

BUILDINGS AND GROUND

by

Douglas Edward Mahone

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Signature of Author.....
Department of Architecture
8 February 1977

Certified by.....
Edward B. Allen, Thesis Supervisor
Associate Professor of Architecture

Accepted by.....
Wayne V. Andersen, Chairman
Departmental Committee for Graduate Students



ABSTRACT

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BUILDINGS AND GROUND, by Douglas Mahone

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Every building, in one way or another, must deal with the ground. Some do it consciously, like those buildings which seem to grow out of the materials and forms of the land. Others, like the suburban tract house set on a bulldozed, concreted plane, are decidedly unconscious about it. This thesis seeks to explore some of the meanings, attitudes, and architecture of buildings as they interact with the ground.

This work is intended, not to develop a comprehensive theory, but to suggest that a point of view can be developed which looks to the interaction between building and ground for insight into more general issues of design and meaning.

The organization of the thesis proceeds from the general toward the specific. The first part deals with the problem of defining the ground itself. Fundamental attitudes toward the ground which are found in the culture, and in individuals, are identified. A series of images of various relationships between people and ground are discussed to gather insight about our built responses to the ground. Finally, a listing of the basic qualities of ground as we experience and perceive them is developed.

From this general background, the discussion proceeds to the physical relationship of buildings and ground. A wide range of examples is used to illustrate specific points about the design of buildings and their implications as regards the ground. Collectively, the examples present the issues which the author has found to be central to the topic. Buildings, and their relationships to ground, are first looked at from a distance and then from closer in. Next, the questions of movement by people and vehicles are examined. Finally, a general discussion of the technical problems and issues raised by altering the ground for human uses is presented.

The final chapters include five case studies of specific buildings. This allows closer and more complete analysis to see how the issues raised earlier, in a general way, are applied specifically to real designs.

Thesis Supervisor: _____

Professor Edward B. Allen
Associate Professor of Architecture

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NOTES ON THE PROCESS:

This thesis was typed on a rented IBM Selectric II Correcting typewriter by the author and Lisa Heschong. It's a wonderful machine which made passable typists out of both of us.

The drawings were all done by the author. They were copied from slides onto vellum using Rapidograph pens and a special light table, designed and built for the purpose, which projected the slides onto the bottom of a frosted glass drawing surface. The technique allowed the drawing to go quickly: after mastering the basic technique, they took about 30 minutes apiece to complete.

The slides on which they were based were mostly taken by the author, with some borrowed from Lisa Heschong and Edward Allen.

The original ink drawings were reduced 50% to their present size, and produced as photoprints by the MIT Microreproduction Laboratory, a marvelous service.

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This thesis is more about ground than buildings. I've found that people, when I mention the title, know what buildings are, but they imagine all sorts of things about what ground is. They think literally, of the dirt, mud, rock and sand which is the material of ground. They think of ground as something to set buildings on, like boxes on a table. Some of them think of ground form, as it is used in design vocabularies. One person even brought up the visual use of the term, like the figure/ground distinction in painting. I think the ground is all of these and more. I would include in its description the cultural images associated with ground, the architectural elements created by shaped ground, the ecological network that uses and depends on the ground for existence, and even the technological limitations on altering the ground. It is this complexity and diversity of the concept of "ground" which influences our architectural response to it, and which makes this topic so universally interesting. Although I will be talking about buildings here, they are only a means to the end of understanding the ground better. Once that end is achieved, good buildings will follow easier.

The beginnings of my interest in the ground were in my love of hiking. Hikers, through their feet, have a broad familiarity with all kinds of ground in its natural state. They also have time to look at the ground, not only as a simple material, but in its other roles as landmark, as a base for vegetation, as terrain that varies from broad and open mountaintops to enclosed, sheltered hollows. For the thinking hiker, all this raw experience connects with the broader currents of human culture. The victories of the pioneers, the the despair of marooned sailors, the sublime inspiration of mountaintop hermits are all associated with experiences of different kinds of ground. Most people have at least vicarious associations with these experiences,

through literature, cinema, or simply membership in their culture. My own understanding of ground is based on physical contact, but is growing in richness as time and thought expand the connections.

In my work as a designer and an observer of other peoples' designs, I have become aware of the difficulty of designing buildings that have good relationships to the ground, where both building and ground benefit from the presence of the other. Too often, the building is seen as an object, designed separately from the ground with only grudging acknowledgment of some of its grosser attributes, like slope or drainage. This results in designs that are totally out of touch with the subtler, richer qualities that the ground has to share. I have found, from my observations of good buildings, that often their wonderfulness comes from their relationship to the ground. The building and the ground work together to make good places for people to live, and they do it in subtle and many-splendored ways. To design so that this can happen requires a consciousness and a sympathy on the part of the designer. I feel I have the sympathy, and I have set out to develop the consciousness.

What follows is the beginning of that process. It is not meant to be a comprehensive theory; I don't consider such theories possible. Rather, it is the beginnings of a point of view; one which looks to the interaction of buildings and ground for information and meaning about the broader issues of architecture and design. It is hoped that others will find this record of my process to date useful, if only to set their own thinking in gear and suggest some of the potential that lurks between buildings and ground.

The beginning chapters seek to identify and expand on some of the qualities, images, and attitudes toward ground that form the basis of our experience with it. With this general background in hand, the discussion moves on

to how it is related specifically to buildings and design. This discussion is supported by drawings, which illustrate the points made in the text. The drawings, in a way, play fast and loose with the buildings because often a judgment is made, either positively or negatively, about a particular building feature which is contradicted by other features not shown. The specific points, however, have broader application than the examples, so hopefully any sins of omission or commission will be forgiven. Also, the choice of examples is not intended to be universal. There are probably hundreds of better examples from all over the world, but instead of trying to contend with such a broad range of material, I have limited myself to buildings with which I have more direct experience. Virtually all of the places illustrated are places I have visited, most of them during this past summer on a Graham Foundation travelling grant.

The final part of the thesis is a series of five case studies, which are analyses of specific buildings from the point of view developed in the earlier chapters. They provide an opportunity to look at complete buildings, rather than parts, and to test the general applicability of the ideas in the thesis. The buildings were chosen to be quite different, one from the other, yet to present between them a wide range of building types and design conditions.

The ideas in this thesis combine to describe a way of looking at buildings and ground that is in many ways personal. While I have not tried to make a strong, independent attitude statement (a task more appropriate to a life-long architect than to a student), many of my own attitudes have inevitably appeared in the writing. Where this happened, I have tried to be as clear as I am able about where the statements come from, and to provide enough visual documentation for the reader to disagree. If I occasionally confuse rather than

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clarify, it is probably because I haven't gotten it entirely clear myself. But the process of working through the issuss has been enormously fruitful for me, as I hope it will be for my readers.

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I. THE GROUND: NATURE AND MAN

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The myths and fantasies of human beings have imparted deep significance to the earth for as far back as we can remember. The early creation myths of a great many cultures have spoken of the Mother Earth as the source of the material world and its contents. Even in the Bible, with its male God performing the creation labors, the clay of the earth is the material from which human life is formed; we didn't just materialize out of thin air. Similarly, when we die, we are returned to the mother material from which we were made. The theme has been played in hundreds of variations throughout human history. Different cultures have settled on different conceptions of man's relationship to the natural world: sun, moon, and animals have all been seen as identifications for worship, but always the earth has an important role.

THE ANASAZI The Anasazi culture is just one example, but an instructive one. The Anasazi people flourished in northern Arizona and New Mexico between the 8th and 13th centuries (1). They apparently developed very strong beliefs in the Mother Earth symbol as a deity...to the point that many of their religious ceremonies focussed around it, and certainly much of their building activity. The earth was seen as the source of all life, and therefore holy. Religious significance was given to places that were enclosed by the earth, and ceremonial architecture took the form of kivas, circular pits dug fully into the ground, roofed over with timbers, and finally covered completely with earth. The only openings were for smoke, ventilation, and a slender ladder which was used to climb down through the roof hole. The kiva was dark, cool, cocoon-like, and far removed (sensorially if not physically) from the desert sun, dryness, and human activity above. These artificial caves undoubtedly had some unpleasant qualities for those fearful of darkness and underground

crawly things, but to a people with a reverence for the earth, they must have been full of magic and meaning.

The Anasazi were relatively primitive and, like all such people, were directly dependent on the benevolence of nature and natural forces for their survival. In fact, their decline and disappearance has been attributed to a climate change which turned their already dry land into a virtual desert (2). In view of their dependence, then, it is interesting (though not uncommon in primitive peoples) that their response to nature was reverence. Much of the modern response, as I shall discuss below, has been antagonistic. For the Anasazi, the physical act of building and being close to the earth was the outward expression of their spiritual desires to become one with the natural order.

JOSEPH WORCESTER There are modern counterparts to this attitude, and it is interesting to see their reflection in building. One relatively recent expression of such an attitude can be found with the Rev. Joseph Worcester, a Swedenborgian minister who was influential in the development of the San Francisco Bay region vernacular around the turn of the century. As Freudenheim and Sussman summarize Worcester, "He saw the natural world as beautiful because it was the work of God; man's creativity, he felt, should harmonize with God's rather than disturb it." This attitude was related to that of Ruskin and the Romantics, but with a more spiritual aspect. What is unique about Worcester is that his attitudes were directly translated into building. Through his active associations with architects of the time (Maybeck, Polk, and others), and his influence with San Franciscans who were building patrons of these architects, he affected the character of residential architecture in the Bay area profoundly. He virtually designed the Swedenborgian church in San

Francisco. The building is heavily nature-oriented, using natural wood and stone. The rafters, in fact, are undressed madrone tree trunks, which carry strong resemblance to growing trees. Integral to the overall design of the building is its relationship to the garden. "To Worcester the church's garden was primarily a captured piece of nature, and since he believed in the holiness of nature, the garden to him was an outdoor church." (3) The natural world here has been humanized, as it was in the Anasazi kiva, but the underlying attitude is still reverence and a desire to be close to nature and its larger associations.

A contrasting attitude to the one typified by Worcester was nicely described by Hubbard and Kimball at the beginning of this century (4):

"A work of art which has style may be esthetically organized in either one of two fundamentally different ways. The artist may design his work to express his own ideas, to serve his own uses, to show his own control over some of the materials and forces of nature. Or on the other hand he may design his work to express to the beholders the understanding which he has of some modes of nature's organization, and the pleasure he finds in them. In the first case, the esthetic success of the work will require that the hand and the will of man be visible in it; in the second case, the higher art would be that which so perfectly interpreted nature's character that the work should seem to be a wonderfully complete and intelligible expression of nature's self."

Worcester's attitude was obviously the second. The first attitude has had a

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good deal of application in building during this century, with buildings that are designed as large objects that are set apart and distinct from the ground and the associations it carries; that are heated and cooled mechanically; and that ignore such basic natural influences as sun and wind.

ANTIPATHY TO NATURE Alongside this attitude of building to assert human will, is sometimes found an attitude of distinct antipathy to the earth and nature. This stems partly from the power of natural forces to destroy us, and partly, perhaps from beliefs that human beings are distinct from, and above nature. Indeed, there has often been a belief in Western civilization that nature, or at least uncivilized wilderness, is evil. Roderick Nash points out that, "Wilderness was construed by most frontiersmen to be in league with devils, demons, and the evil forces of darkness that civilization must overcome."⁽⁵⁾ A big part of the pioneering spirit involved "conquering" this evil wilderness. The prairie schooners were often felt to be ships on a hostile sea. As a result, there was little sorrow when the buffalo were killed, the sod was busted, and the mountainsides were mined.

As we have become more powerful in our technological capacity to alter nature and ground, the scale and extent of human intervention in the natural order has increased. The environmental movement notwithstanding, I think there are many who continue to derive great satisfaction from conquering nature, both at the scale of a Hoover Dam project, and at the small scale. Carving a house lot out of the woods and replacing the underbrush with a flat lawn can be a form of conquest; civilization subjugates wild nature. The vitality of this attitude can possibly be traced to peoples' fearful realization that, despite our technology, if it should fail we will be back at the mercy of

nature. Lacking the fundamental reverence toward nature of the Anasazi, we find the idea of dependence on nature terrifying. This makes the environmentalists' calls for cooperation with nature difficult to accept fully. We continue with our collective conflict in attitude toward the natural world: we can't decide friend or foe.

THE GROUND One of my central concerns in this thesis is to trace this problem of attitude toward nature into the way we build, and to do this via the ground. I am using the ground in a broad sense: it includes not only the soil in which we build, but also encompasses larger landscape qualities such as ground form and vegetation, and includes many of our cultural images and attitudes. Taken in this sense, it is almost impossible, both physically and conceptually, to separate ground from nature. The ground is the stage for the complex and intricate relationship between man and nature. Thus, many of our attitudes toward ground are projections of attitudes toward nature, and our dealings with buildings and the ground reflect this.

COMFORTABLE DISTANCE One indicator we can examine to learn about these attitudes on the part of designers and dwellers, is the comfortable distance they establish between their buildings and the natural ground. By distance, I mean not only the physical dimension measured in feet, but also the virtual dimension which is modulated by barriers, separations, grade changes, paving materials, vegetation, and a host of other devices used for making the transition from ground to building. This notion of distance is similar to the "Hidden Dimension" notion of social distance established by E. T. Hall (6), which suggests that people maintain spheres of personal territory. These

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spheres set interpersonal distances which vary depending on the individual and on the cultural context. When the distance is too close, people become uncomfortable. Most of us don't like to sit as close to our employers as we do to our lovers. Likewise, when the distance is too great we want to shorten it. A friend seated across a large table will often move around to the side to establish a more comfortable conversation distance. The distance doesn't depend entirely, however, on feelings of intimacy. Other factors such as noise, lighting, and odor contribute. People can be closer and as comfortable in conversation on a crowded, noisy bus than they would be sitting in a quiet lounge.

I think many similarities exist with the distance we establish to the ground. It also seems that the manner in which this distance is established is often as subconscious as it is with social distance. Many people are uncomfortable, even on a wooded site, having wild underbrush growing right up to the house. The planting of a lawn sets the wilderness and the house apart, producing a zone of civilized vegetation. Likewise, for a city dweller surrounded by concrete and asphalt, the presence of potted plants makes the artificiality of the setting less acute. There are also practical considerations which influence the building-to-ground distance, such as drainage, sunlight, slope, and view. I shall examine a variety of such situations in later sections. Although I won't attempt to develop rigorously this notion of comfortable distance, I believe it to be an instructive concept to keep in mind while looking at buildings and ground.

