



## **Experiencing Architecture: A Sensory and Creative Approach**

Curriculum Unit 83.01.06  
by Michael A. Vuksta

### **PREFACE**

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I want my students to enjoy architecture. The prevalence of buildings in the urban environment can desensitize and trivialize what is our most natural form of public art. It is necessary to consider this factor in assessing a child's expectations about what architecture means. A strategy for expanding upon them is essential to prevent them from becoming limitations. I am not concerned that they already know what the word means; but when the words building and art are mentioned I am certain that I will not be confronting an empty slate.

After experimenting with architectural concepts in my photography classes, I decided it would be necessary to achieve four objectives in my future class on architecture. First, I wanted to present architecture as the complex and multidisciplinary art that it is. I had no desire to subordinate its various elements and its unique logic to the requirements of another discipline. Secondly, I wanted the students to be in a variety of architectural places and spaces. This personal encounter with architecture would precede the viewing of slides or illustrations in texts. These types of investigations would follow from interests generated at the sites. They would be presented with a broad view of architecture and would be encouraged to make choices in selecting further areas of study. Finally, I wanted students to create meaningful and expressive products that were a reflection of their understanding of the previous activities. I wanted to liberate creative expression rather than imitate or limit it.

Buildings are to be viewed as more than meeting the demands of functional criteria. The architect, in his act of organizing and orchestrating spaces, must attempt to go beyond the needs of shelter and the requirements of construction to achieve a quality that invites inhabitation and strives for permanence. Artistic expression in architecture is the desire to communicate ideas about the nature of human activities, not simply to house them. These ideas and associations reveal the architect's mind, not as the mere organizer of manual tasks, but as the creator of conceptual universes.

The words imagination, choice, freedom, and order are some words in the architectural vocabulary that qualify these spaces. This essay will explore others.

# INTRODUCTION

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## I. Some Previous Experiences

As mentioned above, I have had an opportunity to utilize architecture in courses on photography in the past. I have found that presenting this broad view does not constitute an insurmountable task. By treating it as a unique discipline, full advantage of its newness can stimulate interest and catalyze the imagination. I have found that this approach makes it exciting for them. They were capable of designing and making things. The practical skills involved in these projects provided a rationale for struggling with the more difficult concepts. Their encounter with the concepts of history, space, and the issues of building elements and functions, and the urban context challenged their abilities and fired their creativity. Certainly some of the concepts eluded them. But as they faced the uncertainty of the future they became in some way architects of it. They changed and were changed by the spaces they encountered. They built imaginary cities and castles in the air. In this way they were not unlike some architects who recognize the essential spirit of utopia, the ideal, or romance in their creations. They hope they have created a monument or ruin or simply made a place that is truly inhabitable, demanding a visit and a return.

## II. Values:Defining

When speaking with others about what art is, one often hears this statement, "I don't know what it is or what it's all about, but I know what I like." Immediately, we confront limitations in ourselves. By exploring rather than ignoring the multivalent nature of architecture, these limits can be expanded upon and elaborated. When the question of what we mean by architecture is raised, any one of us might respond that it is buildings or particular buildings. One might add that it is old buildings or choose to limit the category to large, beautiful, historic, public, or important buildings. In utilizing these modifiers we are engaged in a process of applying both quantitative and qualitative values to our concept of architecture and its relationship to buildings.

Defining architecture, or applying values to it, is difficult and relative. This is true for architects as well as for ourselves. We or they might all agree that it is the art of building. But what conceptual categories and technical activities describe this art of building? It is both a product (a concrete material object that occupies and encloses space) and a process (a series of events in time, both in designing, building, and experiencing it). We must conclude that architecture is a big word. It covers a lot of space and spans the limits of time. Our definition of it is always challenging and changing.

In the writings of architects and in those of architectural historians and critics, we find the profession itself engaged in a debate as to whether it is a building science or a creative and expressive art. The sides are often determined by the origin of architecture within a university's development. Some architecture schools trace their origin in their school of engineering, while others began in its school of art. Within the latter category there is a further division of those who emphasize historical and theoretical considerations and those who stress design alternatives; whether architecture should be orthodox composition or expressive creation. Within these extremes alternatives proliferate.

