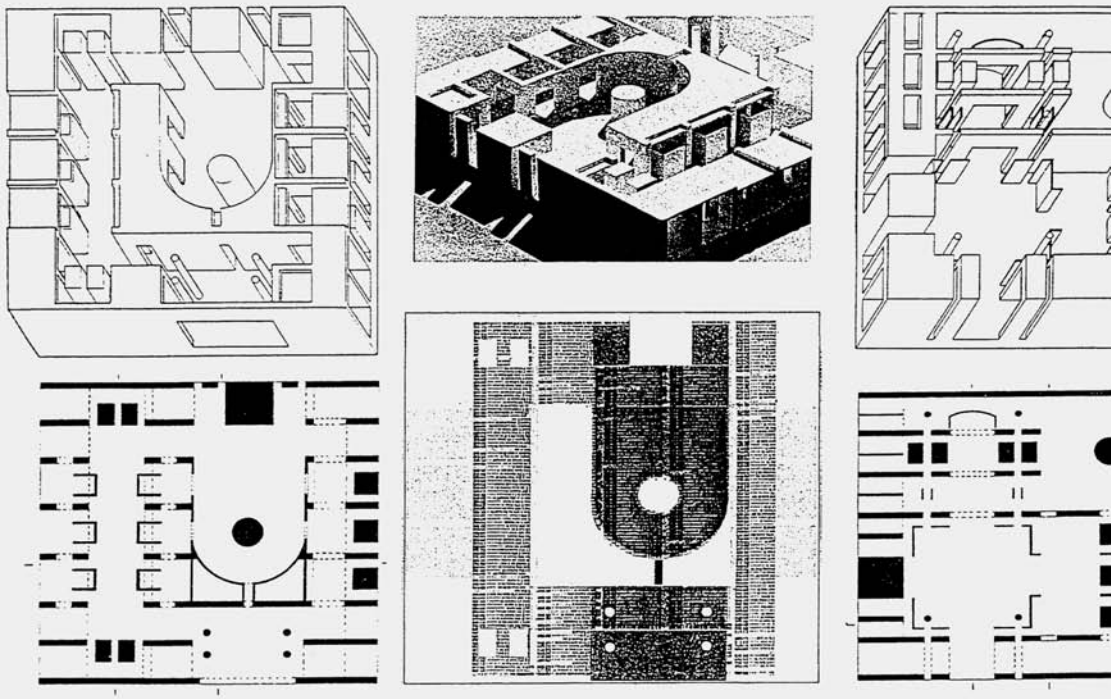


Figure 5: Parallel Wall Exercise: Student Projects

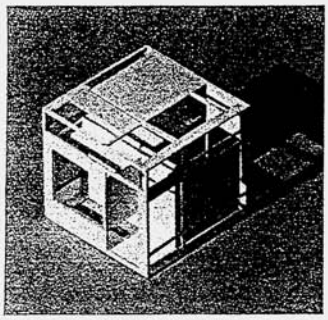


Figure 6: Cube Exercise

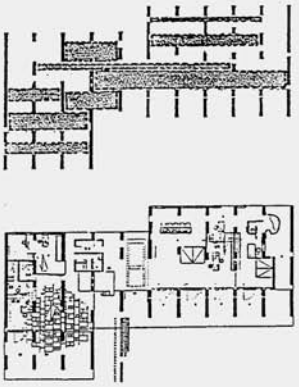


Figure 7: Villa Sarabhai

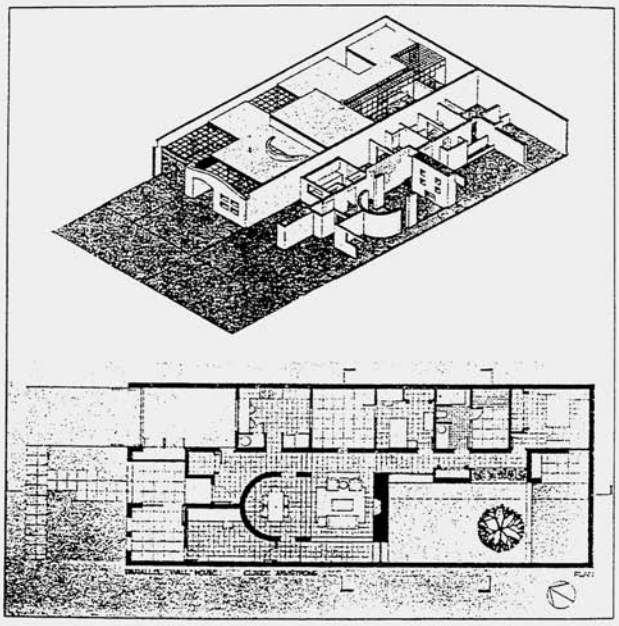
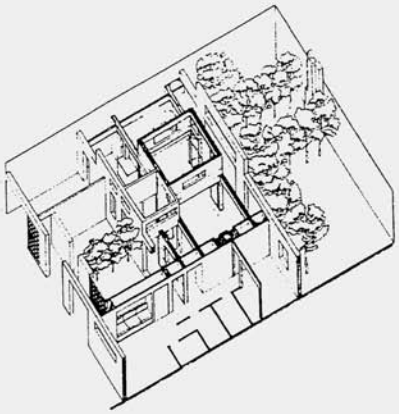
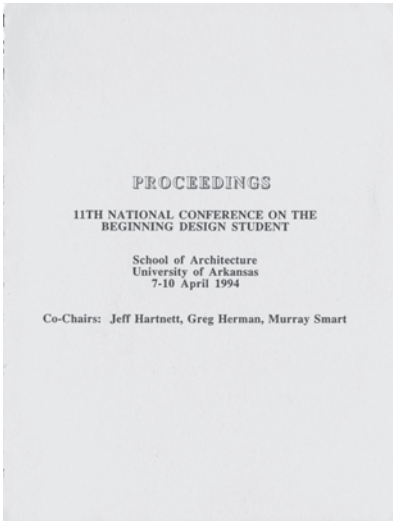


Figure 8: House with Parallel Walls




PROCEEDINGS

11TH NATIONAL CONFERENCE ON THE BEGINNING DESIGN STUDENT

School of Architecture
University of Arkansas
7-10 April 1994

Co-Chairs: Jeff Hartnett, Greg Herman, Murray Smart

Clarity, Confusion, and the Hybrid Nature of Design

Bruce Lindsay
Carnegie Mellon University

Eleventh Conference
University of Arkansas
1994

Clarity, Confusion, and the Hybrid Nature of Design

11th National Conference on the Beginning Design Student

Jeff Hartnett Greg Herman Murray Smart
School of Architecture VWH 104
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Coordinator First Year Program
Department of Architecture
Carnegie Mellon University
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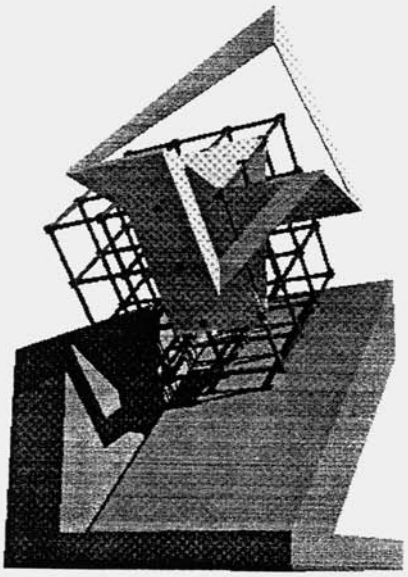
Abstract

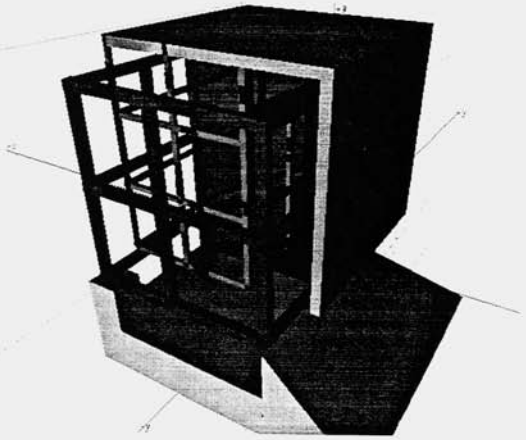
The Gallic parable states that in the study of the part we gain clarity with the risk of incompleteness, and by inclusion, gain wholeness with the risk of confusion. Like life itself architecture is built upon things which we know, and things which we have to search for. Moving between the particular and the global, between clarity and confusion, problems are defined by actions which give value to solutions. This paradoxical nature of design recognizes that architecture is at once a discipline of dreams and realities, consolations and conflicts, which constitute not a problem of architecture but a strength.[1]

This paper will outline the pedagogical goals as stated and illustrated by the sequence of problems in the first year, first semester Introduction to Architecture Studio in the Department of Architecture at Carnegie Mellon University. Moving between exercises which are specific and focused and problems which are ill-defined, and ambiguous the studio attempts to construct a balance between, necessary confusion, clarity, and wholeness. One of a pair of courses, the studio makes explicit connections with the Introduction to Computer Modeling course and the integral drawing sequence to explore a hybrid process of design. Computational tools are used side by side with more traditional means of representation to discover the value and limitations of each.

Two focused exercises, Tool Drawings, and 9-square 4-square Construction, and two problems, Site Tower, and Campus Analysis will be illustrated. These projects which begin in the studio combine related drawing, shop and computer modeling components. The description, sequence and relationship of these problems and exercises will comprise the body of the paper. By focusing on the entire semester a comprehensive approach and pedagogy will be presented within the curriculum of the five year program. Delivered by practicing architects, craftsman, computer folks and those of us who know a little about a lot, the faculty provide the very model of complementarity which the semester of study hopes to illustrate. These people are Bruce Lindsey First Year Coordinator, Doug Cooper, drawing professor, Scott Smith, Shop Director, Skip VanWyck, computer modeling professor, Gary Carlough RA, Jill Watson RA, Anthony Lucarelli RA, David Roth RA, Sherry McKibben RA, and Clair Gallagher director of the CMU Childrens Architecture Program.



9-square, 4-square, computer model, Jeff Angalada



9-square, 4-square, Computer Model, Jenna Yeger

1. Jerome Brunner, Productive Paradox, *On Knowing, Essays For the Left Hand*

Clarity, Confusion, and the Hybrid Nature of Design

Context

The Introduction to Architecture Studio is part of the five year Bachelor of Architecture Program in the Department of Architecture at Carnegie Mellon University. Located in Pittsburgh, PA the university is a research based institution with an undergraduate population of around 4000 students from over 30 countries. The Department of Architecture has 250 undergraduate students, and 75 graduate and Ph.D. students working in the areas of computer aided design and building performance and diagnostics. The department faculty number 15 full time and 18 part time instructors. The department is located in the College of Fine Arts along with programs in Drama, Design, Art, and Music.

College of Fine Arts, Carnegie Melon University

The introductory studio begins in the first semester of the students enrollment in the department. The majority of the students are directly out of high school and usually number between 70-90. In addition to the Introduction to Architecture Studio the students take a Calculus course in the engineering department, an Introduction to World History course, a university required course called Computer Skills Workshop, and a Computer Modeling course offered by the Department of Architecture.

The Introduction to Architecture Studio is organized around three studio spaces each with around 30 students team taught by two faculty. The studio has two components; drawing which is lead by Professor Doug Cooper and occurs on Tuesdays and Thursdays, and Design which is lead by a coordinator and the 6 faculty. Two lectures each week one by Professor Cooper and one by the first year coordinator introduce ideas, concepts, readings and problems (see appendix for reading list). The students receive a grade for drawing (35%) and a grade for studio and lecture assignments (65%) which are used to compute a final grade. The students are engaged in this work five days a week from 1:30-4:30.

As part of the studio the students receive introductory seminars in the use of the shop lead by the shop director Scott Smith, a woodworker and sculptor. These seminars introduce to the students a diverse palette of materials as well as basic hand and machine tool operations. Using several simple exercises and return-demonstrations guided by a strong emphasis on craft, skills are developed which become invaluable in the studio projects.

The Introduction to Architecture studio is explicitly linked to the Computer Modeling Course where assignments are part of the exercises and problems which originate in the studio. This course is taught by Skip VanWyck and David Roth who also teaches a studio in the introductory course and is responsible for coordination between the course and the studio. The course which is organized in three sections and meets for 1 1/2 hours three times a week takes advantage of the extensive network of Macintosh based public computer clusters on campus.

The Gallic parable states that in the study of the part we gain clarity with the risk of incompleteness, and by inclusion, gain wholeness with the risk of confusion. Like life itself architecture is built upon things which we know, and things which we have to search for. Moving between the particular and the global, between clarity and confusion problems are defined by actions which give value to solutions. This paradoxical nature of design recognizes that architecture is at once a discipline of dreams and realities, consolations and conflicts which constitute not a problem of architecture but a strength.

Strategy

Architecture can be characterized as a diverse, multifaceted and potentially boundless discipline. It's broadly based cultural, artistic, and scientific foundations can be seen to touch all aspects of life. Architectural education within the university, on the other hand, must presume to begin at year one and end at year five. Life is short, a little efficiency is necessary. These ideas guide the problems and exercises in the first semester of study.

Although design education includes problem solving and skill development, design education is to much work not to be a passionate activity which includes invention and discovery.[1] Architecture is indeed an endeavor which is comprised of questions which have answers, these will be learned through a lifetime of study. In addition to that which we can know, doubt about what we do not know drives us to speculate, to formulate, to construct, new questions. This is what propels any discipline forward. These questions without answers, this "Journey Without Maps" is the "patient search" of the architect.

Start with what you know and have experienced, add insights brought to bear on new experiences, resulting in new insights. Move from the concrete to the abstract, from the tangible to the ephemeral. Although the studio adopts a thinking by doing starting point these aspects of working are seen to be parts of ourselves which resist specialization.[2] The particular in the act of making is abstracted and applied to new situations resulting in the "fact" of the object. Much like design problems themselves this attitude is reflected in a series of exercises which are focused and specific, and an alternating series of problems which are ill-defined and ambiguous. Tools used and skills developed in the exercises are applied and extended in problems which require the application of these in an unfamiliar and shaky context. Tools are seen as appropriate to the question being formulated and reveal only a partial and incomplete picture. For this reason questions must be examined from multiple and mutually limiting points of view each of which both conceal and reveal possibilities. This composite picture can approach the richness of experience and construct a complimentarity between disparate points of view.[3] The computer is placed along side more traditional tools such as drawing and model making and is distinguished not for what it 'is' but for what it can reveal about the problem at hand. In this way the students are faced with architectural problems not computer or drawing problems.

Department of Architecture Class of 1998

AMMANN, DELPHINE N.
ANGLADA, JEFFREY BRIAN
BAHK, VINCENT J.
BAKER, SUSANNA M.
BARNES, MELISSA J.
BASHAR, TANVIR N.
BIRNBOIM, RACHEL SHIFRA
BROWN, JASON C.
CAMPBELL, REBECCA L.
CAPLEA, JOSHUA M.
CARNEY, SEAN M.
CARTER, VICTOR ALAN
CHANG, KATHERINE
CHEN, I-SHAN JENNY
CHEUK, JENNIFER YU
CHIODO, ADELE M.
COLLINS, MATTHEW G.
CREANY, BRIAN D.
CROSS, MARTHA JANE
DAILEY, MICHAEL C.
DAMOOD, AZARAKHSH
DEVARAJAN, ANAND
DOCTER, KELLY S.
ESTRADA, LIA BARROW
FERRY, ROBERT SHANNON)
FORD, MARC EDWARD _
FUCHS, ROBERT A.
FURUTA, HIDEHISA HIDA
GIACOMINO, THERESA M.
HAMILL, JEFFREY T.
HAN, ESTHER H.
HAZEN, MEGAN U.
HEFTY, NELS W.
HERNANDEZ, GABRIELA
HSUN, JASON
HUANG, PENG Y.
JAROCK, MATTHEW ZENO
JENKINS, REBECCA M.
JOHNSON, DONALD W.
KIM, HEATHER
KIM, SUN ^Joo
KLINE, JONATHAN R.
LANDON, JASON K.
LEE, JOYCE CHIAYI
LEE, YOON SUN Y.
LEET, BRIAN D.
LI, ALEX
LIN, ALEXANDER K.
LIN, DILLON J.
LIU, DAVID
MANAPAT, ANGELYNN TIROL
MANZANO, LESTER JOHN
MILLER, PAUL JOSEPH
MOCKO, KARA K.
MOONS, NICHOLAS J.
NAKAGUCHI, NOBUYUKI
NEWHOUSE, ERIC M.
ONISHI, NAOKO
ORAVIK, ERIN JESSICA
OURS, MARK E.
PACOCHA, SARAH E.
PARTINGTON, BRANT
PERERA, ALEC S.
RALL, CHRISTINA
ROESSLER, RICHARD DALE
ROSENBERG, JOHN DERICK
ROYAL, KRISTINE CECELIA
SANDOVAL, ELIZABETH L.
SHARRAR, THOMAS R.
SHERWOOD, CHRISTA J.
SHIM, EDWARD
SONG, JI
SPECKHARD, DOUGLAS KARL
SPENA, MICHAEL E.
STALLINGS, MARGARET H.
STEIMER, SAMUEL T.
STRINKA, KATHERINE ALICIA
TANIOS, DIANE C.
THYNE, ERIC A.
TING, SHIRLEY HSIAO LING
TIRYAKI, CAN M.
TSUDA, TSUNEHISA J.
WARD, HILARY R.
WARREN, PAUL JACOB
YAMAGUCHI, YUZO
YEE, IRVING
YERGER, JENNA E.
ZEPH, JON-JIN

1. Charles Burchard, *Dialogue and Discovery*, AIA Journal January 1963
2. See Michael Polanyi, Personal Knowledge,
3. Neils Bohr, New York Times Review of Books, 1993

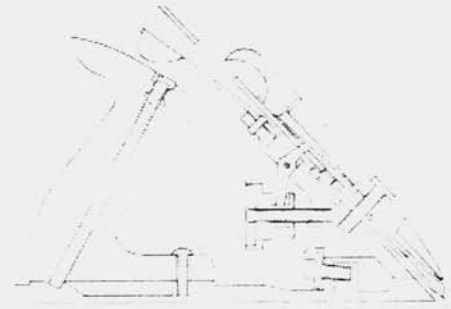
Craft is an essential aspect of the introductory course. The undeniable power of an object which expresses that it was made with care is unambiguous. When confronted with such an object we are confronted with our own humanity and respond in kind. "Things are not as they are but as we are."[1] Craft plays an unexpected role in the computer course where these issues which are more obvious in physical objects begin to distinguish work which can seemingly be seen as the product of the machine, not the hand. David Pye's ideas about the "workmanship of risk" take on new insights when hours of work are lost to a simple disk error.

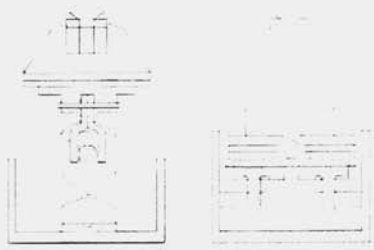
Tactics

Tool Exercise

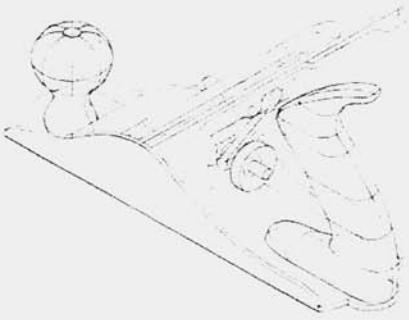
The Tool Exercise starts after the first day problem where students are asked to construct a tower out of the paper of the problem statement. Working in teams of two they must turn two sheets of paper into a tower which stands 16" tall. It must withstand the force of whatever the wind is that day. It is important to begin by making something. The Tool Exercise begins with a simple request: choose a tool from the shop or your desk and draw it. The results range from beautifully rendered charcoal drawings to cartoon like sketches revealing the various levels of drawing skills present. Discussions immediately turn to issues of expression; What does the drawing tell about the tool? How does it do this? What does the drawing not show? From the group a collection of tools is chosen which will be the object of the next three weeks of study. A hand plane is the most likely candidate however a stapler, violin and other shop tools provide the subjects for a series of full size measured drawings utilizing the conventions of orthographic plan, elevation, section and axonometric. The first pencil on vellum drawing, a plan, section and elevation, establish the rules of the game. All aspects of the tool must be measured and re-constructed. Implicit relationships must be made explicit but distinguishable from parts of the tool which physically exist. The drawings must be precise. The second drawing must show the nature of the tools assembly and parts through 10 sections keyed to a plan. The sequence of the drawings become important and the students are beginning to realize the difference between these drawings which show specific aspects of the tool and their first drawings which were almost exclusively limited to some vague overall impression of the tool. The final drawing is an axonometric view drawn with transparency such that all parts of the tool are visible and in a measured and precise relationship.

The students are amazed at the beauty of the drawings which defy their expectations of drafting. They are confronted with the difference and the value of each drawing, including the first one. An object which three weeks earlier had been seen as simple and obvious has become an object which is comprised of a network of precise relationships revealed through the conventions of drawing and examination (looking beyond the surface of things). "You can get there from here."





