

NEW DIRECTIONS IN ARCHITECTURAL EDUCATION: AN INTEGRATED APPROACH TO BUILDING CONSTRUCTION IN THE CURRICULUM

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INTRODUCTION

Introductory construction courses in schools of architecture present a dilemma to educators. On the one hand, few can dispute the importance of providing students with a solid foundation of tectonic information early in their studies to inform subsequent courses and studios. On the other hand, the nature of the material is typically so elementary as to present little challenge to faculty and often insufficient interest among the recipients. Little wonder that senior faculty usually leave the large, mandatory construction courses to their junior or adjunct colleagues in favor of the smaller, higher-level electives, and little wonder that technology-related material often appears separate from, rather than integral with, the theoretical perspectives of the design studio.

Such a situation, while not universally applicable, is sufficiently common to cause concern. The standard of care for an architect established by state and federal courts remains uncomfortably high. Coupled with the increasingly complex nature of building construction and sophisticated advancements in technology, training in both the art and science of construction-tectonics-is a critical and integral component of the education process and not one to be undervalued, especially in the early formative years of a student's career.

Mindful of the importance of the subject area in the light of the NAAB requirements and also the forthcoming observations of the Boyer Report,² an introductory course has been developed and successfully implemented at the University of Wisconsin-Milwaukee which takes a broader, more integrative approach to building construction. The course is co-taught by the Dean of the School and the Chair of the Department of Architecture-an unusual collaboration but one which underscores the importance of the material to the students through its delivery by the leaders of the program. Arch 210, while providing a basic core of information on the process of building and the components of construction, attempts to broaden the student's understanding of the importance of sound detailing on the creation of high quality architecture. The course is intended to provide students having professional career goals with an overview of the theory and practice of building technology in architecture; the underlying assumption is that a building must meet functional, aesthetic, and technological requirements. Through an investigation of the building technologies which inform its "making," this course develops an understanding and appreciation for the systems which constitute the building and influence the form, texture, and character of the built environment. The focus of the semester is to introduce the beginning student of architecture to the technologies in building systems:

structure, environmental, and life safety. Each of these technical systems places rigorous demands on the design professional to not only understand the individual system requirements but to integrate these specific requirements into a total architectural design. The technical theme of this course is to examine the performance criteria which form the requirements of each building system through a series of class lectures and readings. In addition to this fairly traditional "spine" of the course given in lecture format and tested through a series of examinations, students are required to demonstrate their appreciation and understanding of good construction through two further exercises that require different perspectives and different skills.

WRITING TO LEARN ABOUT CONSTRUCTION: THE REPORT PROJECT

The first exercise involves a written essay exploring the construction of a noteworthy building which exists in the context of the student's everyday environment. Undertaken as part of the Writing Across the Curriculum initiative within the school's curriculum, students, through structured workshops and with guidance from the Department of English, learn to articulate their observations in a medium that is not typically a strength among architects. The requirement of analyzing good building construction practice and articulating its qualities in written form sharpens the students' critical abilities and improves their descriptive abilities.

The specific purpose of the report project is to allow students to become familiar with the detail aspects of a local piece of Milwaukee's heritage and to understand the design implications behind detailed construction decisions. As is often the case with beginning design students, the ability to critically evaluate one's environment has been significantly suffused by years of immersion in it, and the concomitant development of biased preconceptions bred by familiarity about what constitutes that environment. To attack this condition head on, each student produces a written report describing the architectural characteristics of a residential or commercial building located in the City of Milwaukee; they are directed to describe the building and its architectural details. The only parameters for building selection are that a) the building selected be located within the city of Milwaukee, b) it was originally constructed between 1889 and 1925, and c) it still retains significant details from the original design. This constraint on building selection is intended to obviate the use of the banal building which characterizes the recent suburban development of Milwaukee, as well as to give credence to the significant historic heritage of the city, most of which was in fact designed by identifiable architects. As a

beginning resource guide, students are assigned two texts locally available which directly address current and historic construction procedures and practices in Milwaukee.³

With the assistance of these texts, the material delivered by the instructors in large-lecture format, and their own critical visual investigations, a written report is developed which addresses a series of construction related issues. The process of construction is researched and verified through investigations which establish the precise dates of construction and summary of renovations and changes to the residence or commercial building. This is accomplished by researching the records kept by the City of Milwaukee. The Department of City Development works in concert with the school to arrange for students to conduct primary research in the city's archives for this project. Additional information is also garnered by consulting the local historical society as well as the files of the city's only newspaper. Along with researching the actual construction process of their building, students research and identify the historical style of their building, and prepare a short analysis of the detailing which characterizes that style.

