

Construct

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Figure 1 Richard Serra throwing molten lead in his studio (from Richard Serra, Sculpture, exhibition catalog, New York, 1986)

The Design Build Studio is a vital part of our curriculum held in the spring quarter of the fourth year. We have complete a Homeless Shelter and a Home Office as well as several full scale study models. The studio offers a way to see technology from new perspectives using a team approach where invention is the constant. This paper is about the importance of introducing experimental construction and linking it with theoretical development. The students worked tirelessly to make these projects a reality.

The construction process employs design, theory and building into a seamless relationship. Construction is a creative act. Technology is a tool used to reinforce design ideas- not weaken them. Our studio offers challenging social issues expressed through the reality of construction. There is a long legacy of learning through building- from the cathedral guilds to Taliesin, Arcosanti and the Jersey Devil. Learning through building offers a cyclical way to view technology and design simultaneously. This leads to a practical approach where theory is vital for it informs the entire process.

Architecture is constructed space. Through experience our senses are offered a dynamic perception of this space.

The ritual of building is a cyclical process- from idea- to building- to reality. The dialogue begins with drawing, modeling and full scale prototypes. Each action is the catalyst for the next. Construction is a normative process which moves from detail(part) to whole- from effect to cause. In this way it is Aposteriori- what is not known from experience - it is experience. If poetry is a new way of seeing existing knowledge and philosophy is a way to invent knowledge - than surely construction is aligned with philosophy. Construction looks to the future through invention.

Architects once were interested in crafts - but today - where are the plasterers, blacksmiths the woodworker, the bricklayers the stonemasons? In history they trained succeeding generations through their work. They are becoming extinct - being replaced with the false - fypon, dryvit, naugahyde, plastics- a shallow materiality.

IDEAS

Work + Idea = Architecture (Inspired)

Work - Idea = Building (Uninspired)

Throughout history, ideas have infused craft with meaning. This meaning transforms object into artifact. The greek word **Techne** means the creative revealing of ideas through construction. The japanese word **Shokinun** means to construct with an expertise of the use of tools, the knowledge and properties of materials and to offer creative insight to the making of the artifact. The word also implies a social consciousness. The process of sharpening the tools and cleaning the site is part of the ritual of making.

Experimentation has long been a part of architecture. Buried within Imhotep's Pyramid is a Ziggurat- the first attempt. The parthenon is based on emulating a primitive wooden temple from the past in stone. cathedral collapsed during construction- but construction had to continue- the idea of the flying buttress had to work. In fact structural calculations have been performed on several cathedrals and have found they could not work- yet they still stand. Materials were pushed to their limits of integrity.

Artists have understood the importance of the process in making their works. Isamu Noguchi learned from his

mentor Constantin Brancusi a love for nature and primitive art. Brancusi's Endless column Noguchi sought the inner meaning of materials through the act of construction. American artists Mary Miss and Alice Aycock have both been influenced by architectural precedents. Miss seeks to awaken a primal numbed part of our psyche through the act of making and the act of walking through her work. Richard Serra uses the act of splashing molten lead into a corner makes the process into the art. In his piece, **Circuit** the four steel plates are placed in the corner of a square room and stand because of their mere weight. The structures are the result of experimentation and invention. Serra describes the degree of unforeseeability as a sort of troubling feeling, a wonder after the work is complete. "The part of the work which surprises me most invariable leads to new works. In all my work the construction process is revealed. Material, formal, contextual decisions are self-evident. The fact that the technological process is revealed depersonalizes and demythologizes the idealization of the sculptor's craft. The work does not enter the fictitious realm of the "master". My works do not signify any esoteric self-referentiality. Their construction leads you into their structure and does not enter into refer to the artists persona. If you reduce sculpture to the flat plane of the photograph, you're passing on only a residue of your concerns."¹ Finally, Donald Judd believed that using standard premanufactured parts allowed artists to create the new from the ordinary. Judd purchased most of the town of Marfa, Texas which became his testing laboratory. All of these artists found two dimensional media as not enough for their process. Each was influenced by architecture- Ancient sites, infinite space, materiality all contribute to their process.

One pictures Antonio Gaudi hurrying through the streets in Barcelona to his Sagrada Familia site where he was the orchestrator of construction- allowing the ceramic tile artist and the stone-mason to experiment as they worked. In this process the act of building becomes the art of making. At the Brion-Vega cemetery near Treviso, Italy- Carlo Scarpa worked alongside the craftsmen learning the properties of wood, metal, concrete- learning from each other. Even at Taliesin- Frank Lloyd Wright saw the importance of construction for his apprentices. An apprentice first built their own shelter at the Arizona compound or design his own room at the Wisconsin Fellowship.