Tool Exercise, Section, Jonathan Klein



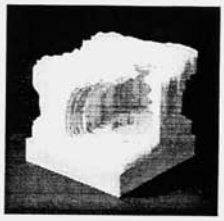
Tool Exercise, Axonometric, Jonathan Klein

1. Jean Labatut, An Approach to Architectural Composition, JAE 1956

Site Tower

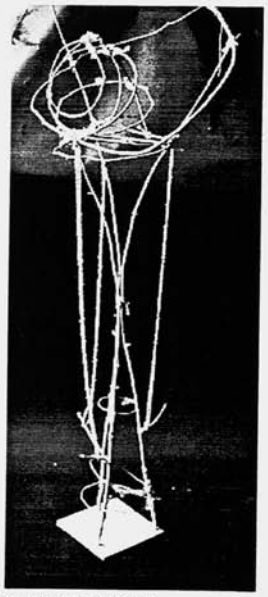
Part One: The second project applies the newly developed skills of orthographic drawing, measurement and x-ray vision learned in the Tool Exercise to a new situation. Where the Tool Exercise represented a discrete object the Site Tower Project begins by looking at an environmental state of affairs. The students choose a site with the knowledge that they will have to build a space for 5 people and a tower for one. The two elements must be related. Where the previously studied tool has defined edges and clear boundaries the site requires choices as to how much is included, how much is important and what limits are set. Charles Eames film "The Powers of Ten" supplies discussion on the extent of the frame which is important to any problem. A consensus is developed that sounds loose but works; not to big, not to small, with the anticipation that you may have to look bigger and that you may have to look smaller. Nested Russian dolls are used as an analogy. The site seems to defy description using orthographic drawing. Contours are introduced as a way to expand the potential description of the plan and the length of the students pace replaces precise measurement. As with the Tool Exercise 10 sections must accompany the plan drawings. Contour models are constructed which extend the reality of the abstract plans. A sub-plot develops with great controversy as to how trees should be represented on the models. No conclusions were reached other than broccoli was unacceptable. Sectional models constructed using pieces of bristol board spaced at 1/8" intervals show how different the same site looks using two different conventions, one based in plan, and one based in section. Discussions center around the way in which these representations reflect inherent choices which begin to characterize the problem itself.

Part Two: The project program is to construct a tower for one person which is related to the sky and a space for 5 people which is related to the earth. The space and the tower must be related and respond to the specific circumstances of the site such as access, views, location on campus, and topography. To get the project rolling and to raise issues of materiality, structure, and formal expression we ask the students to construct a 36" high tower from sticks. It is not seen as a "model" of the tower which they must design but as an object which must fulfill the expectations of a tower. Some fall down, some are heavy as rocks, and some soar. To this point the students were on familiar ground, as what they have been asked to do was straight forward and the definition of the problem was given to them. The last stage of the problem steps off the edge into deep water. The students must presume to begin to design a tower and a space associated with it. The problem does not point to a specific solution or evoke an obvious response. This first step must be imposed from within the problem. We describe the nature of this beginning as a struggle between what the problem may demand and what the designer may want to do. The struggle is seen to be effective when new light is shed on the problem and the designers preconceptions of what to do are challenged. At this point the students feel that we are trying to teach them to swim by pushing them in the water. They find to their surprise that they can not only swim but that the mysteries of designing are not so mysterious. You can't see the end at the beginning but you can still get there from here.



Section Model, Stacy Damood

Contour Model, Brian Leet

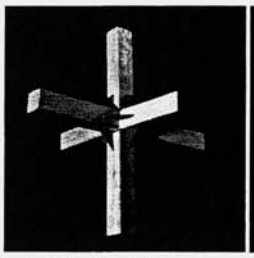


Stick Tower, Eric Newhouse

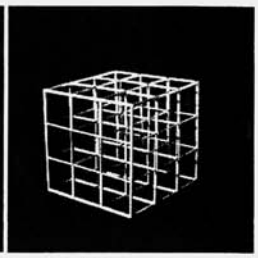
Site Tower Model, Brian Leet

9-square, 4-square Construction

Space is the medium of architecture, geometry is the order of space, composition is the arrangement of geometry. Geometry is distilled from nature in an attempt to understand the underlying structure of things and then re-applied to create new "things" with underlying structure. Geometry makes magicians envious. This project explores paired concepts in a way which reveals the implications, possibilities, and limitations of each. In this way a bridge is built, one which is based on "and" instead of "or," complimentarity as opposed to duality. The goal of the project is to construct a beautiful object. One which is more than a model but not quite a building. Beauty lies somewhere between boredom and chaos, the intentional and the fortuitous, the simple and the complex.[1]



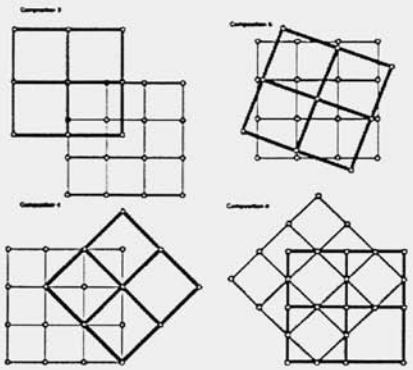
Joint Study, balsa & chipboard



9-square cube, balsa

The project begins by exploring the nature of a family of joints constructed from two sizes of balsa wood. The joints, consisting of 3-legs, 5-legs and 6-legs must be guided by the logic of the structural connection. An additional family is considered which may use chipboard as a connector. The family of joints guide the construction and expression of a 12" 9-square cube. Gravity is the critic. The cube must have an attitude. The problem and therefore the goal can be seen clearly from the outset. The literal structure is the conceptual structure and the balsa has materiality, dimension and proportion.

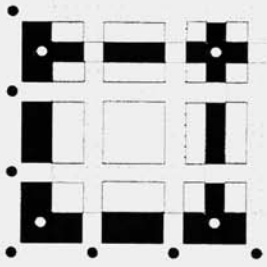
The cube reveals unexpected distinctions which were not anticipated. The center, the corner, and the edge are unique due to the geometry. These distinctions hold possibilities. *Piece - Joint, Joint - Cube, Literal Structure - Conceptual Structure.*



9-square, 4-square variations, computer drawings

Simultaneously with the cube construction the students are asked to consider 6 variations on the intersection of a 9-square grid and a 4-square grid. They are to construct drawings on the computer using an object-oriented drawing program (Mac Draw). Lines become elements which can be easily picked up and moved. Intersections of grid points become columns and the variations must be guided by relating these elements. This work, which is done in the Computer Modeling Class, is then looked at in the way the variations may suggest 3-dimensional possibilities. Two variations are chosen and transformed using the drawing program to illustrate depth using transparency, overlap and occlusion. Simultaneously in the studio a hand drawn grid variation is developed in plan oblique. The plan oblique must resolve 3-dimensionally the intersection of the 9-square grid and the four square grid. *Hand Drawing - Computer Drawing, 2-D - 2 1/2D, Literal Space - Phenomenal Space.*

The final stage of the project gives the abstract grids a program. The intersection must define a dominant interior space and a secondary exterior space and develop a site which has a reciprocal relationship to the construction. The 9-square grid is developed from the 12" model and the 4-square grid is developed predominately with planes (1/8" thick) or walls (1/4" thick). A syntax is given which states that walls may replace grid elements, but planes must be supported.



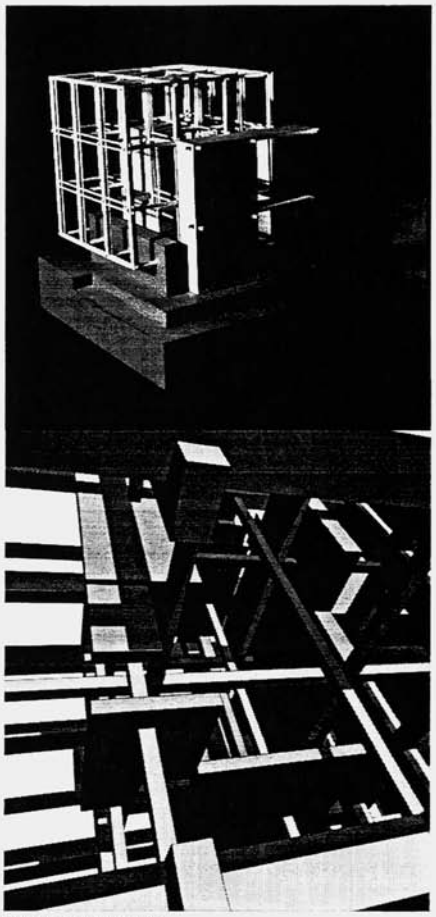
Transparency, Overlap, Occulsion, computer drawing

1. E. H. Gombrich. *The Sense of Order, a study in the psychology of decorative art* "Order and Purpose in Nature"

The site is to be consideredsubtractively and must be constructed from chipboard. A hand drawn plan, a half scale model and a computer model developed in a 3-dimensional modeling program (Form Z) is asked for. Each mode of representation is examined for the particular insight of it's view, but also for the possibilities it suggests. These possibilities are developed using whichever view seems appropriate. When a dead end is encountered it is a sign to turn around or to use a new view. The final project is modeled full size both in the computer and in balsa and chipboard. In addition to re-presenting the object the computer presentation must show the logic of the joint and structure, the possibility of light to emphasize the structure and the nature of the interior space. Although the project was not considered to be a model of a building, the program of spaces invited occupation. Both the computer model and the physical model were looked at for their ability to catalyze the imagination to be "in there." Most were interesting not for the fact that one model was better than another but that they affected each other when seen together.
Part - Whole, Inside - Outside, Object - Site, Model - Drawing,

Campus Analysis
The final project of the semester was the most ambiguous, both with respect to the problem and the methodology. Intended to make obvious the creative nature of any analysis, the project began by modeling aspects of the Carnegie Mellon Campus using a given palette of materials placed over an aerial photograph. To include a historical, and typological foundation each student prepared a research paper on one of the following topics: Beaux Arts Planning Principles, Performing Arts Center Typologies, and American Campus Planning. The model, developed in layers, was to not only suggest a likely place for the new Preforming Arts Center but through the manner of representation provoke a possible formal beginning. This was to be done by modeling not only physical elements but forces, perceptions, and implied relationships inherent in this complex environmental situation. The form would be the natural result of the gravity of forces on the particular chosen site. This project proved difficult for both students and faculty alike. The fact that the form of the model could not be foreseen called for a more speculative approach. This speculation must be grounded by a well articulated strategy or it results in either literal or overly abstract results. The need to work simultaneously at a general and specific level, while a goal of the project, was not grasped by the students.

Conclusion
What do you do when you don't know what to do or where to start. This process, dependent on experience, is none-the-less important for the beginning student. Confidence in dealing with "messy" problems is often the result of experience, of having done them before. How do you gain this experience in the studio such that the results are not haphazard, vague and confusing. Certainly these problems include more defined problems which we will continue to explore with the students. However our future pedagogical efforts will be focused on the way an ambiguous problem such as the campus analysis problem can be orchestrated productively in the context of the first year studio. We hope we can get there.


Physical and computer model


Campus Analysis Problem.

Studio Reading List

Adams, Crosby, Helmer, Nius, and Scheuermann
"An Introduction to First Year Design Studio"
School of Architecture
Tulane University
(pp. 1-9)

Arnheim, Rudolph
"The Intelligence of Visual Perception"

Gombrich, E. H.
"The Sense of Order: A study in the psychology of decorative art"
(pp. 6-10)

"Urban Analysis and Architecture as City-building"
Yale University
A-3 & A-63
(pp. 1-4)

Architectural License Seminars
"Site Design"
(pp. 3-3 - 3-38)

Treib, Marc
"Inflected Landscapes"
Places, Volume 1 Number 2
(pp. 66-69)

Grudin, Robert
The Grace of Great Things
"Discovery" (Chapter 3)
(pp. 25-32)

Grudin, Robert
The Grace of Great Things
"Analysis" (Chapter 4)
(pp. 35-44)

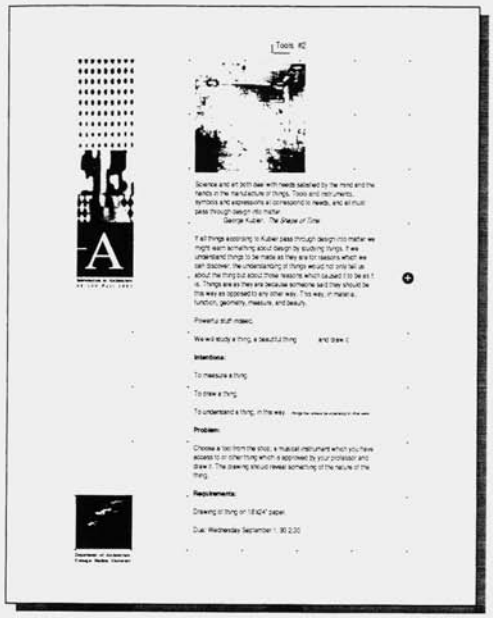
Architectural Graphic Standards
Wilkes, Joseph A.
"Western or Platform Framing"
(p. 238)

Berger, John
The Sense of Sight
"The White Bird" (pp. 5-9)

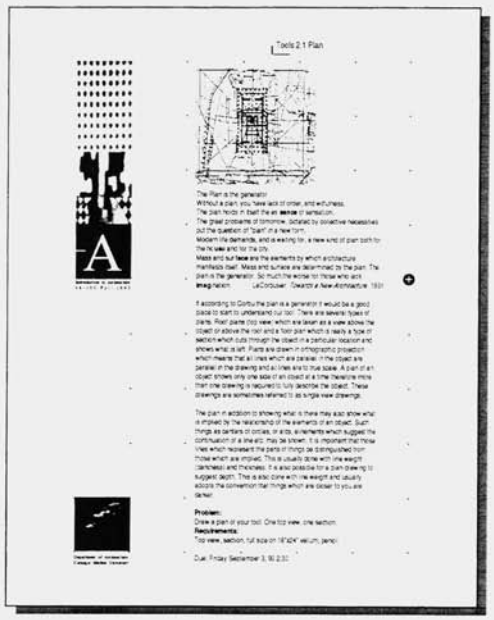
Scon, Donald
The Design Studio, An Exporation of its Traditions and Potentials
"Part IV: The Paradox and Predicament of Learning to Design"
(pp.53-63)

#2 Tool

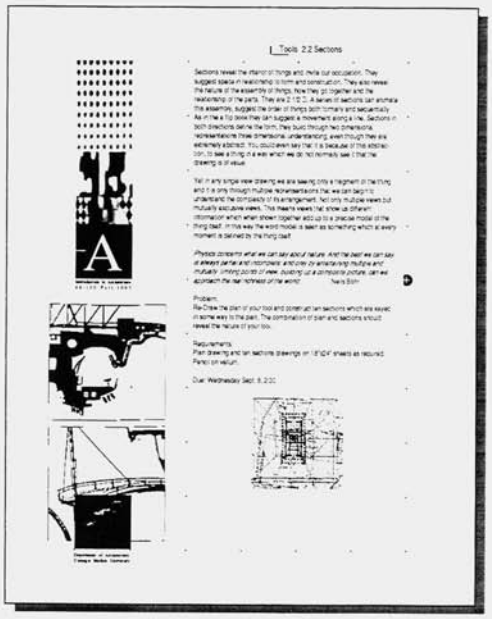
1


Tools #2
Science and art both deal with needs satisfied by the mind and the hands of the manufacture of things. Tools and man-made symbols and expressions all correspond to needs, and all must pass through design into matter.
George Kubler: The Shape of Time
If all things according to Kubler pass through design into matter we might learn something about design by studying things. If we understand things to be made as they are for reasons which we can discover, the understanding of things would not only tell us about the thing but about those reasons which caused it to be as it is. Things are as they are because someone said they should be this way as opposed to any other way. This way, in material, function, geometry, measure, and beauty.
Powerful stuff indeed.
We will study a thing, a beautiful thing and draw it.
Intentions:
To measure a thing
To draw a thing
To understand a thing, in the way
Problem:
Choose a tool from the shop, a musical instrument which you have access to or other thing which is approved by your professor and draw it. The drawing should reveal something of the nature of the thing.
Requirements:
Drawing of thing on 18"x24" paper.
Due: Wednesday September 1, 90 2:30

2


Tools 2.1 Plan
The Plan is the generator
Without a plan, you have lack of order, and wholeness.
The plan holds in itself the ele sense of sensation.
The great problems of tomorrow, dictated by collective necessities put the question of "plan" in a new form.
Modern life demands, and is waiting for, a new kind of plan both for the he new and for the city.
Mass and surf faces are the elements by which architecture manifests itself. Mass and surfaces are determined by the plan. The plan is the generator. So much the worse for those who lack imag nation.
Le Corbusier: Towards a New Architecture, 1931
If according to Corbu the plan is a generator it would be a good place to start to understand our tool. There are several types of plans. Roof plans (top) view: which are taken as a view above the object or above the roof and a 'floor plan which is really a type of section which cuts through the object in a particular location and shows what is left. Plans are drawn in orthographic projection which means that all lines which are parallel in the object are parallel in the drawing and all lines are to true scale. A plan of an object shows only one side of an object at a time therefore more than one drawing is required to fully describe the object. These drawings are sometimes referred to as single view drawings.
The plan in addition to showing what is there may also show what is implied by the relationship of the elements of an object. Such things as centers of circles, or arcs, or elements which suggest the continuation of a line etc. may be shown. It is important that those lines which represent the parts of things be distinguished from those which are implied. This is usually done with line weight (darkness) and thickness. It is also possible for a plan drawing to suggest depth. This is also done with line weight and usually adopts the convention that things which are closer to you are darker.
Problem:
Draw a plan of your tool. One top view, one section.
Requirements:
Top view, section, full size on 18"x24" vellum, pencil
Due: Friday September 3, 90 2:30

3

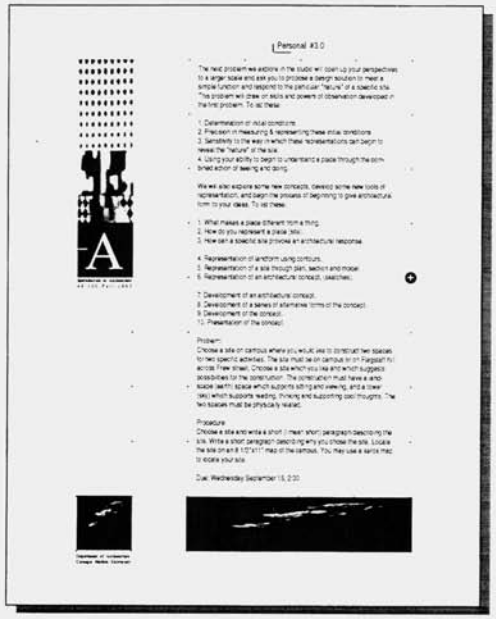

Tools 2.2 Sections
Sections reveal the interior of things and invite our occupation. They suggest spaces in relationship to form and construction. They also reveal the nature of the assembly of things, how they go together and the relationship of the parts. They are 2 1/2 D. A series of sections can animate this assembly, suggest the order of things both formerly and sequentially. As in the a flip book they can suggest a movement along a line. Sections in both directions define the form, they build through two dimensions, representations three dimensions, understanding, even though they are extremely abstract. You could even say that it is because of this abstraction, to see a thing in a way which we do not normally see it that the drawing is of value.
Yet, in any single view drawing we are seeing only a fragment of the thing and it is only through multiple representations that we can begin to understand the complexity of its management, not only multiple views but mutually exclusive views. This means views that show us different information which when shown together add up to a precise model of the thing itself. In this way the word model is seen as something which at every moment is defined by the thing itself.
Physics concerns what we can say about nature. And the best we can say at present parts are incomplete, and allow for entertaining multiple and mutually limiting points of view. Applying us a connecting picture, can we approach the real richness of the world.
Henry Stein
Problem:
Re-Draw the plan of your tool and construct ten sections which are related in some way to the plan. The combination of plan and sections should reveal the nature of your tool.
Requirements:
Plan drawing and ten sections drawings on 18"x24" sheets as required.
Pencil on vellum.
Due: Wednesday Sept. 8, 2:30

4


Tools 2.3 Axonometric
Plans and sections are extremely valuable ways in which to study the aspects of a thing, to communicate aspects of a thing and to discover those aspects of a thing which are not immediately apparent. These ways of looking at a thing adopt a convention of looking that is not analogous to the way we see. Because of this we describe a plan or section drawing as being abstract, or presenting a thing in a particular way or using a drawing convention (plan, section) we are forced to see something in a new way which is revealed to the convention itself. In a plan we see the horizontal relationship of part to part in an unfastened scalar relationship, we see the totality of a thing generally in a way that does not give more importance to any single part. In a section we see the vertical relationship of parts, the nature of the material revealed by thickness, and a sense of the assembly of the parts. In an architecture section we also become aware of the space within and without and can even begin to mentally occupy the space using scale indications to establish human scale. The act to do this is extremely valuable for an architect, and is a skill which must be learned. This learning is facilitated by drawings sections.
Drawings not only reveal certain things through the convention of the drawing but are necessarily incomplete. They edit, condense and give precedence to a particular point of view. This is why we study things using different "tools." This point is made eloquently by Rene Magritte. The French painter in his famous painting "Les Fleur une zoie." This is not a pipe, of course what it is is a picture of a pipe.
Axonometric drawings are characterized by showing more than one side of an object at a time and by having parallel lines in the drawing which correspond to parallel lines in the object. This is in contrast to perspective drawing where parallel lines converge in a common vanishing point. Axonometric lines are generally to their true scale but can sometimes be scaled to overcome distortion. This kind of drawing is closer to the way in which we see an object and can be called a pictorial view.
Problem:
For the last drawing of your tool construct an axonometric drawing of your object in isometric projection. Draw the object such that it appears transparent so that all parts are visible. This will be confusing unless you use line weight, construction lines and line thickness to give clarity to the drawing.
Requirements:
Isometric drawing in Pencil on vellum
Due: Monday Sept. 13, 2:30

#3 site

1



Personal #3.0

The next problem we explore in the studio will open up your perspectives to a larger scale and ask you to propose a design solution to meet a simple function and respond to the particular "nature" of a specific site. This problem will draw on skills and powers of observation developed in the first problem. To list these:

1. Determination of initial conditions
2. Precision in measuring & representing these initial conditions
3. Sensitivity to the way in which these representations can begin to reveal the "nature" of the site.
4. Using your ability to begin to understand a place through the combined action of seeing and doing.

We will also explore some new concepts, develop some new tools of representation, and begin the process of beginning to give architectural form to your ideas. To list these:

1. What makes a place different from a thing.
2. How do you represent a place (site).
3. How can a specific site provoke an architectural response.

4. Representation of landform using contours.
5. Representation of a site through plan, section and model.
6. Representation of an architectural concept, sketches.