Once the preliminary research establishing the building and its context has been completed, a close reading of the enclosure system is developed. As an example, if the selected building is wood, an accurate description of the wood, siding, and trim details, along with an assessment of the construction type used, is developed. For a masonry structure, an accurate description of the brick, mortar, stone, and stucco details is established. Additionally, identification and description of the roof system and materials including the chimney style and construction, gutters and downspouts, and any roof cresting details are further explored. Door types, hardware types, windows, porch details, column and beam supports, handrails and baluster systems, and any fences and retaining walls are also included as part of the description of the enclosure system. Oral interviews with the current tenants of the residence or commercial building are also encouraged. Photographic documentation to support identifications and descriptions are included along with a list of illustration credits.

TOUCHSTONE AND TONIC: UTILIZING NARRATIVE PEDAGOGY IN BUILDING TECHNOLOGY INSTRUCTION

The pedagogic objectives of the writing report are many. The primary objective is to provide a vehicle with which beginning students can take the literate model of education in which they have been previously trained and transpose it for use in learning about building technologies. It is also intended to mix a variety of pedagogic modes to reinforce the notion that discovery in architecture requires a multiplicity of departure points. Carlo Scarpa exploited the drawing as a tool for the conscious critique of accepted graphic conventions in much the same way that the writing project is joined with the study of building technology to intentionally create a field for potential discovery. "These are mistakes you make in thinking, acting, doing. So you need a double-crossing, a triple-crossing kind of mind, the mind of a thief, of a speculator, of a bank robber. And you need to be sharp-alert to everything that's going on or might be going on."⁴ Through a precise, well researched narrative description of the enclosure system of a building which they have carefully studied, students develop an advanced understanding of technology, and the subtle and not-so-subtle ways it is

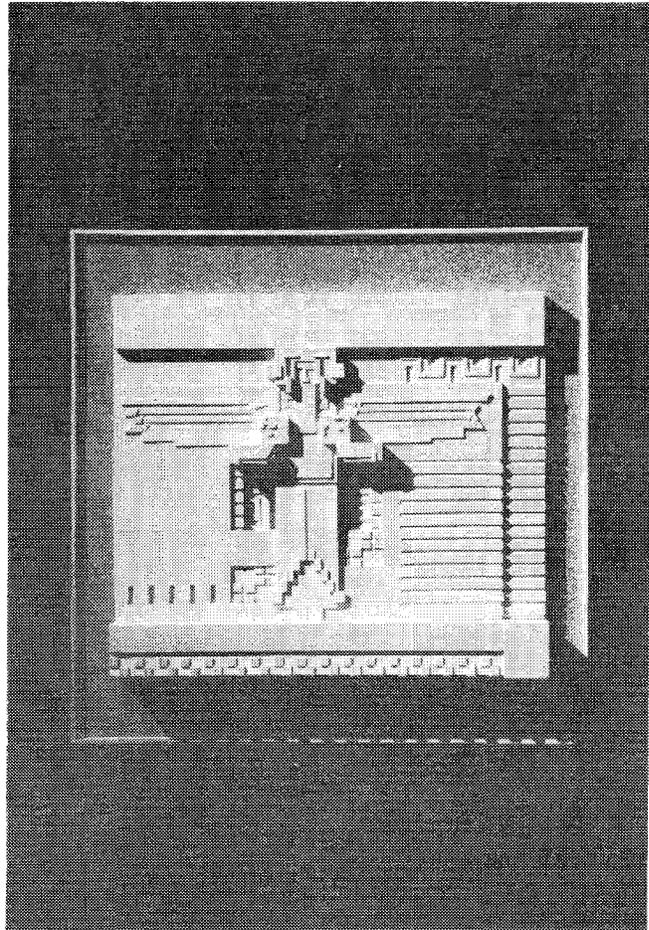


Figure 1: Pilaster capital detail of F.L. Wright's Bogk House, Milwaukee

employed in architectural detailing. Learning about technology is integrated with the development of critical writing skills, suggesting a different level of awareness from traditional models of architectural education. The students are required to look very carefully at their selected buildings, and to describe with great specificity the parts which make up the whole.

