CRAFT, INTENTION AND PRODUCTION

Architectural Specifications:
Intertwining Material and Technique;
Thought and Action
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This paper presents a critical study of the notions of "digital," "technology" and "communication" in architectural production. Here the term "communication" is understood as the development and articulation of architectural intentions through the medium of the Construction Specifications document. "Digital" is construed etymologically as "made with the digits (fingers)" or "tactile," and "technology" is explored as a cultural phenomenon that engages both thinking and action within the framework of a shared or negotiated system of values.

These topics were the focus of a technology seminar I taught entitled: "Small Building Systems: (re)Building the Primitive Hut." The intention of the course was to explore technology and specifically "tectonics" as the locus of relationships between intellectual concepts, natural forces and physical phenomena in architectural thought and practice. Since its introduction into architectural vocabulary in the Nineteenth Century, the "tectonic" with its privileging of craft, nature, and gravity, has been a protagonist in recurring attempts to re-ground architectural discourse within its own disciplinary boundaries. The tectonic generally appears in theoretical debate as a point of resistance -a reaffirmation that the essence of architecture is found in the craft or technology of building often at the expense of other intellectual or cultural concerns. It is this conservative tendency of tectonic discourse that I specifically sought to challenge in the seminar. Our method was to question the nature of tectonic and technological thinking by critically re-interpreting the taxonomy of construction practice as codified in the CSI Master Specification Format, and then to test the potential for these reinterpreted specifications to inform the making of a modest structure: a primitive hut. This reinterpretation of the scope of specifications for construction drew upon material typically excluded from discussions of architectural technology, namely: mythology, traditional handcrafts like weaving, contemporary art, and non-western cultural practices. Thus, the Primitive-Hut was engaged not as a paradigm of architectural origins but rather

as a site for testing the potential for construction specifications to broaden rather than narrow the scope of architectural production and for exploring a more-than-instrumental application of technology in the production of architecture.

In presenting the work of the course, I will begin by presenting some highlights of the lectures and student presentations in which we critically re-interpreted divisions one through nine of the construction specifications. In conclusion, I will present some of the student's Hut Installation projects.

DIVISION ONE: GENERAL REQUIREMENTS

In addition to laying out various scheduling and contractual issues for the course, Division One established the definitions of important terms and provided a vehicle for establishing the course's overall methods of inquiry. The form of our collective investigation was taken from Vitruvius' description of the origins of building as a social practice. Although taken to be the first book of architectural theory in the western tradition, Vitruvius' Ten Books on Architecture is a remarkably practical document, dealing with everything from material and site selection to formulas for paint[1]. It is noteworthy that his description of man's earliest building activities had little to do with the idealization of nature or even with architecture for that matter. Instead, the discovery of fire, and the subsequent development of language are the crucial precursors to the art of building.

...During that time, in a certain place, dense, close-growing trees, stirred by stormy winds and rubbing their branches against one another, took fire. Terrified by the flames, those who were in the vicinity fled. Later, however, approaching more closely, when they discovered that the heat of fire was a great advantage to the body, they threw logs into it and preserving it by this means they summoned others, showing what benefits they had from this thing by means of gestures. In this gathering of people, as they poured forth their breath in varying voices, they established words by happening upon them in their daily routines. Later, by signifying things with more frequent practice, they began by chance occurrence to speak sentences and thus produced conversations among themselves. The beginning of association among human beings, their meeting and living together, thus came into being because of the discovery of fire... [Later] some

in the group began to make coverings of leaves, others to dig caves under the mountains...Then, observing each other's homes and adding new ideas to their own, they created better types of houses as the days went by[2].

This narrative of the development of language as among the first technologies posits a reciprocity between physical experimentation and the development of "new ideas." It was to this empirical and discursive model that we turned in the seminar. We pushed the issue of technology beyond both the privileging gravitas of functional practicality as well as the utopian positivism of high-tech progress in pursuit of fresh potential relationships between material and technique, and between thought and action in architecture.