SETTLING Another part of the fundamental attitude we carry toward the ground comes from the human experience of settling down in the ground. A

popular conception of civilization is that it didn't really get started until man left the nomadic existence of wandering over the surface of the ground and settled down to raise crops and domesticate animals. Not only does settling enable us to develop our material world, but allows us to grow into harmony with the spiritual. Analogies are drawn to trees that "take a firmer hold on the earth that they may rise higher into the heavens."(7) There is also a spiritual feeling associated with building a house in the ground. As Aron Faegre says, "By settling in earth--sitting in a house with a foundation in the earth--we and the house become part of the earth."(8) It's a way to link up with the Mother Earth similar to that used by the Anasazi.

This attitude is counter-balanced by a feeling that, in the process of settling down, we lose something fundamentally valuable to human life. Thoreau, the philosopher of the natural life said, "We have settled down on the earth and forgotten heaven."(9) When we are wandering the earth, we are very much a part of its flows and rhythms, and as free (and vulnerable) as the birds to participate in the benevolence and the hostility of natural forces. There is a feeling that this keeps us more in tune with the natural order of things and prevents us from falling prey to all the constraints of civilization. The lyrics of the Paul Simon song sum up this feeling of loss quite well: "A man gets tied up to the ground, He gives the earth its saddest sound, Its saddest sound."(10)

The ambivalence of these two polarities is still unresolved in many cases. All but the most firmly rooted of us feel regular urges to pull up and travel. The trend in American society is toward greater mobility, despite tenacious dreams of family homes on the soil. A large part of the population now move the home every few years and spend vacations moving even faster. Many of the

old signs of settlement--orderly countryside, stone walls, family orchards--are disappearing as a result. They were modifications of the ground by 19th century society. There is still a great deal of attraction to these signs, despite the disappearance of the settled society that created them. And for all our individual mobility, human beings must still build on the ground. A kind of settling is still happening, and the new signs of settlement manifest themselves in different kinds of modification of the ground. These reflect our current capacity for altering the ground--roads, parking lots, bulldozed marshes and woodlands--and in many ways our current attitudes as well.

II. THE GROUND: IMAGES AND RESPONSE

The issues discussed up to this point have focussed on the spiritual and symbolic meanings of the earth and ground, meanings related to the broad currents of human thought and man's place in relation to the natural world. The discussion which follows seeks to identify meanings which depend more directly on human experience of the ground. I have chosen a small set of images which I believe have broad application in describing human response to the ground. In each case, the image describes a particular combination of physical environment and human relations to that environment, based on such factors as ground form, height, scale, accessibility, microclimate, material, and movement. The response is also based on subjective human factors: cultural environment, psychological response, even individual phobias or preferences. Because of this, in one sense, these images and meanings are my own. But to the extent that I participate in the broader currents of my culture, they will also be general and broadly agreed upon. There are hundreds of physical ground types and hundreds of ground images to describe them, but I believe that the limited set of images I have chosen here are general and fairly pervasive in their influence on peoples' understanding of buildings and ground, both as users and designers. In any case, I have found them to be useful for describing some of the qualities and meanings of specific buildings and their ground, and they are presented here in preparation for later discussion.

BROAD PRAIRIES The Broad Prairie image sees the ground as an infinite broad surface bounded only by the horizon. Vegetation is simple, like grass... forming a carpet on the prairie that softens it and livens the surface, rippling in the wind. Grasses present little obstacle to movement. Changes in the terrain are in the form of gentle undulations which subtly differentiate the

surface, but don't disrupt the feeling of broad continuity. In fact, there is little sense of enclosure. To some, this gives a liberated feeling, to others it is decidedly unpleasant. As Capt. W. F. Butler observed in the last century, "The unending vision of sky and grass, the dim, distant, and ever-shifting horizon; the ridges that seem to be rolled upon one another in motionless torpor; the effect of sunrise and sunset, of night narrowing the vision to nothing, and morning only expanding it to a shapeless blank; the sigh and sough of a breeze that seems an echo in unison with the solitude of which it is the sole voice; and above all, the sense of lonely, unending distance which comes to the *voyageur* when day after day has gone by, night has closed, and morning dawned upon his onward progress under the same ever-moving horizon of grass and sky."(11)

The wind is very much a presence on the prairie...there is little there to stop it. Extremes of temperature are not uncommon. There is a sense of dryness, but also an expectation that the ground is fertile and will burst forth in flower at times. There is a feeling of freedom from normal human social constraints, the recall of the nomadic life that lies hidden in our primitive psyches. To inhabit the prairie requires the setting up of a differentiation in the surface; either by digging down (sod houses), or building boldly on the surface (and therefore into the horizon).

This latter approach has been described as claiming a portion of the ground.(12) By creating a building which stands out on the surface of the prairie, a zone of influence results which differentiates the human place from the wild prairie around. The claiming is often aided by planting trees, which make a larger intrusion into the monotony, and which create an enclosure around the building, further setting off the place. This combination of trees

and open land seems especially hospitable to human habitation. There is a notion that people are happiest living at the edge of the forest and next to the grassland, and this claiming of place within the prairie can achieve the same results.

The image of the broad prairie also relates in some sense to the experience of the ocean. They share many of the same qualities of flatness, horizon, wind and elements. Travellers on the prairies often compare them to the sea. The difference, as far as the discussion here is concerned, has to do with the fact that the ocean cannot be inhabited in the same way as the prairie. But building and living on the edge of the ocean shares many of the associations of claiming and seeing to the horizon that characterize living at the edge of woods and prairie.

Movement is also an important factor to the image of the prairie. Movement there is characterized by galloping freedom, uninterrupted to the horizon. Paths and highways are long, straight or gently curved, and seem endless. The movement is flat, or else over low, gentle undulations and into shallow depressions; minor differences in the surface become important.

The prairie is a strong image, basic because of its total simplicity. It is an image which fewer and fewer people can experience directly any more, as the vastness of the prairies is diminished by human habitations and enterprise. But the power of the image remains and figures in many kinds of landscapes and buildings.

BURROWS AND CAVES These are two images that are related yet different. Burrows, I think, have fewer negative qualities. We speak of burrowing for the truth, burrowing into our pillows for comfort, digging for an answer.

Besides shelter and coziness implications, there is a sense of linking up with the deeper truths of life associated with burrowing. In the spiritual sense, this ties in with the notion of Mother Earth and the wisdom to be found there. Aron Faegre has constructed a story of quest for enlightenment that ends up in the burrow of a wise Badger.(13) Burrows are imagined as cozy refuges, places to hide from the predators and storms, warm and snug and dry. There is also something about a burrow that is constructed; it is seldom a found environment, but rather something that each animal digs to its own specifications. These are aspects that differentiate burrows from caves.

In this sense, Anasazi kivas were burrows, rather than caves. They functioned better for their purpose than natural caves would have. Their regular roundness and understandable size and shape would be much more satisfactory than the irregular, receding, complex spaces found in most caves. The artificial stone walls that held back the earth would have been understandable as such. In a related discussion of cellars, Bachelard points out that, "The cellar dreamer knows that the walls of the cellar are buried walls, that they are walls with a single casing, walls that have the entire earth behind them."(14) Natural cave walls tend to take on a life of their own which makes this understanding far less apparent.

Caves are found places in the earth, created by ancient geological forces. This makes them more mysterious and foreboding than burrows. They are larger, draftier, damper. They go deep into cracks in the earth, and unlike burrows are of indeterminate length. Strange, blind animals inhabit the darkness of caves. The air is foul and unhealthy (or so people often believe, and this can be the case).

But there is something primitive about a cave that appeals to us. We

speak of primitive man finding shelter in caves, not burrows (even though they usually inhabited only the mouths of caves). The ancient cave paintings indicate they were used for ritual purposes. The mystery that is found there is somehow profound; the darkness is total. It is the place for robbers to hide, for dwarves to mine strange minerals, for hidden rivers to flow, for strange and beautiful shapes to form. The twisted pathways lead down into the bowels of the earth: the path to hell must have started in cave. The walls of the cave have unique qualities; they don't seem to be merely the surface of the earth, although we do somehow sense that we are a long way below the surface. Caves appeal to the adventure in some, but generally to the hidden fears of most people.

SNUG VALLEYS Images of Snug Valleys have a certain magic about them. Such a place is a sheltered refuge from a hostile world. It is a hollow, with a stream flowing at the bottom, and a rim of protective hills or mountains around. Leo Marx describes just such a place: "The lay of the land represents a singular insulation from disturbance. and so enhances the feeling of security. The hollow is a virtual cocoon of freedom from anxiety, guilt, and conflict...a world set apart, or an area somehow made to evoke a feeling of encircled felicity."(15) Such a place is surrounded by harsh, mountainous country, often lost and difficult to reach. Within it, the warm sun shines, and gentle rains fall, but harsh winds are excluded. Camelot must have been in a snug valley. The ground is fertile, and trees and friendly vegetation grow. There are level places and gentle hillsides and enough space, but it is not a large place; probably no more than a day's walk end-to-end. It is a place of peace where the landscape encloses and supports.

MOUNTAIN EYRIES Images of Mountain Eyries immediately call in eagles and fortresses. The vertical worlds of the mountains are surmounted by these high overlooks, inaccessible, impregnable. Supernatural, or at least powerful creatures inhabit eyries -- creatures who can contend with the mountains to carve out their refuges among the rocks. From there, they can overlook vast areas, stretching to the horizon, encompassing many valleys. The altitudes are heady, the escape from the mundane worlds below complete, the rocky surroundings spectacular. The ground is at its most vertical, the materials at their most eternal, the forces of nature at their fiercest. The eyrie is secure within that world, commanding all it surveys.

TREEHOUSES Images of Treehouses are important to children and other people. Trees are close-at-hand vertical worlds. By climbing, one enters the sky, leaving behind and denying the stable ground entirely. There is the exhilaration of being above the ground, the opening up of the vistas as one goes higher, the decreasing sense of support as the branches get thinner and begin to sag under weight and blow in the wind. The world takes on a new structure; vertical and linear, free from the planes and horizontals of the ground. There is also the primitive remembrance of climbing into trees for escape from the clumsy but powerfully dangerous predators on the ground. Up there one can see but not be seen.

We have images of the Swiss Family Robinson and Tarzan living in treehouses. A treehouse includes all the feeling of being up in the trees, with the added appeal of a house and shelter. When kids get old enough to climb, they take what they learned about little houses when they built under cardtables, and transport it up into the sky, making the break with their regulated normal

environment complete.

WHEELED VEHICLES Images of Wheeled Vehicles, and the surfaces they imply, call to mind movement...from skateboards to Jaguars. As soon as we get up off our plodding feet onto a set of wheels, the surface of the ground becomes entirely different. Our movement becomes fluid, swooping, fast, akin sometimes to being airborne. The surface becomes more abstract. Instead of something to be measured out by paces, it just flows along, interrupted only by bumps and ripples which break the smoothness of flow. Our requirements for the quality of the surface become more strict. It should be hard and smooth, and preferably level (unless the vehicle is gravity-powered like a skateboard). Roads are the obvious example, and with the coming of the automobile age, we've taken over vast areas of the ground surface for use by wheeled vehicles - not only roads but also parking lots and garages.

III. THE GROUND: PHYSICAL QUALITIES

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The discussion of images of relating to the ground attempted to identify some of the intangible qualities of the ground. There are also quite tangible physical qualities which combine in various ways to convey meaning and influence design. These will be examined in a general way before looking at specific examples of buildings and ground.

STABILITY AND PERMANENCE The stability and permanence of the ground is fundamental. It is the base for all of our structures, conceived of as rock-solid and unwavering. One of the reasons earthquakes are so fearsome is that they contradict our expectations. The stable ground is suddenly moving, "alive", and the result is toppled buildings, breaks in the surface, and other major kinds of disruption. In our engineering consciousness, we recognize that the ground does indeed move, sag, settle, and slip, and we've learned not to overextend its capabilities. But this is all to maintain that basic quality of stability.

It should be noted that the perception of stability and actual stability are often two different things. A building built high on slender stilts can be quite stable in the structural sense that it doesn't move or deflect, but it will lack a visual sense of earthbound stability. I am referring here to stability like that of a massive stone building, firmly rooted both in fact and appearance to the ground. Such a building, through its materials and its forms, shares the feeling of stability and permanence associated with the earth in a way that a spindly stilt building on a precipice cannot.

The notion of permanence is related to the notion of stability, but speaks, I think, more of the materials than the shapes of a building. The materials which come directly from the earth bring with them a resistance to

time which comes as close to permanence as anything we know. While this is not strictly true for all earth materials (adobe or metal, for instance), the enduring qualities of stone, brick, and concrete are associated more with geological time than human transience. These qualities can be enhanced and shared by building design, and they will reflect themselves in peoples' attitudes toward the building. Venerated institutions are all the more venerated when housed in buildings which evoke a sense of earthly permanence. Massive prisons are all the more formidable because of this same quality.

Similarly, building materials can conspicuously lack these qualities of permanence. Wood, thatch, and glass are a few of many that we don't expect to remain intact forever. Thomas Jefferson was singularly disdainful of early American construction because it was of impermanent wood, and lacked the enduring qualities he associated with a nobly founded culture.(16) This isn't entirely bad, however. One of the things we admire about teepees and igloos is their admirable impermanence and therefore their appropriateness for a nomadic existence.

Permanence and stability, then, are most directly expressed in the form and material of a building. The ground naturally carries these qualities. The contrast or similarity between building and ground in these respects is a significant source of information about the designer's attitude toward the building and its meaning.

LEVELS, LEVEL CHANGE AND SLOPE Another, perhaps more fundamental physical association carried by the ground is its essential horizontality. The understanding of the horizontal earth is easy on the plains and at the seashore, but it becomes obscured amidst hills and forests. When we get up high enough, how-

ever, all but the highest mountains become submerged in the overall flatness of the earth's surface, and the horizon takes over as the eye's magnet. The awareness of the horizon brings with it an understanding of the relative scale of humans on the earth: that we are really quite small and easily lost in the vastness. The power and expansiveness of the earth becomes apparent. But this awareness of the horizon also has a liberating effect: it carries the suggestion of unbounded possibilities, of unlimited lands to move over. Our popular images of nomads and explorers always seem to place them at broad overlooks or heading out toward a distant horizon. The ability to see to the horizon has always carried special significance. The Mayas built their massive pyramids with stones of the earth, but they used the stones to get them up above the trees of the jungle.(17) The height provided the ability to transcend the closeness of the ever-present trees.

The forms of our buildings often take the broad horizontal of the ground into account directly. Frank Lloyd Wright made it a basic part of his design attitude. His buildings are often formally tied to the horizontal plane of the earth, a device that links the interior space to the vast exterior space encompassed by horizons. The effect is both liberating and secure. The liberation comes from the horizon, the security from having a distinct place on the ground plane to inhabit.