Due to the large size of the class—normally over two hundred students—peer groups of five to six students are established by the instructors which meet at the end of the lecture, still during class time, to discuss the progress of their work. Since the report project is divided into four intermediate submissions which are reviewed both in the peer groups and by the instructors, these sessions are used for each student to read that portion of the assignment which they have been required to complete by that date. This accomplishes two objectives: one is to have the students talk with each other about their work and to test their emerging technology knowledge base. The other is to assure that completion of the research and writing is done in small enough increments that it serves to reinforce the material learned in lecture and assures an iterative approach to the report writing rather than a mad dash to complete it in the last three days of the semester. For these peer group meetings, the instructors prepare specific tasks to be undertaken by each group which are intended to hasten discussion and to focus it on both technology and writing issues. One example of these tasks is the requirement that one student member read their initial description of the enclosure system to the group, and that the others

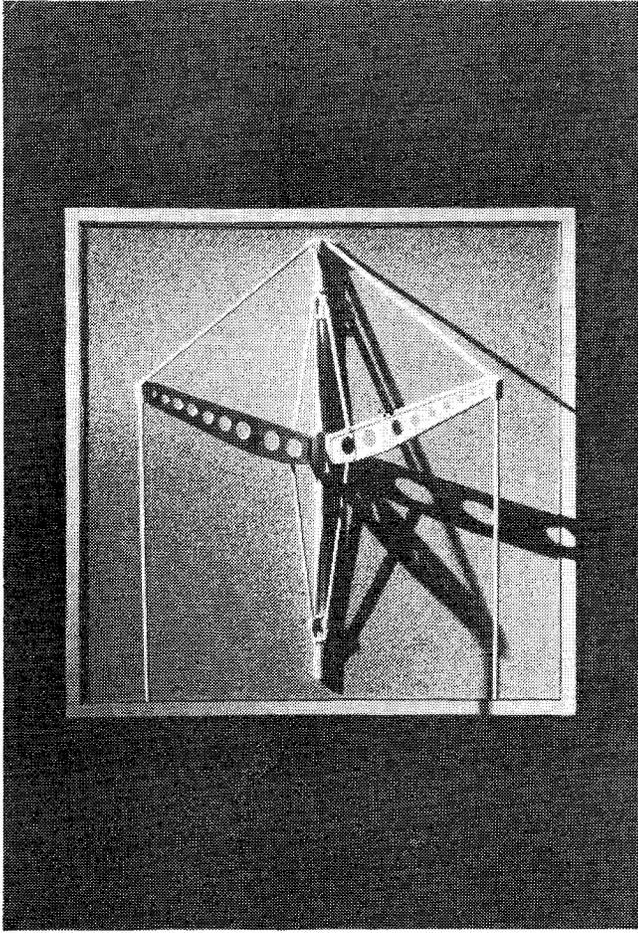


Figure 2: Column and Beam detail of Renault Parts Factory, Swindon, by N. Foster

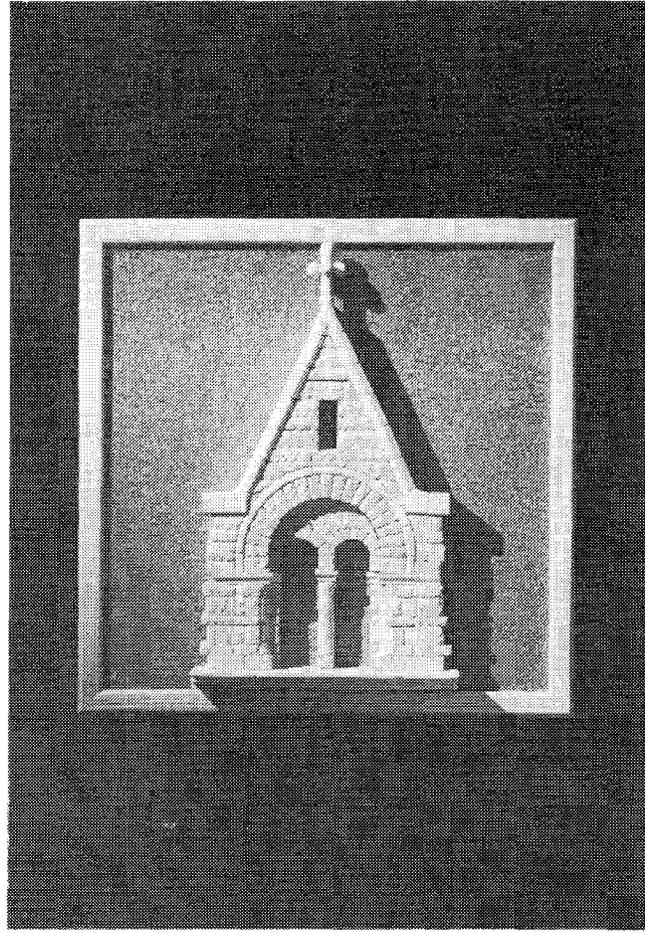


Figure 3: Entrance detail of Grain Exchange Building, Boston, by Shepley, Ruten and Coolidge

prepare a sketch based on the description read. While there can be great variety in the tasks given the peer groups, it becomes clear as the semester progresses, that peer learning and interaction increases to a level which requires little effort from the instructor to sustain its momentum. By the end of the course, writing is accepted as a critical skill useful in architecture, and the precision of expression and description required in the study and implementation of building technologies is both reinforced and expanded.

DETAIL TRANSFORMATIONS: THE MODEL PROJECT