DIVISION TWO: SITE REQUIREMENTS, EARTHWORK AND DEMOLITION

Following the establishment of communication as a primary act of construction and an introduction to the issues of technology, tectonics and the Primitive Hut, we turned to student presentations starting with Division Two: Site Requirements, Earthwork and Demolition. In the physical poetry of the force of gravity, the Earth is the primary body to which our human bodies are attracted, and whose pull we resist and redirect in numerous ways. According to the logic of the CSI format, it is presumed that all acts of construction will engage the earth in some manner. Even the most disembodied examples of virtual architecture address the earth and its gravitational pull if only by their implicit or explicit denial of physical contingencies. Similarly denied a direct engagement with the earth by their placement in a gallery setting, our hut installations none the less raised important questions about their relationships with the earth. In this regard, we turned to the work of Michael Heizer and other earth artists active in the 60's and 70's. Robert Smithson's "Non-Sites" raised the issues of context, scale and the strategy of displacement as well as the explicit critique of the technologies of artistic representation and art gallery presentation. We considered the effects of time, ephemerality and entropy in Smithson's work as well as in the architectural interventions of Gordon Matta-Clark. His work recast the act of demolition as a process of editing and re-contextualization, and it raised the positive potential of negative processes in architecture. Finally, we looked at the work of Christo as an example of the ability of large scale art work to transcend the personal in favor of social and collective action, and for its ability as a technology to reveal otherwise hidden conditions like the property lines dividing the Marin County landscape and dictating the sinuous path of the "Running Fence.

DIVISION THREE: CAST IN PLACE CONCRETE

Our discussion of Division Three, Concrete centered around the tech-

nique of casting as an indexical process and as a strategy of inversion. The work of Rachel Whiteread was presented and analyzed beginning with her intimate casts of the body and extending through the increases of scale from the space under a chair to the space of a room. Her work forges and reveals important relationships between the body and its containing conditions (chair or room for example) by inverting the related conditions of surface and space and excluding the viewer's physical inhabitation of a space that is recognizable but which has been rendered as a solid where it once was void. More than that, her literal densification of space, giving gravity to what otherwise would be considered emptiness, displays an important recognition of the role of gravity in perception. Investigating the process of casting and reversal reinforced the reciprocity between solid and void, container and contained, and led to speculation about the conceptual power of techniques of inversion to engage and reveal conditions of duality. Finally, we considered her major environmental pieces "Ghost" and "House" in terms of the ability to record and display normally hidden conditions of domesticity and interiority as the ephemeral substratum of urban conditions.

DIVISION FOUR: MASONRY

The possibility of a material's having an inherent "nature" or "essence" was explored in Division Four: Masonry. Does the brick or masonry unit embody specific clues as to the correct or preferred techniques for its use? -or to echo Louis Kahn, can one ask the brick "what it wants to be?" Are masonry techniques latent in the material? and if so how? For Mies Van der Rohe, the nature of the brick lay in its rectilinearity and in the dimensional meter of its proportions. The formal result of the application of these ideas to masonry technique is best demonstrated in his brick country house project of 1934, where the thickness and shaping of the walls are all the direct results of the brick module. Kahn found in answer to his question that the brick wanted to be an arch. In his own work Kahn used masonry in a variety of ways -but most memorably perhaps as enclosing shell-walls, pierced by round and triangular openings. This divergence of technical imperatives led us to seek other ways to link material and technique in masonry construction. We compared the masonry wall's structural logic to that of a frame or skeletal system. Unlike frames, which localize forces in a few articulated joints between heavily loaded members, masonry walls distribute forces through a multitude of members connected by simple and highly repetitive joints. Thus a masonry wall can be seen as a relative of a woven fabric that similarly derives its strength from the distribution of forces through numerous strands and repeated knots. The fabric potential of masonry structures challenges the reductive essentialism of Mies' Cartesian model. This challenge is perhaps best illus-

trated by the work of Uruguayan architect Eladio Dieste whose church in Atlantida displays the remarkable fluidity of masonry conceived and treated as a fabric. Our conclusion was not to posit a newer understanding of the "nature" of masonry intended to supersede the others -bricks are undeniably rectilinear and posses a dimensional meter that is very compelling. Rather, our methodology of closely questioning the processes of how bricks operate as a woven assembly revealed the potential for rigorous re-considerations of material and technique to extend the formal range of those same materials and techniques.