## A Note on History

When one looks at buildings in New Haven and throughout the United States, one is not faced merely with the hundreds of years that people have erected permanent structures on this continent. Because of the numerous revivals from earlier European traditions, one confronts the spectrum of thousands of years of constructing

permanent shelter and monuments. Couple this with the fact of the traditions of Primitive, Pre-Columbian, Indian, and Asian architecture, and one must admit that the task seems insurmountable.

In this essay I will choose to make only one comparison. It will not be my purpose to identify and master all the variations and sometimes subtle characteristics of the building art. What I propose to do is to provide a contemporary view of how history by recalling cultural values can provide a deeper meaning to spaces. When viewing buildings that represent the traditional vernacular styles of construction and ornamentation, they will be noted and pointed out. The major historical consideration is the differences and similarities that exist between these styles and that of the Modern or International Style. The similarities lie in the persistence of universal forms and the continuity that exists in building elements that is universal and the maintenance of principles of proportion. What characterizes their differences is their technology and motivational principles and impulses.

The traditional styles, while employing various methods of masonry and stone construction and deploying differing styles of narrative and detail, strive to express higher cultural values of ideology and order. This is apparent in the use of ornamentation and in the hierarchical arrangement of rooms and spaces in buildings. The Modern movement represents a departure from previous methods of construction necessitated by the introduction of new materials such as steel and concrete. These methods have also given a new use to glass, almost altering our ideas of wall and window. Modern architecture, as visible products of culture, express form as a result of the buildings function rather than any religious, social, or political values. Ornamentation is absent and any reference to regional qualities are removed. The building often aspires to expressing the image of the machine. This is arrived at by following a careful list of the buildings program (a series of activities to take place in the building and the allocation of space for these activities). While the traditional styles respect qualitative values, the Modern stresses quantitative ones, almost reducing them to the maximization of space utilization and minimizing cost.

This transition from orthodox vernacular expression to what was believed to be creative composition began in this century and had virtually triumphed until recently. Though a lot of the craftsmanship is lost and the labor intensive technology would be considered prohibitive, some architects, designers, and citizens have opened the debate within the profession about the need for recognizable cultural and symbolic codes within future buildings.

## **SPACE: THE SENSORY MODE**

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The architect's skills and sensibilities have expanded into the areas of spatial analysis and the problem of large scale urban planning. Combined with the renewed historical considerations, these factors have compelled me to concentrate on investigating our personal responses to certain aspects of the man-made environment. These responses to architectural space are not only physical, but they are possessing of values related to them.

The first activity in the curriculum is designed to heighten one's sensory encounter with space. In beginning with this activity I am acknowledging this mode as vital to the learning process. Paradoxically, the activity achieves this objective by depriving the student of one of his senses in an effort to increase the value for them. This "Blind Walk" through the confines of the school will form the basis for our analysis of buildings in the future.

Simply stated there are four sensory categories that form our reactions to space. (I am omitting the olfactory because it is not a factor that is often considered in building design aside from the location of certain activities away from areas of unpleasant odor and the building issue of ventilation.) These four categories are: the visual, the tactile, the aural, and the haptic. My use of the aural will be brief and refer only to the associations we can make from sounds. The visual and the tactile are familiar because they are tangible. The final mode, the haptic, is less tangible and therefore more abstract. While it is separate from the other two, it utilizes, transcends, oscillates, integrates, and expands upon what we understand from them.

We first encounter buildings through our eyes. We remain outside and separate from the building and observe it at a distance, taking note of some particular detail. We recognize colors and shapes and record the placement of a door or a window. We may allow our eyes to linger upon an ornament or the play of light and shadow. We might associate the door to the mouth and the windows to eyes as we “face” the building. This process of association is to be encouraged. It will form the basis of values which will continue to develop as we precede further in understanding buildings as capable of expressing and revealing more than mere functional static object.