Horizontality and levelness are also fundamental from a physical point-of-view. It has been suggested by Le Corbusier, Lyndon, and others (18)(19), that the first act of building is the creation of a level platform, not the erection of a roof overhead. One reason this is probably true has to do with the physiological facts of human life. When hands are kept free from chores of locomotion and stabilization, human beings are left in the rather unstable

upright posture of standing on two legs. When the ground is uneven, a great deal of our attention must be devoted to remaining upright and not stumbling--attention that could be better used for more productive purposes. A flat surface for movement greatly facilitates virtually all of the activities that are uniquely human. Obvious examples of this include dancing, athletics, manufacturing and craftsmanship, and most of our means of locomotion. Certainly our wheeled vehicles require relatively flat surfaces for movement.

Another reason that level platforms hold such human significance is that they so rarely occur in nature. Their creation is a uniquely human endeavor, and has often been performed to create quite special places for human needs. The Mayas constructed broad ceremonial platforms for ground around their temples and as a special stage for their processions. At ancient Persepolis, a platform 1000' x 1500' x 40' high was built. The power of these platforms comes, not only from the broad flatness at the top of the platform which sets the rest of the world at a distance, but also from the fact that they are elevated above their surroundings and become special places removed by height from the ordinary ground.

Jörn Utzon has understood this and done a great deal of very interesting design work with the notion of platforms. At the Sydney Opera House, the platform is used as a broad, elevated surface with terraces and ceremonial stairs. Above this surface, there is a grand play of space beneath his floating "clouds" of structure, which are treated as physically independent from the platform.(20) Many other designers use this platform principle, although usually less dramatically.

Levelness, or lack of slope, also strongly influences our movement, because the presence of any appreciable slope is difficult to ignore. When

slope is pronounced, there is a great differentiation of directions. "Up" requires considerable effort; down is a force that has to be resisted (and which can even be dangerous). Across the slope is the easiest path, the closest to level. Even a slight slope greatly influences the useability of the ground because these differentiations, no matter how subtle, are felt. A person lying on the ground will always position his head up the slope. A touch football team playing in the down direction has an advantage over the opponents who must work against the slope. The direction and degree of slope of the ground adjacent to a building have a big influence on how it gets used.

Similarly, level changes have tremendous significance for the use and movement patterns of buildings and sites. As James Marston Fitch has noted at length, level changes in the form of steps and platforms present problems for people.(21) Much of the movement toward barrier-free environments is concerned with these issues. Architects are aware of the problems, but also the potentials, of level changes. Even small level changes create privacies, differentiations and dominance of use. A curb is only a few inches high, yet separates cars from pedestrians. A terrace three feet high produces very strong separation. A six foot retaining wall, with its additional visual separation, almost separates two different worlds. Even stairs, which are meant for movement, affect differentiation of spaces. As Fitch notes, "It takes a fairly strong motivation to draw a pedestrian up three steps into a shop, as any retailer can tell you. "Pedestrians vote with their feet."(22)

VIEW The qualities lent to a place by a view are related to our desire for the horizon, but it need not be as grand as the horizon to be a view. Even the ability to see across a pond or down a hill is valued and lends special-

ness to a place. It is in the nature of the ground surface, in most regions of the planet, that some places put the viewer in position to see farther than normal, or to see some piece of the world from a different perspective. From a military point-of-view, the value of such place is obvious: forts were always built to have views out over significant terrain, at least as long as line-of-sight surveillance was the only means of observing movement. Even in non-military situations, the most important places have always had the most imposing views. Kings were "powerful over all they could survey". The rich often position their houses for symbolic dominance over the surroundings by locating for view. In a humbler sense, view is important to people for the simple fact that it enables them to take a "larger view" of the world, to expand their everyday image of their surroundings. View probably figures in the siting of almost every building that is built, even if only in the negative sense of avoiding a view with unpleasant contents.

The importance of view is not limited to looking out from a place. It is often just as important how a place or a building looks to a distant observer. Castles are usually just as imposing when seen from far off as they are from the base of the parapet. The ability to see the small town down below in a valley makes it understandable and special as a place. There is also much that can be learned about buildings when viewed from afar, as I will further demonstrate.

VEGETATION I wrote earlier of the identity of nature with the ground, and the difficulty of dealing with them separately. To a large extent this also holds true for vegetation and ground, especially in relation to buildings. Many of the physical and visual qualities of the ground, at least in the

broad sense of ground used here, have to do with the type, size, and density of the vegetation it supports. A gentle slope covered with soft grass is entirely different from one covered with scrub pine, and a house in a forest carries very different associations from a similar house in a cornfield. The vegetation of a place influences our perceptions of its wildness, its openness or sheltered-ness, its accessibility or isolation, even of its treatment at the hands of people. A very symmetrical, formal arrangement of vegetation is handled much differently from a brambly, overgrown, loose arrangement, which may not have been handled at all.

We have come to expect certain patterns of vegetation to go with certain uses. Suburban houses and play fields have grass and dandelions. Parks for strolling and cemeteries have ornamental shrubbery and trees. Municipal buildings have manicured landscaping, and formal arrangements of flowers and shrubs. Alvar Aalto surprised people with his Säynätsalo (Finland) Town Hall by setting it in the midst of a forest; a device used, according to George Baird, "...to ensure a distinct, albeit ironic, dematerialization of any urban space that might tend to crystallize there". He also points out that, in the case of Frank Lloyd Wright, "...the built-form and the planting together make up--even celebrate--a metaphor of organic unity". (23)

Vegetation, then, is the living, changeable component of ground quality. It can be altered, destroyed, or changed entirely, and the results are usually as significant as changes in actual ground form. When the natural vegetation has qualities we admire, great efforts will be expended to preserve it. When it is altered radically, the results depend on the designer. Like other qualities of ground, vegetation can be used well or used poorly.

DRYNESS For ground to be really useable for most human purposes, it must be dry, but not too dry. Overly dry ground is dead and dusty. Overly wet ground creates all kinds of problems, and whenever there is a choice it is avoided. If unavoidable, it is usually altered to make it dry. Surface water is controlled to prevent flooding, erosion, and (in cold areas) icing. Subsurface water is controlled to keep foundations stable and to keep below-grade spaces from being damp. The human necessity for the level platform to be dry is fundamental--so fundamental, in fact, that it is seldom made explicit; provisions for it are simply included in our standard way of building. The reasons dryness is important are many. Wet ground is soft and difficult to use. Bugs, rodents, and decay thrive in moisture. People are uncomfortable when damp. Many of the kinds of vegetation we prefer and cultivate will not grow in wet ground. The stability of slopes is affected by excess water. There is even a whole range of fantasy fears that people carry for swamps and damp ground with their reptiles and insects. The result is that the degree of dryness profoundly influences the uses and qualities of the ground.

SCALE Buildings and the ground with which they associate tend to mutually reinforce their feeling of scale. A landscape without buildings will often seem grander and of larger scale than it does after buildings are introduced. When we have an understandable reference to bring the actual sizes of the landscape features into scale, they can seem smaller. Likewise, the scale of a building is often expanded or diminished by its placement in the landscape. A hut clinging to a barren mountainside can appear forlornly small, even if it isn't physically small. A big house on a small hill can appear larger than it actually is. Trees, as accessories to the ground forms, also contribute

to feelings of scale. A lone house on a prairie is difficult to size accurately until a tree grows up next to it. We know how big trees are, so the house usually becomes understandable. The scale effects are not necessarily misleading; usually they help sizes to read more accurately. The scale, then, of a building in the landscape is strongly influenced by the ground around it and the vegetation next to it.

TEMPERATURE Just a few feet below the surface of the earth, the temperature remains constant year-round, independent of the wild fluctuations on the surface. The temperature is usually perceived as cool, although the Eskimos find it to be a source of warmth in the arctic world.(24) This uniform coolness is a part of our expectation of the ground. Any place with associations of underground is expected, at least subconsciously, to be cool. This is reinforced by the fact that earth materials on the ground, such as stone or concrete paving, are usually cool to the touch when they are out of the sun. When they are in the sun, the opposite occurs. Heat is absorbed and surfaces become warm. Wind-sheltered, sunny places surrounded by earth materials such as stone contradict the usual coolness of the ground, and so are special. These temperature qualities of ground influence the comfort and useability of ground materials and places on the ground.

MATERIAL QUALITIES When we speak of earth materials and their qualities, it is usually color and texture that are being referred to, previous discussions here notwithstanding. The colors of these materials are the rich, muted browns, reds, blues and greys of clay and stone. The textures are infinite, but usually varied and complex, following a subtle order derived from their formation pro-

cesses. Their use has evolved under local conditions in different cultures, leaving us with a broad palette of wall and pavement possibilities. Besides color and texture, though, earth materials have other qualities that we associate with them. They are generally hard, stable, permanent materials, little affected by water and weather. In their softer forms, like clay and mud, they are plastic and impermanent. They have a solidity and massiveness that we admire. The presence of earth materials in buildings recalls strong associations to natural ground and the qualities they share. These associations are neutral in themselves, but in use they can greatly add to the richness and layering of meaning in buildings.

IV. BUILDINGS AND GROUND: SEEN FROM A DISTANCE

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Much may be inferred about a building that is seen from a distance. One can, of course, discern such obvious information as whether the building stands alone, whether it sits high or low, its color, how it has been landscaped, and so on. But I believe the distant observer can also say a lot about the underlying attitudes of the owner and the designer. The form that a building takes, the way it is sited, the way vegetation has been allowed to grow around it, whether it sees or can be seen...all tell a story about the attitudes taken, deliberately or not, toward the surrounding world and its inhabitants.

OVERALL FORM One of the primary ways that buildings and ground interact is through their overall form. The image here (fig. 1), of a barn on the northern California coast, shows a building whose form is quite sympathetic to the general landforms around it. The low eaves, the broad slope of the roof, the double pitch, all combine in a form quite similar to the small hillocks nearby and both rise above the meadows as

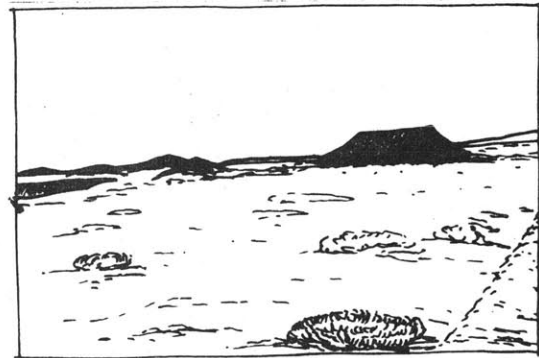


Fig. 1 Barn, Northern California

isolated, but not grossly obtrusive events on the surface of the ground. This sympathy of form is assisted by the weathered wood material of the building, which has a color and texture that harmonizes with the stone and grasses of the meadow. A bright white building of the same form would not be nearly so gentle an intrusion.

This example is fairly straightforward and simple, but the principle of building form and ground form being in sympathy has found widespread application. The stone Italian hilltowns on their rocky mountainsides, the low sod houses of the prairies, even craggy castles on promontories all reflect the general forms of their surroundings. Several superb designers, most notably Frank Lloyd Wright, have consciously designed with this principle in mind.

MERGING WITH SURROUNDINGS A similar principle, perhaps a bit easier to design with, is the building merging with the surrounding vegetation (fig.2). This requires refraining from

the more usual building technique of indiscriminately cutting down all the trees and shrubbery to clear a space for construction. When the vegetation is large, as in the case of trees, almost any building form will merge, as long as most of the trees are left in place. When lower vegetation prevails, the building must be more consciously restrained on order not to protrude.

FINDING A NICHE Another approach is that of finding an appropriate niche in which to build. The cliff dwelling shown (fig.3) was placed where it is largely for defensive reasons and for protection from harsh elements, but this placement also preserved

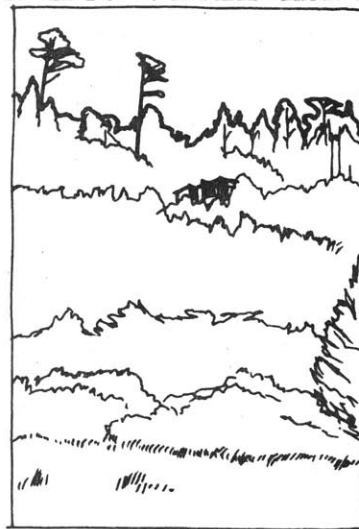


Fig.2 House in forest
Sea Ranch, California

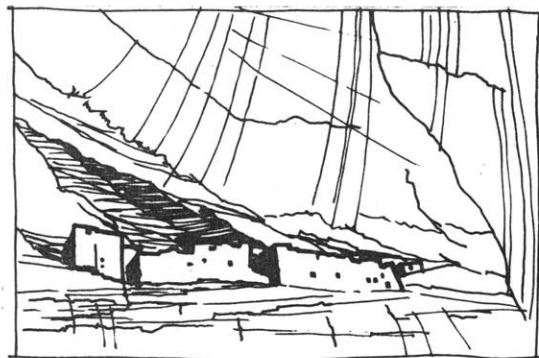


Fig. 3 White House Ruin
Canyon de Chelly, Arizona

valuable valley floor for agriculture. It is built in a niche literally, but in most landscapes there are places, such as changes in terrain or edges of vegetation, where a building may be fitted as comfortably. These natural events often provide a degree of shelter, and usually provide clues to building form, scale, material, color, and even layout.

This group of buildings at Sea Ranch, California (fig.4), occupies another sort of niche. The site is part of a vast, wind-swept meadow on the northern California coast. Windbreaks were planted years ago in the meadow, forming long lines of tree shelter amidst the exposed expanse of grass. The windbreaks have been shaped by wind shear and the lay of the land rising up from the ocean. The zone of transition from the grass to the trees provides a break

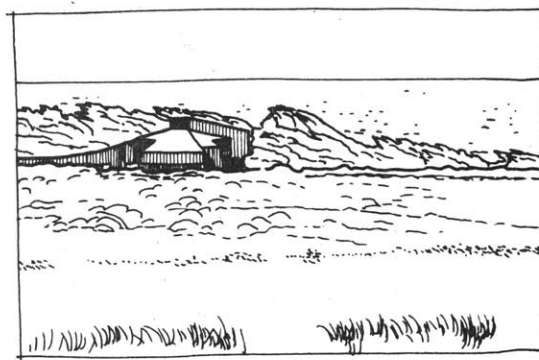


Fig.4 Houses in the hedgerow, Sea Ranch, California

in the landscape and an area sheltered from the wind. This is the niche where the houses were built. Their low sloped roofs, covered with sod, and their clustered configuration combine to work with the shape of the trees and the rough edge of the windbreak in creating shelter and merging with the surroundings.(25)

All of these forms of merging with the surroundings depend on an attitude toward the ground that values cooperation. There must be a desire to leave the qualities of the landscape and the ground relatively undisturbed, and a belief that the building benefits from the cooperation with the landscape. This is partly what Hubbard and Kimball, whom I quoted earlier, were referring to when they talked about designing to express an understanding of nature.

