DIVISION OF ARCHITECTURE – UNIVERSITY OF NEW MEXICO

The five year curriculum in architecture at the University of New Mexico is designed to give a student training in all the phases of architecture and prepare him to become a registered architect so that he might practice architecture as an individual if he so chooses. In no sense of the word are these students architects when they graduate, nor are they accomplished draftsmen. It is hoped, however, that they will have learned an appreciation of the various facets of architecture.

All architectural graduates need the "Architect in Training" program which further prepares them for the State Board Examination for architects. It is hoped these young graduates will take the training period in the same spirit that it is given. It is also desirable that the architect for whom these young graduates are working will find a little time to help them with the routine which they can best learn in an architectural office.

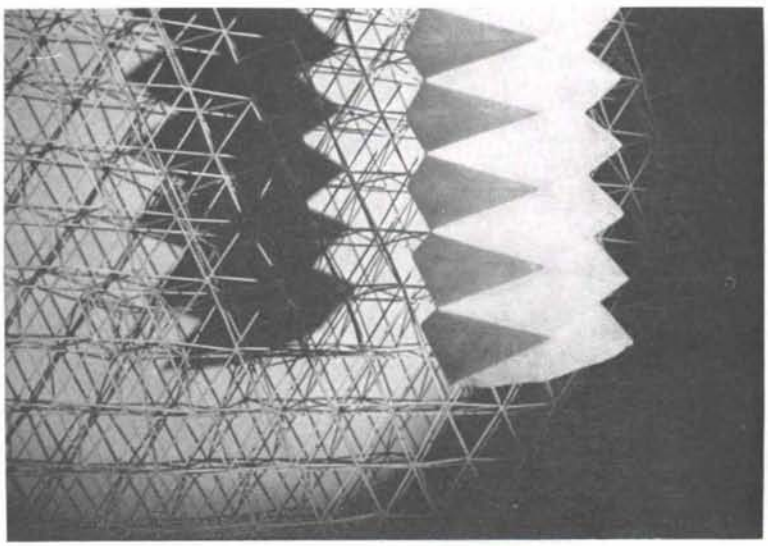
If all architectural students were primarily trained as designers, and the majority would like to be so considered, an imbalance would occur. Hence, a curriculum is offered which will permit a student to be exposed to all the fields of architecture, then after passing the State Board he can begin a concentrated study on the part of architecture he most enjoys.

The first year curriculum will be discussed at this time so that the reader will better understand the aims of the department of architecture here at the University of New Mexico. The second, third, fourth and fifth year programs will be discussed at some time in the future.

It is considered essential that the architectural graduate have a background in the humanities before he graduates, so the first year student is required to take an elementary elective course in the social sciences. This elective may be in the fields of anthropology, economics, geography, government, history, philosophy, sociology or speech. Two semesters of freshman English are required of all students in the university. Algebra and trigonometry are required as pre-requisites to future mathematics and structural design courses.

A course in materials and construction is required of the architectural student for both semesters in this first year. The object of this course is to acquaint the student with the advantages and limitations of the various building materials and types of construction and to gain a partial working knowledge of an architectural vocabulary. This course is correlated with the freshman design course so that the student will not only better understand design, but that his design will be more nearly realistic.

One of the topics discussed is the plot plan which includes contours, bench marks, invert elevations, utilities, restrictions, set backs, easements, direction and distance of lot lines, etc. Another is foundations including piles and piling, the various types of footings, waterproofing methods, caissons, etc. Standard and local methods of wood framing is another phase of building which must be considered as well as masonry and prefabricated wall construction. Students are required to draw selected details as the topics are discussed as an aid to learning. These are drawn on tracing paper in a manner which will print. Inspection trips are taken to job sites when applicable, and local block and brick plants are visited to learn the method of manufacture which may definitely limit the use of a particular product in a creative design problem. Other items discussed in this course sequence are



codes, floor systems, roofing, hardware, paint, lath and plaster, tile, fireproof construction and fire extinguishing agents, plumbing and sewer systems, wood laminated beams, etc. A flexible schedule is attempted in order to take advantage of a guest speaker who might be in the city for just a day so that he might lecture to the class. It is felt that an outsider's approach is often stimulating and certainly informative.