Carlo Scarpa was a craftsman, he revived an interest in glassmaking, ceramics, furniture, metalcasting. He did not believe that the process of making was limited to drawing only. Stonemasons, woodworkers and glassblowers and other artisan were an integral part of the process. He was involved in endless and exhaustive discussions with craftsman. He considered their opinions as valuable as anyone involved. In Scarpa's work the craftsman is like a player in an orchestra. Like a cellist or pianist the builder brings with him many talents that the architect orchestrates. As Scarpa drew ideas like notes on a page the builder interpreted them in his own way. No two builders could build alike because

their opinion became a part of the process. Like his predecessor Antonio Gaudi saw the potential of working with regional craftsman to establish his architecture. His way of working went against the norm. As he worked, there was a constant dialogue between ideas and building. As one discovered a new element it was sent back and readjusted the original intention. As an idea changed so did the materiality. In a renovation, the first act was to measure- this became a ritual, it was a way to become familiar with the spirit of a building. Then an esquisse drawing was drawn on card stock, this became the framework for future decisions. The drawings were records of the ideas to come. The plan and section were often used and surrounded by studies of the joints sketches of the axonometric and visual notes.

His draft design provided the productive exchange with a script, it provided the craftsman with a score, a system of notation. For Scarpa, draughtmanship was comparable to the virtuosity of a performing musician: it demanded the same visual control. The drawing followed its own tradition, it too had marks of virtuosity, it's technique of instrumentation. Scarpa's decomposition of space was determined by the progress of the building work. The cut of the various elements was a product of the site context, even when the work was carried out by different craftsman. In his first attempts at the architecture of decomposition, his fragments can be taken as episodes of construction. The first step in the development of his architecture thus created a union between workshop and Academy, ending a separation between craftsmanship and the academic approach which had begun with the first working drawings. The many carpenter, stone masons glaziers, plasterers who made up the highly valued local building trade were given a great boost by secession architecture. Their feeling of materials, the combination of textures put across their cornices, the care they took with their joints their clever details, all indicate a consummate skill which one feels impelled to use upon learning of it. Scarpa did not restrict himself to using the available skills, but cultivated communication with the people who were to implement his drawings, developing both their skills and their creativity. He thus revived an artisan culture which had been threatened with disappearance. Moreover, he showed that one could restructure existing buildings by employing almost forgotten techniques which provided a link between the new and the old. With this conviction that one can learn by doing, he also developed the intellectual side of manual work which had typified mechanical drawing since the early Renaissance. He emphasized that one reaches the truth through manual constructional work, a thought akin to the logic of dialectical reasoning² nested, without renouncing technological advance or personal expression. Any activity of production involves the transfor-

mation of matter for a purpose clearly defined somewhere between society and the individual. The maker and the object to be created are tied together by an intimate relationship which does not disappear at the conclusion of the production process. This tribute to the traditions and common meanings of the collectivity in which the production activity is nested, without renouncing technological advance or personal expression. Any activity of production involves the transformation of matter for a purpose clearly defined somewhere between society and the individual. The maker and the object to be created are tied together by an intimate relationship which does not disappear at the conclusion of the production process. This relationship can be described in different ways, in each case inseparably connected to the nature of the production process itself.³

Scarpa was very interested in traditional Venetian techniques- whitewash, shining stucco, marbling and fresco. He rarely produced final working drawings, instead he sketched on any paper he could find with notes on materials. He would visit the workshops often to develop ideas as they were built. Like Antonio Gaudi he was interested in regional craft. The argument of how the machine would overtake the manual crafts has been around since Ruskin, Morris, the Wiener Werkstatte and The Bauhaus. For Scarpa, the modern production methods could be used alongside and joined with the handcrafted material. His work was beautiful because it was useful-

The aesthetic quality of an object does not deny it's function or hide it, but displaying it's function reveals another quality, it is a will to bring the aesthetic quality with the quantity of mass production. In his work the moral responsibility of the artisan is twofold, it deals simultaneously with preservation and innovation. Through Scarpa's work we see an interest in invention as tied to a continuum of tradition. This is seen through the description of Scarpa's lifetime collaborator in stucco- Eugenio De Luigi. "When our work was to be done outside the Veneto region, Scarpa always wanted to use the local sands. He was interested in the local quality of things."

