A *Simple* Exercise

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This paper describes an exercise that was given both as a three-day design studio charette and as a one-week introductory problem in the context of a required third year construction class. It was intended to provide an opportunity for students to examine the relationship between architectural intentions and conditions of production, as well as the notion of considering constraints as opportunities.

MOTIVATIONS BEHIND THE EXERCISE

The context within which a work is produced can have a significant effect on the outcome. In practice, architectural desires or intentions are subject to a bewildering array of constraints, including (among others) material, financial, time, or political constraints. It is common to hear architects speak of low budgets, low fees, short deadlines, or unsympathetic clients and administrative officials as reasons behind the difficulty in fully realizing the potential of a given project.

The ultimate physical existence of an architectural work of quality requires an appropriate architectural desire / intent together with the presence of an active, productive and fruitful engagement with the social and material conditions of its production. But rather than considering architectural intentions as a pre-existing condition that is then subjected to the realities of production in a linear manner, both architectural intent and the conditions within which the work will be produced should be considered simultaneously. Together they define the nature and the potential of the engagement with "reality". The architect should consider the unique context of each project... the volatility and relative uncertainty associated with each new situation... not as constraints to be circumnavigated, minimized or resisted, but as an occasion to locate and exploit opportunity within the process.

THE EXERCISE

This problem was given on two separate occasions; the first time as a visiting critic for a three-day design charette at Catholic University of America (see Fig. 1.), and the second time as a two-week introductory exercise in the context of a junior-year required construction class at Arizona State University (Fig.1.). The exercise was a deceptively simple one, involving the construction of a curvilinear vertical enclosure. Relatively large groups (55 to 70 students) were involved in each case, and smaller groups of 5 to 7 students were responsible for constructing a segment of the overall enclosure. In the vertical dimension, each group had an identical brief; construct a surface 7' high by 6' wide, and "locate" the surface itself 1' above the ground plane. The plan configuration for each separate group was different, each group receiving a plan (Fig. 3.) indicating the precise form of the curvilinear surface required (radii, chords, etc.). In one instance of the exercise the necessary structure was to be located on the concave surface (inside the finished figure), and in the other instance it was to be located on the convex surface (outside the finished figure). The orientation (NSEW) of each segment was provided. The conditions of the exercise formed the remainder of the brief:

Design, build and install the above,
a: in 4 days,
b: working in assigned groups,
c: using available tools and skills,
d: spending only the necessary time and money to complete the exercise.

At a basic level, the problem required the students to engage fundamental issues present in any work of architecture; gravity and stability, the nature and limitations of materials and methods of assembly, and the use of materials in conjunction with one another to produce sub-assemblies and assemblies. But in a larger sense, the context of the problem required the students to engage:

Commodity, Firmness, Delight (Vitruvius)

as well as the inevitable...

Better / Faster / Cheaper (anonymous).