This need not, however, imply that ground and vegetation be left untouched. Often good design will actually improve the original ground by careful and sensitive modification. Likewise, the building need not slavishly follow the natural order, as Hubbard and Kimball go on to point out (26):

"We should bear in mind, however, in our endeavors to subordinate a building to a natural or naturalistic landscape, the fact that it is not essential for harmony that the shape of the building should resemble any natural form. The building need not be rounded like a great tree, or jagged like a cliff, or irregular or flowing in outline like the surface of a mass of shrubbery; indeed, an attempt to do any of these things, however successful it might be in subordinating the building to the rest of the scene, would inevitably, if carried to any length, result in architectural ugliness. The building should be beautiful, convenient, efficient after its own kind. In fact, fitness to local conditions, and simple form obviously expressing a practical need in construction or in use, tend of themselves to make the building less expressive of man's will, more expressive of man's necessity, and so less incongruous with natural expression."

The deciding factor, then, is the attitude and skill of the designer, which results in buildings that are compatible with the ground, or which fight it.

CONTRASTING OVERALL FORM The opposing attitude can be just as strong and just as obvious in the final product. This house project by Craig Ellwood

was deliberately designed to express the difference between human space and natural ground (fig. 5). It is built with a highly sophisticated technology, using materials decidedly un-earthlike. It is open and exposed, capitalizing a unique view and creating, in effect, an artificial eyrie. It denies the usual associations with stability lent by the ground in favor of a suspended stability in space. The uniqueness of the form, and its contrast with natural ground form, makes the building stand out in the imagination and memory of the viewer.

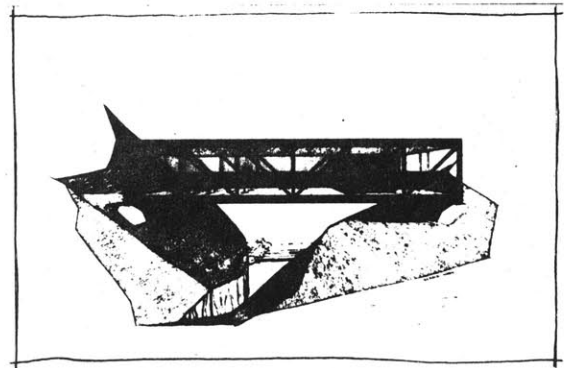


Fig. 5 Mountain house project
Craig Ellwood Assoc.

BREAKING THE HORIZON Of these two houses (fig. 6), the one on the right has been built to stand out, but in a different way. It occupies the highest ground, which always imparts importance to a building. But even more important, it breaks the horizon, which makes it visible for miles around. It dominates the countryside with its presence because it is almost impossible to look up at the ridge on which it sits without noticing that particular house. The house on the left is similar in many ways: it is bright in color, it sits high on the hill, it has a broad view of the valley below. But in other ways it seems humbler and less assertive than its neighbor as it merges with the trees around it, and even more importantly, does not break the horizon.

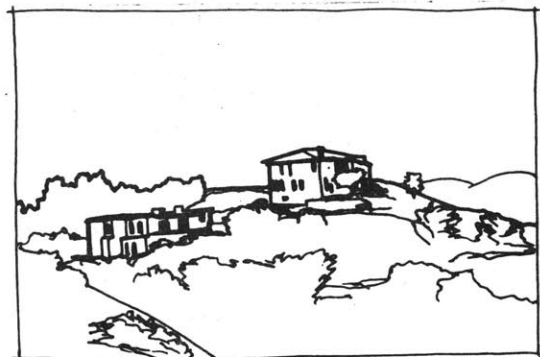


Fig. 6 Hollywood Hills, Calif.

DOMINATING GROUND One obvious source for the domineering attitude taken by the house on the right is the baroque chateau. This example (fig.7) is modeled after the likes of Versailles, which were built in an era of grand centralized power. It seemed appropriate in that age to organize the world around the ruler's seat into a large, symmetrically ordered realm with a grand axis leading up to the center. In this castle at Crane's Beach, a broad swath was cut from the

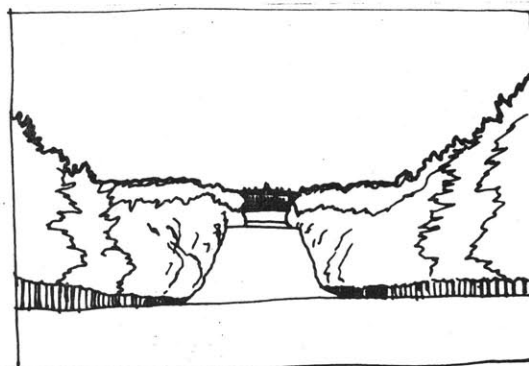


Fig. 7 Crane's Castle
Crane's Beach, Mass.

mansion to the sea. The house is clearly saying it is lord over all it sees, that the world falls into place at its feet. Despite the fact that we've gotten a good deal more democratic than the days when this might have been appropriate, many people still feel urges to emulate the Versailles model, at least as far as their means will allow. We find remnants of it in the most unlikely places...even owners of vacation houses in the New Hampshire woods have been known to cut long axes through the trees leading to their picture windows.

PRE-PACKAGED RELATIONSHIP Often today, the relationship of a building to the ground is standardized and pre-packaged. This mobile home (fig.8) was constructed to move over the surface of a highway, a surface that is relatively level and smooth. When it arrived at its des-

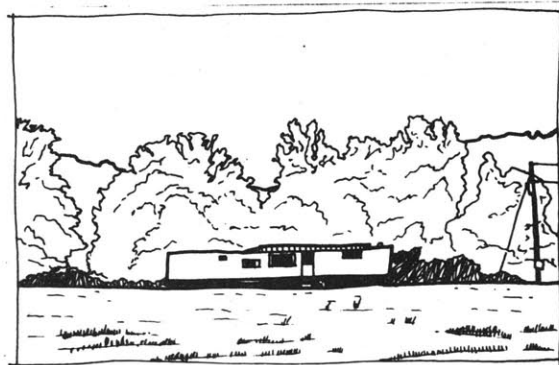


Fig. 8 Mobile home in field

tion, it required a flat place to rest on or supports to hold it level off the ground. Its relationship to the ground would be the same to whatever ground it was parked on. Owners of such mobile homes often make attempts to smooth over the rough connection with skirting, or even with masonry walls built around the perimeter. But they can do little with the fact that the building is a complete box form whose materials, scale, shape and color were determined elsewhere for reasons having nothing to do with the site. A good deal of construction that happens today shares these qualities to one degree or another. The buildings seem plunked down on their sites, often after the sites have been bulldozed to eradicate whatever natural qualities they did have. Such buildings ignore the ground and miss much that it has to offer.

DENIAL OF GROUND In more extreme cases, ignoring the ground is exaggerated into an intentional denial of the ground, as with the building shown here. (fig.9) Not only has this house been placed on a pedestal high above the ground, but its form has nothing to do with anything we

associate with ground form, If anything, it is trying to remind us of flying saucers (indeed, on several occasions drunken citizens have frantically reported sighting it as a UFO). The foundation solution undoubtedly made fairly good technical sense, given the very steep site. It probably would have been very difficult to create any useable level space on the slope, and would have required extensive disruption of the ground and vegetation if it had been tried. The form, while rather boring in its circular singularity, is the

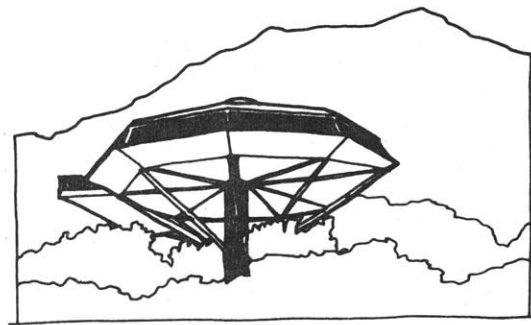


Fig. 9 Chemosphere house
Los Angeles, Calif.

logical attachment to a cylindrical pillar. Yet, despite all this, I am more inclined to ask why anything was built there at all, and if the structural gymnastics and the permanent visual intrusion were warranted by the result.

BUILDING FOR VIEW As mentioned earlier, one of the great potentials that the ground often offers a builder is a view. The point to be stressed here is that this phenomenon often has a profound influence on the form that a building takes. Buildings such as these (fig.10) seem to be climbing even higher than the hill to get as much of the river view as possible for as many of the rooms as possible. The poles, upon which the floors and roofs are supported, bear on piers pinned into a steep slope. From a distance, they are a very minor part of the visual composition, so the base of the building seems like, and indeed is something to be used. The building also exhibits many of the characteristics of dominance, denial of ground, and breaking the horizon that have been discussed earlier, all operating because of the desire for the view. This desire becomes overriding in many other buildings also, with the frequent result that the relationship to the ground suffers. As in this example, the site becomes an excuse for getting the view, rather than a participant with the building in making a living environment.

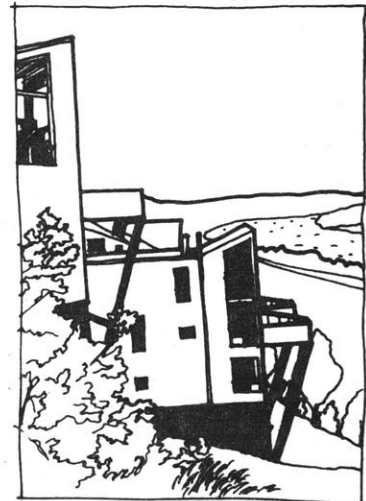


Fig.10 The Cloisters
Cincinnati, Ohio

BUILDING AS GROUND A completely contrasting example is found at the Oakland Museum (fig.11), a building that could perhaps be described as "building as

ground". This view shows the top of the building; several different exhibition spaces, courtyards, and a restaurant are below this level. The height of the built "ground" surface varies from one to three stories above street level, but it has been carefully designed to behave as ground over much of its top. The platforms are thick and broad, and large planters support vegetation almost as varied and rich as would be found in

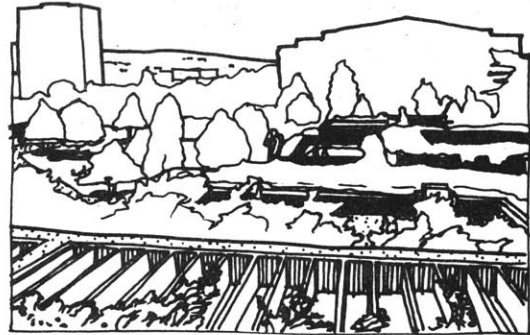


Fig. 11 Oakland Museum, Calif.

a more typical park on real ground. Indeed, most of the top of the building is used as parkland: there are open, sunny areas, sculpture gardens, secluded sitting areas, and promenades. The stairs and ramps connecting levels are broad and gradual, as if they are connecting terraces cut into sloping terrain rather than different levels of a building. Where there are spaces left between the individual parts of the building to let down light and air, they are built like big sunken courtyards. Often they are partly covered with trellises and vines, to suggest the continuity of the ground surface above instead of emphasizing the void below. One large area of this park-on-a-building is broad and flat, rather than terraced and stepped. The suggestion is even stronger that this is natural ground, but it is in fact the roof of a large parking garage.

If a prime quality of ground is that it is continuous and one-sided (as Maurice Smith and others have suggested), this building has demonstrated the point well. The different surfaces of the building are shaped to minimize their separateness, and detailed to maximize their connectedness. Vegetation not only disguises discontinuities, but also helps one to ignore the concrete

building structure which is really quite massive. Where the paths lead down to entrance doors on the lower levels of the museum, the feeling is very much one of moving through grottos and underground corridors, rather than coming down off the roof. Even from the lower levels, one is often given the opportunity to look up to the sky and the vegetation growing above, and maintain that sense of the ground surface above.

COMFORTABLE WITH THE GROUND Few of the principles I've been discussing are found acting in solo. Usually, it is the way in which they combine that ultimately determines a building's relationship to its ground. The principles are not inherently good or bad, but succeed or fail according to how they are applied (and, of course, how they are judged). I believe that a building should not blatantly oppose the ground around it; that they should be comfortable together.

This house on Martha's Vineyard (fig.12) should illustrate what I mean by this. The house and outbuilding sit on a promontory in the marsh and have a fine view of the bay and the dunes beyond. Likewise, they can be recognized from all around as a human dwelling. But the small scale of the buildings, the muted colors (dark grey), the simple forms which are quiet and self-contained, and the simple landscaping which eases the transition from the yard to the marsh, all combine to make a special place in that environment which does not clash with the surroundings. In fact, the house serves, I believe, to make the entire

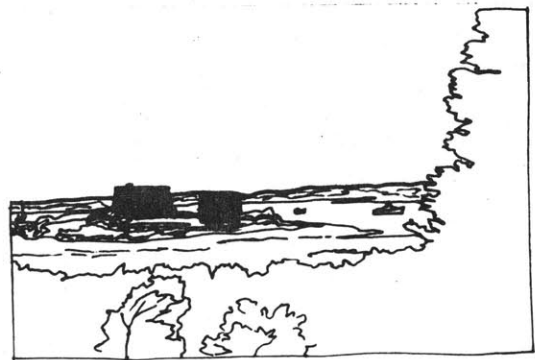


Fig.12 House and cove
Martha's Vineyard, Mass.

view rather special. It reminds one that people inhabit the place, that the natural world has been modified somewhat to meet human needs without totally contradicting it. The house transforms an otherwise wild expanse of marsh and bay into a gently humanized place with the feeling of encircled felicity that we associate with sheltered coves.

Another example of comfortable building and ground is this house on a hilltop (fig.13). The site chosen has a broad view, and is visible to people for a good distance around. The building does not deny these facts, but works

with them to alter their impact. The form of the building includes a broad porch across the front, a long low arch spanning the porch, and a roof that is hipped.

These combine to bring the building visually down to the ground and tie its form to the curve of the hilltop. The trees planted on either side become the forms

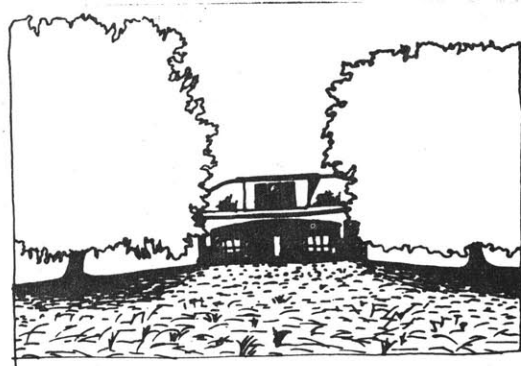


Fig.13 House on a hilltop
Zanesville, Ohio

that break the horizon, putting the house in a secondary, and therefore good deal less obtrusive role. The fact that the trees are symmetrical about the axis of the house serves to make the place a bit more special than if there were a clump of trees all around the house. The low steps up to the porch and the low rail along its perimeter make an easy and direct connection to the ground for the people of the house, which enhances the building's comfortable relationship to the ground.