ALEXANDER

Christopher Alexander has called for architects to understand the process of building and the needs of the users in architecture for many years:

Quite apart from my desire to work as a builder, quite apart from my desire to see buildings with this quality built, and quite apart from my belief that architects should be builders, there is just the simple, plain, ordinary fact of the necessity for having first-hand acquaintance with building and making things. And it seems ridiculous to have to mention it except for the

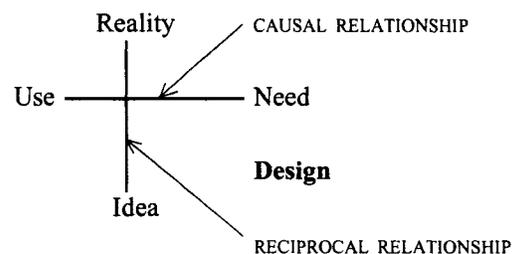
fact that most architects today do not understand this. In a woodworking shop, one of the distinctions between somebody who understands working with tools and somebody who does not is to realize that the process of sharpening or sweeping up are absolutely fundamental to the activity of making something. Most people who do not really understand tools properly, you realize that sharpening the tool is an integral part of its use. For example, I used to spend day after day, out on the site in Martinez, trying our gunnite experiments. It is the love of making, and the instinct for making, which has led me in the right direction. I do not believe that someone more remote from the act of making, could identify what is going on in a made thing, with sufficient accuracy, to get anywhere near the truth. The fear which people experience, the fear of making something which truly does have "it", because it communicates with a deeper level of the human person. I do not believe that this fear can be overcome, except within the context of a workshop, or the context of physically making things.⁴

CONSTRUCTION THEORY

Through this process a project begins with intentions. The idea emerges from careful listening to the client and the site - from direct experience. During construction the listening continues and becomes a working dialogue, where theories are developed and tested with the client and builder central figures. This simple relationship has caused a rift between builders, patrons and architects. If this rift can be bridged the process will become vital again and the meaningful dialogue of construction can begin.

To endure through time a theory must not fatigue with use. The Greeks believed that true theory was a systematic focus on order over chaos. A theory must have chaos to be usable - because chaos offers the chance to invent with no limits. A theory should be strong enough to allow for change and have the ability to accept the hyper-ideas as well as a center in reality. Reality offers a test to the process of making.

The design process begins with collected knowledge and memory. This is what every artist possesses and uniquely offers - no two buildings can ever be the same. The direction described is built upon a procedural way of working but instead of looking to the past only for inspiration it also looks forward.



History - looks back - PROCEDURAL

poetry- a new way of seeing existing knowledge- desire congruence

process

from cause to effect, general to particular

Classical Theory = a priori (Positive) what is known

- History as model
- Procedural method is based on Process, Analysis and Research
- **Plato - ideal** as generator - a positive descriptive theory explaining and predicting reality.

Theory - Looks forward - SUBSTANTIVE - Design-Build

philosophy- a way of inventing knowledge- wonder confluence

product

Romantic Theory = A posteriori (Normative) what is not known

- from effect to cause, particular to general
- Theory as model
- Substantive method is based on Environment, Phenomena and Function
- **Aristotle - experience** as generator - a normative theory based on positive theory described through a philosophy

Two distinct ways of making are the positive and the normative. Each is valid, each has been used throughout history with success and failure, but a clear distinction is vital.

Positive: Procedural Theory

(based on Lang, 1987 *Creating Architectural Theory*)

Procedural theory is a rational idea. It is a classical ordering system described by Plato as a priori - what is known before. In this way of making a linear process emerges allowing the process to posit a truth. Procedural theory is based on a process of analysis and research. It is an affirmation of reality and leaves no doubt in the resolution of a problem. In this classical way of working the flow of ideas is congruent. It emerges from the left side of the brain. Procedural theory is based on history. This continuum of ideas looks back in time for models and moves from cause to effect, from general to particular. This theory explains reality with history.

Normative: Substantive Theory

Substantive theory is based on experience. It is an order described by Aristotle as a posteriori. This cyclical process moves from effect to cause, from particular to general. It attempts to describe the unknown through a right brain and creative process. Substantive theory is built upon the foundations laid by procedural theory and offers a forward looking process. This way of working is based on phenomena. It allows for the flow of ideas in a process of confluence. The substantive process is based on offering new ideas to the continuum of architectural history. Design-Build is a norma-

tive process because it is based on experimentation and experience.