Based upon this visual encounter, we are either compelled to examine it more closely. Or perhaps, we are repelled by its forms and arrangement and precede to another place. If our curiosity is stimulated we move closer to the building and can touch the surface to feel the coolness of the metal or the roughness of the stone. We might even find that in touching it we have been incorrect as to its nature. Our senses, though normally trustworthy bearers of information, can sometimes deceive us. By combining a variety of sensual modes we can become more certain of our experience. We can begin to separate architectural illusion from fact.

As we investigate further, we now see that what our eyes had convinced us was an easily accessible window is now out of arms reach. Our curiosity is further aroused and as we look back to consider the point from which we first spied this window, we learn that we have come down a short flight of steps and along a curved and narrow path bordered by a well kept lawn. Had we been alert rather than insensitive, we might have heard the tone and rhythm of our shoes as we walked this route. As we turn to pick up the pencil we had dropped, we bend down and our eyes are now facing another flight of stairs which we see we must descend to enter this increasingly mysterious place. Now, as we hurry down these steps, we pay close attention to the sound of leather on the low but deep granite steps.

We have begun to experience the layering of visual, tactile, aural, and hepatic senses. The latter can best be described as the basic psychophysical coordinates of up, down, left, right, back, front, and centeredness. We stop and wonder whether this might be a conscious act on the part of the architect who designed the building. We conclude that it is and discover a new understanding of his tasks. We look up at what is now a much taller building than we had expected. As we open the glass door at the entrance, our eyes are delighted with the pattern of black and white stone on the floor of the lobby. But as we push through the door and glance once again at our shoes, we see that they have become darker. What we thought was black stone is now a shadow. We look up to find the source of these lines to be the concrete supports for the glass ceiling overhead. We also noticed that they are arranged in a sunburst pattern that is not centered but is at an angle. We follow these rays as they converge on our right and arrive at the inner door of the lobby. Before we walk in we turn once again and look back and up to our left and realize that the lobby is two stories high. From the outside, the glass entry seemed to be only one story because of the stone facade above the glass entry.

I have been describing an imaginary building, but this experience is possible whenever one goes to a new

place. The possibility of surprise and the necessity of attention and participation can be exciting. It is not exclusive to the imaginary or the new, but through an awareness of these sensory modes, we may encounter familiar places in a new way. What activities take place in front of a building? What do we see and what do our bodies feel as we approach? Or as we enter? These are the things the architect considers as part of the building design. They are what transform an ordinary building into a memorable place.

The activities of contour and gesture drawing can illustrate and increase our awareness of the visual, tactile, and hepatic sensory modes. Drawing is one of the most useful skills of the architect. Even before he measures and marks a site, he will make quick, freehand sketches of the site. He will begin to create volumes and start to organize forms that will be the basis of more detailed and accurate drawings in the future. He will sketch the contour of the site, the surrounding elements of the land or cityscape, and may even start to furnish paths of movement and approach. He will note the direction and quality of the light and begin to locate doors and windows. Familiarity and comfort in making these quick sketches are invaluable for recording our response to a place. The recording of images during site visits will be refined and this skill can be used in later projects.

## **THE BUILDING TOUR**

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Equipped with the knowledge acquired from this series of activities and discussions, the students are now prepared for their first site visit. They have developed some categories and methods for analyzing space and some skills for recording their responses. Students should be encouraged to take notes, draw, touch, examine materials more closely, and to photograph the buildings and spaces they visit. They should observe their movement and the movement of others.

I have chosen a site on the Yale campus to utilize these skills. It presents us with many of the issues we have been discussing. It provides a perfect example of the historical contrasts I have mentioned and offers a large open exterior plaza to examine as well as well as intriguing and fascinating interiors. It is the Hewitt Quadrangle located on Wall Street. The major buildings to examine are the Woolsey Hall/Commons complex and the Beinecke Rare Book and Manuscript Library. The building is to be approached from the Old Campus and as we approach the plaza some examples of the Gothic Revival can be pointed out to contrast with the Classical that will be observed at Woolsey/Commons.