A building seen from a distance, then, tells us many things about itself: whether it merges with the vegetation and landform or dominates it; whether it has found a niche or is breaking into the horizon or is plopping

down arbitrarily on any piece of ground; whether it is setting itself apart from the ground or becoming more like it; whether it is climbing for view; whether it is working to help make a place special. All of these characteristics are more or less in the hands of the designer, and the choices he or she makes tell much about the designer's attitudes toward the ground.

V. BUILDINGS AND GROUND: SEEN FROM CLOSE-UP

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As one gets closer to a building, the attention shifts from the broader kinds of observations that were made in the last chapter, to much more specific phenomena. The attitudes that were discernible from the distance still apply, but the way in which they are carried out now becomes the issue. At this smaller scale, different levels of meaning will be built into the building that can reinforce or negate the meanings suggested by the overall building form in its larger context. A building that seems, from a distance, to merge with the ground can actually join the ground quite abruptly, an inconsistency not visible from afar. Close to a building, more detailed design issues become important, such as the materials of construction, the vegetation and how it interacts with the building, the sizes and character of retaining walls and stairways. People experience these elements directly, and their scale, use and meaning are important to our understanding of buildings and ground.

BUILDING MATERIAL The material from which a building is constructed becomes quite important from up close. The material can be foreign to the context, or it can be quite local. In this drawing (fig.14), we see an example of vernacular building which seems to grow out of the materials around it. Not only is it constructed of the same soft rock which makes up the cliff behind it, but its form borrows directly from the cliff. The building becomes a man-made cave. It is in direct contact with the natural earth, backing up against it for shelter and modifying its shape to enhance the sheltering quality. Even though the rectilinear



Fig.14 Pueblo ruins
Bandelier, N.M.

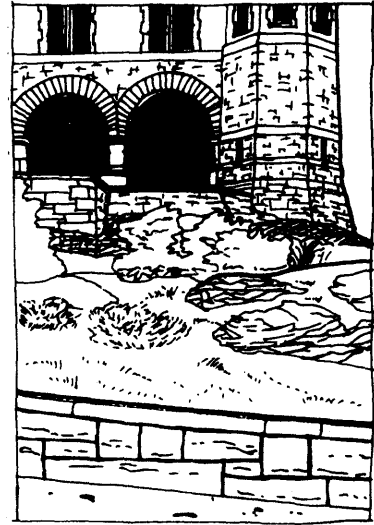
shapes of the building are not found in the natural formation, the scale of the building, its openings and its parts, along with the surface texture of the wall, are similar enough that the connection is readily apparent. I should note that when these buildings were in use 500 years ago they were plastered and whitewashed, and must have made a much more striking contrast to the brown cliffs. But this does not take away from their power today, and the principle has been applied in many areas.

MAKING A BASE A more common architectural device for making a strong association to the ground is in the making of a base for a building. This design device has a long and venerable tradition, going back through the design of columns, and probably originating with natural forms such as trees. John Wood, in the 17th century, was theorizing such an origin: "...as the pillars imitated the trees, so they were made with a base at the bottom, to answer the root end, and with a capital at the top to represent the head of the tree".(27) Louis Sullivan carried this one step further by saying that a building, like a column, could have a base and a capital.(28) But it seems to me that the notion of a base intuitively makes good sense, if only from a formal point-of-view: when the vertical planes and forces of the building intersect the horizontal resistance of the ground, there should be some formal acknowledgement of the fact. A base acts as the transition, combining elements of structure and ground, uplift and stability.

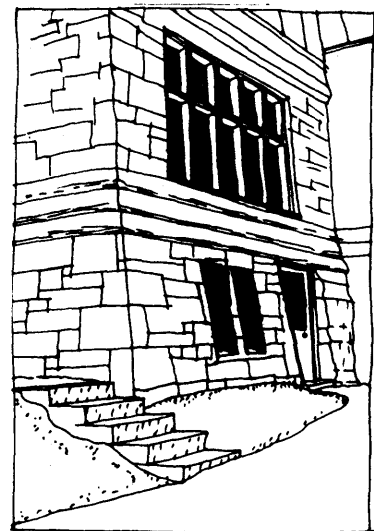
H. H. Richardson was a master at designing bases that seem to bring part of the natural ground up into his buildings, as shown here at the North Easton, Mass., Ames Memorial Hall (fig.15). The building sits up on a knoll, with outcroppings of natural rock around its base. At the perimeter of the site

runs a low stone wall, which is quite similar in appearance to the natural rock, and which serves to establish the precinct of the building. The rough stone of the building rises, in many cases, directly from the rock outcrop, as does the stone wall. This rough stone establishes a firm base that acts as the formal transition from the rocky ground to the superstructure. The base is designed to enhance this transition function by the random coursing of the split-face stone, and by the battering of the wall which recalls natural rock formations, and the structural imperative of widening the base to spread the accumulated loads from above onto a larger area of ground.

In another building by Richardson in North Easton, we see the same principle at work (fig.16). The stone of the base is rougher and appears more like the parent stone than the material further up the building. It is widened at the base, and the principle floors of the building start above the level of the top of the base. At the back of the building, shown in this view, the ground surface has sloped down enough that several feet of the base are above grade. Some useable space has been claimed within the base, and some windows and a door have been cut in to allow light and air. These cuts show the thickness of the wall, and suggest the underground nature of the spaces within. They are the basement areas,



*Fig.15 Ames Memorial
North Easton, Mass.*



*Fig.16 Library
North Easton, Mass.*

the places surrounded by stone, where one walks within the "ground", not on platforms built above the ground. The base serves to distinguish building from ground at the same time it makes a connection and transition between them.

Occasionally, as in the Rookwood Pottery building (fig.17), the neat division between base and building is blurred, and the base becomes an active part of the building, but the uses are not so clearly differentiated. Here, there is activity going on beneath the arches in the stone base of the building. The arches are not so small and thick that these spaces feel like the basement, yet they are clearly more related to the ground than the floors above. The natural ground has actually been held back from the edge of the building by the brick paved area a few steps above grade. The low stone wall and the hedge upon it, then, mark the real transition from ground to building, and the bricked area is a built, outdoor extension of the floor platforms within the building envelope.

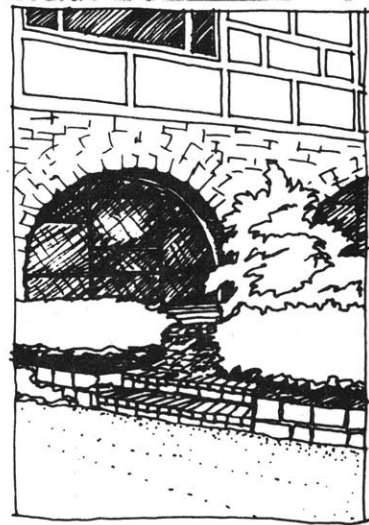


Fig.17 Rookwood Pottery
Cincinnati, Ohio

USING VEGETATION Another way of making a transition between building and ground is to blur the distinction with vegetation. In this rather extreme example, the building has been nearly covered by the same vegetation which grows around it. (fig.18) The building becomes a bower, an opening beneath the vines, rather than a man-made



Fig.18 House
Berkeley, California

wooden box sitting on a foundation. The vegetation, by claiming the house partly as its own, suggests that the house participates in the natural order of the site. Ivy growing on buildings produces much the same effect, except that the shape of the building is left intact. Vegetation will not necessarily make a building and the ground around it take on a compatibility that wasn't there before the plants, however, but it can enhance or set off the compatibility that exists, as shown in the earlier example of the Oakland Museum.

A good example of where the vegetation doesn't succeed in creating a better relationship to the ground than existed before can be found in the typical suburban house solution of foundation plantings. The drawing shows a fairly

typical situation (fig.19). The concrete foundation has been brought up out of the ground for some distance before the wooden structure of the building begins. Since the foundation has no particular qualities of its own to enhance...it has a rather non-descript concrete finish, it

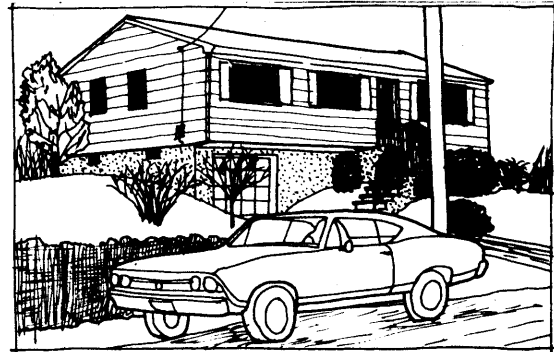


Fig.19 House, New Jersey

isn't articulated as a base, it doesn't act differently from the rest of the building as a wall...it is instead covered over with decorative plantings at the front door where it wants to look nice. The landscaping there does shift attention to the upper parts of the building, but the fundamental abruptness of the concrete wall meeting the smoothed over ground is still there. The house only partially succeeds in blending with the ground.

The reasons this kind of building/ground relationship is so ubiquitous are largely economic, although other factors exist. Building a straightfor-

ward concrete foundation wall in the ground, with a simple wooden frame above it is cheap and performs satisfactorily for most purposes. Building a more elaborate transition from ground to building is time-consuming, laborious (even with machines), and often involves a good deal of expensive hand work. Also, the design of such a building/ground transition is more difficult than designing the building for a flat condition and making up any irregularities in the ground with the foundation wall. In addition, there has developed an American tradition of foundation planting, which is used to dress up the formal side of the building facing the lawn and the street. Some people succeed admirably in planting the transition from the lawn to the house, and those that don't probably don't mind all that much. Besides, for most people this is seen as a continuing project, the result of small investments and improvements over a number of years. As the house and the inhabitants get older, the ground around also grows and mellows. None of this, however, can offset the basic abruptness of the built transition. There is a better way, from the standpoint of how a building and its ground can come to more mutual accommodation.

BUILT TRANSITION This house (fig.20) is perhaps not typical, but illustrates a better way for the ground to associate with the building. The steepness of the site is more extreme than that of most building sites, but it has been made into an asset rather than a burden. A large retaining wall has been built to create a relatively level place from which to begin the garden. It is built to be mas-



Fig.20 Hillgard Street
Berkeley, California

sive and rough, like a cliff face, which reminds us of its ground function. It does not have a straight, flat top, but rather follows the slope up to the house. Above the wall are a series of terraces which are extensively planted with shrubs and flowers. This garden, then, retains qualities of the original ground...it is steep, fairly rugged, obviously built of earth materials, yet it is human and civilized. The steps, like a grand staircase, climb up the garden to arrive at a terrace built at the first living level of the house. Its location at the top of the slope makes it a gentle eyrie looking out over the lands below. The terrace has a form which is of the ground, but is made from the white stuccoed material of the house. The formal railing around the terrace serves further to suggest that this is as much a part of the house as it is a part of the garden. The French doors which lead from the terrace into the house complete the transition from ground to the built environment. The place is rich, not only in plant materials and ground forms, but in human associations: imagination material.

Most of the devices which this house uses to make the transition from the ground to the house, however, are also constructed. The disruption to the ground necessitated by the retaining wall and terracing construction must have been extensive. But the final result still carries a rich set of associations with the ground, its forms and materials, and the building achieves a real sympathy with its ground as a result. The vegetation that has been introduced serves to enhance this sympathy and smooth out the rough edges, but the overall success depends on good ground work.

In the case just presented, the modification of the ground was to enhance the association of building with ground, and to encourage as many pleasant things to happen along the way as possible. The same devices can also enforce

separation. This building in Columbus, Indiana (fig.21), illustrates this point. The transition from street to building goes thus: street, curb, sidewalk, low stone wall, berm sloping upward covered with ground cover and a small forest of locust trees, building wall.

The result is a pleasant landscaping for the street edge; certainly more agreeable than the blank wall of the shopping center would have been. It also prevents the rather large mass of the building from competing with the historic buildings which are located across the street. From a

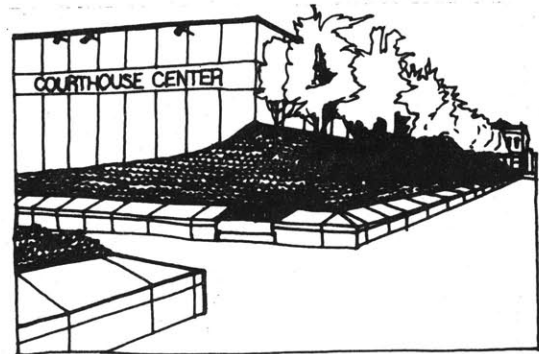


Fig.21 Shopping Center
Columbus, Indiana

pedestrian point-of-view, however, the result is akin to a barrier. The sloped top of the low wall and the sloping berm do nothing to encourage one to stop and enjoy the greenery, The only benches are built into the wall in the courtyard to the left, none are found in the low wall along the street. The straightness, length, and unchanging monotony of the wall insist that one hurry along, rather than linger. The ground, then, is primarily there to submerge the building, both figuratively and literally.

SUBMERGING THE BUILDING Ground and vegetation are also used to submerge the building at the Oakland Museum, but with different results (fig.22). As was mentioned earlier, the overall form of the building encourages one to read it as ground and terraces, and roof plantings reinforce this. From within



Fig.22 Oakland Museum, Calif.

the building, the vegetation further enhances the suggestion. The lush shrubs and vines on the upper levels hang down over the structure, bringing their associations of sunlight and surface down into the courtyards and underground passages. They also serve to disguise and diminish the concrete beams and walls supporting the massive roof. Vegetation is also used in the sunken courtyards which open to the sky from the lower levels. The suggestion is that this lower surface is like the ground above, which helps the sunken places feel less subterranean and less cave-like without totally denying the fact of being below grade.