CONSTRUCTION WORKSHOP: JOURNAL

At our school, the construction studio is a mandatory course taught in the fourth year. It allows for theories to be tested in reality. It is a testing ground for normative theory. The collaboration between the individual craftsman and the team becomes inseparable from solving the clients problem. The act of finding materials was as much a part of construction as swinging the hammer was. The lost art of "dumpster diving" became a prerequisite for the course.

We had no budget when we started, and when the ten weeks were over we acquired over eleven thousand dollars worth of materials. In building shelters for the homeless in Atlanta we visited homeless camps in town. One was at a condemned themepark called "Funtown"; here shelters were scattered throughout the park and one woman was actually living inside the former ride "Tunnel of Love" Our client was out of work and simply needed shelter near a metro station so he could get to the job bank each morning. We gathered the materials and built the project- it is now his home.

In our trailer home project a very different story unfolded. We visited a local town Dahlonga, Georgia about one hour north of Atlanta. The town had been severely hit by tornadoes which has demolished hundreds of trailer houses. We noticed parts of these homes hanging from the tops of trees and the belongings of the residents strewn about the sites. We purchased our trailer for 500 dollars. Its add on porch was ripped open but the frame was intact and no bent. (Although the additions grafted to trailer houses are usually very interesting themselves) Our trailer rolled up onto campus in early April. Inside it was a snapshot of the family who inhabited it. Pictures, food, a Pets of the Stars calendar with Suzanne Summers and her pekinese smiling hung in the kitchen. The dog dish was still full of food. It was as if the family had simply been called away like a 1950's nuclear war movie. Time had stood still here.

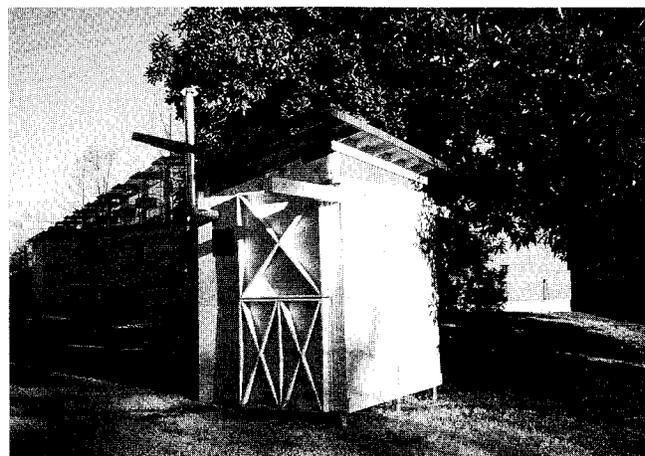


Fig 2 Atlanta Homeless Hut

In Japan, when the teahouse is to be built, the tools are lined up, the wood prayed upon and the tatami mats carefully made - the sacred site prepared. In sharp contrast, here in Marietta - it was Milwaukee Sawzalls cutting and sledgehammer smashing out walls. You see these students were reacting to their past. Of the ten students, seven had at one time lived in trailer houses. Next to our construction site, ironically is a small trailer park. We began the design process by deciding to dismantle the building to its steel frame. Two piles were made - one of damaged parts, the other of usable materials - trusses, metals, systems and framing.

We then sought out the donated materials. We all boarded a large 36 foot long diesel stake body truck and headed north. We stopped at a company that shipped large HVAC units from Germany they donated over 2,000 dollars worth of plywood which was to be thrown out. The next place we stopped was a local Theater which had just dismantled their sets. Here we got enough wood framing material- though painted bright colors - could do the project. Our last stop was Waterbed Warehouse - here we got about 700 pieces of particle board 1'x4'. These were left over after the production of Waterbed frames and were also to be thrown out. This would provide custom flooring for the trailer. In this case garbage was gold.

The construction began - a dogtrot scheme with an open center. The sun and wind forces influenced the form - indirect lighting and other current technologies were used. The living and kitchen at one end, the bedroom and bath at the other. We also identified what we did not want to do - some of the problems identified by the students of existing trailer houses were:

1. Sentimentality of Elements - ie pasting fake pediments or roofs onto a metal box.
2. The lack of architectural space
3. The lack of expression that the home can move - even though the wheels are still on it
4. Dishonesty of materials - ie Vinyl woodgrain siding, naugahyde, fake wood paneling etc.