Woolsey Hall and the Commons, with their connecting rotunda, are like three separate buildings. Woolsey and the Commons are large rectangular volumes radiating from the central rotunda and form the major structure which enclose and defines the plaza. The building should be examined both inside and outside to see how the themes and ornamentation are carried out. This ornamentation is a rich blend of the Classical Order (column, capital, and entablature). A colonnade of columns and pilasters spans the length of the Commons and the pilasters are also present in the interior.

Beinecke is a floating rectangular solid with slabs of marble suspended in a grid framework of granite. The building should be entered to observe the splendid visual effects of light passing through the translucent marble. The exterior plaza can be used to illustrate the concept of hepatic responses to a defined space.

Although the students have yet to discuss the connection between form, organization, and function, these ideas can be introduced to show their relation to the buildings' visual appearance. Beinecke is composed of a single geometric form and the building performs a single function of enclosing space for the purpose of storing

materials for study and research. Woolsey and the Commons house a variety of functions that are temporary. The use of repetitive forms expresses two very different feelings that suggest different associations. Beinecke's repetitive shapes-of marble and granite are amassed to stop the motion of the eye in the space. The building represents the static function of a wall. The row of columns presents us with a contrasting use of repetition that leads the eye in a progression toward the entrance at the rotunda. These two uses conflict in their purposes with the Library frustrating the natural progression created by the columns.

Another comparison can be made of the buildings' memorializing functions. Beinecke achieves this via its function of storing precious historical documents. Woolsey/Commons achieves this with its elaborate ornamentation and inscriptions. The language of permanence takes very different expressive paths. The Library sits there, closed ~ to us, like a book requiring our action to discover its seemingly secret function. However, its entry is "covered" and interrupted by a sunken courtyard that contains a monumental sculpture. The regular forms should be considered for their possible implications. Like the building itself, they are abstract and suggest cryptic associations. The flag staff and cenotaph around Woolsey/Commons, unlike the sunken courtyard, do not impede passage and openly admit to their memorializing purposes. The two can be discussed for their contrasting visual and verbal means of achieving this function.

## ACTIVITY #1: BLIND WALK

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This activity is adapted from a theater exercise found in Viola Spolin's *Improvisations for the Theater*. Recorded data is design specifically to establish criteria by which we experience architectural space.

Procedures:

In groups of threes students will take a blindfold walk through the space in and around the school. One student will be "blind", one will act as "guide", and the other will record the verbal responses of the "blind" student. The recorder should also note the time of the tour, registering starting and ending times and also recording it at various locations along the route. He will be furnished with a floor plan and he can note the various locations where responses are solicited. This plan will later be compared to one marked by the "blind" student in trying to retrace his path.

Students should be instructed to respond to sounds, textures, and the path of movement. A list of words that might be utilized to indicate the students reactions include:

Tactile: rough; smooth, hot, cold, movable or immovable objects he may encounter;

Aural: natural sounds, such as wind, mechanical sounds, like machines or doors opening loudness and softness, pleasant or discomforting;

Emotional: trust, fear,-enclosing, inviting, repelling;

Hepatic: left, right, up, down, back, front (in relation to movement), wide, narrow, whether spaces feel tall or short; in regards to centeredness, students can venture a guess as to whether they feel lost or are familiar with where they are.

In guessing where they are students should indicate clues which influenced this decision. Students should be urged to respond from their memory and imagination and feel free to make any associations they might think of, such as, "I remember being in a place like this before in my life," they should then try to describe it. And there type of imaginative association can take the form of "This place is like a park, or a box, or a train

station.

It is not necessary that all students take such a walk, since discussions will consider all three roles. But if students all wish to do so they should be permitted. The guide should encourage responses by asking questions. If a tape recorder is available it can be used to record these responses.

In the discussion that follows, the students should be informed of certain values that are associated with the seven psycho physical coordinates of the hepatic sense. This can be supplemented with reading the section on the hepatic sensibility in *Body, Memory, and Architecture* and from readings adapted from *The Poetics of Space* .

## **ACTIVITY #2: CONTOUR AND GESTURE DRAWING**

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Contour drawing emphasizes the tracing of the outline of a person or object. Students should not be concerned with recording details, but should utilize their eyes as if they were actually moving their fingers along the subject they are drawing.