RESPONSES TO THE EXERCISE

The requirement of working in groups (essential in practice,

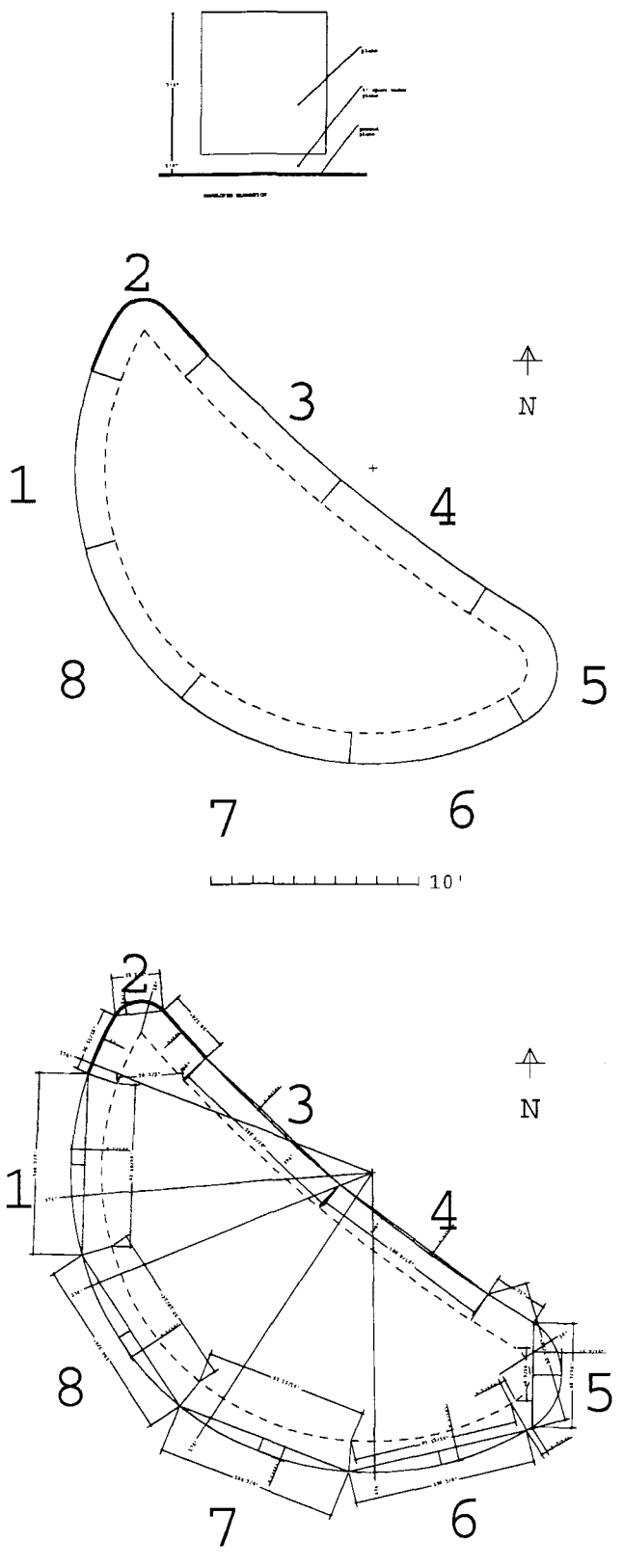

Fig.1. Plan and elevation at ASU

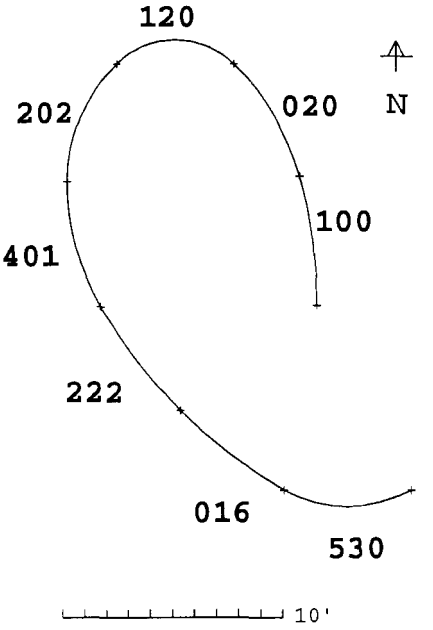

Fig. 2. Plan configuration at Catholic University of America

rare in schools) affected the outcome of the exercise in several ways. While all groups necessarily followed the linear sequence of designing and then producing, some groups spent a large portion of the available time collectively discussing possible solutions, making models and drawings. These groups were investing time and effort in a substantial "design phase" in order to reduce or eliminate uncertainty about the form of the solution. However, groups following this model did not necessarily produce the most compelling or the most thoroughly resolved projects. As they began to build, they encountered problems with detailing and connections, or found that the materials did not always behave as anticipated. Other groups simply began to build, searching for solutions as they searched for raw materials. In these groups, thinking and doing were often present simultaneously, and the discovery of a particularly interesting fragment or material often provoked the solution, or at least a direction for more focused thinking, searching and building.