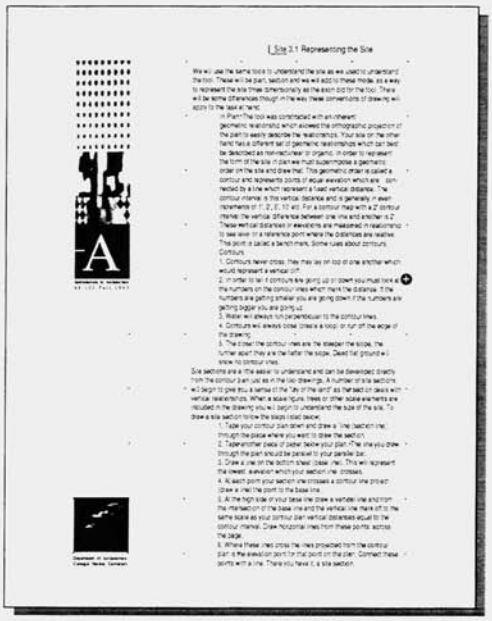
7. Development of an architectural concept.
8. Development of a series of alternative forms of the concept.
9. Development of the concept.
10. Presentation of the concept.

Problem:
Choose a site on campus where you would like to construct two spaces for two specific activities. The site must be on campus or on Ferguson Plaza across Frew Street. Choose a site which you like and which suggests possibilities for the construction. The construction must have a wind space (earth) space which supports sitting and viewing, and a tower (sky) which supports reading, thinking and supporting cool thoughts. The two spaces must be physically related.

Procedure
Choose a site and write a short (~mean short) paragraph describing the site. Write a short paragraph describing why you chose the site. Locate the site on an 8 1/2"x11" map of the campus. You may use a xerox map to locate your site.

Due: Wednesday September 15, 2:00

2



Site 3.1 Representing the Site

We will use the same tools to understand the site as we used to understand the tool. These will be plan, section and we will add to these mode, as a way to represent the site three dimensionally as the each did for the tool. There will be some differences though in the way these conventions of drawing will apply to the task at hand.

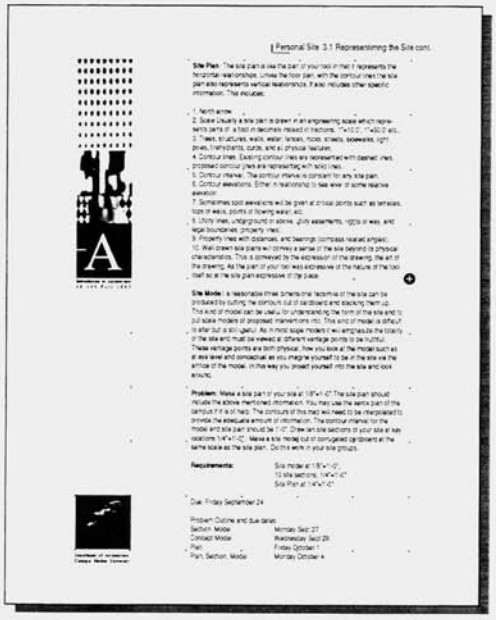
In Plan: The tool was constructed with an inherent geometric relationship which allowed the orthographic projection of the plan to easily describe the relationships. Your site on the other hand has a different set of geometric relationships which can best be described as non-rectilinear or organic. In order to represent the form of the site in plan we must superimpose a geometric order on the site and draw that. This geometric order is called a contour and represents points of equal elevation which are connected by a line which represent a fixed vertical distance. The contour interval is this vertical distance and is generally in even increments of 1', 2', 5', 10 etc. For a contour map with a 2' contour interval the vertical difference between one line and another is 2'. These vertical distances in elevations are measured in relationship to sea level or a reference point where the distances are relative. This point is called a bench mark. Some rules about contours.

Contours
1. Contours never cross. They may lay on top of one another which would represent a vertical cliff.
2. In order to tell if contours are going up or down you must look at the numbers on the contour lines which mark the distance. If the numbers are getting smaller you are going down if the numbers are getting bigger you are going up.
3. Water will always run perpendicular to the contour lines.
4. Contours will always close (make a loop) on run off the edge of the drawing.
5. The closer the contour lines are the steeper the slope, the further apart they are the flatter the slope. Dead flat ground will show no contour lines.

Site sections are a little easier to understand and can be developed directly from the contour plan just as in the last drawings. A number of site sections will begin to give you a sense of the "lay of the land" as well as begin to deal with vertical relationships. When a scale figure, trees or other scale elements are included in the drawing you will begin to understand the size of the site. To draw a site section follow the steps listed below:

1. Take your contour plan down and draw a line (section line) through the place where you want to draw the section.
2. Tape another piece of paper below your plan. The line you drew through the plan should be parallel to your parallel bar.
3. Draw a line on the bottom sheet (base line). This will represent the lowest elevation which your section line crosses.
4. At each point your section line crosses a contour line project/draw a line) the point to the base line.
5. At the high side of your base line draw a vertical line and from the intersection of the base line and the vertical line mark off to the same scale as your contour plan vertical distances equal to the contour interval. Draw horizontal lines from these points, across the page.
6. Where these lines cross the lines projected from the contour plan is the elevation point for that point on the plan. Connect these points with a line. There you have it, a site section.

3



Personal Site 3.1 Representing the Site cont.

Site Plan: The site plan is one part of your tool in that it represents the horizontal relationships. Unlike the floor plan, with the contour lines the site plan also represents vertical relationships. It also includes other scientific information. This includes:

1. North arrow
2. Scale (Usually a site plan is drawn in an engineering scale which represents parts of a foot in decimals instead of fractions. 1"=10'-0", 1"=30'-0" etc.
3. Trees, structures, walls, water, terrain, roads, streets, sidewalks, light poles, trash/ants, curbs, and all physical features.
4. Contour lines. Existing contour lines are represented with dashed lines, proposed contour lines are represented with solid lines.
5. Contour interval. The contour interval is constant for any site plan.
6. Contour elevations. Either in relationship to sea level or some relative elevation.
7. Sometimes spot elevations will be given at critical points such as terraces, tops of walls, points of flowing water, etc.
8. Utility lines, underground or above. Utility easements, rights of way, and legal boundaries. (property lines).
9. Property lines with distances, and bearings (compass related angles).
10. Well drawn site plans will convey a sense of the site beyond its physical characteristics. This is conveyed by the expression of the drawing, the art of the drawing. As the part of your tool was a expression of the nature of the tool itself so at the site plan expressive of the place.

Site Model: a reasonable three dimensional facsimile of the site can be produced by cutting the contours out of cardboard and stacking them up. This kind of model can be useful for understanding the form of the site and to put scale models of proposed interventions into. This kind of model is difficult to alter but a good useful. As in most scale models it will emphasize the totality of the site and must be viewed at different vantage points to be truthful. These vantage points are both physical, how you look at the model such as at eye level and conceptual as you imagine yourself to be in the site via the article of the model, in this way you project yourself into the site and look around.

Problem: Make a site plan of your site at 1/8"=1'-0" The site plan should include the above mentioned information. You may use the same plan of the campus if it is of help. The contours of this map will need to be interpolated to provide the adequate amount of information. The contour interval for the model and site plan should be 1'-0". Draw ten site sections of your site at ten locations 1/4"=1'-0". Make a site model out of corrugated cardboard at the same scale as the site plan. Do this work in your site groups.

Requirements:
Site model at 1/8"=1'-0"
10 site sections, 1/4"=1'-0"
Site Plan at 1/4"=1'-0"

Due: Friday September 24

Project Outline and due dates
Section, Model — Monday Sept 27
Concept Model — Wednesday Sept 29
Plan — Friday October 1
Plan, Section, Model — Monday October 4

4

Personal Site 3.2 Design

"the designer must simultaneously investigate two opposed processes: one that is decisive and productive, the other questioning and reflective."
Steven Holl

There are times in the context of an environmental problem when limitations can frame the problem productively. These limitations are often part of the initial problem and must be in the beginnings of a design problem tested by being a larger perspective. These limitations can also be imposed by the designer in order to establish a relative place to begin. This personal intervention can take many forms such as a formal style, Gothic or Post-Modern, aesthetic, such as the most for the week: Materials, such as only from books and sociological, such as only recycled materials. Whatever the source such limitations can be productive and inspirational.

We will impose these limitations in the context of this problem.

Tower:
Must hit the ground in one, three, or four places only.
Must be a minimum proportion of four to one height to width.
Must be constructed from base no bigger than 1'-6"x1'-6" for any length.
Must have a platform to support one person to look out.
Platform must be accessed by a ladder.

Floor:
Must define 25(sq) and be constructed from chipboard.
Must have an entry and a relationship to the tower.
Floor must provide seating for five people.
Parts must be constructed from chipboard and do not count in the 25(sq).
Minimum 50% of the floor must be enclosed by side walls.

Walls:
Must be made from corrugated cardboard.
Walls must be a minimum of 12" (h)ox.
Walls may extend beyond floor.

Site:
Must be constructed from corrugated cardboard and may fit into the larger site model.

Scale 1/8"=1'-0"

#4 9sq.4sq.

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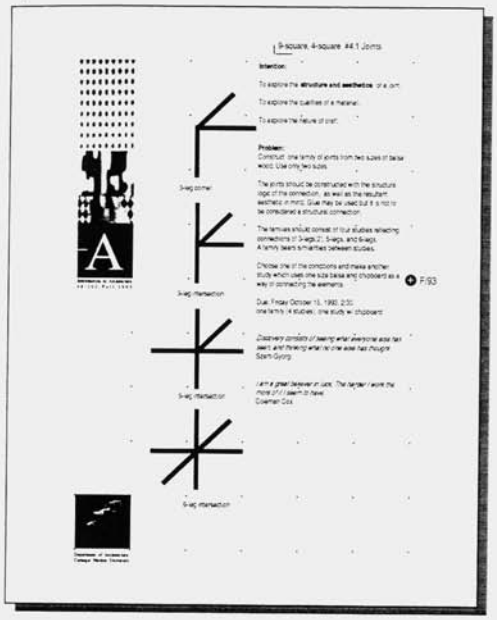

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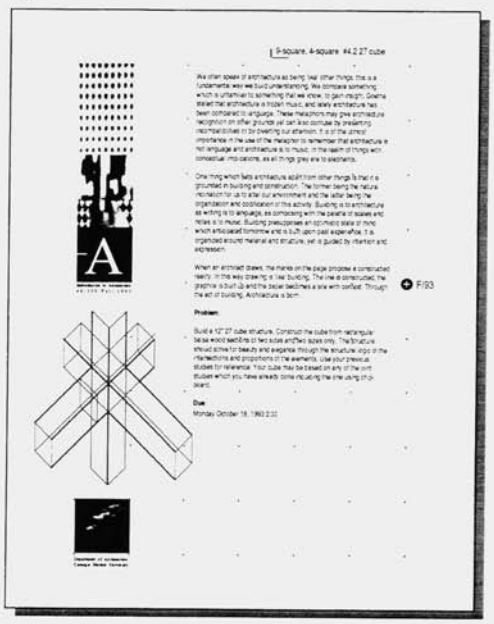

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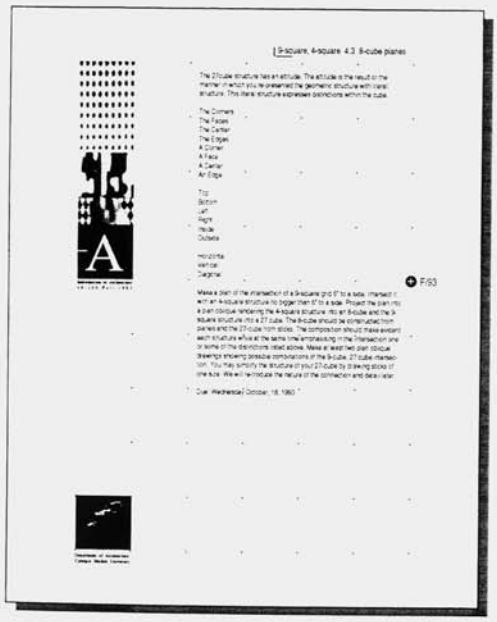

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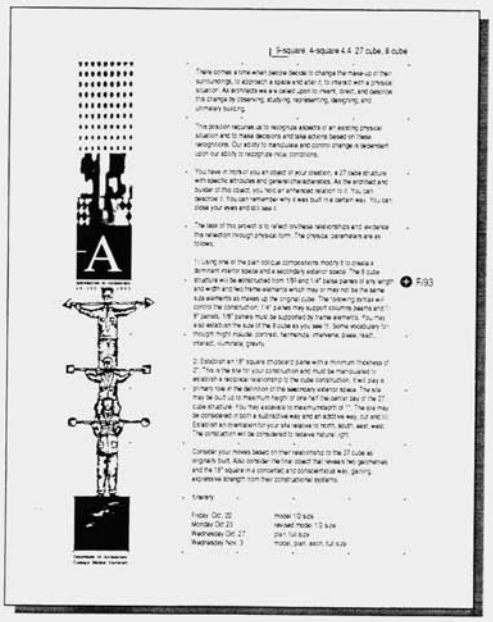
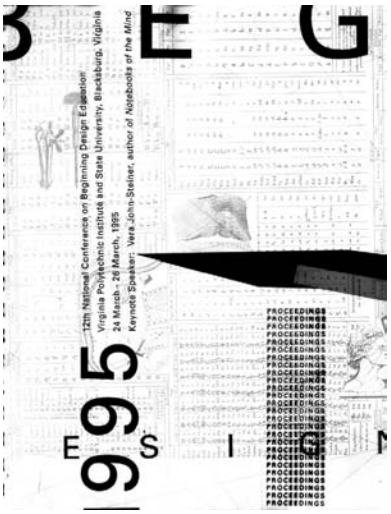




The Foundation Program: Design Fundamentals Revisted

David Diamond
New York Institute of Technolgy

Twelfth Conference
Virginia Polytechnic
1995

The Foundation Program: Design Fundamentals Revisited

David Diamond
New York Institute of Technology

Background

Open enrollment at NYIT has made our school one of the largest architectural design programs in the United States. During the past ten years, between 450 and 750 students registered annually for Design Fundamentals at our three campuses. Our admissions policy results in a first year class with a wide range of academic experiences and skills. A typical first year studio includes transfer students with technical degrees from community colleges, students with degrees in other areas, recent high school graduates, and adults with work experience, frequently in the building field. In order to allow students with different skills and educational backgrounds to compete equitably, and to approach the study of architectural design most directly, problem statements are concrete, tangible, and hands-on in terms of architectural space. They are, however, abstract with respect to function and context. Students work directly with three-dimensional models. By working first in model form, as children build with blocks, the program is open to students unfamiliar with architectural jargon and drawing techniques. Architectural conventions and drawing skills are introduced incrementally as students develop their abilities to see and formulate ideas in three-dimensional space.

Pedagogy

Design Fundamentals, the introductory design studio sequence, is based on the following premises: that form and content in architecture are inseparable, that meaning in architecture is transmitted through the medium of space, and that architects must understand the relationship between organizational strategies, which are abstract, and the concrete perceivable order of form(s) within a project. Students are encouraged to see, think, and work directly in spatial terms. This underlies everything that students will explore and ultimately build. It is the core of our curriculum and pedagogy at NYIT. All of the rest, without an awareness of space, will be just building: another strip, another mall, another condo, another split-level ranch. But the spaces: their figures, arrangements and densities, their qualities of darkness and light, these are what architects use to form what they make. These are the means of organizing and structuring spaces for human activity. If we understand these spatial organizations, it is possible to compare Hadrian's Villa with projects by Frank Lloyd Wright or Maya Lin. Being aware of their spatial qualities allows us to understand universal principles. Understanding universal principles enables us; first, to make comparisons that transcend the circumstances of politics, culture, and program, and second, by recognizing the continuity of form, to better understand differences in political, cultural and programmatic contexts. As Le Corbusier said: *"Architecture goes beyond utilitarian needs. Architecture is a plastic thing."* [1]

The exercises described below require students to break familiar habits of seeing and thinking about architectural space. Cubism provided a revolutionary model of perception to the pioneers of modernism. It let them see the world stripped of its baggage, as if from the eyes of an innocent. According to Gertrude Stein, as:

> *" [a] child sees the face of its mother... in a completely different way than other people see it, ... it is certain the child for a little while only sees a part of the face of its mother, it knows one feature and not another, one side and not the other, ...no one had ever tried to express things seen not as one knows them but as they are when one sees them without remembering having looked at them.....[Picasso] commenced the long struggle not to express the things he did not see, that is to say the things everybody is certain of seeing but which they do not really see."* [2]

Picasso stripped bare the subject of his gaze. Through his omissions and some other ideas about multiple views through the passage of time, Picasso transcended the paradigm of renaissance perspective. Though one may speak of the Cubism of Picasso versus that of Braque or Gris, the Cubist vision, like perspective, was not merely subjective. The nature of Cubist works is that of establishing a language. It constitutes a symbolic form, a filter of structured relationships through which visual data is interpreted. John Berger, in The Success and Failure of Picasso, stated that:

> *"[t]he Cubists created a system by which they could reveal visually the interlocking of phenomena, And thus they created the possibility of art revealing process instead of static states of being. Cubism is an art entirely concerned with*

interaction: the interaction between different aspects; the interactions between structure and movement; the interactions between solids and the space around them; the interactions between unambiguous signs made on the surface of the picture and the changing reality which they stand in for. It is an art of dynamic liberation from all static categories." [3] and further:

"All is possible [wrote Andre Salmon], everything is realizable everywhere and with everything...[4] *"The renaissance artist imitated nature...The Cubist realized that his awareness of nature was part of nature."*[5]

Cubism made us aware of the architectonics of vision. And as a consequence, Cubism allowed us to rethink the architectonics of architecture. Cubism offered a way to see the world fresh again.

Curriculum

The exercises in Design Fundamentals introduce students, through the agency of a "kit of parts" and a series of architectonic problems, to rules of organization in three-dimensions. The kit is designed to avoid representation of context and material. Rules of organization, in this instance, are not prescriptive as in a do-it-yourself kit, nor are they prohibitory, as in a building code. They form conceptual models for thinking critically about three-dimensional, architectural space. Students explore the strategies of four square and nine square, the sub-divisions and extensions of the square and cube, problems of center and edge, figure and field, the three coordinate axes, the four cardinal points, etc. to understand the geometric principles underlying visual and spatial phenomena.

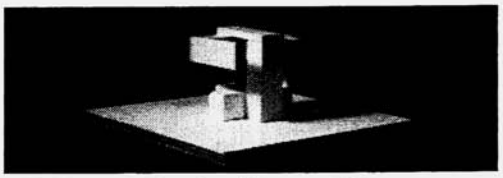
Of the ten or twelve design problems that comprise both semesters of Design Fundamentals, three problems serve to demonstrate how we approach our pedagogic goals: the Volume Problem, the Cubist / Purist Problem, and the Phoenix Problem. Each offers a different conceptual model for generating forms in space. Respectively, each derives from abstract spatial, pictorial, and utilitarian requirements. The Volume Problem and the accompanying Tile projects were first published in Creation in Space in 1989 by Jonathan B. Friedman. Four class sessions during two weeks are devoted to this project.

Volume Problem

The Volume Problem requires students to design a three inch cube on a nine inch square base, using a limited set of elements from the "kit of parts." The cube is presented as an ideal form. It becomes a datum against which the design process may be evaluated, and an armature against which more complex problems may be planned. This exercise requires students to investigate the homogeneity of solid / void and spatial hierarchy while developing the internal x, y, and z axes. The rigors of considering number, proportion, and details of connection emerge in the design process and during reviews.

A concurrent two-dimensional design problem requires students to develop a three inch square composition, or tile, and use it to organize a six by six field that maintains field continuity, maximizes the illusion of grid layering and spatial depth, and generates a variety of scale and visual incidents across the field. The graphic tile becomes a two-dimensional module. Design in this instance is limited to the orthogonal rotations of single tiles or clusters of tiles. The practice of arranging tiles across the field allows students to explore composition and transformation by manipulating rules of organization.

In one recent solution to the Volume problem *(fig. 1.)*, a student organized 12 cubes and 12 rods into three modules of four and four. By rotating these three spatial "tiles," parallel to each of the coordinate axes, he generated a composition that both satisfied the requirements and demonstrated a high degree of consistency and invention.



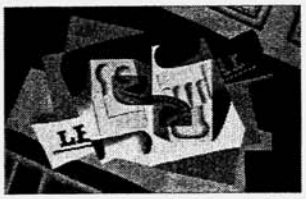
1. The Volume Problem, Greg DiGennaro, 1994

Cubist / Purist Problem

The Cubist / Purist Problem is the first exercise in the second semester of Design Fundamentals and lasts for five class sessions, during two and one half weeks. The Cubist / Purist Problem derives from the Juan Gris Problem that was developed at The Cooper Union, where I first encountered it. I developed the current version at NYIT with Jonathan B. Friedman. It will be published in his soon to be released Creation in Space, Volume II. The Cubist / Purist exercises are meant to introduce students to the phenomena of spatial ambiguity, simultaneity, and transparency, as developed by Robert Slutzky and Colin Rowe in the essay - "Transparency: Literal and Phenomenal." In this way students are introduced to the spatial qualities that underlie all modernist architectural projects, particularly the works of Frank Lloyd Wright and Le Corbusier.

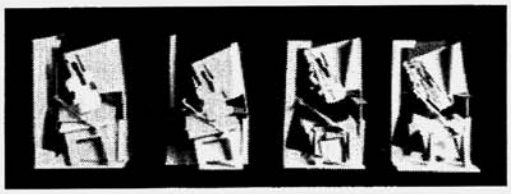
In this exercise students are asked to choose a reproduction from a range of paintings by Gris, Picasso, Braque, and Le Corbusier. It is postulated that each image was not only derived from an actual model in space, but that the paintings record multiple, albeit fragmented, views of that model and space. Now more familiar with architectural conventions and drawing techniques, students are asked to recognize simultaneous plan and section readings in their chosen images. They are asked to restore the missing third-dimension by interpreting potential clues of depth in the Cubist / Purist images *(fig. 2 - 5)*. Questions of interpretation require students to identify, or isolate, both visual incidents and the matrix that orders their relationships. Spatial clues may be both perceptual and diagrammatic, incorporating aspects of plan, section, elevation, axonometry and perspective. The Cubist / Purist exercises establish visual criteria as the exclusive program for this exercise. As a consequence, questions are raised concernng the complexity of how we receive information about spatial events, and extends the means by which students may effect that reception. Criteria for evaluation include fidelity to the original image, and the logic of the process that generates the third dimension.