Concomitant with the writing exercise, students in Arch 210 are required to undertake a scale construction. They are required to select an outstanding building detail which, when justified and approved, has to be constructed to scale in basswood and cork. While not uncontroversial—it can be seen merely as an exercise in model making—the idea behind the task is to focus the student's eye on the art and craft of good detailing. Undergraduate design studios tend to focus on good design at the larger, massing scale; Arch 210 demonstrates in painstaking detail that tectonics is as much a part of component assembly as the composite building form the pieces created. At the end of the semester, the two hundred students exhibit their carefully constructed building details, creating a superb object lesson in the art of detailing for the whole school—especially poignant when it is a lesson taught by the youngest members of the

program.

The primary purpose of the model project is to allow students to become familiar with detail aspects of a significant architectural work and to understand the design implications behind detailed construction decisions. In contrast to the report project described above, the selection of buildings from which detail models may be developed is substantially limited to those found in locations outside of Milwaukee, and in many cases, outside of the United States. Additionally, the era in which the selected buildings have been constructed is also left to the student's discretion. This is a critical aspect of the exercise because it forces the student to extrapolate, sometimes from incomplete information, about the nature of the building, and thus, the quality of its detailing from both the perspective of art and performance. The intention is to have students work with their understanding of building technology through photographs and textual research to arrive at a conclusion about the technological basis of the design they are investigating. In securing this conclusion, and in extracting a building detail from its context to recreate it according to the requirements of this exercise, the transformative act takes over, and the detail interpretation becomes a design act in and of itself. This appropriation by the student of an existing detail and its re-creation in a pre-established field which does not conform to its original field provides a rich ground for invention. The act of replication thereby becomes a creative act, not one which seeks simply to imitate an existing artifact.