The general progression in our tradition has been to build more and more out of the ground (from hogans to high-rises), but a counter-movement, based on environmental concerns, is developing. As Malcolm Wells, one of the most vocal spokesmen of this movement, describes it,

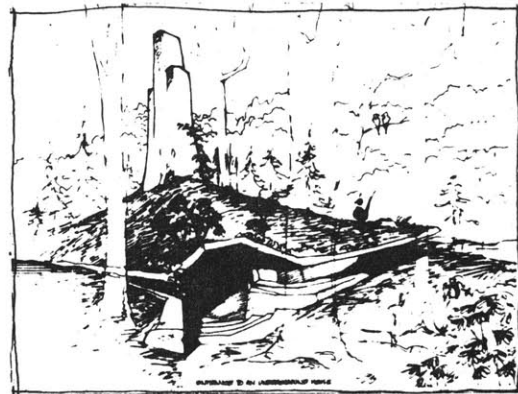


Fig.23 Malcolm Wells, project

our current building practices cover the ground with pavement and roofs. This destroys the capacity of the ground to absorb water (replenish the water-table), to support vegetation (purify the air and produce food), and to sustain wildlife. He advocates buildings that are literally underground, or at least covered with a thick layer of soil (fig.23). Besides preserving the ecology, such buildings have low heat losses and conserve energy. He insists that, with good design, they can be as dry and pleasant as above-ground buildings, and can also tie in with some of the rich imagery discussed above.(38)

A house which, to a lesser extent, is also underground, is located on Mount Adams, in Cincinnati, Ohio (fig.24). The site is steep and buildings

are built close on either side. The concrete walls act to hold back the soil pressure and water seepage on the sides and back, and make a place for the house to sit in the slope. It is interesting, however, that the occupants are given few clues that the rooms they inhabit are below grade. The only views are directly out from the inside. The reasons, it would seem, that the building was built as it was, have more to do with blending in with the landform and not standing awkwardly above the slope. There may also have been construction considerations if the soil was unstable enough to make building a tall house difficult. And, of course, the house is probably quite private, free from neighborly interference, and energy-conserving.

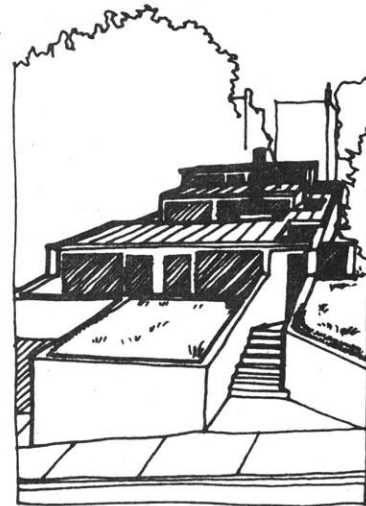


Fig.24 Mount Adams
Cincinnati, Ohio

DEALING WITH STEEPNESS Another major reason why buildings are often dug into the ground and surrounded by retaining walls has to do with the need to create level places. This school, built on a rather steep slope, would have no level play yard at all without the construc-

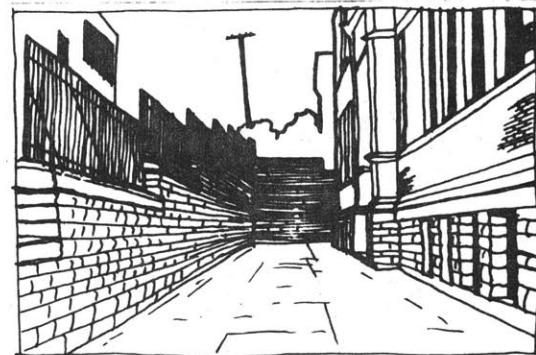


Fig.25 Schoolyard, Cincinnati

tion of the massive retaining walls seen on the left (fig25). The relationship of the building to the ground becomes rather strange as a result: it is built like a flat-ground building, with an inhabited base of rough stone supporting a smooth brick superstructure. The ground immediately around it is obviously artificial, with its continuous asphalt surfacing and its lack

of vegetation, more like an extension of the floor platforms inside the building than the ground surface. The building mass sits in a wedge cut two stories deep into the hillside, and carries no relationship to the fact of the slope. Its only relationship to the retaining walls which make all this possible, is the similarity of the stone in the building's base to that of the retaining walls. This is an example of a building where the need for the level surface completely overrode the architectural possibilities for dealing with the ground and the slope.

A similar situation occurs with these buildings by the San Francisco Bay (fig.26). The level platforms, in this case, were desired in order to give people a place to enjoy the view across to San Francisco. The site was so steep that ordinary construction was impossible, and carving into the slopes as on Mt. Adams would have not given the height desired for maximum view. Building on stilts was an obvious enough solution, and probably practical, given the overriding need to get good views, but the relationship of the buildings to the ground below them was completely sacrificed. The stone building to the left does the same job of climbing for view, but is still firmly related to the ground.



Fig.26 Tiburon, Calif.

This drawing also shows an interesting contrast in slope stabilization techniques. Whenever a steep slope must be left exposed to the weather, it is necessary to protect it from erosion after the construction process is completed, and until vegetation can re-establish itself. The exposed soil under the stilt buildings was covered with large rocks, at least up high enough to

be completely under the building and out of the weather. The result is a rugged slope, inhospitable to humans, plants, and animals alike. The slope on the left, on the other hand, was covered with piled bags of cement and sand. These give a softer texture, but more importantly allow vegetation to take root and grow. By the time the bags have disintegrated, the slope will have naturally revegetated itself.

This process of construction on stilts has been carried to an extreme in parts of southern California (fig.27). These houses are of rather standard suburban design, meant for flat lots and normal ground. Instead, they have been hoisted into the air and placed on spindly steel scaffolds. They seem to have no relation to the ground. The reasons for such construction have to do with high land costs, which make such ridiculously steep sites desirable, and possibly a desire for views, but the results are nothing short of absurd. Even the Chemosphere house on its pedestal (fig.9) is a more appropriate solution to a house in the air, if only because it carries no pretensions of relating to the ground.

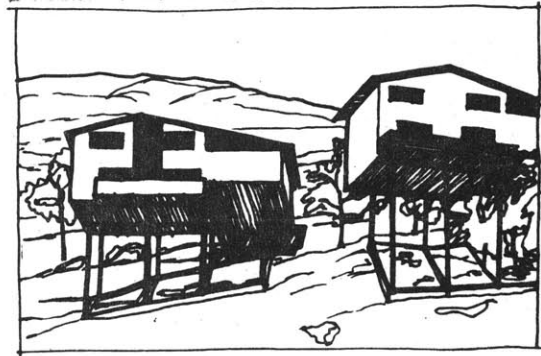


Fig.27 Coldwater Canyon
Los Angeles, California

VI. BUILDINGS AND GROUND: MOVEMENT

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The underlying theme of all this discussion of buildings and ground has been the transition from the natural earth surface to the built environment of buildings and human spaces. I have looked at this transition from a distance and from close-up, but the emphasis has been on meanings and form. Just as important, however, from the point-of-view of a person actually using a building, is the aspect of movement. In moving toward, around, out of, or into a building, one is directly affected by the shape and qualities of both the ground and the built surfaces, and by their sequence of events. The sequence informs one about where to go and not to go, introduces one to the building and the ground around it, allows some uses and discourages others, and reinforces meanings that the building conveys. The sequence toward a building starts a long way away, perhaps on the other side of the city or across the valley from the building, and continues to its inner recesses.

FLATTENED GROUND As I discussed earlier, one of the most important functions of a building is to provide a level, sheltered platform for human use. Often, when site conditions allow, the ground around a building is also leveled (fig.28). In this case, the site has a gentle slope coming down from the street (from the right). The area next to the building was flattened and paved to create a surface much like an extension of the floor inside. This area is even treated like the floor, with a bench for sitting, planters, and arching trees providing a ceiling overhead. There is a brick border marking the transition to



Fig.28 Women's Club Building
Sausalito, California

the lawn. The lawn, in character, is somewhere between the smooth pavement and a rough, natural ground surface. The path leading to the building is paved with bricks, and cuts through the grass until it merges with the flat brick pavement near the building. The movement, then, starts somewhere away from the building, and leads the visitor through a series of gradually more-controlled pieces of the outdoors in preparation for the totally man-made indoors.

SURFACE MATERIALS The nature of ground surfacing materials has a big influence on movement, both pedestrian and vehicle. This is largely because some materials are simply easier to move over than others. Natural ground is usually a poor surface for movement. Vegetation larger than grass is an impediment, and grass is usually worn away with steady use. Dirt gets muddy when wet, dusty when dry, and lumpy in general. Gravel avoids some of these problems, but it is still limited by softness and surface unevenness. Asphalt and concrete paving make movement easy, and have become essential components of all active use areas. Other hard pavements, such as brick, flagstone, and tiles are used as higher class and visually richer substitutes when the budget allows. All pavements can be used to direct traffic and give clues as to use, public or private, and type of movement. The absence of pavement also does this; grass may usually be walked on but not driven over, ground cover planting is for looking at but not for movement. There is a wide range of surfacings and uses for them which work with the shape of the ground and buildings to control movement.

TERRACED SLOPES After levelness and surfacing, changes in these qualities

become important. A vital aspect of level changes in the ground is their surface dimension and the difference in height between levels. These terraces (fig.29) are like giant steps in a steep slope, connected by smaller steps moving up the side. Both sets of steps are cut into the same overall slope, but their uses are radically different. The stair is almost exclusively for human movement. It makes the negotiation of that slope possible, if not always enjoyable. The larger scale steps, however, are quite difficult for people to move over; their



Fig.29 Sachs Apartments
Silver Lake, California

three or four foot size requires climbing hand and foot. They do, however, create relatively broad, level patches of ground, which could be used for a variety of human purposes otherwise impossible on such a steep slope. In this case, they provide garden plots for the occupants of the apartments which climb up the slope in yet larger steps on the other side of the stairs.

TRANSITION TO CLIMAX This house by Greene and Greene shows a well-orchestrated sequence from ground to building (fig.30). The ground, in this case, is a cultivated surface rather than raw natural ground, so some transitions have already occurred by arrival at the lawn. From here, one ascends several levels and makes two changes of direction before reaching the front door. In the process, one pas-

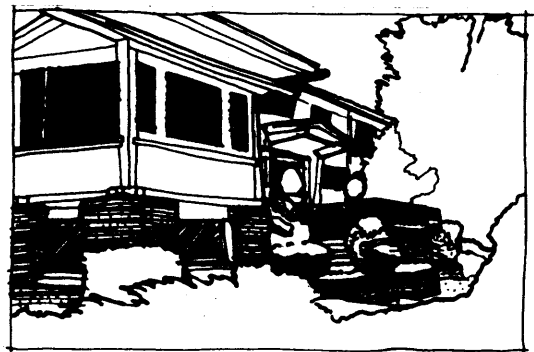


Fig.30 College Avenue
Berkeley, California

ses planters made of the same rough brick as the stairs. The plants become somewhat more ornamental, and the brickwork more decorative the higher one climbs. The first level is only two or three feet higher than the lawn, and the plants are similar to the shrubs which skirt the grass. At a higher level, the brick forms a balustraded podium which looks back over the lawn like a reviewing stand. Flanking this platform are two ornamental shrubs acting almost like gateposts. Higher up, one arrives at the door, sheltered finally by a small projecting roof. The klinker bricks which were used to construct these terraces are quite earth-like in their color, texture, and irregularity, but their gradual refinement of use, going from base to balustrade, enhances the transition from ground to building.

ZONE OF MOVEMENT The use of terraces and steps to create transitions from ground to buildings does not have to be so singular in leading up to a climax. In this building by Rudolph Schindler (fig.31), the terracing and steps create a zone of movement between the building and the ground adjacent to it. The shifting of the building mass in and out and at different heights is echoed by the shifts of the retaining walls on the other side of the path. The different sizes of the steps and platforms combine to create a variety of places along the path up the slope. Some open onto small courtyards, some are narrow passages, and some have vegetation close in, held by the masonry of the retaining walls. The materials along the way are quite consistent: concrete and stucco; and the



Fig.31 Bubeshko Apts.
Silver Lake, California

contrast of the building on the one hand with the natural slope and vegetation on the other is the more striking because the movement zone in between them gives equal design attention to the building side and the ground side.

SLOPES AND PLATFORMS In a more urban context, a common situation one encounters is that of making an entrance from a sloping street to the level floors within the buildings. Since the slope is likely to vary, nearly every building entrance has a different relative height to the street. While this can cause problems for mass builders, when more individual responses are possible a great deal of richness can be achieved along the street edge because of this condition. In this hillside example (fig.32), a vocabulary of small terraces with brick walls and posts and iron gates has been shared by different owners and applied to individual conditions. On the left, the entrance is in line with the gateway from the sidewalk, with the terrace raised a few steps to the right. On the right, the path takes a turn and climbs up to the door platform. A variety of very simple configurations is possible within the same vocabulary. There can be elaborate formal entrances with axial symmetry and hierarchies of ascent; there can be informal entrances with sitting terraces and low walls; there can be micro-gardens of flowers and herbs. Variations in brick bonds, iron-work patterns, and wall heights are readily adaptable. Because of the different house heights, variations of this nature are almost unavoidable along the street, resulting in both a livelier street edge, and individual movement



Fig.32 Mount Adams
Cincinnati, Ohio

sequences for each house.

LADDERS The movement from ground to building need not always be accomplished by modifying the ground surface. Such modifications often become elaborate undertakings because of the difficulty of working with ground materials.

They are inevitably heavy, difficult and expensive to alter, and bulky, even when they perform simple tasks like creating a few steps. One of the simplest alternatives is a ladder (fig.33). Here, the difference in level was great, and the cliff slope too steep to permit anything like a ramp or other gradual transition. The ladder is safer than handholds and footholds, and has the defense advantage that it can be pulled up after entering. Modifications have been made to the ground surface, however. The soft rock which makes up the cliffs has been carved out immediately in front of the entrance to the small cave to give a useable surface

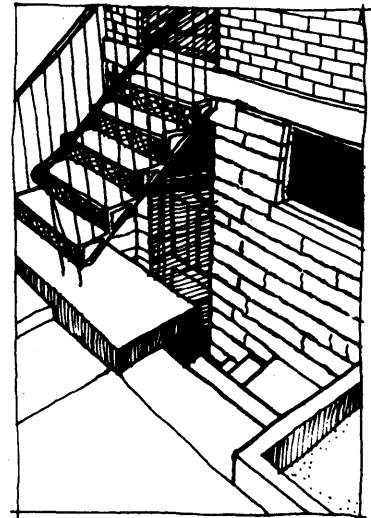
out in the sun. At the lower level, a low wall has been carved out which partially encloses the landing area for the ladder. The ground in this case, then, does more than act as the surface for action. It also encloses open space and covers over small sheltered areas. The rock does everything but make the level transition, a job which the wooden ladder does better.



Fig.33 Cliff dwelling
Bandelier, N.M.

In a more conventional example (fig.34), the same devices are present, at least diagrammatically. The concrete and stone which here act as the solid, continuous ground material, are "carved out" to make a step descent into the basement. The doorway at the bottom leads deeper into this material and

under the building; it speaks strongly of going into the ground. The climb to the upper platform, however, is handled quite differently. The upper level is made from a more refined material (face brick), and the construction is more finished. The stair which spans from the sidewalk to the upper level is light and open. It acts very much like the ladder in the previous example: people leave the ground and climb up through the air to an elevated platform.