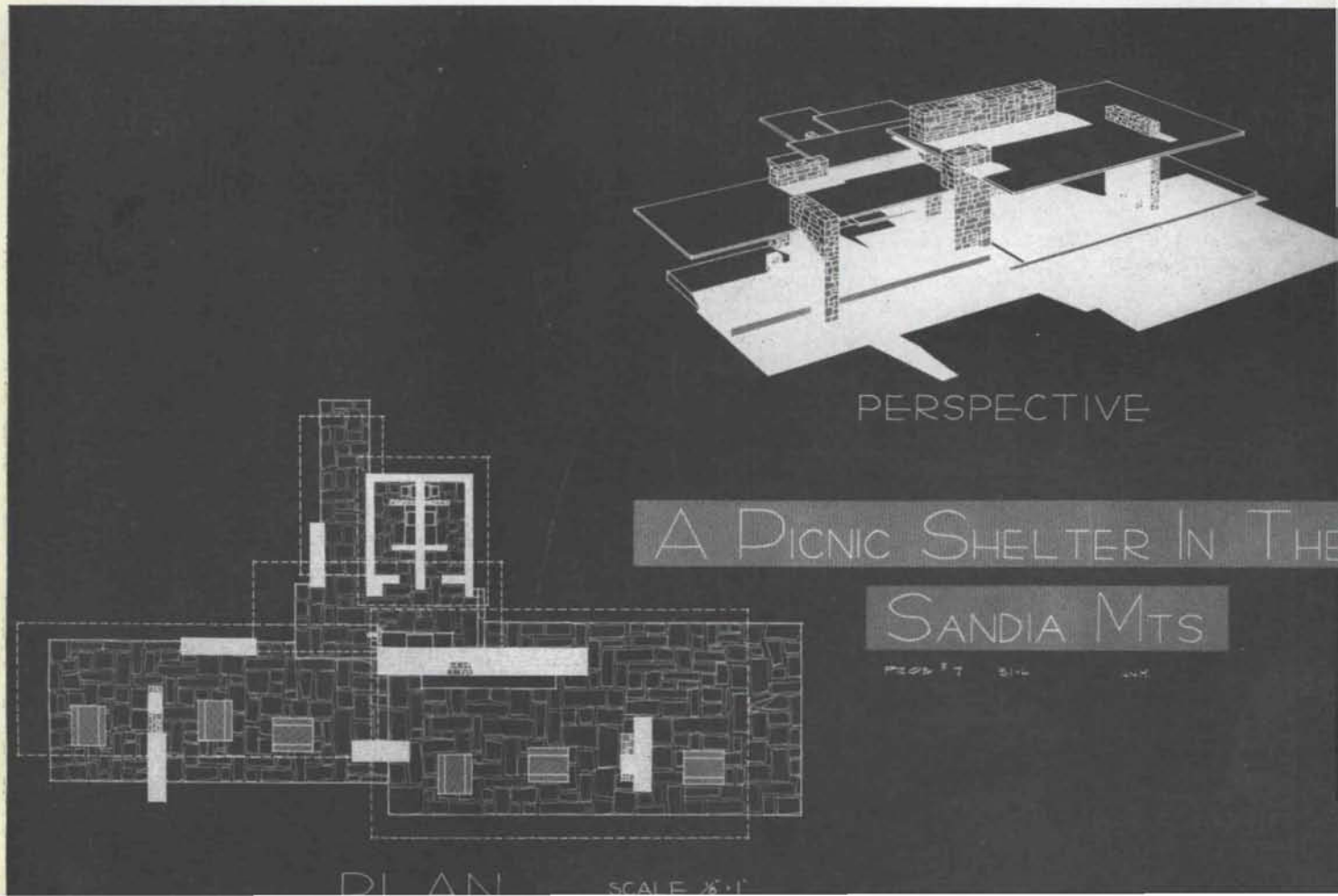
It is not the aim of this course to completely cover all of the present day materials, which would be an impossibility in such a short time, but to familiarize him with the basic ones, and if the student is alert, he will further his study on his own. The details which are required are again basic items. If the student is able to solve the assigned problems, again he will be capable of solving most other given problems.

Today's freshman student majoring in Architecture is eighteen. He has just graduated from high school and has taken the first step which will decide his future. How he has arrived at this major decision, always amazes me.

One will answer that he was impressed with the social prestige of the profession. Another has had a relative or a parent involved in some way with architecture. Then there is the one with illusions of large incomes or maybe the reason he selected architecture is that he draws well, or mathematics has never been difficult.