Gesture drawing is the attempt to capture movement in its rhythms and fluidity. Students will try to draw the essence of a movement by drawing quick lines. The exercise can be done using a single figure and with a series of figures in motion.

The drawings can be done with either charcoal or pencil and the size of the paper should vary according to the medium which is used. They should be done in a single color. -

For the contour drawings, students should sketch people, objects, and cityscapes. The activity should take place both inside and outside and can progress from timed quick sketches to a whole class exercise.

Students can attend a dance or gym class to observe movement of people, or they can be their own models. The motion of cars moving, objects rolling or being dropped, or being scattered by the wind are examples of other movement that can be observed. The motion of machines or vibrating objects present another possibility.

Both exercises may be varied by limiting the drawing to be executed with a single line without removing the pencil from the paper.

In discussion and review, the two types of drawings may be compared for their qualities of expression and representation.

## **FINAL PROJECT**

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The purpose of this project is to utilize the knowledge and skills acquired as a result of the previous activities, discussions, and the building tour.

Students will create a book or box that contains examples of their understanding of the visual, tactile, and



hepatic senses. Included in this book or box will be: different materials, such as paper, fabric, metal, wood, or stone of different shape, sizes and textures. They may be traditional art materials as well as found objects. The hepatic sense can be demonstrated by the positioning of objects on the page. Students can include collages made from their drawings or photographs. The size of the book should be large enough to maximize physical interaction on the part of the viewer. Books should not be smaller than 14 X 18. The boxes should be of different shapes and should accent one of the dimensions.

The theme of the book or box will be to compete or contrast the two major types of architectural styles we have observed.

## OTHER ACTIVITIES

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### *Organization:*

Equipped with the knowledge of how we perceive the characteristics of spaces, we can begin to try to understand the organization or ordering of these spaces. On our building tour we mentioned that the marble used in the Library was organized or arranged in a grid pattern. In discussing the Woolsey/Commons complex we used the word radiating. These are two systems of arranging forms in a regular way. Other examples are: linear, centralized, and clustered. These systems are available to the architect as he approaches the problem of locating rooms within buildings and buildings on the site.

Each of these systems can be understood as evoking the possibility of greater meaning as we move toward, around, and through space. Linear organizations give us a feeling of continuity and progression. In a grid pattern we experience regularity, repetition, and ease of location. Centralized arrangements suggest enclosure and security. Expansiveness is the primary sensation derived from radial organizations, while clustering provides a sense of spontaneity and peculiarity to buildings, rooms, and spaces.

To illustrate and utilize these methods of organization, students will construct two compositions of construction paper cutouts on posterboard that is 22 X 28 inches large. The cut outs will be in the shape of regular polygons and are to be arranged according to two separate systems of organization selected from the ones listed above. They , may overlap the shapes as long as the identity of the polygon is maintained. The polygons should vary in shapes and sizes and the paper can be of a single contrasting color or they may be of many colors.

This project can then be expanded by tracing the compositions and overlapping them. Each drawing should be on a separate page. When they are completed possible ways of connecting the two can be explored. They can be united at the intersection of similar shapes vat spaces that are of similar size. The drawings should be done in pencil.

### *Architectural Drawings:*

Architects utilize three types of drawings to illustrate their organization of spaces within a building. They suggest the location of spaces for different activities that will take place inside the space. These drawings are the plan, the elevation, and the section. The plan exposes the arrangement of rooms within the enclosed structure and is created by "cutting through" the floors of a building horizontally, thereby exposing the rooms



below. The section reveals the vertical projection of the spaces within a building and often reveals much about the building's supporting structure. The elevation is also a vertical projection, but it is used primarily in displaying the building's exterior.

After familiarizing students with the three different types of drawings, the following activities can be utilized to expand upon the students formative knowledge of organization.