DIVISION FIVE: METALS

Our discussion of Division Five: Metals centered around the work of the artist Richard Serra. Beginning in the 1960's, Serra sought to focus his work on the potential for action, in the form of verbs (mostly in the infinitive) to be embodied in the physical form of his sculptures, installations and films. His "verb list" from 1967 gathers together the verbs that he was to explore in his subsequent works. "To Lift," also from 1967 is a good example of his attempt to register the ongoing effects of his action -the lifting of this sheet of heavy rubber. Although the action is in the past (the rubber sheet *has been* lifted, it isn't actively being lifted) it continues to reveal its condition of having been lifted, highlighted perhaps by the tenuous quality of its position which relies upon (and reveals) the forces of the material's stiffness and the weight and friction it exerts on the floor to maintain its stability. The sense that gravity is being held in a delicate equilibrium is inescapable. An even better example is another series called "Props" from 1968. This time Serra uses lead: a material chosen for its great weight, density and manipulability, -chosen also perhaps, because it is considered the least refined, most base and earthen of metals. Using only lead sheets and their material properties, the walls and floor of the gallery, and the force of gravity, Serra freezes the verb "to prop." In this case it is clear that the artist has "propped," the materials, but it is equally clear that the materials themselves are now carrying on the work of "propping" each other up. The work engages and reveals lead's specific material properties: the ability of lead sheet to be rolled, to maintain its stiffness, and to transfer linear forces from wall to floor. Simultaneously, they reveal how the force of friction between lead sheet and wall and between lead tube and floor are all crucial to the piece. The verb "to prop" is truly displayed in the infinitive, invoking the concepts of time, continuity and infinity, while at the same time gravity, which enables the piece, also waits in the wings to bring about its potential and, in fact inevitable downfall. In these and other works from this phase of Serra's career, material and technique are deftly engaged in sculptures that are charged by the courtship of entropy.

DIVISION SIX: WOOD AND PLASTICS

In considering of the rich and varied traditions of wood construction, our discussions focused around the ritual and spiritual associations with the working of wood. Beginning with the ancient Greek attribution of the highest aesthetic merit to the craft of the woodworker as embodied in the term "techne," we went on to explore Native-American and Japanese woodworking traditions. We examined the cosmological significance inscribed in both ritual and quotidian Native American structures as well as the techniques and values embodied in their nomadic and sedentary building cultures. From the shake-tent, intended for the lone shaman's communication with the spirit world to the multi-generational and communal long-house, we looked at many examples drawn primarily from Peter Nabokov's book on Native American architecture. In the context of traditional Japanese building practices, we considered the role of ritual, both in the example of the Shinto carpenter-priests, as well as in the strong ties between material objects, like tools, utensils and furniture, and their ritual roles in the elaborate Tea Ceremony. Through these discussions we situated the concerns of cosmology and the practices of social and religious ritual within the domain of architectural technology. As potentially powerful mediators between thought and action, we speculated on the potential for ritual and cosmology to be reinterpreted and to re-inform contemporary secular architectural discourse and practice.

DIVISION SEVEN: THERMAL AND MOISTURE PROTECTION

Possibly the most overtly pragmatic of the nine divisions under consideration, Division Seven: Thermal and Moisture Protection was presented not in functional terms, but rather in terms of the human desire to protect that which is sacred or precious. As a corollary, we considered the role of the act of protection in the establishment and maintenance of the hierarchies of value. We examined the paradigmatic structure of the Hebrew Temple, with emphasis on its concentric wrapping of the Torah in a hierarchical series of veils and enclosures which each carry social restrictions as to who may pass from one to the next. As illustrations of the concept of sacredness in contemporary art and culture, we looked at the Austrian artist Walter Pichler's "Shrine" and "Chapel" projects. In "Shrine" Pichler engages in an extended meditation on the wrapping, housing and protection of a found object. From its status as a lost or discarded object with reduced inherent value, the effigy accrues significance through the artist's obsessive acts of protection. We speculated about the specific mechanisms by which particular materials, techniques or activities are assigned cultural or social value, and we explored the relationships between perceived value, belief and action. In considering strategies of reversal or inversion such as Duchamp's DaDa "ready-

mades" and Italian Arte Povera, we concluded by critiquing the value of craft for its own sake.