In four years of my interviewing freshmen architectural students there has very seldom been an idealistic point of view expressed. At times the logic is hard to comprehend. For example: "I want to design houses, but I don't like to draw," or, "I always wanted to be an architect — no, I never go to look at buildings." With this kind of reasoning, sixty-five to seventy students enter architecture at the university each year. Most of these students originate from towns like Cuba, Santa Fe, Tesuque and Albuquerque. They are Anglo, Spanish-American and occasionally American-Indian. They come from the custom-built houses, project houses, ranches and the pueblos. This is the extent of their architectural background. This is the embryonic architect with whom we begin.

Our objective in teaching architecture is to establish an atmosphere which will challenge, stimulate and discipline the neophyte. He alone holds his destiny,

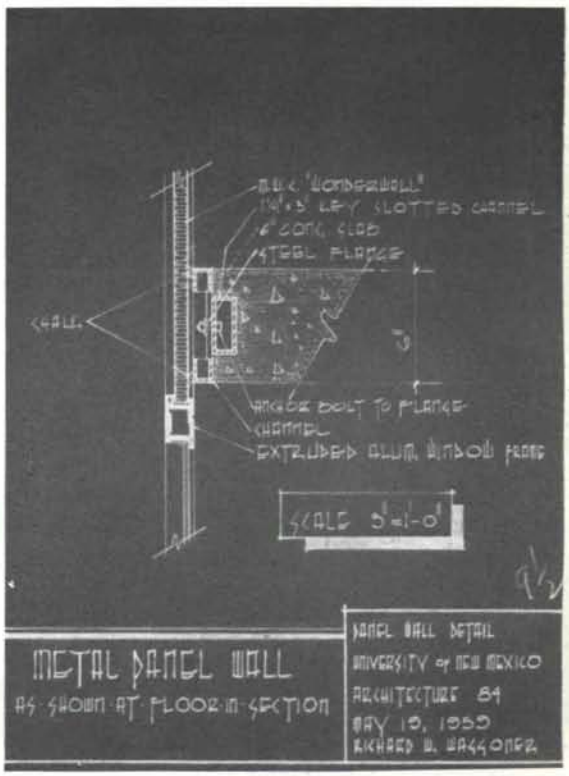


and he must learn to continually search for an approach to architecture which is compatible with his own way of life. We hope that we are able to assist him within a five year period to establish a way of life which will include a great deal of awareness, a great sense of integrity, a moral obligation to his society, and the maintenance of a continual thirst for knowledge.

Our approach to teaching freshman architecture varies only in degree from other Universities. By this, I mean that we place more emphasis on the students acquiring a comprehensive knowledge of architecture in the first year. We try to integrate the abstract with the real. The reasons for this are that the student will be able then to decide very quickly whether or not this is his real interest and he will be able to apply directly all the information to an architectural sojourn. This is not true in most other schools where a student could be enrolled in architecture for three years before realizing that his main interest lies in another direction or where he might be taking courses in design and not understanding their architectual significance. This theory of total familiarization with architecture in the first year means that our problems must be of much greater scope. Generally design curriculums start with a bus shelter on the basis that the student must solve single functional elements first, and slowly build up to large, complex problems by the fifth year. Then by presenting different building types it is hoped the student will have experience with residential, governmental, institutional and commercial design.

I disagree with this approach, for I am not interested in a student's learning building types on the theory that when he becomes a practicing architect he will be some what familiar with the problem whatever the commission might be. I am interested in the student's ability to develop a method and approach which is consistent with the solving of all problems, for in solving either a bus shelter or a 500-bed hospital, the process always remains the same. It is hard for some people to realize that the problems at the university level are never a solution to a building prototype; they are only a means through which the process can be learned. Solutions have never been meant as a means only to an end result. Student work is never architecture and should never be shown as such, for the means is always more important than the end product. Problem after problem given over a period of ten semesters only clarify and refine one's own approach to the architecture process. My reason for this point of view is that the architectural problems given to students at the universities are so far removed from real architecture that there is very little similarity. For example — there is no client, the program is hypothetical, the actual site is seldom considered, cost is rarely interjected, there is no coordination of structural, electrical, mechanical consultants, there is very little consideration of construction details and the project is never built. In fact, all the real problems which are motivating forces behind any architectural design are eliminated. I disagree with the popular concept that we should develop students' design imagination in the universities by not facing the problems of an architectural practice, for design imagination only occurs through solving actual problems. When design becomes pure imagination, the student creates a two dimensional paper architecture which, when carried over into an architectual practice, will only result in the engineer forcing an unnatural solution to the structural problem, thus the building cost skyrockets way over the budget and the problem generally fails even on a functional basis. This eclectic approach must be eliminated in our architectural education system for it is still one of the problems within the profession today.