2. Juan Gris, Le Violon, 1916



3. Juan Gris, Verre Et Journal, 1917

The Cubist / Purist exercises combine two and three-dimensional design, and coincide with a series of color exercises based on Josef Albers' Interaction of Color. The color exercises continue throughout the semester and are intended as a two-dimensional analogue to the three-dimensional architectonic exercises, as the Tile Problem was to the Volume Problem. Briefly, Albers' contention is that our perception of color phenomena is conditioned by adjacent contexts. Hence, two areas of a single color may seem different against contrasting backgrounds. The color exercises build on the figure / field exercises explored in the first semester and are used as design and presentation tools in conjunction with architectonic problems in the second semester.



4. The Cubist Problem, Roberto Petruccelli, 1992

5. The Cubist Problem, Robert Schmitz, 1993

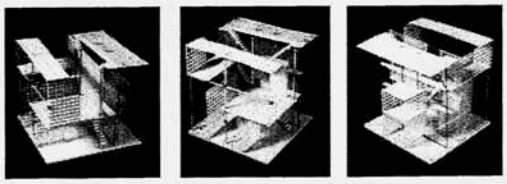
Phoenix Problem

The Phoenix Problem was invented by Jonathan B. Friedman and developed with the assistance of myself, and colleagues Christopher Chimera, Erin O'Keefe and Pascal Quintard-Hofstein. The Phoenix Problem has been used for the past four years. It is the third project in the second semester Design Fundamentals course. Approximately eight class sessions over four weeks are devoted to this problem. As the final problem that utilizes the "kit of parts" approach, it brings to a culmination the modeling problems that it follows. The Phoenix problem is also the bridge to second year design studio, where basic issues of program, partí, and site are explored. Students are required to produce full sets of architectural drawings, along with concept and presentation models.

The Phoenix Problem provides a model for the design process, and consequently, for more complex architectural challenges that will be confronted later. As the previous two projects focused attention on isolated aspects of the design process, the Phoenix Problem is the first project with a complex program, circulation, and construction elements. A new kit, called a "bag of tricks," allows students to model spaces with empty volumes as they had previously modeled with solid volumes. The new elements permit structures of varying degrees of stiffness and transparency. The Phoenix project is posited in the following story:

> " Near here a phoenix has found evidence of the return of human culture. Wisdom, compassion, science, and all the arts have re-emerged as the essence of civilization. This fabulous Bird loves to play solo and ensemble music in concert with others. True to its complex nature, it enjoys shade as much as sunlight, and especially likes to fly through the rich fabric of both. The phoenix is eager to share with people its well-developed sense of freedom in space. It knows that a three-dimensional tartan grid of circulation weaving throughout a site can provide a human equivalent to flight, celebrating movement in fully plastic and temporal terms. In addition to accommodating program volumes listed, the 30' cubic site may be modulated to indicate the following:
>
> a. 1- 16' x 16' x 16' large chamber where the bird and people make music together. Light and dark.
> b. 1- 16' x 16' x 8' roost for the phoenix, vertical or horizontal, mostly dark. Connect to a. and c.
> c. 1- 8' x 8' x 90' continuous 3-dimensional flight run, well lit. Connect to a. and b.
> d. 1- 8' x 8' x 16' practice room, horizontal or vertical, for visiting musicians. Connect to a.
> e. 3- 8' x 8' x 8' visitor galleries, offering a view to the proceedings and privacy to a small group. Connect to d.
> f. 1- 30' x 30' x ? vertical reference plane to attract visitors and phoenix." [6]

The design process as delineated in this exercise follows the familiar design phases in traditional practice, if "fast-tracking" has not entirely made this sequence obsolete. The exercise involves implementing a massing diagram (schematics), and developing it at a variety of scales and to higher degrees of precision and differentiation (design development). The massing diagram is constructed with the cubes and rods left over from the previous semester. They are color coded to identify program volumes. By associating program requirements with explicit spatial and volumetric parameters, students manipulate some elements in order to define others. The basic functional and access relationships may be established at this phase. Following this, students build paper and cardboard models at double that scale, modifying earlier assumptions about structure, solving circulation and refining strategies for enclosure. Once they have generated a useful diagram, discussion surrounds the mutual impact that architectural decisions have throughout the matrix. Students begin to understand that even seemingly minor gestures either support or undermine their larger plastic strategies. In the final phase, the scale of the model is doubled once again as students trans-



6. The Phoenix Problem, Eldon Smith, 1994

late their plastic intentions with the "bag of tricks" *(fig. 6)*. This last phase parallels the professional practice of developing details, building systems and construction assemblies.

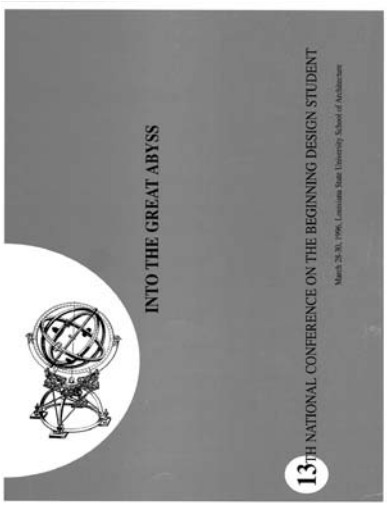
A series of color exercises run concurrently with the Phoenix problem. Included are the Three Color Transparency Problem and the Color Tile Problem. Students begin with a transparent frontal axonometric of their Phoenix models as a template. Using the color code from their preliminary models, they must find in their Color-aid packs the appropriate colors to produce the illusion of intersecting planes or volumes of space. The color exercises introduce beginning architecture students to a variety of ways that color phenomena effect how we understand what we see, and therefore, how color may be used to both communicate, analyze and generate ideas about space. This essentially concludes our first year program.

Conclusion

In a "two plus four" Master of Architecture program, architectural design studios are delayed until after broad cultural and critical contexts are developed during two years of liberal arts study. At NYIT and other "five year" Bachelor of Architecture programs, cultural and critical contexts must be developed concurrently with and frequently through architectural design studio courses. The School of Architecture at NYIT operates within an institution whose mission is to offer the widest possible access to higher learning and professional education. As a result, many of our students are unprepared for college level study. In this respect, we are unlike other five year programs. Our pedagogy requires a program that allows beginners to start and attain a measure of achievement with the basics and simultaneously nourish those who are more advanced. By paring away extraneous material and developing essential architectural concepts with rigor, the program is an initiation to the poetics of architectural design.

Notes

1 Le Corbusier, Towards A New Architecture, Holt, Rinehart & Winston, 1984. p. 10.
2 Gertrude Stein, Picasso, Dover Publications, 1984, pp. 15, 19 (emphasis supplied).
3 John Berger, The Success and Failure of Picasso, Vintage International, 1993, p. 69.
4 John Berger, The Sense of Sight, "The Moment of Cubism," Pantheon Books, 1985, p. 167.
5 Ibid., p. 176.
6 Jonathan B. Friedman, Creation in Space 2, Kendall Hunt, 1996, pp. 251, 297.



Form *en abyme*

Robert Somol
Los Angeles,CA

Thirteenth Conference
Louisiana State University
1996

FORM *en abyme*

Robert Somol

In contemporary design education and practice there would seem to be no place for the form of the manifesto, and certainly no grounds for a manifesto on form. This abysmal condition of work bote on form as well as on programmatic thought no doubt has a persuasive pedigree given the documentation of the "failure" of architectural experimentation offered by postmodern history and the more recent suspicions over "master narratives" raised by poststructual theory. The price of this critical sophistication, however, has been an inability to engage in any speculative, generative, or projective thought. Thus, a theoretical diagnosis that was intended to promote innovation and experimentation-namely, that one no longer reply on the truisms of the master narratives of modernity-hasitself become codified to induce retreat and timidity, to serve as a rationalization for the fear that we have nothing new to say. Before suggesting how it might now be possible to begin at the end, or after a series of ends, it will be useful to return briefly to the last moment when it was still credible to the event a common beginning.

Common Ground: The nine-square as an introduction to disciplinary (c.1954-1976)

However one would like to date its origins, the nine-square problem (and variations of it) emerged as perhaps the most durable and widespread beginning design problem in the postwar period. The elegance and ingenuity of this problem was in which it consolidated a series of discourses and demands. Thus, while the technical preconditions that allow modern architecture to refound itself exclusively on the twin bases of *structure* and *space* had existed for almost a hundred years, the aesthetic, philosophical and intellectual sources-e.g., the unique combination of cubism, liberalism, gestalt psychology, and the new criticism, with a new renewed understanding of mannerist organizing geometries—would not be rostered as an articulate assemblage until the early 1950s when it would provide a new disciplinary foundation for high modern (or mannerist modern) architectural design and pedagogy. As an educational device, a concrete machine, the nine square problem emerged from the collapse of two modern diagrams-Corbusier's domino (*space*)-filtered through the reductive planimetric logic hypostatized as Pladio's "twelfth villa" by Rudolph Wittkover. What this problem provided was a *discipline* for modern architecture-a perverse and clever argument for a rhetorical capacity against those who would understand architecture as simply the literal addition of constructional systems and programmatic requirements. Further, it assumed a *language* of architecture founded on the articulation of a series of dialects (center and periphery, vertical, and horizontal, inside and outside, frontality and rotation, solid and void, point and plane, etc.), a logic of contradiction and ambiguity reinforced by the black and white representational techniques of the ink on mylarorthographic set and isometric supplemented by the ubiquitous neutrality of the white foamcore model.

Of course, to make evident the institutional and disciplinary nature of modern architecture-to emphasize its rhetorical or linguistic or representational aspect—was, *sotto voce*, already to question its simple *necessity*, an interrogation that would increase in volume over the following thirty years in the ideological disputes of postmodernism and deconstruction. Thus, what was considered (in good, liberal proceduralist fashion) as *the language* of architecture, quickly pluralized into the competitive cacophony of *languages* of architecture, as all possibility for aesthetic and political consensus increasingly dissolved after the 1960s. In this context, the faith in a single problem as universally relevant to introductory design education quickly disappeared.

Opening the abyss: Partial critiques and the pluralization of design education (c.1976-)

The power and beauty of the nine square problem, of course, was that it was immaterial, that it existed without function, site, client, body and, to some extent, even without scale. And this abstract universality was precisely, in the multicultural 1980s and 90s, what came to be challenged as exclusive, irrelevant, and closed—judgements which mapped too closely to the failures of the profession itself to go unheeded. Thus, as a way to both specify and diversify design interests, an investigation of the abstract language or geometry of form was replaced by historical alternates:i.e., an emphasis an materials (or tectonics) and narrative (or program). As implemented in the design studio, these partial critiques deployed new techniques (e.g., from college, photography, construction sculpture, performance, film, video, etc.), appropriated new discourses (from post-cubist-aesthetics to alternate philosophical, political, and scientific models), celebrated both base and hi-tech materials (from metal, wax, plaster, fabrics, and fluids to various found objects and readymades, up to and including television screens and VDT's), and even challenged the "place" and

format of the architecture review itself (i.e., against the "neutrality" of the pin-up space wall, projects would migrate outdoors and in situ, ultimately into the virtual space of screen). often than not, this multiplication of techniques, materials, sites and scales has resulted in "anything goes" introductory studios where would-be do-it-yourselfers (from craftsy furniture-makers to artsy construction-sculptors) meet wannabe raconteurs (who spin tales of their autobiography or project personality traits from a catalogue of preselected figures or characters). Rather than challenged the limited criteria (or "relevance") of the previous model, these partial critiques develop an implicit contract of irresponsibility among faculty and student, where discussion to an evaluation of whether something works or whether it confirms the author's intentionality. Here, criticism is often reduced to the litmus test of whether the student is *responsible enough* or, equally absurd, whether he or she is *passionate enough*. In other words, lacking any consensual basis for what constitutes an architectural project or thematic, work can be evaluated only in reference to the society in general or to the idiosyncratic vagaries of the individual psyche, there being no disciplinary scale which effectively operates between the two.

The Nostalgia for Lost Ground: The return to "the Real" after representational excess (1992-)

The various attempts to establish a language based or semiotic model for the architectural discipline from mannerist modernism to postmodernism to deconstruction—have recently been abandoned. Professional organizations (such as the ACSA, AIA, NAAB, etc.) and publications (the JAE and the now defunct PA), along with various educational institutions and academics, have come to call for a return to "the real," variously defined as a return to office skills, to essential typologies, to a 1:1 craft ethic of making, to building tectonics, or to a presumably stable referent such as the community or the environment. This new reality principle ha been able to absorb many of the strategies of partial critique outlined above, as they had always been motivated by a reinvestment in the supposed "real" substance of architecture namely, materials and program. Meanwhile, other critics of architectural education, not content simply to reappropriate the discrete and haphazard options thrown up by the new design studios, have called for professional offices to assume educational responsibilities currently vested in the university, as these academic settings are now perceived as too separate from real world concerns (see Robert Gutman). In this way, *professional* identification is proposed as a substitute for a *disciplinary* discourse that now seems impossible.

Form en abyme: the diagam as a chance for a post-representational design practice and pedagogy

In the current climate, "form is quickly becoming architecture's favorite four-letter word, though one also hears related expletives tossed around such as "theory," "avantgarde," and "autonomy." After the thirty year period where the question of form was a major preoccupation, formal investigation and experimentation have been dismissed by those calling for a return to order, to architecture's supposed reality principle or essence, to social responsibility and constructional integrity. The result of this embarrassment over the question of form—its presumed relativity or impossibility, its exile to the black box of design education and practice—has caused it to return in the guise of unexamined expressionisms or a desperate pluralism where various "starting points" for form-making (history, context, site building systems, program, body, or biography) are considered equally valid. However, in a more expansive sense, form does not (can not) *follow from* any one of those presumed preconditions, but rather constructs the field that allows them to be articulated as different from one another in the first place. They do not *precede* form so much as their ability to be expressed via form—to be formalized—implies that *it is only through the possibilities of form that they can be conceived at all*. In this way, form can no longer be imagined simply as a static object, nor naively understood as part of a binary opposition where its other term could be variously posited as function, or matter, or content, or even the real. This begins to point toward a new program for work on form—one which is here being referred to as *form en abyme*—an informal project perhaps, and one that relies on the initial prop of the diagram.

This minor manifesto, then, begins within our current impasse, which can be described as a kind of triple impossibility: namely, the impossibility of returning to the canonic modernist model, the impossibility of an enthusiastic embrace of its partial critiques, and the impossibility of following Gutman's refusal and abandoning the educational project altogether. Rather than wish for a *prerepresentational* consummation with an unmediated "reality," it pursues a *post-representational* politics of design education. For example, against the recent call for *tectonic* sincerity and authenticity (an attempt balance between the representational and constructional aspects of architecture that locates its origin in the "real"), this project is conceived as an instance of a *diagrammatic* practice, one that points to the virtual. In the words, whereas to date the most rigorous formalisms have required the systematic elimination of everything considered "other" (whether structure, program, site, materials, etc.), the question of form today may only be able to be broached by the simultaneous and promiscuous solicitation and affiliation of those concerns. This project condenses and channels a set of forces and collectives, some of which may even be (from the point of view of current spatial politics) impossibilities. It attempts continually to restate and subvert dominant oppositional terms and to suggest the plasticity of formal-material instances, to register that things can become other than they presently appear to be.

This surprise of otherness, or possibility for the event, I take to be the central element of the design process. As Gregory Ulmer has suggested in his call for a new pedagogy appropriate to the techniques and forms of knowledge enabled by electronic media, this will involve a heuretics of invention rather than a hermeneutics of interpretation. As a popular instance or emblem of this euretic moment, one can look to the scene in *Bugsy* where Warren Beatty, after randomly stopping the car in a fit of anger, wanders into the desert and has an epiphany by envisioning a new territory, a new way of occupying, due

to the confluence of a diverse range of forces: legalized gambling, new technologies of transportation, the development of the Hoover Dam which enables the delivery of water as well as massive amounts of electricity, and the expansion and proximity of Los Angeles as a talent pool for entertainment. These are precisely the kind of "preformed" matters and activities that would be registered in the diagram, suggesting that form is not the static (and vertical) repetition of a proper origin model (like a nine-square) but a horizontal repetition, a provisional moment in the condensation of a heterogeneous line. When asked by a business associate how "the Hoover Dam and fucking are connected," Bugsy answers emphatically, *"by air-conditioning!"* The diagram registers new forces and infrastructures that makes evident a teeming virtually in what currently appears to be only a barren desert. Thus, while opposed to the domesticated and classicized calls for "eco-humanism" or reductive models of "community," the pursuit of *form en abyme* is not the enemy of the social, but simply opens alternative ways to solicit ecological forces and collective arrangements.

As suggested above, to reimagine institutional and disciplinary models — which this paper proposes is both a possible and desirable project from a post-representational or diagrammatic position - requires an alternative way to think repetition, a view which conceives repetition as becoming other, as a swerve, rather than as the static reproduction of a proper original or model. Further, as Ulmer notes, "Eureka' results from a repetition between quotidian and disciplinary experience" [141]. This is clearly true in those infamous "eureka" stories, of Newton under the apple tree, Archimedes in the bathtub, and even Derrida shopping for a postcard. In this way, designing (and setting up a studio) first means enabling the possibility for an accident — this is the pre-design of the diagram, providing the scenario by which the sewing machine and the umbrella can meet to a specific and pointed effect. As one example of the crossing of codes of the social and the aesthetic, or the everyday and the disciplinary, one can take Hans Haacke's "Isolation Box": on the one hand a meticulous reconstruction, from a *New York Times* account, of the containment devices used in Grenada, on the other a comment on the exhibition of minimalist boxes in the gallery and his own work within that history — thus, the condensation of political/everyday, disciplinary, and personal frames.

For Derrida and, following him, Ulmer, the *mise en abyme* (or placing into the abyss) is a figure of difference, of infinite regress, and is formally associated with miniaturization and repetition, perhaps one could even say "fractalization." While Ulmer looks to heraldry and mirrors as historical devices of this trope, current consumer technology has made this an everyday experience: the "picture in picture" for simultaneous television viewing, the "seat in seat" automotive advance for the toddler, and the "refrigerator door in door" for frequently used items, like ice and water. In looking for a way to recuperate (at least in a minor idiom) the disciplinary coherence provided at one point by the nine-square, one might look to the Sierpinski carpet, a problem from mathematics (like the Ideal Villa itself), which is constructed by removing the center ninth of a nine square, then removing the scaled centers of each of the remaining eight, continuously. The three dimensional version of this exercise in voiding, the Menger sponge, produces a solid looking lattice, the surface area of which approaches infinity, while the volume approaches zero. Here then is a contemporary disciplinary response to the modern invention of space which had been reified in the nine square problem, an organization that is all *surface and event*, rather than *space and structure*. Unlike the Palladian nine-square this is no longer a problem in typology, but one in topology — a repetition as difference rather than repetition as identity. Now, before being misunderstood, I do not propose to privilege the appropriation of this counter-nine square as the new universal and exclusive problem, but merely to suggest that what needs to happen in design studios is the reinvention of organizing systems, the continual argument over the terms of the discipline by placing prevailing oppositions in the state of suspension, initially through as simple and condensed a schematic as the diagram. In this instance, the project of *form en abyme* both perversely confirms the nine-square (through a kind of repetition twice over — by its initial citation and process of reiterative sampling — as well as being truer to the problem than ever imagined by its authors) while subverting its limited logics, principles, terms and effects. This desired effect is what, in another context, I have called the "both and neither" or a "false positivism."

The crossing of the disciplinary with the everyday - one aspect of the "improper" repetition of *form en abyme* — requires educators and designers to mobilize the "eureka" of surprise and the event. The site of my own "eureka" with regard to the request to propose a manifest for this conference came not under a tree or in the tub, but, appropriate to our twentieth century situation, in front of the TV. *Seinfield* to be precise. There, all the elements and principles of both design and desired studio performance seemed to be operating in condensed form:

1) *The stand-up routine*, which acts as the initial diagram or storyboard for the entire episode, a part which stands in for the whole—humor *en abyme*.

2) *They are explicitly "about nothing"* (or nothingness), thus defeating any attempt to summarize or categorize. As John Cage states, as a corrective to the misunderstanding of advanced art production after the 1960's, "anything goes, but only when nothing is taken as the starting point."

3) *The principle of ecological paranoia* (or, everything is connected to everything else). As with the butterfly effect of catastrophe theory, indeterminate small events will impact large scale organizations: e.g., a taste for juicy fruits will lead to the collapse of an international publishing house. This leads to another correction of the currently misinterpreted late 60's slogan, "the personal is the political"—in other words, it's not enough to indulge the individual creator, but each individual narrative must resonate with and be connected up to collective concerns.

4) *Scheming*, or an incredibly elaborate and hyperrational calculation of events and forces, to the extent of rendering virtual possible scenarios in totally absurd detail. Inevitably, all the systems of logic end up producing totally unexpected results: hours spent producing the perfect plan to "pull the roommate switch" has effect of an invitation to a threesome, which is equated with "accidentally discovering pluto-

nium," Eureka. The obsession with "invention"—the coffee table book, the bra for men, etc.

5) *Alternative social and economic alliances*, a background urbanism structured by horizontal chances, coincidences, repetitions (interchangeably of products, words, characters, public figures), the solicitation of new personal and institutional relationships; the temporary assumption of alternative identities.