DIVISION EIGHT: DOORS AND WINDOWS

In Division Eight: Doors and Windows, we explored the themes of duality, threshold, lens and filter through the work of Marcel Duchamp. His famous door which is always open even when it is closed, focused discussions on the nature of dualistic oppositions like open / closed, and inside / outside. His two major works installed in the Philadelphia Museum, known as the "Large Glass," and "The Given," were analyzed in depth during this presentation. The mechanisms of desire embedded in the "Large Glass" draw together technology and sensuality, or rationality and chance operations in much the same way that the transparency of the glass draws its setting and other viewers together in the experience of viewing the piece. Similarly, "The Given," a rough-hewn door giving a peep-hole view of a "four dimensional perspective representation," draws the viewer into an undeniable participation in the construction of the work's meaning. With their eye pressed to the door's rough wood surface, the viewer is drawn into an act of voyeurism that engenders a shocking sense of self-awareness. The viewer and the act of viewing are thus co-opted by Duchamp, and the viewer becomes a participant in the completion of the work. This potential for the artwork to engage and in fact to demand the participation of the viewer by disallowing passivity was discussed and critiqued as a potential strategy for engaging the subject's expectations and responses, their body and their intellect in an aggressive relationship with a physical artifact.

DIVISION NINE: FINISHES

Since our hut installations were intended to remain primitive and thus without need of HVAC, plumbing or electrical systems, we concluded our discussions of the specifications for construction with Division Nine: Finishes. Our principal topic was the dichotomy between inherent and applied meaning in architecture. The modernist penchant for abstract or inscribed meaning was contrasted with both the pre- and post-modern practices of encoding and re-coding architectural surfaces with signs, images and references often originating outside the immediate circumstances of the building's functional and structural imperatives. The comparison of ancient Roman and Native American practices of painting and carving narrative and allegorical imagery on building structures and surfaces was of particular interest. This 'addition to-' or 're-qualification of-' the inherent qualities of a structure and its materials was seen to relate to practices of tattooing and ritual masking. Masks, particularly those of Eskimo and Pacific Northwest cultures are elaborate mechanisms of transformation and the practices of re-coding, narrative and role-playing

raised new and unexpected tectonic possibilities. Ultimately, we contrasted the values of structural expression and material honesty with the more playful practices of masking, hiding and revealing, and we explored the potential for a rewarding interplay between architecture's structural gravitas and its potential to serve as a vehicle for other layers of rich cultural meaning.

HUT INSTALLATIONS

The hut installations project was assigned in the spirit of experimentation with consequently greater emphasis placed on the process than on the final product. Our shop facilities are modest at best, and most of the students in the seminar had never been challenged to construct anything at full-scale using "real" materials before (figure 1).

figure 1

Despite these limitations, many of the students pursued ambitious projects. Finally, it is important to keep in mind that craft as an overriding value was not stressed for its own sake. As the following excerpt from the project brief indicates, the goal of the exercise was to explore the territory between thought and action, and a valid position might have included a critique of the inherent value of craft (figure 2).

"The purpose of this assignment is to allow you to demonstrate your ability to maintain a rich line of intellectual inquiry through the process of constructing a "real" artifact at full scale. The form of this artifact will loosely be called a Hut because it is meant to exist at the most intimate limit of architectural signification. While modest in scale, this construction should draw the participant into a dialog that is intellectually and sensually ambitious. Your hut need not take the form of a complete structure (floor, walls, and roof). Instead, you should focus on the potential for material and technique, through the narrative

specification of tectonic choices and operations, to engage a participant's physical and intellectual curiosity. Materials can be fine or coarse, imported or found, and techniques can be primitive or elaborate -it is their appropriateness to your ideas that matters."

The student's hut constructions fell loosely into three categories according to the strategies used to transform the viewer into an active participant. These included projects that addressed primarily visual/ tactile critiques, those that engaged entropy, change and transformation, and finally the majority that directly engaged the participant's body through its scale and experience of gravity.