*Fig. 34 Mount Adams
Cincinnati, Ohio*

GANGPLANK An even more extreme example of spanning a level change is the gangplank (fig.35). The transition is from a pier (out of the picture to the left), which represents a kind of ground, to the deck of the houseboat. The gangplank not only accomplishes the level change (a change which varies with the tide), but bridges the water which separates the two closest things to ground that are present. In moving from pier to deck, one travels out into space and out over the fluid surface which is definitely not ground. The arrival at the platform is, in a sense, a return to ground, albeit an unusual ground which moves and rocks. This deck has been treated so as to maximize its suggestions of ground, despite its obviously un-ground-like context. There are plants growing, the house is supported on the platform, and there is an outdoor enclosed place on the deck. The experience of



Fig. 35 Sausalito, California

the bouncy gangplank, however, is different enough from normal movement that it is exciting, and the overall contrast to being on firm ground is the primary effect.

MOVING INTO GROUND On the other end of the experience spectrum, is this example of moving into the ground (fig.36). The path leading up to the building passes between berms that have been built up over the original ground surface. The house at the end of the path sits somewhat down in the ground between these berms. As the path descends slightly, the berms rise on either side, providing an increasing sense of enclosure and ever greater protection from the wind and elements. One almost feels that if the house hadn't been there, the path would have tunneled on under the surface. The experience is completely

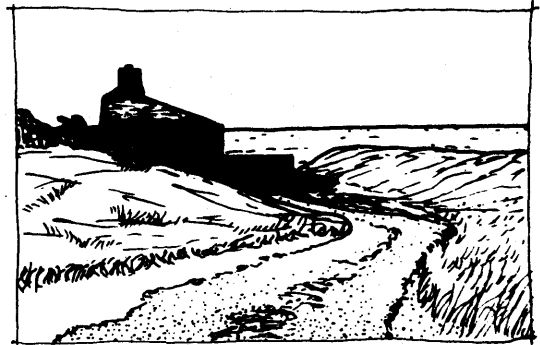


Fig.36 Shinefield House
Sea Ranch, California

opposite to that of leaving the ground and moving over a void. It recalls images of burrowing, of places sheltered and snug. The movement and the ground form, then, greatly enhance the protection function, and also peoples' imaginings of that function.

VEHICLE MOVEMENT The discussion to this point has concentrated primarily on the movement of people on foot, and the scale of their experience with differences in the ground. An entirely different set of problems arises when vehicles must move around a building. The responses to these problems tend to be more demanding on building design than those for pedestrian movement,

because vehicles are a good deal less flexible than people when it comes to movement. They require ground that is basically flat and continuous, with only gradual changes in slope and small bumps, if any at all. In addition, the scale of the vehicle is usually much greater than people-scale, so much larger ground areas must conform to the vehicles' requirements. On a flat site with ample open space, the usual response is simply to pave over enough ground for the vehicle traffic required. On sloped sites, the provision of suitable ground becomes problematic. Usually the solution requires rather large-scale earthmoving and paving operations, but with ingenuity these can be minimized, or else used to advantage.

This house in San Francisco is located on a very steep hill (fig.37), and it was evidently desired to bring automobiles into the building. The necessary ramp, from the street to the height of the courtyard, essentially determined the ground around the building. Paths for pedestrians lead off of this vehicle ramp into doorways at the front of the building and under the passage through the building, and a place has been created for the tree to grow, but they all depend on the requirements of the ramp for their basic character. The building form was likewise largely determined by the vehicle ramp; a large



Fig.37 Pacific Avenue
San Francisco, California

part of it has been lifted up over the passage through the middle, with uses relating to entry functions clustered on the lower level. The problem of vehicles, pedestrians, entries, and building configuration, then, have been worked into a reasonable solution. Other buildings are seldom so fortunate.

In this much less carefully worked out solution (fig.38), the automobile was essentially given the leftover part of the plot, leaving little open ground for the people to use directly. The entrance to the building was treated completely independently, and is akin to the ladder examples discussed earlier. Since the building was built, some accommodation between the car and the building has been made. Some outside space for people was reclaimed as the deck over a carport, but nothing was done to integrate the arrival by automobile with the pedestrian arrival on the other side of the building.

This is actually a general problem with most residential buildings. The car demands a large part of the site for drive, parking, and garage.

Often, when the garage is attached, the everyday entrance for people is from the car through the garage; a very uninspiring entrance. Still, a lot of attention is given to the formal, ceremonial entrance: a nice path, steps, lamp post, covered entry, fancy front door. It is seldom used. It would seem that, if all that money is to be spent on the formal entry and on the driveway and garage, a more reasonable accommodation of conflicting requirements could be made than commonly is. Perhaps the previous example hints toward a better direction for design.

Outside of the residential sphere, the building and the ground have sometimes been brought to a more satisfactory accommodation as regards the movement of vehicles. In the case of barns and some industrial buildings, it is often desirable to bring vehicles in at several different levels to



Fig.38 Bay Street
Cambridge, Mass.

eliminate the necessity to move within the building. In this example (fig.39), the building has gone to some pains to accommodate to its steeply sloping site, but the result is a vehicle entrance at every level except the upper-most.

Evidently the added expense of dealing with the slope was offset by the savings and convenience of eliminating a lot of elevator capacity. This solution is appealing, but obviously it requires a rather special site, and presents strict constraints on internal building layout.



Fig.39 Cincinnati, Ohio

The problems of vehicular movement, then, are severe and, in the general case, not well solved. Many of the questions raised earlier in regards to pedestrian movement (sequence, meaning, imagery) drop out of consideration because of these difficulties with vehicles. In addition, passengers in vehicles are so isolated from direct experience of the ground that the subtler issues of ground movement are lost under the larger scale experience of the vehicles' movement. This is much larger than the building scale. Most of the concerns of this thesis are focussed on the pedestrian scale because of this.

No discussion of the interactions and meanings of buildings and ground can be complete without some mention of the process of building with the ground: how we alter its shape, its vegetation, and its flows of water. It is not my intention here to rewrite the standard texts on soil conditions and earthmoving techniques; the topic has been more than adequately covered elsewhere.(29) I would like to discuss, in a general way, some of the "facts of life" about altering the ground, which all designers must face.

LIVING GROUND One of the fallacies which people commonly operate under is that the ground is simply huge piles of inert material which can be pushed about with impunity, like so much sand in a sandbox. It is, in fact, very like a living organism. Most of the plant and animal life which is supported by the ground lives off of a very thin layer of topsoil and humus on the surface, seldom more than a foot or two thick. It is an intricate system of decaying and living plants and animals, and subtle balances of moisture and nutrients which sustain the living organisms within it. It is constantly building up and breaking down, absorbing and giving off, reproducing and dying, like any other living being. This system is shattered as soon as the surface layer is disturbed. One of our biggest problems in dealing with ground is that it is extremely difficult to build anything without damaging the topsoil.

The soil layers below the surface are also living, though perhaps in a more figurative sense. These layers provided the back-up nutrients and support for the topsoil. They also comprise a vast, underground network of water channels, holding reservoirs, and absorbers. The subsurface flows of water are just as important to the overall water cycle as the clouds and rivers. Every building in the ground alters the subsurface water to an extent; surface area

for absorbing rainfall is covered over with hard surfaces (roofs, roads, parking), water that would otherwise be absorbed is turned into rapid runoff, and foundation drains create a zone of speeded-up subsurface flow.

The vegetation which grows on the ground is sensitive to changes in both the topsoil and the subsurface layers. The natural vegetation growing in a place, assuming it hasn't been disrupted for a number of years, will have adapted to the particular combination of soil, moisture, sunshine, and temperature of the site. Any intervention on the scale of a building will result in a new set of conditions, and a new set of plants and animals who find the place suitable to their needs. This is inevitable, and it is up to the designer to deal with the changes in a way that is sensitive both to the needs of the natural environment and the needs of the building.

CHANGING GROUND It has been suggested by Wayne Andersen (30) that the human process of building with the ground is really a kind of accelerated geology; that the ground is constantly, but slowly changing, building up and tearing down landforms, vegetation, and soil. The changes that man accomplishes do much the same thing, only quicker. If this is the case, then one test of the appropriateness of man's intervention is to ask whether the changes produced follow the same logic and respond to other natural forces in the same reasonable way that most geological changes inevitably do.

Judging the success or failure of altering vegetation is not so clearcut. To a degree, it depends on budget (landscaping allocations are often the first to be cut), and it varies with time and the kind of vegetation. Some grows back quickly, other kinds require years to recover, and all can be destroyed by poor design. Efforts to save existing vegetation are often made, and some-

times work. But if major changes are being made on a site, the plants growing there will be hard-put to survive. In one case that I know (31), several large and beautiful trees in a housing project were saved from the chainsaw. Elaborate cribbing was built up around the base of each tree, several feet from the trunk, to hold back the three feet of fill that was to be placed over the entire site. Within a year after the fill was brought in, all the trees were dead. Either the cribbing hadn't held back a large enough area of fill and the roots were smothered, or the subsurface water was so altered that the trees couldn't survive. As for the rest of the site, it was fresh and green with grass that had been sodded over the fill, and was doing much better than the tree areas.

Most of the subdivisions that we look at and remark on their barrenness are barren because they lack trees and large shrubs. But perhaps, when a lot of cutting and filling goes on, it is unreasonable to expect otherwise. When the soil undergoes major disruption, the loss of topsoil and the alteration of subsurface conditions leaves it relatively inhospitable to vegetation. It requires careful fertilizing and mulching, and often the importing of topsoil, for regraded ground to quickly grow new desirable vegetation. Trees, of course, take longer. The changes that happen, then, will be obvious for years.

TYPICAL PROCESSES An example of the common range of problems that are encountered and sometimes solved can be found in a typical house foundation (fig.40). In order to dig down six or eight feet for a cellar, a hole in the ground from ten to twenty feet larger in each dimension than the floor plan must be created. This is because the walls of the excavation can seldom be cut vertically, but must instead be sloped back from the footing. In addition, the base of the

hole must be several feet larger than the footing to allow room for working in the hole. Finally, all the earth removed from the excavation must be piled somewhere on the ground. The result of all this digging and movement of machinery is a grossly altered piece of ground, with major disruptions to topsoil, vegetation, water table, and other site characteristics. With great care and skill, it is possible to heal many of the wounds and even restore many of the original qualities of the site (or, for that matter, replace them with entirely new qualities), but, again, the process takes time.



Fig.40 Goosebrook House
Harrisville, N.H.

Construction requirements also affect the building process. This house (fig.41) was built with much the same technique: a simple poured concrete foundation dug into the ground with a wood-frame house supported above. Such construction requires that the wooden part of the building be raised at least a foot above the ground to avoid rot and termites. Foundation construction requires that the footing be several feet below grade to protect against frost. These two facts determine the upper and lower elevations of the foundation walls, assuming a standard eight foot high concrete form. This house made the rather practical decision to raise as much of the foundation above the ground as frost considerations would permit. This gives a good deal of relatively inexpensive

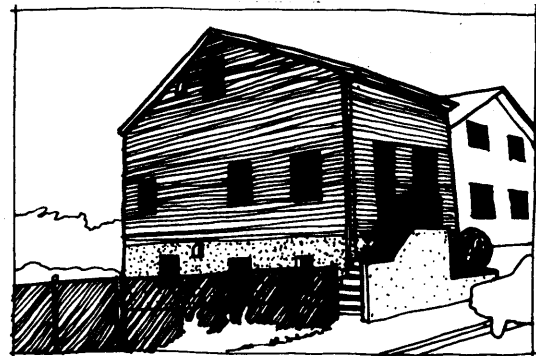
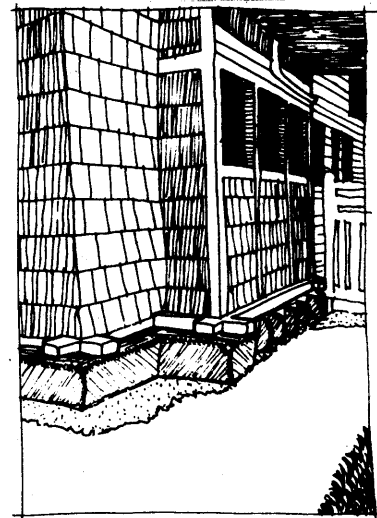


Fig.41 House on foundation
Cincinnati, Ohio

living space in a cellar that now allows windows and light. It also avoided such major excavation as the house in the previous example required. But it is difficult to see how the resulting building can ever have more than a remote sympathy to the ground around it. It sits high and dry on its clumsy pedestal, looking more like something stranded in a flood than a building on the ground.

A complete contrast to this approach resulted from a much clearer understanding of the materials and function involved (fig.42). The construction requirements for foundation and wooden structure are the same, but the outcome is much richer. Here, the earth material (concrete), which makes up the foundation, rises just as far out of the ground as is necessary to separate the wood from the soil. It has been shaped into

rounded, rough-textured forms which resemble the stones that are used in more primitive buildings to raise the wood sill off the damp ground. The building sills which are supported by these walls are also shown for their function--they are the base of wood to which the other wooden members are attached. From this small series of events near the ground, the elaborate wooden superstructure springs. The care and thought that went



*Fig.42 Gamble House
Pasadena, Calif.*

into the detailing of this ground-to-building transition communicates much more information about the functions of foundation and sill than the previous example, carries images about earth materials and building above the soil, and conveys much more of a feeling of compatibility with the ground. This, of course, cannot be construed as a standard solution, like the previous examples;

it wouldn't hold up in a damp climate, or under a building without broad eaves. But it does demonstrate the potential that exists for building meaning into a standard situation, and the lack of meaning in the standard solution.

SLOPING SITES Building on a sloping site creates many of the same problems inherent in all digging operations discussed in previous examples. These are exacerbated, however, by the slope, because of several factors. The stability of buildings is much lower on sloping terrain than on flat, resulting in more extensive digging and foundation efforts. The movement of machinery on slopes is also more disruptive. Probably the biggest problem, however, is soil erosion. As soon as the surface vegetation is removed, the ground is vulnerable, in proportion to its steepness, to erosion by water and wind: the steeper the slope, the greater the erosion. These problems continue after the construction is finished, because the topsoil is usually destroyed, and continuing erosion makes revegetation difficult. Special measures are required to adequately re-establish a stable soil surface on the slope, such as those described on pages 59 & 112.