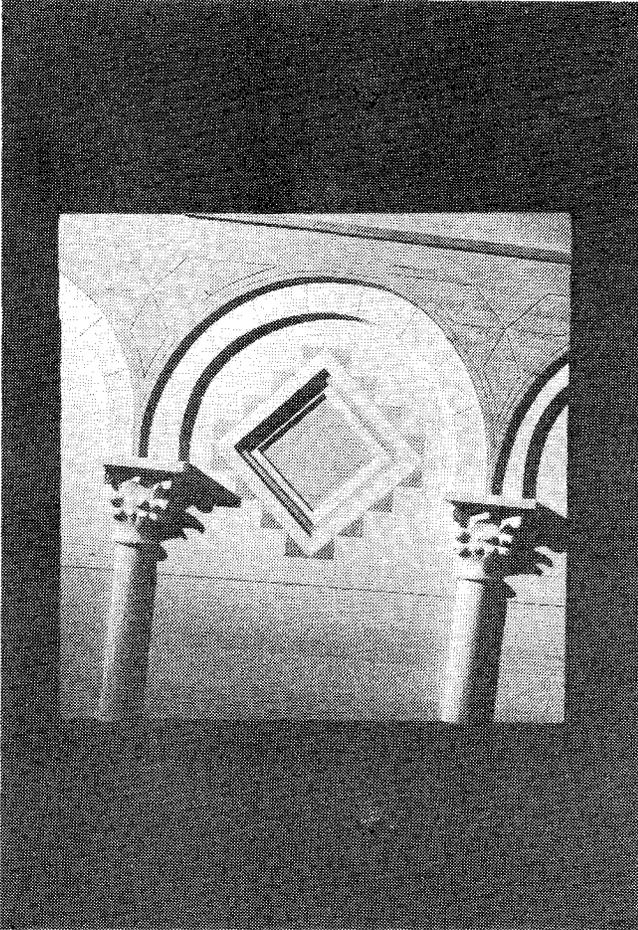


Figure 4: Column and arch detail of Leaning Tower, Pisa, by B. Pisano

Each student builds a model from basswood—a wood with a tight grain—on a cork base of a “detail” of a building or structure recognized for its architectural significance. The model must be sized to fit onto a fourteen inch by fourteen inch field, which is to be covered with cork at its exposed face. A “detail” is defined, in this case, as an important piece of the overall composition of the building or structure and students are asked to carefully “read” the tectonic text of this architectural artifact. It could be, for example, a column, wall jointing, beam connection, or a window head. The importance of the detail in generating form is an important aspect of this exercise. Our students are exposed early in the curriculum to the notion that the development of generative details for a project not only solves a large number of technical problems, but also establishes the visual order and coherence of the architecture. They select a detail which addresses the interplay of support and joint, and then transform it by reproducing a portion of it in the predetermined field. The resultant product is a transformation of the original detail which teaches them to read, order, and understand the role of the tectonic. Since there are no restrictions on the content of the model except that it be approved by the instructors in advance, this encourages a high level of informal discussion about building technology with the instructors, as most approvals are made in the hallways before and after class hours. The materials out of which the model must be built are purposely left monochromatic. This causes the focus of the study to be on the joining of materials in a detail, and the play of light