In the end, this call for a new disciplinary model promotes architecture as the framing and posing of problems rather than the definition of solutions. As such, I am not immediately concerned about procedural reforms or providing a detailed syllabus, and certainly not interested in a Ching-like recitation or listing of the essential elements or fundamental skills of design. The argument for a diagrammatic project takes it as axiomatic that every design project - and the work of every instructor and student - needs to take up anew the issue of what constitutes architecture both as a disciplinary and social question, to suspend and rearrange ruling oppositions and hierarchies currently in operation, to promote design projects and processes that cannot simply be inferred from context or reasoning, but that retrospectively transform their very contexts, social, and intellectual. Design education and practice needs to be more propositional, programmatic, and witty.

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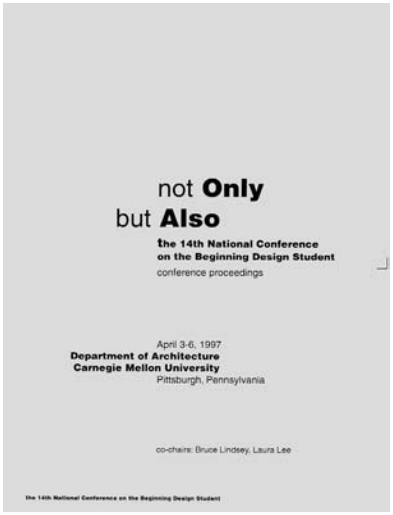

Waffling: The Infinate Plasticity of Architecture

Thomas Sofranko
Louisiana State University

Fourteenth Conference
Carnegie Mellon University
1997

Waffling
the Infinite Plasticity, of Architecture

Thomas Sofranko
School of Architecture,
Lousiana State University

"Benevolent societies seem persistently engaged in bringing things together that are apart and taking things apart that are together, thus fostering the perpetual mobility of art..." [2]

INTRODUCTION

Hegel has suggested that art exists in a constant state of transformation. Trapped by the absolute freedom of the creative process, the artist's imagination is exercised by indiscriminately attaching art to any chosen subject. [3]

Architecture also exists as Hegel suggests, "in a state of infinite plasticity" [4] — embracing any topic or subject in order to develop a narrative or find validation. The variety of "issues" (i.e.. philosophies, fractals, fragments, knots, fields, and swarms, as well as genders, senses, and the body) investigated in design studios suggests a certain liquidity to architecture — a condition in which it becomes a mediator, molding and being molded by anything it encounters. Must architecture always be paired with something else, and is this detrimental? Does the need/ability to find imaginative sustenance from so wide a palate suggest an inherent superficiality in our current conception of architecture education?

This paper contends that architectural design is a process of joining and combining. It is through joining that architecture becomes a mediator between the physical and metaphysical. Architecture, through its transitory or liquid nature, "engages and detaches us at the same time." It makes "us participate in what it presents, and yet presents it as an aesthetic fiction." By participating in this fiction, architecture "draws its power to enlarge our vision by carrying us beyond the actual." [5] In this sense, it will be argued that architecture is enhanced by it's malleable, in-between nature which allows it to mediate amidst an inexhaustible variety of issues.

1. Hegel, Georg W.F. *Vorlesungen uber die Aesthetik, vol II* (Berlin: Berlag von Dunder und Humblot, 1843) p236. a l s o Hegel, Georg W.F. *The Philosophy of Fine Art, vol II* trans. F.P.B. Osmaston (London: G. Bells and Sons, LTD., 1920) p397. Hegel's term, *'unendliche Herumbildung,'* is translated by Osmaston as meaning 'infinite reconstruction.' It is not entirely clear but the translation of *'Herumbildung'* to mean 'plasticity' may be attributed to E. Wind (see note 3). Regardless of the credit for the translation, the notion of the endlessly transforable or malleable suggests the possibility of continual, adaptive change. **2.** Wind, Edgar *Art and Anarchy* (Evanston, IL: Northwestern University Press, 1985) p88. **3.** Ibid. p15. **4.** (see note 1) **5.** Wind *Art and Anarchy* p24

A primary assumption of this paper is that (ignoring religious predisposition) something is always the product or by-product of something else. Things (concrete or conceptual) are formed from combinations of other things. Modern design is typically described as an additive process. As often professed, architectural design does not occur in a vacuum.

Design is a process whereby the world is recreated from the world. The contemporary fiction writer Tom Robbins uses the mockingbird to explain the creative process — he states:

"Mockingbirds are the true artists of the bird kingdom. Which is to say, although they're born with a song of their own, an innate riff that happens to be one of the most versatile of all ornithological expressions, mockingbirds are not content to merely play the hand that is dealt them. Like all artists, they are out to *rearrange* reality. Innovative, willful, daring, not bound by the rules to which others may blindly adhere, the mockingbird collects snatches of birdsong from this tree and that field, appropriates them, places them in new and unexpected contexts, recreates the world from the world." [6]

Accepting the notion of design as an additive or combining process, several theories of increasing precision examine how multiple elements are produced and arranged: Gilles Deleuze begins by describing the Baroque as a folding process:

"The Baroque refers not to an essence but rather to an operative function, to a trait. It endlessly produces folds. It does not invent things: there are all kinds of folds coming from the East, Greek, Roman, Romanesque, Gothic Classical folds... Yet the Baroque trait twists and turns its folds, pushing them to infinity, fold over fold, one upon the other. The Baroque fold unfurls all the way to infinity." [7]

Maintaining the idea of folding as a means by which architecture evolution transpires, Greg Lynn describes a biological model for the combining of geometric bodies. In the article, *Multiplicitous and Inorganic Bodies*, he suggests either affiliative or filiative connective systems are characteristic of multiplicitous organisms. Filiative implying, "the relations of a family, of proper parents and progeny." [8] Affiliative, by contrast, refers to systems in which disparate species are combined. Describing design as inherently multiplicitous, architecture production can then be seen in very general terms as the combining, articulating and delimiting of internal volumes from external forces — folding, particularly of multiplicitous bodies. Lynn provides further elaboration of the argument of filiative versus affiliative or unchanging species versus multiple, folded species:

6. Robbins, Tom *Skinny Legs and All* (New York: Bantam Books, 1990) p6. 7. Deleuze, Gilles *The Fold - Leibniz and the Baroque, the Pleats of Matter* Architectural Design Folding Architecture (New York: VCH Publishers Inc., 1993) p17. 8. Lynn, Greg *Multiplicitous and Inorganic Bodies* 8. Lynn, Greg *Multiplicitous and Inorganic Bodies* Assemblage 19 (Cambridge: MIT Press Journals, 1992) p38.

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"The prejudice toward fixed orders is achieved at the cost of repressing local differences of program, structure, form, and culture. Affiliative relations, by contrast, typically exploit possible connections that occur through vicissitude. They cannot be predicted by the global systems of organization present in any single unified organism. When *whole* systems of geometric description and organization break down, seemingly unnatural connections between disparate elements emerge. The introduction into architecture of forms that are 'protogenic,' or without exact measure, presents such an opportunity." [9]

Lynn begins to relate (via chaos/complexity theory) how the "protogeometries" of open systems (geology, geography, fluid dynamics...) can be partially reduced and plotted so that these systems remain open to fluctuations or inconsistencies, yet they can be reduced enough so that their patterns and formations are loosely quantifiable. A structure, although particular, temporal, and incomplete, can be ascertained. In his affiliative model, order is possible without marginalization.

Marco Frascari has discussed this idea of architectural genesis through union or joining by concentrating specifically on "unnatural connections." *Some Mostri Sacri of Italian Architecture*, traces Giambattista Vico's introduction of monsters and metamorphoses as two new poetic tropes. The joining of ideas creates the 'poetic monster.' And the poetic monster acts as a mediator between the factual and the real. Vico defines monster as "a special case of human representation" by explaining that 'monster' (*monstrare* = to show) was the name given to children of prostitutes according to Roman law because their origin was in an "uncertain union." [10] Frascari explains that Vico introduces the monster as a poetic trope because, like the love-child for which it is named, it is something that is both factual and real, physical and metaphysical: the monster, in the Roman sense, is not only the factual result of a carnal union, but also symbolizes real (individual and relative) ideas of love. Because of its nature of being in-between, because of its condition of simultaneity, the monster assists in the understanding of change. The monster as mediator is analogous to the role of architecture. In Louis Kahn's terms the in-between is, of course, in-between silence and light or immeasurable and measurable.

Rhetorically, returning to Lynn's article; his description of the joining of geometric organizations, phrased in the language of the quasi-biological, relies on the authority of the scientific to bring his argument to fruition. In Vico's terms, the scientific becomes real for Lynn. The persuasion of the argument results when he presents the real as factual — his personal truths are presented in such a way as to imply their universality. Realizing the distinction between the factual and the real is important for students to understand architecture beyond a utilitarian act.

9. Ibid. p39. 10. Frascari, Marco *Some Mostri Sacri of Italian Architecture* AA Files #14 (London: Architectural Association, 1987) p42.

IMAGES FOR COMMODIFICATION

Presenting the real as factual is necessary, in a very basic sense, for the persistence of commerce. A rear spoiler on an *Oldsmobile* sedan, waffle soles on *Nike* cross-trainer running shoes, the angled head and asymmetric bristles of a *Reach* toothbrush; quasi-scientific fiction is sold as fact on a daily basis and is probably the single largest influence on the shape of design today.

Since the Enlightenment, rational discourse and empirical proof have defined the modern. In the pinnacle achievement of man over nature, "it was Newtonian physics that guided the Apollo rocket to the moon and back." [11] It only stands to reason that rocket-like fins on the tails of our cars would give everyone that same Newtonian power over nature — or at least makes it look like it. Fredric Jameson states:

"What has happened is that aesthetic production today has become integrated into commodity production generally: the frantic economic urgency of producing fresh waves of ever more novel-seeming goods (from clothing to airplanes), at ever greater rates of turnover, now assigns an increasingly essential structural function and position to aesthetic innovation and experimentation." [12]

From as distant as Vico (c. 1744), the split between the real and the factual has been a persistent topic of interest. Many have identified capitalism as the underlying force behind a condition of superficiality that results from the misinterpretation of aesthetic and commodity. Plato was even compelled to propose censorship as a hopeless solution to political orations which were deemed meritorious not for their content, but for the manner of their presentation. [13] He saw the liquidity of the words obscure the content of the message and feared not only superficiality, but political collapse as well.

Again, Vico's assertion that mediators (into whose classification this paper places architecture) exist between the factual and the real requires that both can be accounted for. And it is in the constant transposition of the real becoming factual and the factual becoming real that the nature of the mediating-monster is fully expressed.

MONSTROUS FAMILIES
AN ARCHITECTURE PROJECT IN TWO PARTS

The purpose of this project is to introduce architecture as a mediating monster. It is a three weeks long and divided into two parts of approximately one and two weeks.

11. Maxwell, Robert *Sweet Disorder and the Carefully Careless* (New York: Princeton Architectural Press, 1993) p289. **12.** Jameson, Fredric *Postmodernism, or The Cultural Logic of Late Capitalism* (Durham, NC: Duke University Press, 1991) p4. **13.** Plato *The Republic* (New York: Alfred A. Knopf, 1992) pp78-81.

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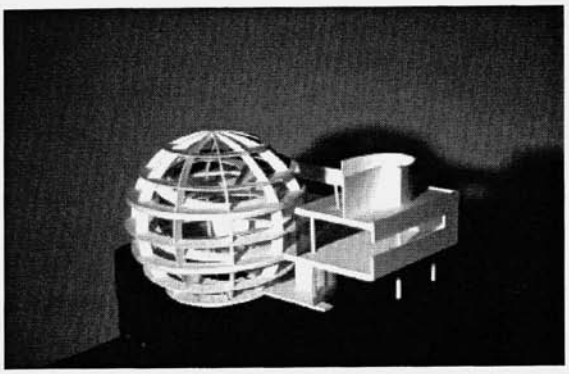
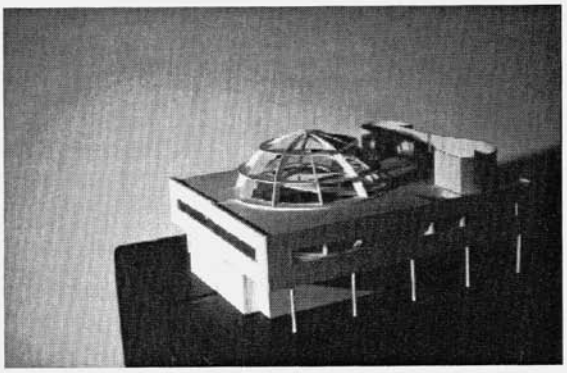
The students are assigned a specific building by one of three architects (typically one long dead, one recent dead, and one still living).



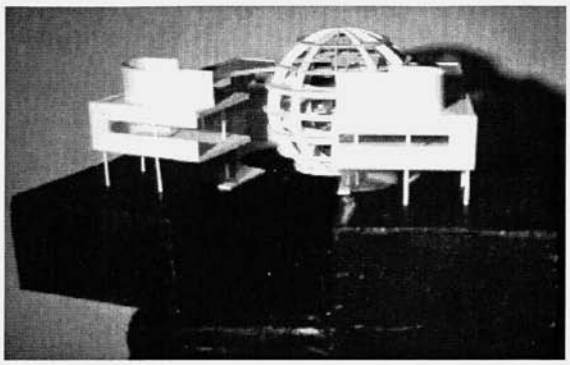
Assignment I Analysis and Research 1 week

Students are required to find information about the architect and the building including as many plans, sections, elevations, and perspectives as required for them to understand how the building goes together. From written information about the architect and the building as well as their own personal interpretation, the student must choose some aspect of the building and in written form describe a fiction of what the building is about — its reason for being. The student then produces a descriptive, exploded axonometric which attempts to convey this same information.



Assignment II Monstrous Intervention 2 weeks

The second part of this project begins with a list of architectural elements: chair, floor, table, wall, window, door, stair... Students are given random pairs from the list: window/stair, door/chair... They are then asked to design their monstrous pairing and, using exploded section models, graft their pairing into the building they analyzed in such a way as to support and extend the thesis of their analysis and research.



There are multiple objectives encased in this project: Primarily, as this paper has been leading up to, this project provides an existing building from which students must identify or distinguish the factual and the real. Following their analysis, the design assignment requires students to participate in an already activated folding process — monster making. Secondarily, the analysis and research requires that the students think critically about a building while simultaneously suggesting that the fictions of personal interpretation are not too dissimilar from the way in which consumer goods are marketed (hopefully education is also seen in the light of commodity). The written analysis translated to a graphic axonometric serves to clarify differences between spoken and built languages. The bizarre pairing of elements requires a rethinking of the use and application of seemingly over-familiar architectural elements; and the final act of grafting to the existing architecture suggests that there is always a context within which work is inserted or folded — both a physical context, and the context of the real and the factual.

CONCLUSIONS

Architecture is a monster (mediator) because its production involves recognizing and combing a variety of physical and conceptual variables. The real and the factual are both inevitable and valuable. Demitrios Porphyrios has suggested that heterotopia, typology, and metaphor have or will fail because they are concerned in some degree in projecting a "false consciousness of reality" [14] — a fiction in other words. While these issues do raise many questions, they have not failed or will not fail because of projection of a false consciousness. If anything, their failure will be attributed to the fact that the consciousness they projected was not false enough — the fiction was not sustained. It has been suggested that, "Language so liquefies the world that one never gets to the real thing." [15] The question that needs to be asked is not how to eliminate the "liquid" (real); that is impossible. The real — the individual interpretation of the factual — is necessary if meaning is to exist. The important questions have to do with ways in which we begin to recognize the value of the "liquid" in completing the role of architecture as mediator, and ways in which the plasticity of architecture is maintained.

"There is nothing wrong with an illusion of intensity, provided the illusion is sustained." [16]

14. Maxwell *Sweet Disorder and the Carefully Careless* p151.
15. Gilbert-Rolfe, Jeremy *Beyond Piety* (Cambridge: Cambridge University Press, 1995) p321. **16.** Wind *Art and Anarchy* p26.

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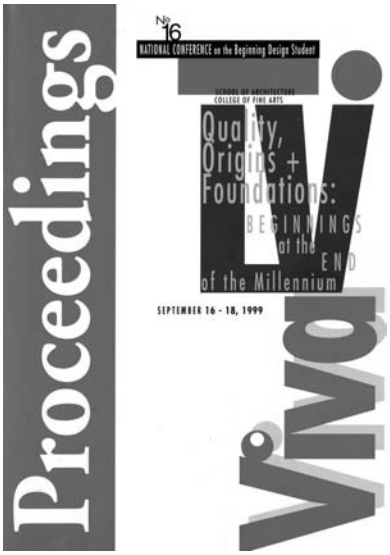

The Beginning Student of Design: Architectural Frames of Reference

Gregory S. Palermo
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Sixteenth Conference
University of Nevada, Las Vagas
1999

The Beginning Student of Design: Architectural Frames of Reference

Gregory S. Palermo, Associate Professor
Iowa State University

Abstract

There they are, every Tuesday and Thursday — two hundred minds seeking perspective on ***the means by which to access architecture****: to think about it, look at it and analyze it, engage in discussions about it, and experience it. Student interests and capabilities are varied because in addition to being required for pre-architecture students, this is a university general studies course — a threshold into the adventure of architecture! This paper addresses the* ***content and methods*** *of introducing* ***architectural frames of reference*** *to the* ***beginning student of design*** *in the challenging* ***large lecture learning environment.***

Canon and skepticism. *Five frames of reference are presented through which to consider the* ***thought-full-ness of architecture****: 1) Immutable Realities of Building (Ordering Landscapes, Enclosure and Object, Interior Space): 2) Historical Perspective: 3) The 'Great' Building; 4) The 'Great' Architect; and 5) Theories of Architecture. These are countered with the questions: Where is the architecture and presence of the 'other': e.g., the less powerful people, the vanquished, the less enduring construction, women and minority architects and theoreticians?*

Departing from the Western historical narrative and form based theories *that anchor many introductory courses,* ***in-depth case analyses*** *from within each frame of reference blossom to* ***situate buildings and places****, their architects, their clients, their users, and their builders* ***in a social-political-cultural context.*** *Complex ideas are made accessible without reduction to the simplistic which often occurs in beginning courses. The intents are to initiate the construction of an architectural knowledge base and to develop a foundation for future independent inquiry. The* ***active learning situations*** *and tactics of small group discussions and team generated questions, an 'anonymous' question collection cap, in-class writing exercises based upon parallel readings, a self-study on-line slide resource 'Plato's Cave', and essay based exams* ***break down the passive lecturer-recipient character that haunts most large introductory courses****.*

"But what is seeing without thinking?"

Goethe[1]

There they are, every Tuesday and Thursday — two hundred minds seeking perspective on **the means by which to access architecture**: to think about it, look at it and analyze it, engage in discussions about it, and experience it. And for some, to help inform their beginning design work. Student interests and capabilities are varied because in addition to being required for first-year pre-architecture students, this is a university general studies course — a threshold into the adventure of architecture! This paper addresses the **content and methods** of introducing **architectural frames of reference** to the **beginning student of design** in the challenging **large lecture learning environment.**

Audiences and The Large Lecture Class

Architecture 182 at Iowa State is an introductory course, for both architecture and non-architecture students, that opens doors into architecture. It originated in a faculty decision to develop a "theory" or "ideas" course as a companion to first year design studio.2 Engendering observing, experiencing, thinking about, and discussing architecture is the heart of it — even if one will not be 'doing' architecture. The ambition of the course is to link *ideas* and *buildings*, and to present resources and tools that enable continuing study of architecture. The course is subtitled "Adventures in Architecture" — capturing the spirit of the quest to come to know about architecture!

Another objective for the faculty is making architecture accessible on a broad basis — not all people interested in architecture are going to be architects, nor do they wish to be. In this sense, the beginning student of design may be interested in architecture as part of a liberal education, just as they may study anthropology, archaeology, psychology, philosophy, political science, etc. Which is to say, architecture has validity as a general education topic alongside studies in the humanities, social sciences and the arts. We study history, literature and theater not because we will become historians, writers or a thespians, but because they are enriching explorations in themselves.

While much of architectural education takes place in small classes: 12-16 students in studio; up to 15 in seminars; core lecture courses rarely larger than 50-70, given the intended audiences and course content, diversity of learning styles, and faculty and space resources, there do exist needs/opportunities for the large lecture course. There are **two main areas of focus in this paper: 1) The content framework** that introduces multiple frames of reference in architectural studies; and **2) Active learning activities and examinations** that move beyond the "Sage on a Stage" (master speaks/empty vessel hears/repeats back) model that often dominates in large classes.

Frames of Reference

What differentiates the content sequence of this course?[3] The historical approach that is typical of many introductory courses — linking cultural themes through time and the emergence of concomitant architectural ideas — is only one among several ways of approaching architecture. So, too, is the formal approach — focusing on form, structure, space, light, composition, material content — but one among many. If not an historical survey or a formal approach, what exists as an introduction? A decision was made to risk a topics based approach, an edited collection of positions not linked to the historical timeline or to the form-based armatures. In selecting and editing the topic content a certain canoni-

cal body of built works, architects and theories is privileged above others. Students should be made aware of the possibilities and limitations of any one approach, and ought to be able to recognize a particular approach when they are exposed to it.

Canon and skepticism. Five frames of reference are presented through which to consider the thought-full-ness of architecture: 1) Immutable Realities of Building (Ordering Landscapes, Enclosure and Object, Interior and Space); 2) Historical Perspective; 3) The 'Great' Building; 4) The 'Great' Architect; and 5) Theories of Architecture. These are **countered** with the questions: Where is the architecture and presence of the 'other': e.g., the less powerful people, the vanquished, the less enduring construction, women and minority architects and theoreticians?

While Arch 182 is not a "History of Architecture" course, much of the reading material and supporting images come from history studies. And, while it is not a "Theory of Architecture" course, architecture is explored in ideas as much or more than in stone. Architecture entails both the process of invention and construction as well as the final built reality and the experience of it. **Architecture is ultimately a social act, a cultural phenomenon.** The course is designed to help portray this idea.

The Pedagogic Objectives for the course can be summarized briefly: 1) Develop a foundation for future independent inquiry: • Understanding architecture as cultural process and artifact, • Building critical research and appraisal skills, • Understanding interconnectedness with other disciplines; and 2) **Initiate the growth of an architectural knowledge base:** • Critical knowledge of several architectural works, • Critical knowledge of several architects, • Awareness of architecture beyond the Western canon, and • Basic conceptions of the architect and architecture.