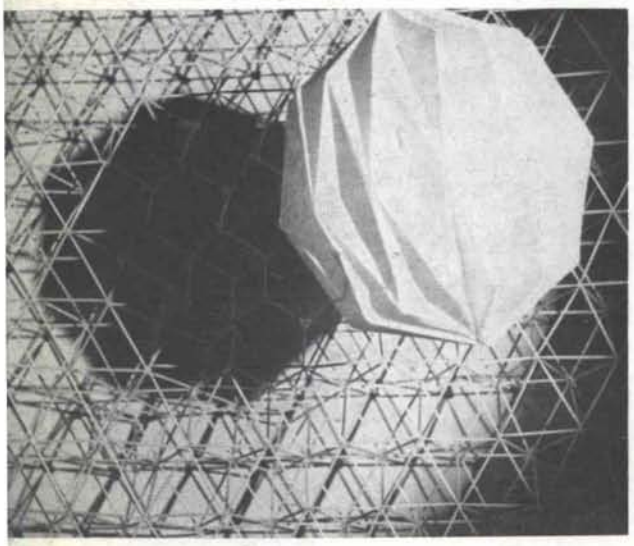
Fortunately, when the architectural department at the University of New Mexico was created four years ago, we were able to start with a clean slate. There was no tradition to which we had to adhere, and we were free to establish an architectural course which best answered the architectural problems of today. This



then became the basic point of departure in the conception of achitectural courses 31 and 32.

We felt that the first thing which should be done was to make the student aware of, and expose him to all the different theories and approaches of present day architecture, as quickly as possible. This means movies, field trips and lectures with slides on Frank Lloyd Wright, Walter Gropuis, Mies van der Rohe, Le Corbusier and many other architects who have contributed thought provoking ideas. Lectures on painting, sculpture, music, landscaping, city planning and interior design are essential to the student's development in order to point out that all the arts are basically striving for the same thing.

The first few weeks are organized chaos, which I feel is essential, for during this period many of the student's previous emotional convictions are being shattered. The class is in a continual turmoil. New ideas, which to him are almost inconceivable, are coming fast and furious. There is more work than the student can ever hope to finish. He is faced with a severe self-discipline and a continual effort to evaluate and select and make decisions through his own awareness of the many facets of architecture, regardless of his limited background. There are no rules, no systems, no absolute answers to guide him. The only criteria is the dissatisfaction with established order and the continual search for the moral solution which forces him to answer all problems creatively.



Discipline, order, technique and awareness begin with the first problem. For the initial program is written so that it will completely establish all limits. The discipline is as follows: The student may not use more than four rectangular pieces of clay, and each rectangular form must be clearly stated. The student then must draw his design by means of a series of freehand, orthographical projections. The procedure of model and then drawing is reversed, for the architect must design orthographic projections and perspective before the object can be built. Additional problems are issued and the discipline is continually changed.

For example, in the third problem the emphasis is placed on space, instead of form. The student still must work with clay and rectangles, but he must clearly define the space forms as the negative design becomes more important than the positive. Following this, the material is changed to balsa wood, and the student should be able to respond to the new limits of this material, as longer cantilevers are possible and truer shapes are realized. During this period design per-se is not important, only the awareness of the nature of material and 3 dimensional space.

The next step in the procedure is to introduce the tools of the profession as these are the means of expressing the design ideas. An architect must depend on visual communication to enable the client to realize the finished product. The T-square, triangle, drafting pencil, ruling pen and architectural square, must be mastered, for he also is a craftsman. Only through experience will he be able to gain control of his equipment, so the program for the problem states, "draw with pencil and ink a brick wall 10 ft. high, 20 ft. long, showing each brick at a scale of ¾" equals 1'-0", using a common bond and ⅜" mortar joint." This problem is also issued with the intent that the student will become aware of the potentials of brick, it's nature, and it's manufacture, and also its limits.