### *The Most Outrageous House*

This is a group activity that requires four people. Fold a piece of 14 X 18 inch paper into four panels (the fold can be made along either of the dimensions, depending upon the desire for vertical or horizontal accenting). The first student will be instructed to draw his idea of a fantastic house on any one of the panels, using any one of the types of drawings explained above. When he has completed his drawing on one of the panels he should extend short lines from the sketch into one of the adjoining panels. This drawing is to be folded so that his panel is not visible to the person who he will pass it on to. (The paper used should be opaque.) The next person is to be given the same instructions as the previous student and then pass it on to the other members of the group until all four panels have been completed.

The results will be incongruous and funny for sure, but discussion can take place about whether the house is functional (Are all the necessary activities for human inhabitation provided a space within the drawing? Are stairways and other means of passage and movement logical?).

When showing students the different types of architectural drawings from texts, one should be sure to find drawings that combine the different types. Examples can be found in most books especially those on imaginary or futurist architecture. It will make these drawings of outrageous houses seem normal.\*

This activity cannot avoid the discussion of function within a building. The following project can be used to expand upon the results of these functional discussions.

Using the compositions from the activity listed under organization students can create a collage from pictures cut out of magazines that will correspond to activities that will take place in certain spaces or rooms that will be assigned to areas within the previously organized spaces. Each of the compositions should be considered as a floor plan and assigned certain functions or room designations. These should include areas for cooking, eating, sleeping, study, entertaining, storage, and washing. A brainstorming session can be held to discover other activities that can go on in the place. The pictures to be placed in this "floor plan" should indicate something about the activities that take place in the room or they can simply be of furnishings or equipment that would be found in such a space. Do not forget to include passageways, entrances, and staircases. Pictures may also be selected to give a feel of the room or show the location or view outside a window or the ambient feeling of light in each of the spaces.

After all the materials have been collected' the students will then construct a three-dimensional model of their individual floor plans, extending the shapes to create regular solids and interior volumes.

After these models have been completed the pictures that were collected can be pasted to the "walls" on the interior of these "Outrageous Houses". The "floor" plans should be executed as two separate pieces so that visibility is maintained into all "rooms". The model can later be sectioned to reveal a vertical view into the "house".

Having completed the interior, students can now precede to collect pictures that will finish the exterior of these models. Students can draw them, take original photographs of buildings in New Haven, or simply collect them from magazines. Remember too that not all surfaces of the exterior must be covered. Areas may be kept free of “decoration” to appreciate the interactions of shape and volume. The project has endless possibilities for thematic creations. So, let your imagination wander.

## Notes

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\*George C. Collins book listed in the bibliography or the one that was edited by Helmut Jacoby are excellent selections.

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\* Lobell, John. *Between Silence and Light* , Shambhala, Boulder, Colorado, 1979. Louis I. Kahn was a poetic architect. His writings are enlightening to read. The collections within this book can easily be utilized in the classroom. Photos and drawings of his buildings are included, with the Yale Center for British Art being listed among them.

March, Lionel and Steadman, Philip. *The Geometry of Environment* , MIT Press, Cambridge, 1974. The introduction and early chapters provide useful reading but the later chapters contain higher level mathematics.

McHarg, Ian L.. *Design With Nature* , Doubleday/Natural History Press, Garden City, N.Y.,1971. A sensitive and comprehensive study of large scale planning with the compatibility of design solutions and the health of the planet and its inhabitants in mind.

National Trust for Historic Preservation. *Old and New Architecture: Design Relationship*, The Preservation Press, Washington, D.C.,1980. Can be read to supplement the new historical awareness championed by the Post-Modernists. Its message is Historic Preservation, but is as good an understanding of the need for contextual relations for new construction in the city.

\*Nevelson, Louise. *Atmospheres and Environments* . Catalog from the artists retrospective at the Whitney Museum.

Nicolaides, Kimon. *The Natural Way to Draw* , Houghton, Mifflin, Boston,1969.

Pennick, Nigel. *The Ancient Science of Geomancy* , Thames and Hudson, London, 1979. Recollects the art of siting and orienting buildings in relationship to the cosmos. An insight into the values and associations in buildings that you never dreamed of.

Pevsner, Nikolaus. *A History of Building Types* , Princeton/Bollingen, 1976. Focusses on the functional typology of buildings, e.g. Theaters, Libraries, Museums, Factories, Railway Stations, etc.