The requirements of working in groups also brought up the issue of authorship. Some individuals insisted on a clear recognition of their contribution to the effort, or attempted to force a particular direction for the work. In a few cases this led to stalemates, or simply an unproductive atmosphere that was difficult to overcome. These instances may have been the result of personality conflicts within the groups, but previous experience with group work in an academic setting seemed to suggest that some students were simply concerned about having their contribution reflected in their grade. Redirecting students' energies toward the success of the group endeavor was accomplished the second time by giving the entire class the opportunity to participate in the evaluation of each project. However, the success of the project remained the central issue in most groups, members stepping in to do what was necessary. In some cases, it seemed that a rigid adherence to pre-defined roles and responsibilities prevented the members from moving freely to where they were needed as the solution unfolded and unforeseen prob-

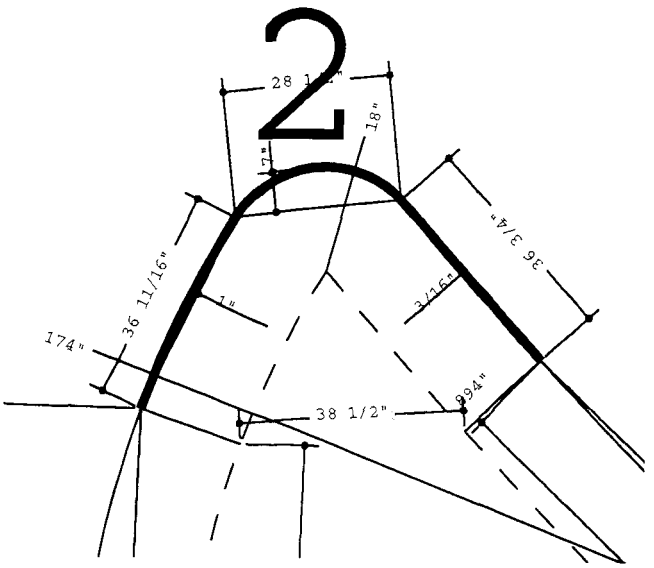

Fig. 3. Plan of individual element

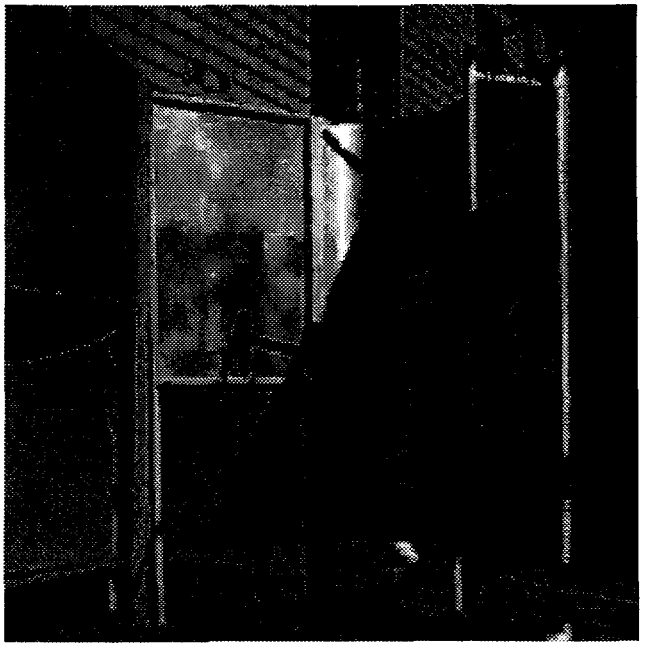

Fig. 4. Finished element

lems arose. In these cases the project suffered. These observations will of course sound familiar to anyone with experience in collaborative work.

In response to budget constraints, many groups used second-hand materials culled from junkyards or back yards. Obviously, those searching for materials in this way tended not to be the design-then-build groups. One group addressed the budget issue by buying raw materials, configuring them with little or no transformation (no nails, screws or cuts) disassembling their piece at the end of the exercise, distributing the materials to group members for use in later studio projects.