As the weeks pass, the methods of prespective shades and shadows are introduced for through these techniques he will be able to show others the validity of his ideas. Different delineation symbols must be developed. They can be taught, but only through practice will the student gain the skill required.

Eight weeks have passed. The abstract process must now be coordinated with an architectural problem, or he will lose sight of the experiences he has realized. So, at this point, a program is written which calls for the design of a picnic shelter. All the disciplines of the last eight weeks are incorporated into the program. Rectangles defining space must be clearly expressed. Materials are limited to concrete and stone. The problem must be presented with ink on illustration board through a floor plan and, perspective with shade and

shadows. We can see the architect beginning to form. He is slowly starting to realize some of the problems involved in an architectural solution.

There are more fundamentals which must be learned so once again we return to the abstract. This new series of problems are presented so that the student will understand a system of architectural design which depends on structure as the motivating force for its image; however, structural formulae, as such are not important at this time.

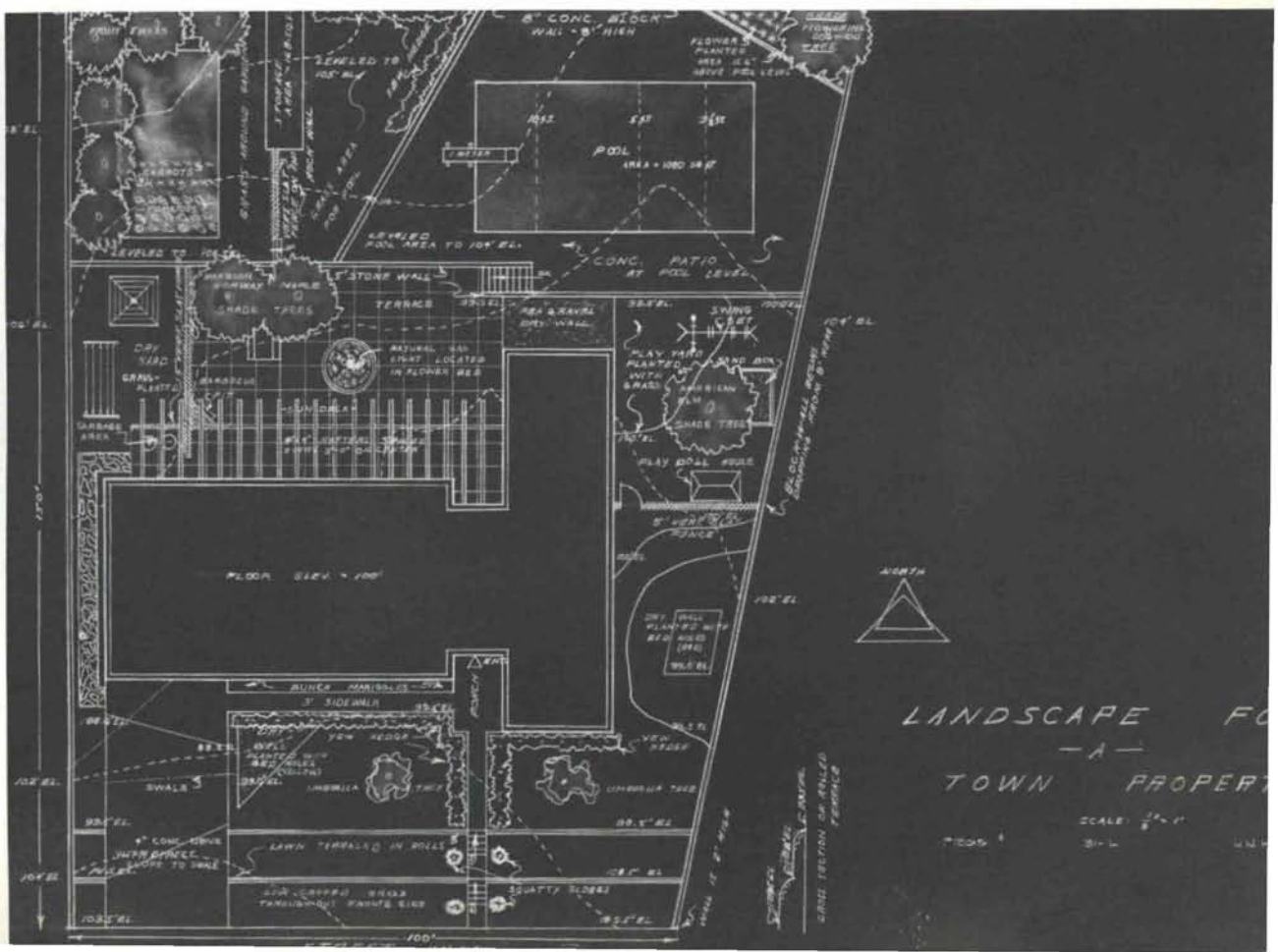
We hope to convey, at this stage, the theory of structure, compression, tension, moment, shear the advantages of skeleton structures, tension structures, skin structures, the differences between two and three dimensional systems, the efficiency of forces and the theory of shape.