Several projects engaged or explicitly challenged the sense of vision as a primary vehicle of architectural experience by employing various devices that framed the subject, or inserted various delays and disturbances in the visual field. One student constructed a series of portable camera obscurae, while another projected the participant's actions onto a shadow screen as a delay in the process of visual feedback (figures 3 and 4).
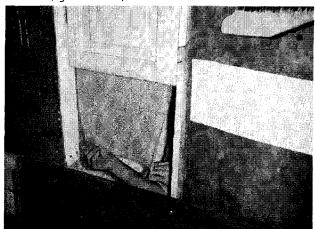
Other projects explored the potential for entropy to emerge as a positive agent in architectural production, either by re-contextualizing decayed or decaying objects, by the use of cutting or dissection to reveal unexpected readings, or by inviting the viewer to participate in processes that eventually "used up" significant parts of the object (figures 5 and 6).
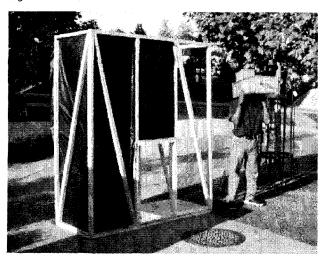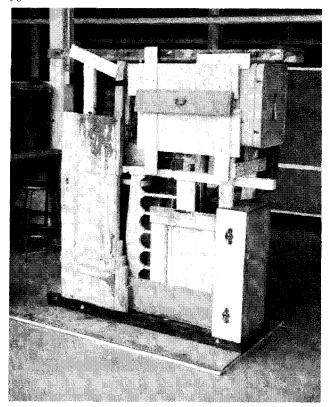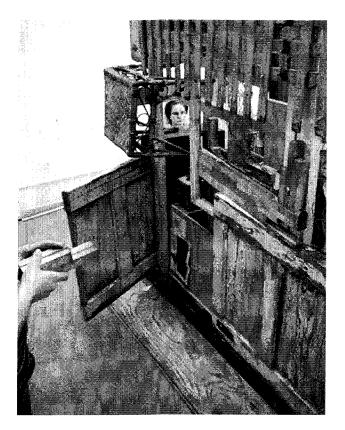

figure 4

figure 2

figure 3

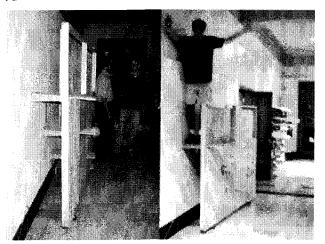*figure 5*

figure 6

figure 8

figure 7

Finally, many of the projects enlisted the specific gravity, dimensional scale and range of motion of the participant's body to actively engage the material and spatial conditions of the hut and its surroundings. Some of these huts became slot-stairs, bungee-swings and ladder-chairs (figures 7 and 8).

CONCLUSION

The discipline of architecture is distinguished by its mandate to address the practicalities of shelter and construction while simultaneously maintaining broad cultural and intellectual aspirations. Too often these challenges are portrayed as being at odds with one another, and the perceived split between theoretical and practical agendas institutionalizes a gap between thought and action in architecture. Rather than perpetuating this opposition by either valorizing or romanticizing the role of technology in architecture, this seminar sought to critically re-engage technological thinking. We focused on the organizational system of construction specifications to explore their potential a locus of tectonic research and speculation in architectural practice. Finally we physically tested the ability for these reconsidered specifications to more deeply engage thinking and action through modest but authentic acts of construction. Our results were provisional and in many ways 'primitive,' but they represented, for each student, an important attempt to invest tectonic discourse and construction practice with broader cultural content and a level of intellectual ambition that is often excluded.

NOTES

[1]Viitruvius Pollio, *Ten Books on Architecture*, trans. Ingrid Rowland, ed. Ingrid Rowland and Thomas Noble Howe (Cambridge: Cambridge University Press, 1999)

[2]Viitruvius Pollio, from "Ten Books on Architecture," in R. D. Dripps, *The First House: Myth, Paradigm and the Task of Architecture*, (Cambridge: MIT Press, 1997) p. 9