Addressing the joining of materials was rarely or never considered early in the process, but the problem ultimately brought out the importance of the joint. As solutions became more specific and materials purchased or found, the search for possible (if not elegant) joining solutions quickly became a primary issue. By beginning with raw structural or surface-forming materials, the students were confronted with a great variety of conditions that needed to be resolved in very specific ways. As a result, many students were forced by necessity to contemplate the purchase or use of highly specific joining components or systems. The general search for materials was transformed into a highly specific search for fastening methods. One group elected to use corrugated cardboard as the unique material, using it as surface, as reinforcement, structure, and fastening system. In one case, the use of fabric as a surface led to a system of wood battens and fastening techniques inspired by nautical techniques of joining. The use of free or inexpensive raw materials was not a successful way of addressing the issue of cost when the overall viability (or stability) of the project required the purchase of elaborate and expensive joining systems and hardware.

The exercise also provide the context for a discussion of the notion of relative economy. There are situations in practice and the building industry where custom elements may be a viable and economical alternative; where the use of one highly elaborated and/or more costly element may in fact simplify the overall solution. The issue of relative economy was present as well in the shaping of materials. In his work and teaching, Jean Prouve pointed out the relationship between strength through shape or strength achieved through the combination of materials rather than strength achieved through quantity or size of elements alone. In many solutions to this exercise, issues of strength, stability and economy were solved through the careful combination or shaping of fewer elements rather than through the use of more material.

Finally, the groups needed to consider what tools were available to them, or take into account their collective skill in using available tools. In some cases this led to solutions that required relatively standard tool sets, or employed methods of configuring and joining materials that did not require extremely accurate use of tools.

LARGER ISSUES RAISED BY THE EXERCISE

The real objective of the exercise was to provoke thoughtful consideration of a few significant issues confronting architectural practice today. One of the most significant issues suggested by the exercise is the nature of the complex interplay between architectural intentions and the conditions within which works are produced. Of particular significance are the aspects of this interplay that help mediate between "external" forces and the internal motivations or intentions of the architect. Intentions can be subverted by external forces and conditions, or intentions can be formed in anticipation of external forces (such as in Rem Koolhaas' Eurolille

scheme, or in several works by the French architect Jean Nouvel).

Several solutions to the exercise adopted strategies (and results) more akin to techniques of collage or montage than to traditional architectural processes. In collage or montage one is often simultaneously aware of what is figured (a vase, a human figure) and the unexpected means by which the figure is produced (bits of scrap paper, of elements borrowed from other contexts). The mind apprehends both the familiar (figure) and the unfamiliar (materials) at the same time. Perhaps the power of these works may lie in the simultaneous presence of the familiar and the unfamiliar; the familiar appearing in an unfamiliar context or application.

On the other hand, one might argue that conventional practice seeks at all costs to contain or eliminate the unfamiliar or the uncertain, to plan ahead, to quantify, to design. This may be motivated by a desire to eliminate the unpleasant surprise, the risk of litigation. One might argue that one aspect of the work of an architect is to establish coherence among conflicting demands and conditions; to make sense of externally imposed conditions. But unfortunately many of the opportunities for achieving this coherence are to be found late in the process; a situation at odds with a design-then-build situation.

It may be difficult to ask professionals to revel in the opportunities afforded by a climate of relative uncertainty as many of the students did during the course of this simple exercise. But by attempting to eliminate all uncertainty, to quantify and control all aspects of the process, we are also reducing the potential for the process to deliver unforeseen and provocative solutions. Among these "lost" solutions we might find physical reconfigurations or materials borrowed from other sources (such as Saarinen's use of automobile gaskets in the General Motors Tech Center project in Detroit). They may be cultural reconfigurations, such as Marcel Duchamp's apartment in Paris, where a door opened or closed both the apartment and the bathroom (a common building element in an uncommon configuration).

CONCLUSION

In the context of the architecture school, it may very well be difficult or impossible to reproduce the complexity and variety of conditions of production found in actual practice. The exercise discussed here is an attempt to devise a set of surrogate conditions that allow the students to understand and explore the relationship between intentions and conditions within which their work is produced, between constraint and opportunity. In this way the students might be made aware of opportunities afforded throughout the entire process, and begin to formulate a model for practice that might capitalize on these opportunities.