The first study in this direction is to present the student with the problem of creating a structure which will span 144 sq. inches and support 25 pounds of sand equally distributed using only toothpicks and glue. This can be done by developing a basic three-dimensional unit and will, through its own inherent shape possibilities, support fantastic weights. We have had some skeleton frame structures constructed in this manner which have supported up to 100 pounds before failure.

Other problems in this area are: how to take full advantage of steel in tension. (As we know, this is much more efficient than steel in compression.), and how to increase the strength of a sheet of paper (which would be equivalent to the skin structure) by changing its shape and folding the paper to follow its force diagram. Another area of architectural education which we cover in the first semester is planning. The student must be made aware that a building is never a complete single statement but is only one element in a total complex. Each building must be related to every other building through the spaces that they create. He must realize that every architectural project is related to the total visual environment—the neighborhood, the city, region—and will affect our whole cultural pattern.

The first semester completed, between fifteen to twenty students decide that they really are not interested in architecture and turn to other fields where their abilities might be used to a better advantage.

The basic foundation has been laid, and the student is ready to devote his time to the full understanding



of the architectural process. Thus, we try to simulate as closely as possible the reality of practice during the second semester.

The design of a house is selected as the starting point, for this is the one type of functional building students are familiar with. We ask a client to write a program—not in square footage—but to tell us about the family likes and dislikes, their income, their budget and their way of life. The student then must visit the site, check the deed restrictions, zone restrictions, and check the availability of utilities. He must then analyze the program, establish the approach and diagram the circulation. This is done by cutting out colored circles of the areas of each room and relating these circles directly or indirectly, according to the circulation pattern.

This is in no way meant to be a plan, but will show how the house should function.

In the meantime there are lectures on different approaches to house design, there are visits to a number of houses within the area. There is an investigation of different types of furniture, talks on landscaping, how an architect's office operates, contracts, fee schedules, preliminary design, working drawings, letting of bids, and supervision of work, in this way the student will realize the total problem. He now has some background with which to begin his design.

The next step in the process is the creation of the partee (pre-preliminary plan and elevations) by drawing a very loose design with a grease crayon or pastels. In order to overcome the two dimensionality in the design the student must build a three-dimensional space model. This, I think, is the most difficult element to understand in architecture. The ability to comprehend the actual three dimensional space through drawings is realized by only a few designers.

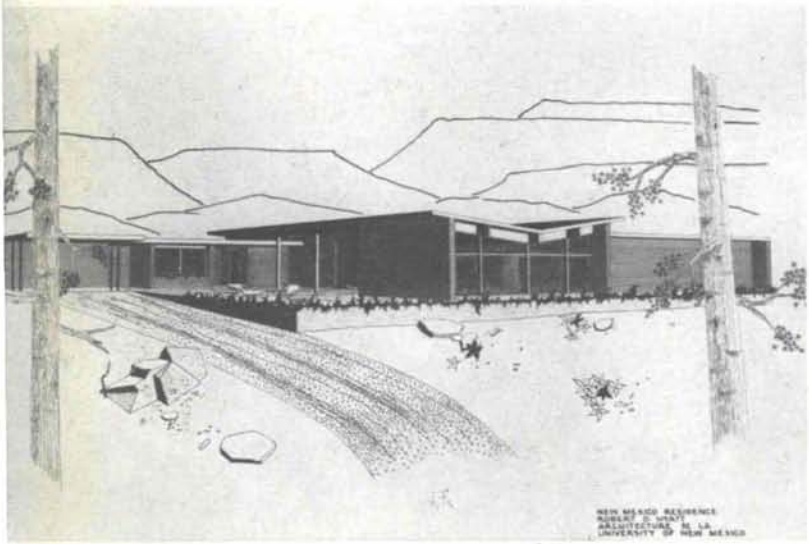
During this period continual criticism and refinement occurs. Some students are overwhelmed, others drop out at this stage. We are beginning to see which students really want to become architects. (I would like to add at this point that there is some question in my mind about the advisability of this much content. Perhaps we are weeding out some slower students who could become fine architects, as well as the incompetent and uninterested.)