Basic Design of the Course

Departing **from the Western historical narrative and form based theories** that anchor many introductory courses, **in-depth case analyses** from within each frame of reference blossom to **situate buildings and places**, their architects, their clients, their users, and their builders **in a social-political-cultural context**. Complex ideas are made accessible without reduction to the simplistic which often occurs in beginning courses. The course is presented in three distinct Parts, each with a set of lectures and class activities coupled with a required book, followed by an examination.

Part 1 introduces architecture as a "Human Affair" through a project case study and film that establish a background reference regarding the collaborative nature of designing and building, and how architecture affects the larger community. Lectures on the **First Frame of Reference** follow, addressing spatial and formal aspects of architecture that are among the "**Immutable Realities**" of the constructed landscape: Aperture and Threshold (concepts of *boundary*, *here* and *otherness*); Ceilings (boundary with the firmament); Profile and Form (consequences of the building as a material production and built object); Interiors (the consequence of bounding space); Nighttime reversals (buildings have 24 hour presence's); and Gardens (marking the larger landscape). Underlying design conceptions and cultural circumstances surrounding the works are presented.

Chambers for a Memory Palace by Donlyn Lyndon and Charles Moore (MIT Press, 1994), is required reading. In a correspondence exchange format supplemented with sketches, the authors explore certain compositional, organizing and formal principles that are used globally, by different cultures and through time, in making architecture — which include interior spaces, buildings, and extends to urban, monumental, agrarian and garden landscapes. They guide us on an architectural tour that shows while differing cultures vested their places with differing meanings, that an identifiable set of form-giving devices, such as axes, the encompassing roof, grids that demarcate space, the harnessing of water in channels pools and fountains, and the use of human-sized figures, are created and re-created in many places and times. "Places could bring emotions, recollections, people, and even ideas to mind; their qualities were a part of a culture's intellectual equipment. ... The [chapter] titles consist of elements (nouns) and actions (verbs). The elements are ones that we have found to be present in architecture throughout the world; the actions describe how these elements shape the experiences that a place affords," (p. xi & xiii).

The second series of lectures, Part 2, outlines four traditional scholarly (and everyday) approaches to organizing and studying architecture. They comprise the **next four Frames of Reference: 2nd) Architectural History; 3rd) Great Buildings; 4th) Famous Architects;** and **5th) Architectural Theories.** These four are presented because they are ubiquitous in the study of architecture, and by examining them, students are enabled to pursue their own explorations of architecture. The typical resources of each (such as the period history book, building and architect specific monographs, and theory collections and manifestos), and the benefits and limitations of each approach are discussed.

One applied case is presented as a model for each, respectively: The Gothic period in France from 1144-1275; in-depth presentation and comparison of two iconic buildings, the Villa Rotunda of 1570 and the Villa Savoye of 1929; in-depth presentation of a single architect, Frank Lloyd Wright, 1867-1959; and case studies of famous architectural aphorisms that work into theory discussions. Whether the beginning position is a time period and 'style', a building, an architect, or a theoretical position, the case is unraveled: the larger historical context, the ideas, arts, politics of the era, the writings by and about the figures involved, contemporary and past writings about the building, etc., are pursued. No 'work' or 'person' is presented solely in descriptive formal or biographical terms. An excerpt from the course syllabus sets the stage:

> "Architecture then has at least two principal frameworks of meaning: the archeological/historical one in which we attempt a comprehensive understanding from within its situation of origin, and the critical one which stems from the character of our contemporary lens and the commentaries upon the work [or person or time period] in the interval from its origination to the present. ... All architectural meaning is provisional in the sense that

> our lens, the vision of one's own time shapes the view of matters present and past. The *matter* of architecture shares with written text and the other arts, a physical presence open to interpretation. We work at developing two concurrent views: a *re*-created milieu, attempting to understand the initial context in its own terms, and that of our own, the critical view from our current perspective."

The required book for Part 2, Moshen Mostafavi and David Leatherbarrow's On *Weathering: The Life of Buildings in Time* (MIT Press, 1993), begins: "Finishing ends construction, weathering constructs finishes. ... In the process of subtracting the 'finish' of a construction, weathering adds the 'finish' of the environment," (p. 5 & 16). This extended essay explores two of the irrefutable circumstances of architecture: time and weathering, and their implications for perfection and imperfection in a work of architecture. It involves an inquiry into architecture of the 20th-C with respect to its intentions regarding form, construction, time and perfection, contrasting the work of the Le Corbusier in the late 20's with his work in the 50's, and the work of the early modernists with that of Carlo Scarpa, Louis Kahn, Eero Saarinen, et al. The book itself is a model of critical theoretical inquiry which brings together explorations of historical perspective, the iconic building, and the 'master' architect.

Part 3, the final lecture group, consists of thematic illustrated essays introducing various positions from which to examine or continue the study of architecture: Travel and Architectural Journals (foundations for observing, recording, and designing); Public Space in the Americas (Spanish colonial space of conquest and American Plains Indian); Speculation, Utopias and Social Criticism (architecture as an device of social-political instrumentality); The Anti-Urbanism of American Cities, etc. The intent is to explode pre-conceptions of architecture as a fixed singular building, presenting a broader disciplinary picture, one beyond the comfortable and known, to stress exploration, to provide some tools for exploration, to provoke debate.

Dolores Hayden's The *Power of Place* (MIT Press, 1995) is the required book. It serves as a **Counterpoint** to the 'march of history, great buildings and great architects' canonical approaches. "Today, debates about the built environment, history, and culture take place in much more contested terrain of race, gender, and class ... The politics of identity — however they may be defined around gender or race or neighborhood — are an inescapable and important aspect of dealing with the urban built environment, from the perspectives of public history, urban preservation and urban design," (p. 6 & 7). *The Power of Place* chronicles the research, marking and memorializing of certain urban places and spaces in Los Angeles. It highlights collaborative work of artists, archaeologists, architects, social activists and community processes as opposed the creativity of a single individual. Its topic is the architectural and urban space of Black women, Latinas and the Japanese and other minority immigrant cultures within the traditionally told and memorialized story of the Spanish Conquest and Anglo-Angeleno male world. Coming last in the semester, this book has a profound affect upon the students, fostering healthy skepticism regarding the more traditional perspectives presented earlier.

Active Learning Exercises

A degree of intellectual rigor, and learning that goes beyond memorization, that is not often a part of this type of course is sought: the goal is the development of a capacity to engage distill and play with the ideas of the course, to learn methods for continuing to learn about architecture, not solely to repeat back facts. Additionally, the students are asked to evaluate and discuss the ideas of the readings and lectures in a comparative manner. This is risky business in the climate of introductory education, in a course largely populated by first year university students, on two fronts: it is a method of analytic/synthetic learning that they are not used to, and it demands a level and type of performance in class and on examinations that is challenging.

Part of this approach was established in the basic design of the course. In each of the three lecture/book segments, the book stands apart from the lectures: the lectures and books were intentionally established as parallel and related, but not explanatory of each other. The objective was to provide a situation in which the students would actively engage the body of information in the lectures and the perspectives of the books and bring them together. This is an advanced model of learning, and for students who are used to preparing for short-answer exams based upon syllabus content, it is quite trying at first. However, by mid-semester they are on-board with the process and begin to sharpen the focus of their questions and writings, and approach to thinking about architecture that is inclusive and exploratory, rather than lecture/text/test dependent.

Another part of this approach was fostered by the types of in-class exercises that were issued. The design studio and seminar where students develop and present projects or present a session of the class are active learning situations *par excellence*: it is in the inventing, the teamwork and preparation for the presentations and in the presenting and subsequent dialogue and discussion that learning through doing is realized. The lecture, no matter how eloquently delivered, and the reception, no matter how well accomplished, have limits. But, nonetheless, many circumstances lead to a large lecture course without recitation sessions. How is learning beyond memorization to be accomplished?

Active Learning opportunities were built into the course, most of which include independent reflection and writing, group discussion and recording, and follow-up Q&A with the professor: 1) writing questions on cards and submitting them anonymously; 2) group discussion with colleagues seated nearby and the generation of questions for the class; 3) individual writing and response to questions about the lectures and or books; 4) group discussion of the individual writings and recording of group questions with recorder/respondents who report for the group; and 5) large group discussions after some type of preparatory event where the professor or the professor and TA's would conduct Q&A's with a subsection of the large class. The group processes (you are not alone in this) and anonymity of question submittals ease the reluctance among students to

ask questions publicly in large classes. As noted, by mid-semester things loosen up. Examinations are 50% essay based, and the short answer segments are designed to evaluate how well students grasped concepts rather than isolated facts. Collectively these tactics **break down the passive lecturer-recipient character that haunts most large introductory courses.**

Several **Learning Resources** were provided. Because there is no text that covers the range of information covered in the course, lecture outlines are provided for all lectures along with annotated bibliographies; a synopsis, reading tips and questions for reflection are issued for the books; review notes for the details of certain lectures are provided; and the proper names and spellings of all key words and persons are distributed. Prior to each exam, a preparation handout is provided. Following a time-honored tradition, the lectures are annotated by an independent service and sold to students, by the lecture and for the full course. The principal innovative resource that was developed when the course was first offered, for which the author and several others received a university Miller Fellowship grant, is Plato's Cave: an on-line slide reference that includes the slides for the lectures. Students can access Plato's Cave from any university computer. For copyright purposes, Plato's Cave cannot be accessed from the www at large.

Student Work Examples

The following are examples of student writings that resulted from the various exercises. To some degree, writing is analogous to design work: the result is there in 'hard copy' for consideration and evaluation. Just as the student design project is a measure of performance, the written word remains currency in the articulation of thought. **The examples build progressively through the semester and show increasing mastery of both material content and methods of reflection, as well as strengthened writing skills.** Each of the selections marked by a "•" is written by a different student.

Written Class Questions: Early in Semester. In the first few weeks of the semester, even anonymous written questions about *Chambers* are dominated by "exam need to know" basis. About 5-10 minutes was provided for students to generate their questions and send them forward:

> • *How does the book and its content relate to the exam and lectures?* • *What is an example of a test question from* Chambers*?* • *By what date does this have to be finished?* • *What are we supposed to remember from the book for discussion and tests?* • *How much of the book is on test?*

There are some content questions, however. These three explore image and function, mental constructs and actual experience, and concept origination and discernment:

> • *The book focuses primarily on the perception one gets of the buildings, but how do we relate that to functionality w/o losing the over-all effects & keeping the building/structure efficient?* • *Is the only difference between the axis and paths the fact that the axis is a mental construct which allows us to tie things together and a path is the physical walking along this 'mental construct'?* • *Are all the concepts used (e.g., the axes, paths, pilasters, columns) planned? Or are they just discovered after the buildings have been constructed?*

Written Class Questions: Later in Semester. After the first exam, and well before mid-semester, both individually written and group generated written questions become more probing and directed toward professorial judgment and response. About 10-15 minutes was provided for groups to generate and record questions. These are from the middle of the semester, and pertain to *On Weathering* and Gothic cathedrals:

> • Do you think the buildings of the modern movement will stand up to weathering like the great buildings of antiquity? With today's economy it seems to be easier to tear down and build a new building, than to restore an old building. Is this a good decision? • Explain, on p. 30, Le Corbusier's glass facade [Cité de Refuge] and how it failed to maintain 18° C temp. within. • Tell about the intentional use of weathering for a desired effect. Do you consider human 'wear and tear' on a building a part of weathering? Why? • Who decides whether weathering adds or subtracts from the object? • In what ways does an architect consider weathering in designing a building? • Are we studying weathering for the physical aspect, or the abstract ideas we get from viewing weathering? • It seems that the history of architecture can also be seen as a continuous struggle: man trying to build and create versus nature trying to tear down. Do you think there is more beauty in proudly resisting nature, as many modern buildings do, or in the allowing nature to take its course but bending and controlling its effects, as many examples in the book show? Or is there a time and a place for each attitude? And what does this say about the underlying human spirit of the builder and the society?
>
> • *It seems as though all the Gothic architecture was cathedrals and churches, etc. Did this style get used at all for other buildings? If not, why — were religious reasons the only reasons to spend money on art?* • *Since the backing concept of Gothic architecture was religious, based on the 'intention of light and heavenly design', how is/can Gothic truly be incorporated into non-religious buildings, re: castles, government buildings, and other buildings built even today?* • *In the construction of cathedrals between 1250-1300, did they use reinforcing such as iron cables or other objects besides stone to hold the structure together?* • *Why did they have to be so impressive? The need to hold pilgrims certainly didn't call for 150 ft. high naves!!*

In-Class Essay: Mid-Semester. In addition to Q&A sessions, students are called upon to write brief essays in class, usually based upon the books. About 15-20 minutes is allotted for two open-book essays. The objective is to sharpen analytic perspective and hone writing skills.

Q: Discuss the concepts of "weathering as addition" and "weathering as subtraction."

• "Weathering as addition" is the concept that weathering of the building adds to the look of the building and completes the look of the building. It looks at weathering as good, as help in overall structure and appearance of the building. "Weathering as subtraction" is quite the contrary. This concept looks at weathering as destruction of the appearance or structure of a building, it takes weathering to be bad.

The weathering of Le Corbusier's Villa Savoye can be looked at as subtractive. Le Corbusier was striving for ultimately pure and clean buildings [in his work of the late 20's]. His emphasis was on whiteness. Weathering of the Villa Savoye dirtied this 'whiteness' thus destroying the goal of his architecture.

I believe these concepts should definitely be considered by all architects when designing any building. One must think of what the building is going to look like in 20 years or even 100 years, if they want that building to survive. And, depending upon the maintenance the building is planned to have, the architect should decide on whether they want to welcome weathering or fight it. The theme of the building and its location should be considered when making this decision.

Q: Discuss the different meanings of the word "weathering" as they relate to the construction of a building and the life of a building in time.

• Mostafavi and Leatherbarrow define weathering in two ways: as "whatever controls the action of the weather" p. 36, and as a "process that can productively modify a building over time," p. 42. Both of these definitions imply that weathering can be harnessed, even tamed, to exert a positive influence on a building. In construction, effects of weathering subtraction can be anticipated and avoided through things like placement of stone (to avoid cracking) and installation of "drips" (to prevent water damage).

The second definition implies that, in the design of a building, weather effects can be incorporated into the finishing of materials. For example, stones could be left rough-cut to allow nature to smooth and refine during the life of the building in time. In these definitions, the authors point out the lesser-known positive possibilities of the weathering process, which is often seen only in a negative light.

Oral Q&A: Late in Semester. By the final third of the semester, the students are comfortable with question and answer dialogue. They know each other better, and a situation of trust has developed in which their questions are respected. They continue their probing, although more informally, and do not limit themselves to course content. The questions here have been taken from a transcript:

• If the jury were held to day for the Chicago Library Competition [viewed the PBS documentary in class], would the outcome be different? Is the city happy with the results? • Describe the differences among a) travel guides, b) personal journals, c) architect's travel drawings and journals, and d) travel literature again. • What are some of research projects of the faculty, and yourself in particular? • Is architecture a dying profession given all that interior designers and engineers are doing? • What is the role of architects in historic preservation and adaptive re-use today? • Much of the discussion in the course seems to focus on the abstract ideas about architecture rather than the concrete and technical side of it as a physical reality. Why?

Written Questions: Late in Semester. Examples of the shift brought about by Hayden's *Power of Place* follows. The nature of the questions reveals a new mood from mid-semester. The directness reveals a certain awakening:

• Why is it that in order to get a general view of the more liberal areas of urban form (i.e.: women designers, social consequence of urban form) we must turn to a woman author? It seems such material is never covered by male WASPS. [male student] • Do you feel that covering up the past by building new is a result of being ashamed of our past? Do we through architecture try to preserve or try to erase the past? • Was it only because of occupational segregation, racial segregation, and economic hardship that women were represented so poorly for the deeds and tasks they accomplished, or was there more reasoning behind the prejudice? [woman student] • On pages 85 & 86, Dolores Hayden says about 97% of LA's historical landmarks are to commemorate rich white males, only 2% are other races, and 4% are women. Until recently, only a very *small number of women and minorities have been able to hold an important position or do something to be remembered ... What* kind *of landmarks would historicize these people? How would we bring these numbers up? • Do you think that one possible reason for the lack of monumental architecture for the minority, Chinese, women and black was because for the longest time our society was white, male dominated? Are there gradually more monuments for minorities emerging or not? • The average person — lay-person — seems to have the biggest impact on the* Power of Place, *yet they are not generally acknowledged. Why is that? • How can architects "have missed the role of people in creating a 'place' because they are trained to look at people as users of space"? The ways in which people use space are greatly dependent on ethnicity, social class, culture, and traditions. How can architects overlook this fact when creating space?*

Essay Test Response: Lectures on Form and Space (Part 1 of Course). In the early part of the semester, questions are framed to establish the direct relevancy of the issues being discussed to personal experience. Exam Q: Lectures 4a Aperture, 4b Ceilings, 5a Profile, 7a Gardens, 7b Nighttime, and 8a The Interior, addressed fundamen-

tal aspects of the environment. Think about the ISU campus. Select three different basic concepts from the lectures and discuss them in terms of three different places on campus:

• A good example of garden on campus is Lagomarcino Hall. As you enter the walls of the building on the south side, you don't enter into a room, but into a courtyard surrounded by the building. From the inner circle of the interior the garden is a beautiful scene. The courtyard is not only a beautiful place, but it is also a quiet and relaxing place to study or just sit and enjoy the surroundings. The courtyard is an extension of the building, like the Hearst Gardens where the gardens extend off the buildings and seem to go on forever. Yet it is still encompassed by almost four walls so it is contained at the same time.

Driving up to campus on Welch at night, you get a wonderful view of the southside of Alumni Hall. The rounded walls, normally somewhat nondescript, come alive when lit up at night. It is essentially like the Paris Opera House [Opera Bastille] that goes from black to illuminated when night falls, although not quite as dramatic a change. On either side there is a soft glow at the bases of the columns, which adds more life to the building, but still enhances the rounded wall. The columns seem to dominate during the day, but take backstage at night, as the profile of the Paris Opera House does the illuminated room.

One of the best examples that I have seen of ceiling, is the ceiling in Beardshear. All along the edges, decoration entertains and entrances anyone stopping to catch a closer glimpse. The ceiling continues in this fashion up to a dome that highlights the whole building. It also is a very central part of the building as a whole. Each floor has a circle cut out so even people on the bottom floor can look up and enjoy the beauty of the dome. The dome added to the architecture of the entire building in this way. The railing around the circle, allows for observers to rest, look up and enjoy, or resters to do the same and gain something through it. (A)

Essay Test Response: *Power of Place* (Part 3 of Course). Exam Q: Develop an essay defining and exploring several of the concepts in the *Power of Place*.

• *In Dolores Hayden's book* The Power of Place, *many different ideas and themes were presented that all relate back to a central concept — the ability and power of people everywhere on this earth to interact with the landscape, simultaneously producing architecture and history.*

This book has special meaning to me personally as a student studying architecture. After half a semester of studying famous architects and society's high culture, it is easy to overlook the other aspects and possibilities of architecture, and even easier to overlook altogether the unseen forces and struggling people that have shaped our landscape. James Roja's comment on how architect's formal training causes them to look past the people and only see the building furthers my realization, "Architects have missed the role of people in creating a 'place' because they are trained to look at people as users of space ... People are both users and creators of place ... People activate settings merely by their presence." (p. 87)

This problem of people being overlooked in relation to architecture is much of what this book is about, along with the non-profit organization originally using the book's name. The Power of Place *begins by discussing "contested terrain," relating the debate between Herbert Gans, an urban sociologist, and Ada Louise Huxtable, an architectural critic, to the struggle of people today attempting to save vernacular history (p. 3). Today the* Power of Place *focuses on the theses of communication, education and collaboration — a future different from the past described by Hayden. Referring to the Gans/Huxtable debate, "In this exchange from two decades ago, a leading urban sociologist and distinguished architectural critic were unable (or unwilling) to understand each other's language." (p. 4)*

With remembrance and education as their goal, groups like the 'Power of Place' collaborate with a host of different people and specialists, including historians, sociologist, local residents, artist's, poets, architects and landscape architects, etc. When devising and brainstorming about the most effective way to educate the public of the true essence of a place and its people, these groups use several different methods.

The most moving example of a method for public education is the context of a "sensory experience" is the actual site or building itself — the place where people lived their everyday lives through history while forming history. ... Another method involves remembering a site through artists' means because the structure is no longer present, as demonstrated at the Biddy Mason memorial. These collaborative processes allow for creative inspiration, and the forming of new areas of public space. ...

This book clearly defines the concept that the struggle of life, while at times may be a horrible monster, is truly a gift to be remembered. Everyone on earth finds a way to form a place, whether it is by selling flowers [Japanese immigrant industry] or erecting grand monuments. Unfortunately our culture overlooks the flower salesman ... The Power of Place *successfully tells the story of the that flower salesman and explains why he/she are notable and special. ... (A+)*

Concluding Comment

A paper that is based upon a lecture course, with examples of writing rather than the more normally expected studio project designs, may seem to be out of place at a conference titled "The Beginning Design

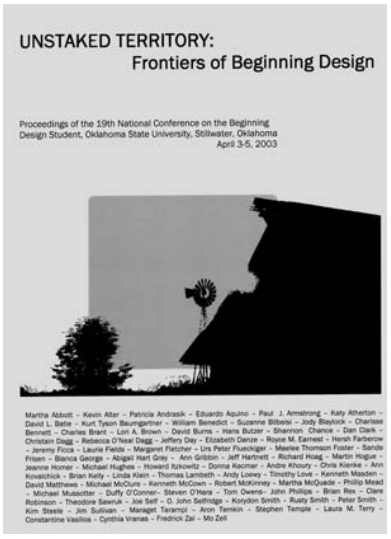
Student." The play on the conference theme in the title of this paper "Beginning Student of Design" is not without intent. All initiates grapple with thinking•making•representing in architecture. Writing is part of that representing. Humbly extending Goethe's "What is seeing without thinking?" I propose "What is thinking without communicating?"