\*Nuttgens, Patrick. *The World's Great Architecture* , Excalibur, New York, 1980. A popular survey accessible to students and teacher alike.

\*Pluckrose, Henry. *Let's Use the Locality* , Mills and Boon, London,1971. A teachers' manual of activities by a British educator.

Pollitt, J.J.. *Art and Experience in Classical Greece*, Cambridge University Press,1972.

Porphyrios, Demetri. *Classicism is Not a Style* , St. Martin's Press, New York, 1982. Contemporary view of the debate on historical reference in architecture.

Ruskin, John. *The Seven Lamps of Architecture* , Farrar, Strauss, and Giroux, New York,1981. Polemic by the nineteenth century critic. The seven lamps are: Sacrifice, Truth, Power, Beauty, Life, Memory, and Obedience. Valuation and association in architectural—analysis begin here.

\*Salvadori, Mario. *Why Buildings Stand Up*, McGraw—Hill, New York, 1980. A very readable explanation of structural concepts in architecture, not out of the students reach.

\*Sanoff, Henry. *Design Games* , William Kaufman, Los Altos, Calif., 1979. A set of problem solving activities for children based upon the man-made environment.

Spolin, Viola. *Improvisations for the Theater* .

Stenhaus, H.. *Mathematical Snapshots* , Oxford University Press, London,1950.

Stevens, Peter S.. *Patterns in Nature*, Atlantic-Little, Brown, Boston,1974. A synthesis of art and science that introduces a myriad of patterns of organization not mentioned in this essay.

Stone, Harris. *Workbook of an Unsuccessful Architect*, Monthly Review, New York,1973. A New Haven architect reflects on the vagaries and frustrations of the profession.

Summerson, John. *The Classical Language of Architecture* , MIT Press, Cambridge, 1963. Concise and readable explanation of the Greek and Roman Orders with references to their use throughout history.

Tafuri, Manfredo. *Theories and History of Architecture*, Harper and Row, New York, 1980. A structuralist criticism that posits the limits of the profession to examine and criticize itself.

Venice Biennale. *Architecture 1980: The Presence of the Past*, Rizzoli, 1980. The European art establishment accepts the Post-Modernists. A catalogue from the exhibition.

Venturi, Robert. *Complexity and Contradiction in Architecture*, Museum of Modern Art, New York, 1966.

The manifesto of the Post-Modernists, calling for historic and other cultural symbolic cultural codes in contemporary building design. It signals the departure of a generation of architects from the Modernists' rigid functional aesthetic.

———, Brown, Denise Scott, and Izenour, Steven. *Learning From Las Vegas*, MIT Press, Cambridge, 1972. Venturi and others apply the principles and categories of Post-Modern Eclecticism to the Las Vegas strip. A controversial appeal for 'common' architecture with popular appeal.

(Pollio), Marcus Vitruvius. *The Ten Books on Architecture*, Dover Publications, New York, 1960. Probably the earliest known treatise on architecture. An insight into classical principles, early functional typology, and the Greek Orders.

Wheeler, Karen Vogel; Arnell, Peter; and Bickford, Ted. *Michael Graves Buildings and Projects 1966-1981*, Rizzoli, New York, 1982. A monograph of the eclectic contemporary architect, includes furniture and building interiors.

Wingler, Hans. *Bauhaus*, MIT Press, Cambridge, 1969. A history of the German school that is the home of many of the founders of 20th century modernism; includes a thorough documentary and portfolio.

\*Wurman, Richard Saul and Gallery, John Andrew. *Man-Made Philadelphia*, MIT Press, Cambridge, 1972. A comprehensive analysis with excellent maps and graphics that can provide ideas for local history projects in the classroom.

Yale Architectural Journal. *Perspecta 9/10*, New Haven, 1965 Sections of Venturi's book first appeared here. There is an article by Hersey about the design for the State Capitol in Hartford.

Zeier, Franz. *Paper Construction*, Scribners, New York, 1980. Great ideas for working with advanced students. Provides a working understanding of the combination of geometric forms.

Starred listings can be used for student reading.

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