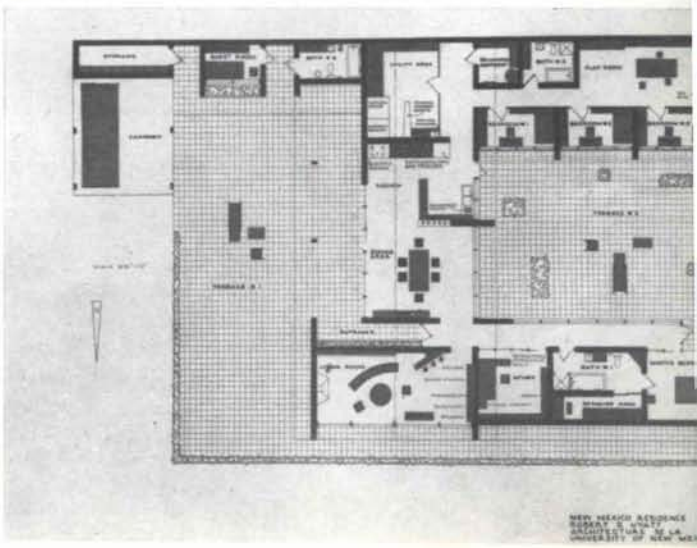
Now the student develops the partee by drawing the plan and elevations to a quarter-inch scale. The site plan is studied, contours changed, elevations established and outside spaces organized through landscaping.

In order for the student to better understand the construction problems of his design, we request that he build at a $\frac{1}{4} = 1\text{-}0$ scale a balsa wood model showing all the framing. This will clarify the depths of the facia, the expression of the beams and connection details. Only through this process will he become aware of refinement and expression of construction detail. In this manner we hope to convey the importance of the design detail.

During these phases of design we are not concerned with criticizing on the basis of classical principles such as balance, rhythm, proportion and scale. We are concerned with the approach, definition and the realization of the concept.

The design is complete. The student must now present his solution both visually and verbally. He must draw the floor plan, showing the location of all furniture, the site plan, elevations and interior and exterior perspectives on illustration board with ink and zip-a-tone. No entourage is permitted in order to control the presentation because of the varied drawing ability of each student.





So that the student can realize the importance of a verbal presentation, each student spends thirty minutes discussing his problem with a local architect and several faculty members at a very formal evening meeting. The criticism is based on how well he solved the clients specifications, the site problems, and how well the final solution expressed his initial approach.

Eight weeks have passed. A great deal of time has been spent on this project but the methodology of preliminary design has been thoroughly investigated.

Has the student designed a good house? Did he make a grade of "A"? Actually, these questions are really not very important. What we really want to know is does this student have the potential to become an architect. The questions we want the answers to are: Did he study the problem thoroughly? Did he investigate other solutions to the problem? How well did he integrate the total design? Did he organize his time? Was he concerned with improving his craftsmanship? Was he willing to change the approach when he found out it was not applicable? What was his attitude towards the problem? Was he his own severest critic? Does he realize his ultimate responsibility. Each problem is given to enable the student to learn some phase of architecture, however, at this point a change of pace is required and well deserved, so the next problem is quite different in concept. The problem is to abstractly express the full realization of a total design. We have the student design a kite, which calls for the solving of three essential problems. The function of flight, an efficient structure when only the use of balsa wood is allowed. Originality of design by direct expression of the first two. The success or failure of the student's solution is inevitable. If the kite flies, the student has understood the problem. If it fails to fly, it must be placed in the category of paper design.

We hope that thru this experience we can in a small way make the student realize the importance of the end product, which always occurs in practice, but seldom occurs in his education at the university.

The remaining four weeks is devoted to a small design problem so that the student can clarify and solidify the many experiences to which he has been exposed. This will be a continual endeavor, at the University, and we hope it will never cease.

Thirty students enter the sophomore year fully aware of the future and willing to accept its challenge.

—John Heimerich and Don P. Schlegel