Notes:

[1] Johann Wolfgang Goethe, *Italian Journey (1786-1788)*, trans. W. H. Auden and Elizabeth Mayer (New York: Penguin Books USA, 1970), 71

[2] Iowa State has a 1+4 structure to its five year B. Arch. program. Pre-architecture students take a required 4 credit design studio, Arch 102, and the 3 credit lecture course, Arch 182, which is described in the catalog: "Through the study of architects, buildings and theories, this course is designed to introduce the discipline of architecture, presenting architectural process and architectural works as culturally grounded events and artifacts."

[3] **Introductory Resource Books**. There are a number of books which provide an introduction to architecture, each with its strengths and weaknesses. From the selections here, the *Roth* and *Conway/Roenisch* books are new introductory textbooks with very good overviews of many aspects of architecture. *Hellman's Architecture for Beginners* is a fast paced lively overview of architecture. The *Stern* and *Kostof* books are companion books to PBS television series of the same names: Hazel Conway and Rowan Roenisch, *Understanding Architecture: An Introduction to Architecture and Architectural History* (London: Routledge, c. 1994), very good introduction arranged in topical fashion; Sinclair Gauldie, *Architecture*, The Appreciation of the Arts/1, gen. ed. Harold Osborne (London: Oxford University Press, c. 1969), driven by aesthetics and formal issues; Louis Hellman, *Architecture for Beginners* (Beginners Documentary Comic Book, New York: Writers and Readers Publishing, Inc., c. 1988); Geoffrey and Susan Jellicoe, *The Landscape of Man: Shaping the Environment from Prehistory to the Present Day* (New York: Van Nostrand Reinhold, c. 1975), human settlement and architecture shapes the landscape — this remains perhaps the finest introduction to cultural foundations and landscape architecture; Spiro Kostof, *America By Design* (New York: Oxford University Press, c. 1987); John Julius Norwich, ed., *Great Buildings of the World: An Illustrated History from Stonehenge to the Twentieth Century* (New York: Bonanza Books/Crown Publishing, c. 1978), very good graphics, many 'three-dimensional' drawings; Patrick Nuttgens, *The Story of Architecture* (London: Phaidon Press Ltd., c. 1983, 1995 pbk. printing), excellent brief survey introducing the scope of architecture, much non-Western material included; Steen Eiler Rassmussen, *Experiencing Architecture* (Cambridge: MIT Press, 2nd U. S. edition, c. 1962), a classic introduction to the formal, spatial and experiential aspects of architecture, though gender references are dated by today's standards, it is perhaps still the best book of its kind; Leland M. Roth, *Understanding Architecture: Its Elements, History & Meaning* (New York: Icon Editions/HarperCollins, c. 1993); Paul Shepheard, *What is Architecture?* (Cambridge: MIT Press, c. 1994); Robert A. M. Stern, *Pride of Place: Building the American Dream* (Boston: Houghton Mifflin Company, c. 1986). **Tectonics Resources**: Architecture is realized through material fabrication. These three principal works, each a classic in its own right, highlight the material, structural and environmental engineering aspects of architecture: its tectonics: Reyner Banham, *The Architecture of the Well-Tempered Environment* (London: The Architectural Press/Chicago: The University of Chicago Press, c. 1969); Cecil D. Elliott, *Technics and Architecture* (Cambridge: MIT Press, c. 1992); Kenneth Frampton, *Studies is Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, edited by John Cava, Graham Foundation for Advanced Studies in the Fine Arts, Chicago (Cambridge: MIT Press, c. 1995).



Building Analytical Frameworks

Richard Hoag
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Nineteenth Conference
Oklahoma State University
2003

Building Analytic Frameworks: Towards an Optimum Education for Beginning Students in Architecture

RICHARD HOAG: Kansas State University

A little over thirty years ago Claude Winkelhake delivered a keynote address at the Milwaukee Conference on the Beginning Student. His address *With Understanding: An Optimum Education for the Beginning Student in Architecture* (1972) addressed the general question of the value of a basic curriculum. Using the research of his contemporaries in philosophy, mathematics, language, anthropology, and psychology he set out to answer the question he posed.

His characterizations of approaches to beginning education prior to 1970 could easily be used to characterize a wide array of approaches to teaching the beginning student today. In his address he described approaches to teaching prior to the 1970's as both subjective and ad hoc, approaches he considered to be less than optimum because they delivered information in a piecemeal fashion. He indicated that the question of the value of a basic curriculum was difficult to ask because the subjective and ad hoc approaches to instruction "make the task look both easy and worthy. Students notice mainly the fun they have 'doing it,' whatever it is at the moment. Professors also enjoy 'doing their thing' as well as 'doing good" (Winkelhake, 1972). These approaches were highly questionable in 1972 and remain so today. Today the question is no less difficult to discuss objectively because students and teachers are still having fun "doing it," and they appear to be doing it in spite of an ever-expanding literature in the behavioral sciences that makes these approaches highly suspect.

In the early 70's the architectural academy was poised to develop and use physical and behavioral information together to carefully describe environment-behavior relationships. These relationships connected information on environment and behavior into complex transactions that had the potential to provide an intelligent basis for design-decision-making as well as an optimum education for beginning students in environmental design and planning. Beginning students would learn to think about, use and thereby value information. Advanced students learning to value this information would then be in a position to generate new psycho-social and psycho-cultural information systems. Although we have begun to embrace these ideas in professional practice, we are still having difficulty embracing them in our efforts to prepare students for practice. Unfortunately in architecture many programs continue to disregard new knowledge on the processes of seeing and learning in the instruction they provide in their beginning curricula.

In tracing the history of new knowledge on perception, Winkelhake pointed out that early in the 19th century scholars recognized that seeing was more than a matter of the optics of the eye. Early in the 20th century the field of general semantics clearly established the eye as an end organ of the brain (Korzybski, 1933). As scholars moved away from the simplistic notion that seeing was a matter of optics, Shannon and Weaver gave us the concept of information when they wrote the *Mathematical Theory of Communication* (1949). With the publication of the *Perception of the Visual World* (1950) the transition away from the idea of optics was complete when Gibson demonstrated that seeing was not a matter of optics in the head, but was also a matter of

information in visual stimulus arrays "out there." In 1957 Bruner demonstrated that perception was also a function of the readiness of information: information organized through experience in language. Our psycho-cultural and psycho-social experiences are organized through words and sentences. The problem of optics transformed into a problem of language.

In 1960 Ittleson made us aware of the important roles perceivers play in the process of seeing. He described the process of seeing as a transaction. Like an exchange of goods and services, seeing depended on exchanges between a perceiver and her environment. Like buying and selling you can not have one without the other. The experiences we bring to the process of seeing an environment are critical to what we see. Seeing was recognized as a highly dynamic affair like reading and writing.

Later in the decade, additional research brought transactions and categories together. In 1966 Hochberg demonstrated meaningful perception was organized or constructed in a particular order or sequence. Thus on the bases of new studies prior to 1972 Winkelhake was able to conclude that perception was: "(1) categorical, (2) sequential, and (3) transactive. In terms of the problem of language: seeing and thinking depend on (1) a vocabulary of verbal categories, (2) a syntax of verbal sequences, and (3) a semantics of verbal transactions…(therefore)… INFORMATION ORGANIZED INTO VERBAL CATEGORIES AND SEQUENTIALLY ORDERED INTO DYNAMIC TRANSACTIONS PROVIDES THE BEST BASIS FOR WORKING WITH THE BEGINNING STUDENT. We (the instructors and they the students) see in terms of what we and they already know *verbally*, what we and they are currently looking for *verbally*, and what we and they hope to see *verbally*."

"Seeing and thinking are basically verbal. On the other hand -- and I would like to suggest for the optimum education for the beginning student: way over on the other hand -- drawings, architectural models, photographs, and other modes of visual notation merely illustrate our vocabulary of verbal transactions. I say merely because I want to stress the fact that there is no direct path from visual notations to seeing and thinking and back again. That path necessarily leads through speaking and writing in terms of words and sentences – that is, in terms of language per se."

"Because we deal with many visual illustrations of verbal categories, we may refer to vocabulary in architectural education as *visual-verbal.* Let's not forget, however that seeing and thinking are basically verbal. Visual notations can only *illustrate* verbal categories, sequences and transactions…a picture may be worth a hundred (or a thousand or just a few) but we still need words and sentences to understand the picture -- to handle the picture with understanding. The gesture may illustrate the word, but the word can stand alone – the gesture cannot. Let's move beyond subjective and ad hoc approaches in architectural education, especially for the beginning student."

" The key to an optimum education for the beginning student in architecture – that is, one with understanding – is an objective visual-verbal vocabulary…the perceived objects, persons and events in any conceptual organization have meaning in terms, first and foremost, of words and sentences (Goodenough, 1971). The smallest unit of meaning is the word (Vygotsky, 1962), and a string of words arranged according to certain rules gives rise to the meaningful sentence (Chomsky, 1966)."

"Further perception always belongs to *somebody*: we use symbols in the process of architecture for somebody else to use an environmental object in direct connection

with a behavioral event. Accordingly, a technical vocabulary in architectural education that handles social and psychological *as well as* physical information is the fundamental key to the success of the architectural practitioner… An optimum education for the beginning student in architecture first and foremost provides a technical vocabulary that can handle visual and verbal information: social and psychological as well as physical. Such a crisp and definitive vocabulary of verbal categories permits the gathering and remembering of behavior environment relationships -- with visual notations illustrating the verbal categories in a systematic way. As the beginning student builds his basic studies and becomes the advancing student, his descriptions and evaluations along with those of others, add up gradually from situation to situation into useful generalizations: social and psychological as well as physical" (Winkelhake, 1972)

The data structures Winkelhake used to illustrate his address were meant to be experimental and flexible. They remain important to learning and teaching today precisely because they were meant to be used experimentally and flexibly to engage students and their teachers in the process of building new experimental data structures. These are data structures that would be informed by on-going research in the social and behavioral sciences as well as new developments in technology and the physical and biological sciences.

The first data structures Winkelhake developed consisted of inverted trees that organized vocabularies hierarchically. He saw the development of these vocabularies as key to instructional success. Early vocabularies or data structures clearly connected social and psychological as well as physical information. The goal was to replace the subjective and ad hoc with public and objective frameworks for thinking and talking about man-environment systems. It was clear that the "conventional wisdom" frequently used to teach beginnings student was virtually useless.

Winkelhake's first data structure consisted of five major sub-vocabularies. Two vocabularies handled methodology or process in instruction, one for simulation or communication and a second dealt with decision making or procedure. There were three other sub-vocabularies: one for physical or technology information, a second for social information and a third for psycho-cultural information or image information. These three sub-vocabularies are the data structures for the substantive or conceptual part of a framework for teaching the beginning student.

The image data structure in Figure 1 consists of thirty verbal categories arrayed hierarchically (Winkelhake, 1972). In an optimum instructional setting a student would use an experiential data structure like this one to record, store and retrieve psycho-cultural and physical information. Data structures like this one enable students to systematically gather, organize, and remember environment-behavior relationships. Using these data structures students are positioned to use their basic studies to begin *thinking critically* about creating environments for others. Learning and teaching are not left to the teachers or students "conventional wisdom," but instead become a product of careful, deliberate, and thoughtful action. Beginning students become advanced students as they build on their descriptions and evaluations. They are in a position to compare their data structures -- hypotheses about man-environment transactions -- with their teachers and peers. Through comparison they learn about their teachers' and peers' views of the world and they modify their data structures as on-going research reveals new knowledge through out their professional lives. As they're intellectual world changes

students may consider alternative sub-vocabularies as more or less appropriate. The vocabularies described here are viable yet flexible vocabularies that demonstrate that design can be something other than and arbitrary affair.

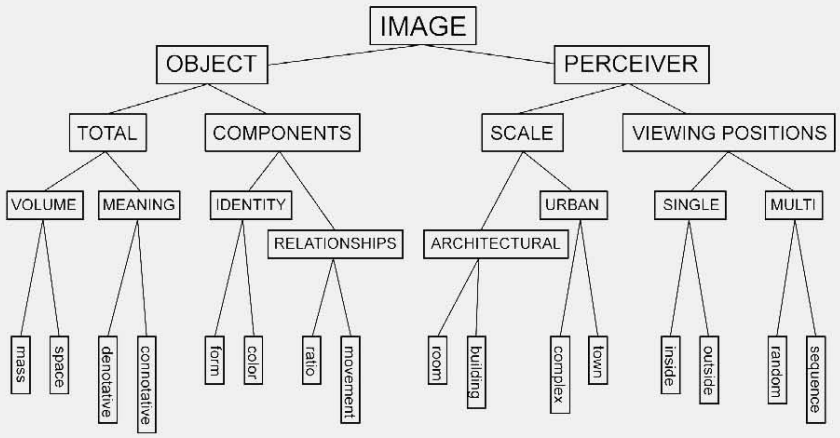

figure 1

These data structure present students with the opportunity to incorporate information they acquire in curricula outside departments of architecture. In 1957 Osgood and his colleagues wrote *The Measurement of Meaning*. The Semantic Differential, Osgood's instrument for measuring meaning presented students and teachers in architecture with a technique to measure perceiver responses to formal design schemes (e.g., form, color). Using an image data structure (Figure 1) students can be taught to recognize and track the multiple meanings perceivers bring to a setting. By using image data structures students can be taught to recognize and measure different types of meaning, and to build analytic frameworks for thinking and talking about there design schemes. They can be taught to recognize "scale" and "viewing position" as critical determinants in the perception of the environments they create.

The power of these frameworks for learning and teaching can be seen by comparing the data structure in Figure 1 with the data structure in Figure 2. A student could start with a data structure that reflects Gibson's (1950) view that perception is a product of environmental stimulation; that is, that meaning is directly perceived in the environmental stimulus array. The category "meaning' would therefore be included on the "object" side of the image data structure. On the other hand, a students and her teachers could construct an alternative data structure based on Brunswik's (1969) view of perception, which emphasizes the active role the perceiver plays in interpreting sensory input. The data structure in Figure 2 could be used to reflect this alternative view (see also, Craik and Appelyard, 1980) where "meaning" is included as a subcategory for

"perceiver." Regardless of placement or theoretical construct, both student and teacher are involved in the public (objective) creation and description of categories and their relationships.

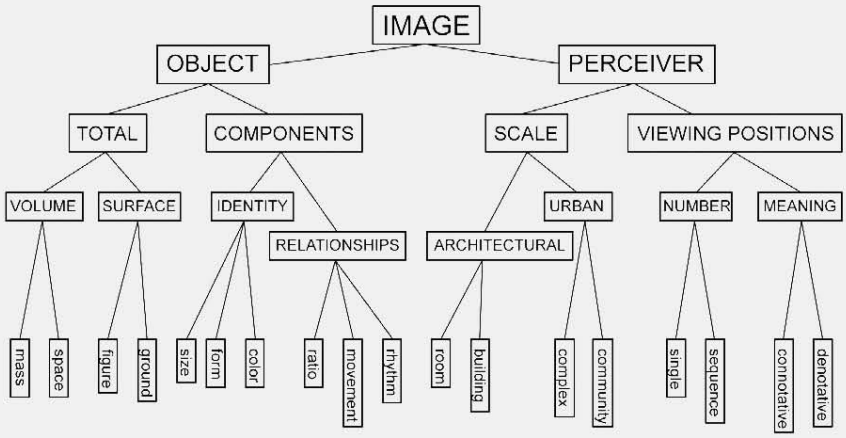

figure 2

Many of the subjective and ad hoc approaches today continue to focus solely on the "object" sub-vocabulary in Figure 2. For example, subjective approaches to teaching color in architecture largely ignore the ever-expanding research on color perception. Frequently color is taught (wrongly) as if there is clear evidence that to use reds makes a space exciting and to use blue makes a space calming. On the other hand, what we do know, and what we can use the data structures in Figures 1 and 2 to teach is that response to color, size, and form vary as a function of the role of the perceiver. Meanings vary according to viewing position, and scale and a number of other variables (e.g., Woll 2003). If we are interested an optimum education for the beginning student in architecture, that is an objective approach *with understanding,* the data structures Winkelhake proposed thirty years ago are an excellent place to start.

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Distance from Actuality: Towards a Theory for First Year Pedagogy

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Nineteenth Conference
Oklahoma State University
2003

Distanced From Actuality: Toward Theory for First Year Pedagogy

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In a recent lecture to first year design students, 5 apples were laid on a desk and students were asked what they saw. Then they were shown a slide of 5 apples and asked what they saw. Then a picture of 5 apples was drawn on the chalkboard and students were again asked what they saw. Then we made five random marks on the chalkboard and called the "5 apples." We then drew the number 5 on the chalkboard and called it "5 apples." Lastly, a single random object was displayed and called,"5 apples."

In the space of a few minutes this demonstration illustrated an index of transformative processes that moved from actuality to symbolic logic through the domain of distance. This sequence, characterized as the "apple schema," established the ground for an investigation into learning strategies used by typical beginning design students. In comparison to a student's other educational experiences, the non-linear character of the design process often seems chaotic and abstract. A student's initial experience with design projects, in contrast with that of writing an essay or solving a physics problem, often becomes one of insecurity and confusion[1]. Beginning design students, asked to *think about design* for the first time, have yet to develop a cognitive skill-set for dealing with *ways of thinking* that are distanced from the everyday experiences of their lives. The *apple schema* is presented to students as an object-lesson, not as an imposed heuristic mechanism, but as a measure of their own development of the *awareness of the difference between concrete and abstract ways of working*. The intent of the schema is to function as an index or map for navigating from concrete to abstract thinking through cognitive reasoning, and in so doing help to enable development of a cognitive operational structure for creative design thinking. While this paper presents an attempt to explore and define this structure, our intent is to elucidate this structure as a preliminary to lessons that first year curricula typically address but may not impart expressly as *connective learning experiences*. It is our contention that this must occur as a primary first year learning objective.

Making Connections

"The actual design process is a geographic exploration: the explorer's expectations and goals change as more is learned along the way, a satisfying resolution only achieved when there is a sense of having gone someplace and returned with the catch. What is important for this sort of explorer is to have schematic notions that guide one along the way, at the right scale so that irrelevant detail or gross features are kept at bay" 2

Design thinking involves making connections. Making connections requires a referential framework or connective structure, which most typically occurs through cognitive awareness. However, cognition can only be achieved by employing a system of interactions in connecting disparate points of knowledge, memories, representations, and experiences. Not until students can actively operate upon or within such a structure will they be able to creatively manipulate, and/or manage, the component aspects of design activities necessary to *creative design thinking*. Fundamental to this understanding is that such aspects can be structured. The *apple schema* elicits a structure that directly relates to a student's everyday life experiences, yet is also analogous to learning experiences that are typical to first year design studio education. The *apple schema* presents relationships to the concreteness of the physical world (and therefore past experiences, i.e. the physicality of apples) and simultaneously elicits connections to the realm of ideas and concepts, many of which may already be enacted through a student's own 'sets of rules,' without specific or cognitive relation to anything concrete.

The range from concrete-to-abstract pervades all cognitive activity. Beginning design students are being asked, by the very design activity with which they are engaged, to develop intentions related to this structure that they will be able to rationally explain. Most are put to great task intellectually and emotionally by the challenge this presents. If left without a grounding or anchoring in the concrete world, many students become mired in a state of doubt, where the structure of their worldview and everyday lives becomes unseated and is not readily redeveloped anew. Loosened from their ontological anchorings many are simply unable to realize or grasp any substantive structural relationship to their first design experiences. In trying to keep up with the rigor of it all, some students simply play along in hope that it will begin to make since at some later point.

Students May Not Know What They Are Getting

Many design programs ascribe to a beginning design pedagogy which holds that abstract learning is simpler and more fundamental and therefore should be taught first (a methodology possibly borrowed from art practice[3]). Likewise, pedagogies that are immersive in "full blown architectural issues" as first learning experiences, or those that

prioritize abstracted and fragmented experiences, are presuming to define student reception of learning outside of any concrete engagement with the built environment. Assignments that are reductive, categorized, limited, and/or focused, concentrate on explicit aspects of the design of the built environment that are objectivized and detached from any direct context of engagement (i.e., non-contextualized aspects such as: point, line, form, rhythm, plane, texture, color, volume, balance, proportion, scale, 'kit of parts', etc.). Underlying the pedagogy of teaching these exercises first is that they will allow students to develop *cognition for design*. However, students frequently emerge from these type of 'learning experiences' believing design of architecture occurs from an 'assemblage' of components or elements. Consequently, students become *trained* to execute, through the manipulation of these aspects and parts, but are not necessarily *educated* for broader comprehension or deeper understanding. These methods presume the beginning student can already deal with higher order abstract learning and/or will either "get it," or make sense of it on their own somehow, at some later point in the curriculum. Some students do and some don't, depending to a large extent on their personal ontologies.

A design pedagogy that prioritizes abstract learning, and/or the abstracting of design process over concrete experience, portends to deny that abstraction *must*, by definition, be built upon concrete experience.4 Teaching "abstraction first" may not intend that abstract learning can occur in absentia from its concrete basis, though this is the resultant learning outcome of many first year pedagogies. A bias toward abstraction as a basis for first year pedagogy, without comprehension of the origin of that abstraction, is often misleading to the student. If human experience of architecture is the combination of concrete matter and perceptual experiences, then the design of architecture would logically necessitate inclusive comprehension of both. Human perception is not an abstract act or an act of interpretation; it is simultaneously concrete and abstract.

It is our contention that for most beginning design students, seeing the world as an architect for the first time is disconcertingly abstracted from what they have come to understand as their own human experience. Presented with seemingly unrelated abstract thoughts and actions, students can become disengaged and ungrounded, left to perceive their success in simply seeking and then following 'rules' without question or understanding. In unwittlngly choosing, then, between an '*abyss of doubt*' or the '*safety of doctrine*,' many students fail to realize their full potential for creative thinking and designing. Learning solely through cognitive abstractions does not equal comprehension or understanding. However, to move analogously from five physically real apples to symbolic logic can enable students to see that the distance created through abstract design activities distorts actuality by seeking a clarity that may not exist in practice. Concrete engagement with the actual world can reconnect processes of detachment, if understanding of

intelligence can be distinguished not through the precise actuality of the object but as a phenomenological rendering of knowledge as a transformative mechanism of realization.