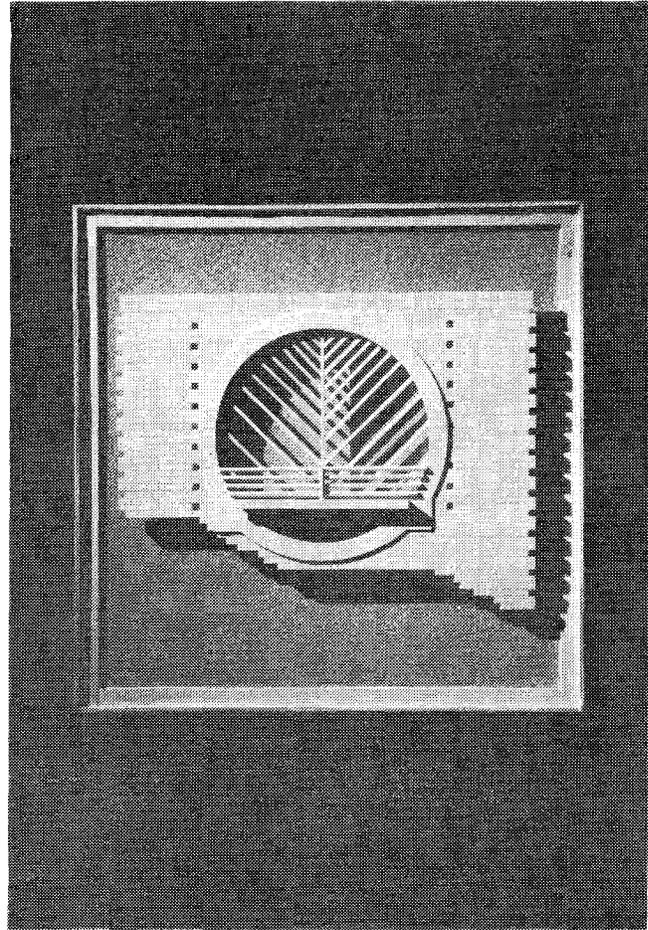


Figure 5: Window detail of Robbiani House, Massegno, by M. Botta

and shadow they generate. As Adolf Borbein remarked in his 1982 philological study, “Tectonic becomes the art of joinings. ‘Art’ is to be understood as encompassing tekne, and therefore indicates tectonic as an assemblage not only of building parts but also of objects, indeed of artworks in a narrower sense.”⁵

WRITING AND MAKING: TOWARDS AN INTEGRATED CURRICULUM OF MATERIALITY AND REALISM

Establishing a methodology for dealing with the tectonic requirements of building is elusive and generally exclusive where design is considered. Bringing design and instrumentality together through analysis of the parts which in turn make up their whole is an approach to architecture with a long tradition of theoretical and practical support. The intent of the pedagogical approach to instruction about building technology outlined above is to reestablish the “art” of building based not just on the literal technical requirements of construction but also the symbolic, cultural aspects of construing. Perhaps in this way we can bridge the current gap between the art of building and the art of design to create the congruity, or *concinntatis*, that Alberti sought. “In the last analysis,” as Kenneth Frampton has written, “everything turns as much on exactly how something is realized as an overt manifestation of its form. This is not to deny spatial ingenuity but rather to heighten its character through its precise realization. Thus the presencing of a work is inseparable from the manner of its foundation in the ground and the ascendancy

of its structure through the interplay of support, span, seam, and joint—the rhythm of its revetment and the modulation of its fenestration.”⁶

While embodying the essential components of an introductory construction course, Arch 210 attempts to broaden the students’ critical awareness of the art of good detailing by focusing their descriptive efforts of their understanding through examination, written description and scale construction. This integration of writing skills and making skills clarifies the pedagogic objective that discovery in architecture requires a multiplicity of departure points. By tapping different learning modes in these beginning students, they develop a seamless correlation between writing and making, one which brings their existing and developing skills together in a way that allows them to approach building technology issues with confidence and vigor.

NOTES

1. The authors thank the anonymous ACSA reviewers of this paper for their elucidating comments on its initial incarnations. They also acknowledge A. Copp, S. Hatton, R. Sutcliffe, and J. Tourand for the use of the photographs of their Arch 210 models.
2. E.L. Boyer and L.D. Mitgang, *Building Community—A New Future for Architecture Education and Practice* (Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching, 1996). This report is part of a series designed “to explore significant issues in education” which was funded by five national architectural organizations.
3. P. Jakubovich, with assistance from C. Hatala and L. Vollmert, *As Good as New: A Guide to Rehabilitating the Exterior of Your Old Milwaukee Home* (Milwaukee: City of Milwaukee Department of City Development, 1993); P. Jakubovich and L. Vollmert, *Good for Business: A Guide to Rehabilitating the Exteriors of Older Commercial Buildings* (Milwaukee: City of Milwaukee Department of City Development, 1995). Both of these texts were designed to assist small and medium scale owners in rehabilitating their properties. To satisfy this criterion, they contain excellent and concise descriptions of historic and contemporary construction techniques, with specific relevance for Milwaukee.
4. As quoted in F. Dal Co, *Carlo Scarpa, the Complete Works* (Milan: Electa/Rizzoli, 1984), 53
5. As quoted in K. Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge, MA: MIT Press, 1995), 4
6. K. Frampton, *Ibid.*, 26