The final part of the project was a separate prototype home office which can be separately purchased. This room



Figure 3 Typical Trailer Home

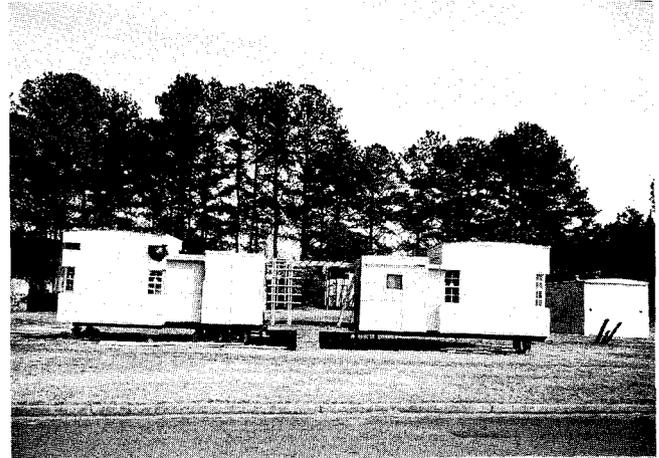


Figure 4 A New Trailer Home

allows for a separate business environment- it is also transportable and can be sold at a later date based on the owner's needs. The design was chosen by the students and faculty in a competition and became the basis for the project design. The 18 students worked to actually build the project on a very tight budget.

The Japanese Tea House is a ceremonial space for reflection. The center of the space is the inhabitant. The home office is a virtual workplace where technology allows you to project to any location with no reference to time or space. In this space - work is ceremony. The wall is an obstacle encountered along the approach it offers a stair which is like

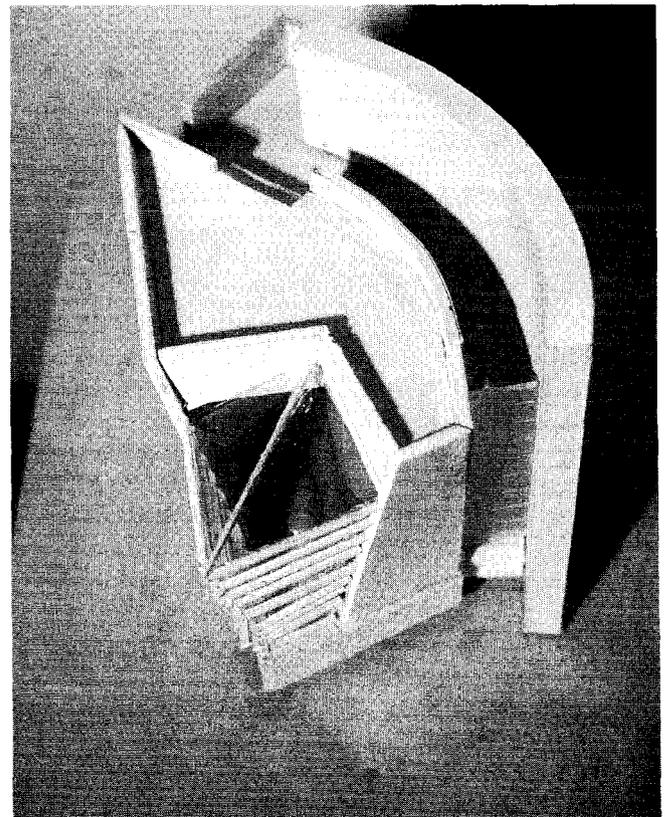


Figure 5 Home Office: Model



Figure 6 Construction: A Home Office

a new commute - a procession up to a threshold. The procession prepares you for the experience to come.

CONCLUSION

This process offers the chance to actually build, to work in teams and see design decisions at full scale. Materials and assemblage are understood and developed as design tools. There is no line between art, sculpture and architecture - they are all seamlessly interrelated. The project offered the chance to work with recycled materials and to see that good design does not have to be expensive. We have found that this dynamic, cyclical process is a functional, inseparable and meaningful way to learn architecture. The students and the faculty all benefit from the collaboration.

NOTES

- ¹ Richard Serra, *Sculpture*, Museum of Modern Art exhibition catalog, New York, 1986, pp. 47-48.
- ² Benedikt Taschen, *Carlo Scarpa* (Verlag GmbH: 1993), p. 16.
- ³ Giuseppe Zambonini, "Notes for a Theory of Making in a Time of Necessity," *Yale Perspecta* 24, Yale University.
This wonderful text describes how Scarpa worked with the craftsmen like an equal. He valued their ideas, thoughts, and ways to make his work.
- ⁴ Stephen Grabow, *Christopher Alexander - The Search for a New Paradigm in Architecture*, Oriel Press, 1983, p. 88.