Comprehension from Distance: A Diagram of Connections as a Pedagogical Underpinning

On a path of learning experiences from the concrete to the abstract, and back again, we encounter a broad range of design thinking. The "apple schema" frames such a dialogue between the student, design activities, and the designed environment. The development of this as a pedagogical directive requires first that concrete and abstract modes be modeled as an index of relationships in which the acts of designing *and* experiencing the world correlate with processes of *abstracting* and *making* concrete. Diagram 1 represents this as an indexed relationship with acts of designing in parallel correlation to experiencing-the-environment. Predicating this indexing of relationships is an understanding that learning to design necessitates the development and internalization of connective structuring mechanisms that operate on design decision making. Diagram 2 illustrates that learning experiences range from the *immediate* (direct experience) to the *meta-cognitive* (abstract understanding). Finally, Diagram 3 situates this index of learning experiences with parallel mechanisms of design and design visualization.

Using this index to develop pedagogical structure for first year inquires and teaching strategies can potentially innervate projects, exercises, and assignments with a connectedness that students can experience directly within engagement with their own work. As a set of learning experiences, student project-oriented design inquires framed by this index can more readily enable and expand intrinsic ways of thinking, over time resonating within the individual as a heuristic frame for independently developing design thinking and creative inquiry. The index arranges those activities that designers do into a connective structure associated directly with attainment of meta-cognitive abilities that are at the root of dynamic design activities. Meta-cognition is the ability to think about thinking for both concrete and abstract manipulation of the relationships between ideas and between ideas and concrete things. Cognition becomes operative in design through processes of positing, experimentation, and informed evaluating and deciding. Once interiorized by students, the structures of the index mark the first steps toward an ability to *think about thinking* for active engagement in designing. Psychologically, interiorization of a referential structure marks a reconnection of a student with their own actuality, enabling them to begin to think for themselves, which is a contingent construct of intelligence at the core of a functional design decision-maker.

Conclusion

Typical beginning design students have a perspective that the first year learning experience is a disjointed sequence of abstractions, cut off from any experience they may be grounded in. While it is true that 'seeing the world as an architect' for the first time is atypical from what they have come to understand as their own human experience, beginning design students often find themselves in a groundless circumstance of learning. Part of the reason for this is due to what we are conjecturing in this paper - that this 'distancing' between reception and engagement caused by first semester project inquiries, is due in large part to students' inability to structure disparate design activities in ways that situate concrete experiences so as to make sense of the tools of design and visualization (i.e., direct and indirect interpretations, reductions, representations, analyses, and ideas). Such assignments fragment the world and do not enable a personal stake in doing them. Our contention is that the structure of connections implied in the "apple schema" is necessary to first year design education. It is not our intent to set forth an ideal model for the development of awareness of a structured concrete-to-abstract relationship. This paper intends merely to point out the necessity for a pedagogy that may enable beginning design students to build greater connectedness between their actions and thoughts. In so doing, operative connections can be built between those devices that designers use in the performance of design that create distance from, and connection to, actuality. An understanding of structured relationships is away of making sense of the disparate forms of design practice that students are first experiencing in beginning design studios. If this structure can be embedded within the experience of assignments, each student will become better equipped to discover and make connections creatively, as individual epiphanies, illuminated in experiential awareness.

It may be argued that the fragmented confusion of first year educational experience is a pedagogically necessity to allow them to work out for themselves the need for structure when they are ready, to make up their own mind about their own lessons of learning. Yet there is every reason to present possible structures to them as an embedded artifice of their learning experiences. Learning about a structure of connections is important because it provides an individual developmental context for learning experiences in lieu of escape into the " abyss of doubt" or the "safety of doctrine." How often it is heard in upper level studios, in reference to the enlightenment that comes from finally situating learning experiences into a personally developing structure, "*Why didn't they just TELL us that in first year?*"

Notes

1 . Hannigan, Jeffery. "Interactive Learning / Learning Interactive." *Proceedings of the IDSA National Education Conference*, 1999. Peter Rowe makes reference to designing as being full of irregular modes of operation. Further he characterizes design "problems" as either *well-defined*, *ill-defined*, or *wicked*. Indeed, most first year students encounters with typical first year design investigations are experienced as wicked problems. Rowe, Peter. *Design Thinking.* Cambridge: MIT Press. 1987.

1 . Kreiger, Martin H. *What's Wrong with Plastic Trees: Artifice and Authenticity in Design.* Praeger Publishers, London. 2000. p. 129.

1 . There is a widespread practice of teaching fundamental art courses with a basis in 'formal elements' followed by 'principles of composition,' with follow-up application to analysis of historical art forms. A typical example title following this vein is, *The Visual Arts Companion*, by Larry Smolucha, Prentice Hall, Englewood Cliffs, NJ 1996.

1 . Abstracting is transformative movement away from the concrete as if drawn out or drawn from the concrete as a continuum from the particular and sensorial to the general and symbolic. Definition of abstraction derived from the *American Heritage Dictionary of the English Language*, William Morris (Editor), Houghton Mifflin, Boston, 1998.

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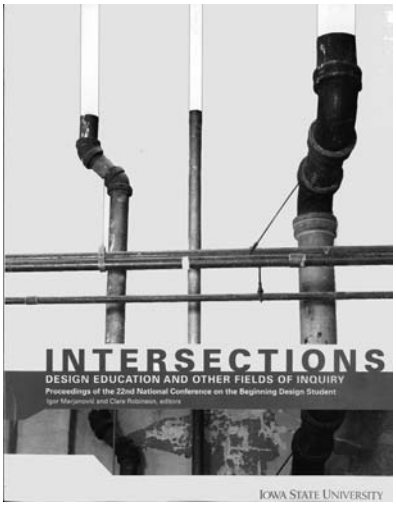

Greener Foundations

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Twenty Second Conference
Iowa State University
2006

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University of Waterloo

Greener Foundations

Environmental Sensibilities and Beginning Design Education

Introduction

The teaching of design and the subsequent responsibility of "building" or "constructing" undertaken by architects must go well beyond some of the more traditional "**D**esign" exercises that remain the backbone of beginning design studios in order to properly prepare students for global mobility. Whether graduates simply move "within the country," or cross the ocean, different grassroots issues must be addressed in architectural design. Environmentally-based design concerns are the most highly affected by changes in climate, siting and general building location/orientation. Technological and environmental concerns need to become a fundamental influence in early design education, if students are to understand that these are to be taken seriously, and are not disciplines or problems to be solved, later, by "others." Architectural design is an inclusive discipline, and the early studios establish the scope and culture that is carried through the program.

If such technical and environmental sensibilities are to be successfully incorporated into early design studios, they must be taught by engaging students interactively through exercises that are highly design motivated. These notions cannot begin with numbers, formulae and scientific terms that will undoubtedly evoke complete disinterest, or in the case of technically-challenged students—fear and subsequent dismissal. Students need to understand the basic principles in environmental or climate based thinking in order to be able to evaluate situations from a global perspective.

The traditional placement of Environmental Control Systems courses in the intermediate section of most accredited architecture degree programs, tends to indicate to students: a) that the material is highly technical and is beyond the comprehension of beginning "creative types"; b) that it is an aspect of design that is not central to the main ideas of design, hence remains unspoken in first year; and c) it is just not very important. "Greener Foundations" seeks to bring these issues to bear on beginning design education to create a base upon which to build the more technical, intermediate-level ECS courses.[1] ECS courses have expanded from "mechanical sub-

jects" to include key issues of sustainable and passive design. By setting up questions early in design education, these topics are given the importance required for students to take them seriously and inclusively. The Box Projects highlight the experiential intersection between environmental design and studio teaching.

Learning by Doing: Visualizing the Experiential

Learning by doing remains the most effective method of teaching any subject.[2] This has long been the accepted norm in the setting of design studio projects, and is increasingly being seen in supporting technical courses. With the growing demand for projects that can answer to sustainable/environmental design criteria, along with increased global mobility of graduates, such is also required in the teaching of traditional ECS courses. Environmentally-designed buildings must incorporate spatial and material "moves" from their design conception, in order to attain a high level of quality and effectiveness. Environmental considerations need to be intrinsically connected to the project from its conception because they affect the building's plan, section, materiality and orientation.

> ...a fundamental weakness in most discussions of architectural aesthetics is a failure to relate it to its matrix of experiential reality... this leads immediately to serious misconceptions as to the actual relationship between the building and its human occupants. –James Marston Fitch, 'Experiential Context of the Aesthetic Process,' *Journal of Architectural Education*, Winter 1988.

These projects were developed as a series of highly engaging, experiential, interactive, environmentally-motivated design exercises specifically targeted at the beginning design curriculum. They are easily used within the studio curriculum to raise sensitivity to environmental issues and to indicate to students that such issues are key to the development of successful architectural projects. They speak to the commonly-used phrase "thinking outside the box," using the box metaphorically as well as physically to demonstrate environmental design principles such as light, wind, temperature, view and time.

A major issue in designing space is the visualization of sensory issues that are not easily seen and therefore, understood. Although experiences of everyday life include light, thermal, acoustic, olfactory and visual ingredients, these are more difficult to realistically include in studio projects whose highest level of realization may be in the form of scaled drawings and models. Models can be seen to most closely approximate three-dimensional reality—and the Box Projects only seeks to add a "fourth dimension" to raise the level to include environmental experience.

Representationally the projects ask that students relate two-dimensional diagrammatic drawings to three-dimensional models, and ultimately to an actual experience. The experience can be taken back to re-inform and critique the 2D and 3D representations. Were these correct in their assumptions and clear? They de-emphasize the use of the computer, as many students are numb to the realities seemingly indicated by simulated computer images, after years of "gaming" in virtual environments. These projects are designed to be "quicker" than could be achieved by using a computer.

The projects constantly change the relationship of the student to the project itself. Design exercises typically restrict interaction to the creation and external observation of scaled work. By adding environmental considerations as well as changing the size and the relative "position" of the student to the project, a different set of observations is possible. External observation is modified by adding "light" and "visualized air movement" to the assessment of a 3D model. The scale is sometimes enlarged to have the students, either in part (head) or in whole (body), inhabit the project expanding realism in the project. Lastly, the student can "become" an element in the project, resulting in a different interaction and level of understanding of the outcomes.

The Box Projects

The Oasis

With increased global movement amongst architecture graduates, it becomes very important to assist students in understanding the impact that specific climate types will have on their building designs. Students tend to "shop" fairly liberally from international periodicals and monographs for ideas to fuel design projects. Some ideas are simply unsuitable for climate transfer. Some might work if they are modified. Students need to be able to understand critical aspects of climate suitability as a means to heighten the tectonic success of their design.

The idea behind the Oasis forms a spring point in the education of the beginning design student—an introduction to the *sensual nature of heightened awareness*. The Oasis forms the pedagogical basis for discussions surrounding the connection between **A**rchitectural and **E**nvironmentally sensitive design. The intrinsic connection between the Oasis (sublime), Climate (regionally varied), Light (ethereal) and Materials (tactile) is Comfort (essential).[3]

Students design a small building/shelter, for an assigned variation of the four primary climate types: hot-arid, hot-humid, temperate and cold. Students focus on issues of thermal comfort (including natural ventilation and quality of light), with an attempt to make a space that is sublimely comfortable. As beginning design students tend to treat architecture as "objects" viewed typically from the exterior, they are directed to examine the design of the "resting experience" from within

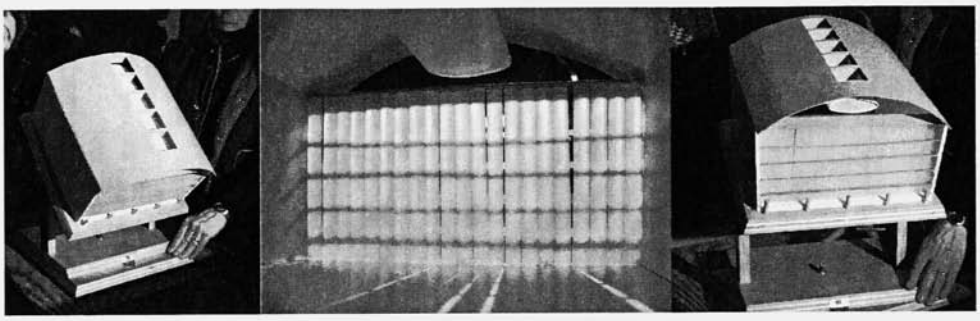

fig. 1 The Lightbox comparing summer (left), interior (center) and winter (right) views. Photos: Caroline Prochazka.

the space, using solely vernacular means to moderate climate. This adds a multitude of design issues that speak to architecture that has been designed "without architects,"[4] or mechanical air conditioning for heating or cooling. *This project is less three-dimensional but important nonetheless as it introduces aspects of climatic difference to students whose life experiences may be limited to their home environment.*

The Light Box

The Light Box singles out solar issues that have been raised in the Oasis project. *How can the sun be used for shading? What is the quality of the light? How does light animate the space/architecture?* It begins to address the problematic use of windows as a means to pierce and decorate façades, rather than to understand their full potential for light and solar control.[5] Contrasting with diffuse light conditions, sunlight can animate a space. Most architectural studio models are viewed in constrained conditions much like an overcast sky day, or randomly lit for the purpose of photographic record. Students are not given the opportunity to understand how sunlight can be used "architecturally"—as a form giver—or "environmentally"—for passive solar gain or for shading.

The Light Box requires the construction of a simple "room," with limited openings, and shading devices, viewable through an open "back wall." This model is tested on a heliodon for specified lighting conditions. This can be used to examine the sun penetration into a space measured at certain latitudes for winter and summer solstice conditions, and to test the effectiveness of solar shading devices. It is advisable that this model be constructed in such a way as not to be "precious" so that it can be treated as a working model. The project can also incorporate color of finish, texture, use of reflective materials, immediately outside and/or inside the space. Although heliodon modeling can only approximate the actual effects of the sun, using the sun is limiting as it confines the experiment to a certain time of day/year/latitude, and may not actually be working on the specified review day.[6]

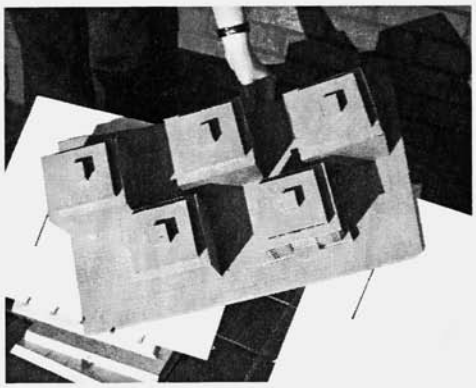

fig. 2 Urban Scale Lightbox: Jan Wils, Daal en Berg Houses (1920).

The Urban Scale Light Box (variation)

Whereas the Light Box examines the quality and effect of sunlight on interior spaces, the Urban Scale Light Box project helps students understand the impact of the sun on the spaces around and between buildings, assisting understanding of the effect of latitude and time of year on the habitability of exterior and interstitial spaces. This project can be customized to suit any studio project, although it has been used to support residential case-study work alongside an existing residentially-based studio design exercise (figure 2).

For the case studies students were divided into groups and assigned one of the residential projects from Roger Sherwood's book, *Modern Housing Prototypes*.[7] Each group constructed a model of the housing development (or part thereof if the scale was too large), and tested it on the heliodon. This

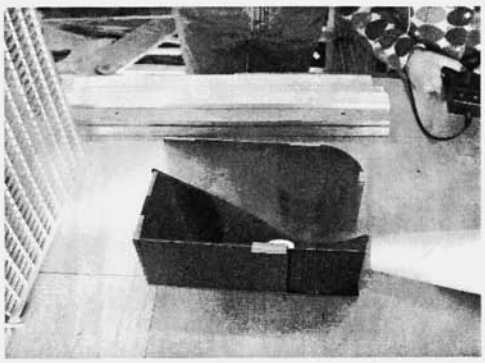

fig. 3 The Smokebox (under the direction of B. J. Smith, Master of Architecture candidate, photo credit).

allowed them to simultaneously become more familiar with some renowned residential projects of the 20th century, via drawing and modeling the buildings, while at the same time, develop a critical stance as to their effectiveness in terms of siting, sustainable site development, fenestration patterns, shading devices (or lack thereof) and quality of exterior and interstitial spaces.

The Smoke Box

Visualizing the movement of air through a space is difficult even for the most experienced designers. Sun can be easily modeled and so visualized. Wind cannot. Yet if students are to understand where to position openings to promote natural ventilation, understanding simple air movement needs to be learned.

The Smoke Box is a simple variation of the Light Box. *Using transparent small models, this project visualizes the flow of air through spaces through the use of "theatrical smoke."* Black foamcore and clear Plexiglas allow for viewing the movement of the smoke through the spaces. The theatrical smoke machine is fitted with a long cardboard cone that directs the smoke to an opening on the windward side of the model. The smoke is injected into the model in a series of "bursts." It is important that a fan be used to draw the smoke through the model and that a fume hood is available to remove the theatrical smoke from the room (figure 3).

For this exercise, students create "magic arrow diagrams" to predict the assumed flow of air through their space. Such diagrams are routinely found in airflow analyses of many buildings, and are easily drawn (wrong), quite convincingly. Students are asked to verify their initial assumptions after the model testing. Again, the models should be treated in such a way as to be able to be modified during the "performance."

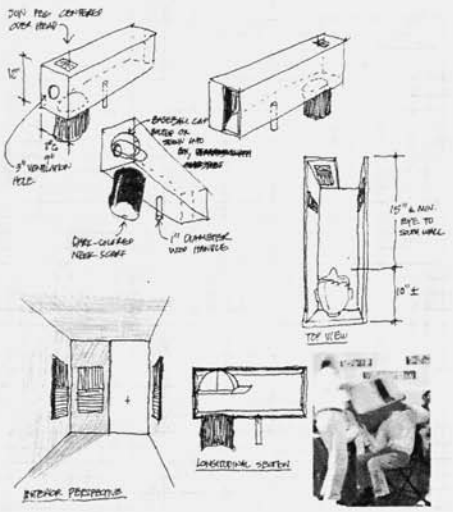

fig. 4 Sketch proposal for the Thinking Box by Edward Allen, FAIA, SBSE Retreat 2005. Credits: sketch/Edward Allen; photo/Tisha Egashira.

Thinking Inside the Box

Although models can be approximately experienced as "real spaces" via computer imaging or photography with model scopes, this project makes students realize what it feels like to be inside a space, and understand the importance of the view out, orientation, and solar aspects. The box is constructed similarly to the Lightbox, with apertures, shading devices attached, and placed over top of the student's head. With assistance from other students, experiences are recorded as the box is worn during a range of potential experiments, including heliodon simulation, wearing the box on a potential building "site" to understand view, orientation and understand advantages and disadvantages of different site locations.

The Four-Dimensional Cube

The box is now large enough to sit inside, but is still highly portable. Environmental limitations on this project can include making the box with found or recycled materials. Students take the notions from the previous "boxes" to create a small habitation to assist in experiencing varying outdoor spaces. Where some aspects of this exercise will reaffirm previous notions of light and air movement, new issues of sound and smell can also be included if the installation is positioned in varying microclimates. The same "box" sitting in the middle of an asphalt parking lot will be quite different than if it is sitting in an open field or a wooded area. The different performances and experiences of the space are documented and compared.

As a design installation, our students have designed and built "dining pavilions," using timber products. These were taken to a natural site and used for an evening of festive eating as well as a sleepover event.

Beyond the Boundaries
Architectural design involves both creating and delimiting space. The boundaries that create, define and confine spaces impact the environmental state of the space. This project divides the students into groups that are large enough to create spatial boundaries using themselves as the architectural elements that separate the spaces. Whereas the other projects ask students to use their powers of observation and senses to understand the environmental impacts on architecture, this project draws them into "becoming" part of the architecture itself. A suggested list of boundaries might include: Protective, Shading, Interconnecting, Dynamic, Thermal, Closing, Opening, Filtering and Embracing.

Conclusion
The "Box Projects" describes an intrinsic intersection between the like pedagogical motivations that underlie beginning design studio and environmental design courses. The projects describe a series of highly energetic, engaging—short—teaching exercises that can form a vital link between issues found in design studio and basic principles of environmentally motivated design, which can assist in preparing students for mobility within the practice of architecture. Each of the projects validates one key aspect of environmental concern that intersects with the act of architectural Design, and that if used properly, will improve Design. All projects can be easily incorporated into a beginning design curriculum and can raise awareness and quality of design in the intersection between environmental and general design concerns, without the use of alienating levels of technicality.

Notes

[1] The Box Projects are part of the outcomes of the Society of Building Science Educators Annual Retreat held in Savannah, Georgia, in 2005. Full information on the retreat outcomes available at http://vsav.scad.edu/sbse2005/papers.htm

[2] *Connector*, a series of newsletters initiated by Ed Allen in the 1990s, features a series of articles regarding effective teaching of technology-based courses using project-based work.

[3] 14th National Beginning Design Student Conference, 1997. Terri Meyer Boake. "OASIS: The Fourth Dimension of Architecture."

[4] Bernard Rudofsky, "Architecture Without Architects: A Short Introduction to Non-Pedigreed Architecture" (University of New Mexico Press, 1987).

[5] 16th National Beginning Design Student Conference, 1999. Terri Meyer Boake. "Beginning to see the light: PIERCING SKIN: Significance-Light-Tectonic"

[6] Instructions on how to construct a simple Heliodon are to be found in *Heating, Cooling, Lighting*, by Norbert Lechner (John Wiley and Sons, 2000).

[7] Roger Sherwood, *Modern Housing Prototypes* (Harvard University Press, 2002).

Contributions

Individual Gifts

Gifts of $250,000
Alfred C. Glassell, Jr.

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Sue W. Turner

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