Failure to adequately handle the problems on sloping ground can create real eyesores and seriously damage the ground. The Cloisters project in Cincinnati (fig.43), is a case in point. The building is built high up over a steep hillside on the poles. Most of the complex is oriented outward toward the view, but there are areas within the complex which enclose ground that is intended to be useable by the inhabitants. The area shown here has some small wooden platforms which are close to the ground and open out from the lower levels of some of the units. The technical problem was to hold back the steeply sloping ground above these platforms. The solution used, which is

only partially satisfactory, was to build up cribbing of railroad ties at the places of gross level change, and to cover the remaining sloped ground with gravel and mulch. Evidently it was hoped that vegetation would reclaim the place and stabilize the slope. The cribbing seems to be doing its part to suppress any gross tendency on the part of the earth to slide, but the control of surface erosion is a total failure. Not only has much of the ground cover washed down onto the platforms below, but significant amounts of soil have also come down. The lack of topsoil and the inadequate light make it difficult for any vegetation to establish itself, especially further up the slope under the buildings. The result is an unappealing, relatively useless piece of leftover ground, caused by a poor technical solution.



Fig.43 The Cloisters
Cincinnati, Ohio

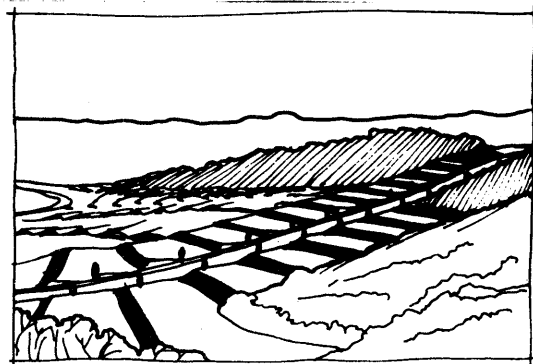
Another part of the same building complex suffers similar problems of design neglect (fig.44). The poles and braces which support the tall upreach of the superstructure are supported on the steep slope by a series of grade beams and piers. The system is very flexible and allowed the designers to make local decisions in response to slope and soil conditions which did not adversely affect the complex structure above. Unfortunately, this underpinning of the building was left as the construction process left it: bare ground, protruding rough concrete



Fig.44 The Cloisters
Cincinnati, Ohio

and poles, and a great deal of surface erosion. The possibility of re-establishing vegetation on the slopes under the building is frustrated by the same conditions of the area within the complex: poor soil, surface erosion, and poor sun. The operating design principle seems to have been "out of sight, out of mind". This is certainly true for the inhabitants above, but for the people who pass below the building, this foundation condition is an unsightly, unkempt mess.

EARTHMOVING The problems of altering the earth to accommodate a single building can be complex, but the trend toward ever more massive earthmoving for buildings is bringing about ever more colossal problems. It is one thing to alter ground water flow around a foundation with perimeter drains: it is something altogether different to completely change the groundwater flow down a mountainside. The same holds true for surface water, topsoil conditions, slope stability, and the whole assortment of soil problems associated with earthmoving. In the past, massive alteration of the natural shape of the ground were only undertaken for ceremonial purposes or to reclaim useable ground for agriculture where naturally flat ground was scarce. The work process was always labor intensive and time consuming, and therefore very expensive. But now, the work is done quickly and efficiently by huge machines, and developers are finding it worth the trouble to make massive modifications to the shape of large areas of ground (fig.45). The environmental problems are ridden over



*Fig.45 Houselot terracing
Santa Monica Mountains, Calif.*

with the same rough-shod alacrity as the original flora, fauna, and topsoil. In this case, the entire side of the mountain has been regraded to create houselot-sized terraces. These steps allow the construction of standard houses designed for flat ground, rather than necessitating construction of a variety of different, individual solutions to the problem of accommodating the building to the natural shape of the ground.

Despite the incredible extent of this kind of earthmoving, however, it is probably less detrimental in the long run than the impact of constructing the large warehousing and manufacturing facilities built these days. At least the houses do not cover the entire surface of the project. The large one-story buildings being built for commercial use require acreage for the building, and more acreage for drives and parking around the perimeter of the building, so the result is a huge paved area that has been deprived of its natural capacity to absorb water, support plant and animal life, help purify the air, control floods, and perform all the other functions provided by natural ground. An example of a relatively small building such as this, an automobile dealership to be housed in



*Fig.46 Car dealership construction
North Easton, Massachusetts*

a prefab steel building, gives an indication of the extent of destruction required by these buildings (fig.46). The entire area between the highway and the wooded hillside in the background has been bulldozed clear of all vegetation. Every ripple and bump on the surface is being systematically removed, and the debris piled up for burning or hauled away as excess fill. The resulting ground will be completely artificial, and completely devoid of its natural

qualities, except for those associated with flatness and continuousness.

The uses of our incredible earthmoving capability, as with so many of our technological powers, are becoming serious moral issues. Less and less, is it a question of can we do something with the ground; more and more we are concerned with questions of should we do it. Paolo Soleri put the question thus: "On the premise that what makes life possible on this planet is the existence of a few inches of topsoil on the geology that is not underwater, one is aware of how good the reasons must be for scraping, digging, and altering the local balance. Most of the time, our business should be to prevent the soil from moving, rather than moving the earth. Earthmoving is an ecological undertaking. It is justifiable if the resulting ecology is better than the original one. Yet, if there is a thing that affords man an eternity of a sort, that thing is the molding of the earth's surface. In the total ecological balance, the action of Bulldozer Man will be measured more by his ability to conserve than by his ability to alter." (32) He raises the ecological issues I've discussed elsewhere in this work, but also puts in the architect's belief in the glory of good shaping of ground. Therein lies the heart of the paradox. On the one hand we have the real problems caused by altering the ground; on the other, we see that many of the most powerful and enduring works of mankind are fundamentally earthworks (Pyramids, the Great Wall of China, agricultural terracing the world over, Machu Pichu, even Beacon Hill). Indeed, many of the buildings I've pointed to in this thesis as good examples of building/ground relationships (figs. 20, 29, 36) are the result of rather extensive alterations of the natural ground. The conflict is between minimum disruption of the ground and maximum association with the ground.

I have not attempted in this thesis to arrive at a final set of rules

and admonitions about how to alter the ground, nor do I think such a listing is possible. As with all major problems in architecture, it is not one issue, but a lot of issues, all connected together by springs, and all in turn connected with springs to the other issues of design (program, structural system, client, budget, codes, etc.). As soon as you grab hold of one issue, you wiggle others next to it. When you try to hold these issues down, you only jiggle others, until pretty soon the whole mass is wrestling with you. All I can do here is to raise some of the issues, and to organize them around a particular point of view which I hope will be helpful to designers in their own thinking and design work.

VIII. CASE STUDY: SEA RANCH CONDOMINIUM

83

The Sea Ranch Condominium, by Moore, Lyndon, Turnbull, and Whitaker, is a good starting point to talk about many of the issues being raised in this inquiry. It was built at Sea Ranch, on the northern California coast, in 1965.(33) It was designed with a strong attitude toward the landscape and the ground, and is built on a site rich with associations and natural amenity. The four environmental constants of the building site are the ocean, with its powerful waves pounding on the steep cliffs below, the broad sweep of meadow sloping up to the hills, the vista up and down the coast, and the wind, which blows cool, hard and steady much of the time. The program called for a cluster of units which took full advantage of the site amenity, moderated the micro-climate, and produced minimum disruption of the ground. The architects wanted to create large building forms that reinforced the natural land forms and scale, but which had strong architectural presence (in other words, didn't fade into the landscape).

The site shares many of the qualities I ascribed earlier to the broad prairie. The horizon is open wide to the western ocean, which establishes the plane of the earth surface. The feeling of exposure to the elements and to raw space is almost overwhelming. One feels the need to seek shelter, but wants to remain in contact with the invigorating expansiveness of the horizon.

The wall which rises steeply from the ocean almost recalls battlements.(f.47) Certainly the transition from water to land is not easy to move over; and from the top of the cliff the view is commanding. The shelf of pasture above the cliffs is broad and gently sloped, before

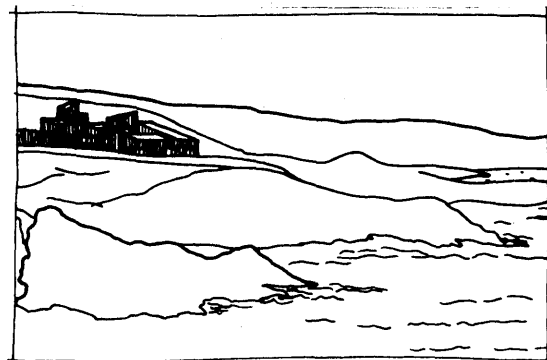
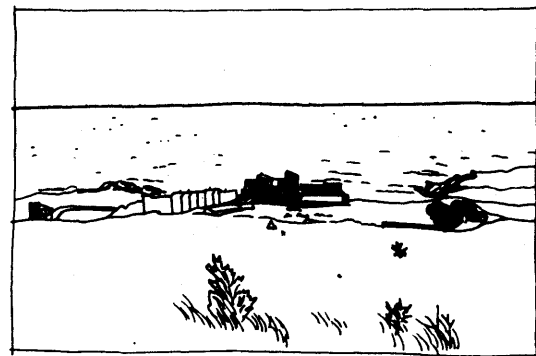


Fig.47 View from the cliffs

it begins its rise to the hills. This shelf, like the ocean, recalls the earth plane, but is differentiated from the ocean by the cliff wall.

The raw energy of the wind flowing over the site shapes the cliffs and the trees into long wedges pointing upwind, gradually lifting the wind up and over themselves. The condominium, at least from the water side, evokes very much the same image. It almost seems to have been formed by the same processes of erosion and carving which transformed the cliffs into the highly sculptured, yet overall massive forms they are. The long slope of the roof brings the mass of the condominium together, but it is broken up and differentiated. Its pitch echoes the ground slope. The overall scale of the building is close to that of the eroded cliffs, the color of the weathered redwood siding harmonizes with the cliff color, and the texture of the walls is not incompatible. Despite this, the forms are definitely human, and definitely introduced, not found in the landscape.

The view of the condominium from the land side (fig.48), makes this more apparent. From here, the forms stand up in stark contrast to the open expanse of water and horizon. The tower which stands barely above the roof plane from the sea side, shows its full height on the land side. It is almost as if it

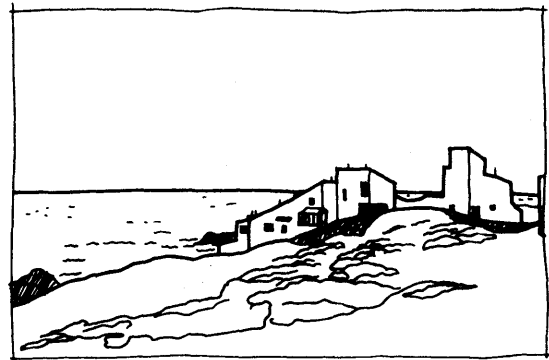


lurks behind the shelter of the long roof, Fig.48 *View from the hills* peering up over the edge into the wind and looking out over the land. It is these vertical forms, so much more obvious from the land side, that really point up the man-made-ness of the building. The verticality makes the landmark quality of the building...makes it a special, human place in an otherwise

beaten-down landscape.

From this point-of-view, the building participates less in the broader landscape than from the sea side. The forms are more broken up, the relationships of the parts to the ground more varied. There is the drive cut into the ground, leading into an enclosed area surrounded by walls and buildings. The garage, at the right, is partially sunken into the ground. The roofs are several different heights and tilts. The building even begins to wrap itself around the hillock on the left. There are more kinds of ground conditions, and there's a local building response to each.

Seen from the south side (fig.49), the interaction with the hillock is more apparent. The rising ground almost seems to bubble into the building mass. The walls partially enclose and protect the bump, and make it a rather special place.



The hillock becomes a sunny, sheltered picnic spot for the citizens. Indeed, this is about the only place on the building's perimeter where the ground is embraced in a friendly way, rather than abruptly confronted by a wall. Even so, there is little direct connection between them; there are no penetrations of the building skin, and only a pathway into the courtyard.

Fig.49 South wall and hillock

As we move in for a closer look at how the building hits the ground, we find quite an abrupt transition (fig.50). The grassy carpet on the surface runs uninterrupted to the face of the building, which rises sharply vertical. Looking closer still, we see a band of copper flashing at grade, slightly under-cut below the boarding. This rather anomalous material and configuration

strangely emphasizes the contrast between wall and ground. Evidently, it is a recent repair: the original wood was too close to grade and began rotting. The downward slope of the roof, which reaches its lowest point here, is assisted by the smaller roofs of the bays in giving

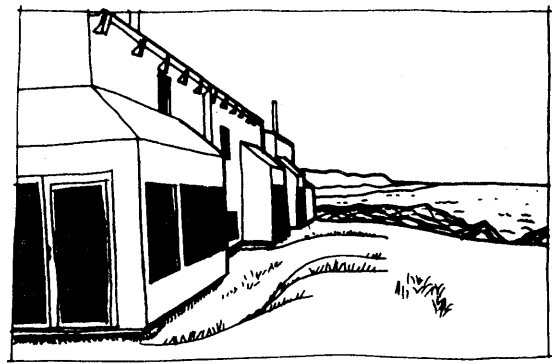


Fig.50 Wall at lower end

an almost plow-like impression as the building faces into the elements. The building surface is amply penetrated by windows for view, but there are few openings for people to emerge onto the grass. The glass door on the left is one of these openings, and it shows no sign of transition. The ground around the front of the building has been dug down slightly, a reverse of the more normal procedure of sloping the ground away from a building for drainage, and adding to the plow impression. The digging seems clearly man-made, a feeling supported by the mowed grass, and one wonders at its purpose. Probably it serves to keep the overall height of the building above the ground within limits elsewhere around the perimeter; possibly it was a design error in miscalculating grade heights.

Moving around to the south side (fig.51), we see that indeed, much has been done to accommodate the building to the slope. Again, the grass runs uninterrupted to the vertical walls of the condominium. It is mowed in the building precinct, instead of being left naturally long. This is rather anomalous, given the intention of minimum impact, but is

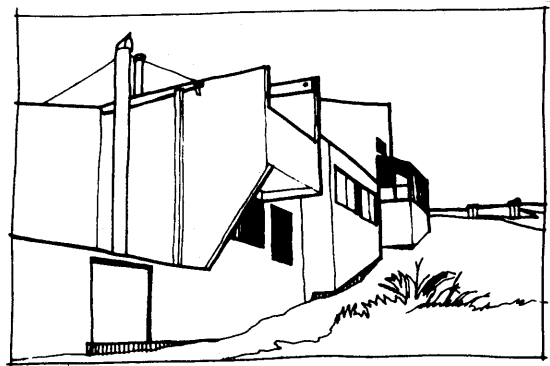


Fig.51 South wall and slope

necessary for fire reasons. There appear to be no human use spaces around the perimeter, except for an enclosure walled into the building mass (lower left). The ground carries little indication of physical disruption, either during the building process or since. One does see hints of the grade beams which make up the foundations. This occurs where the wooden siding has been kept up from the dirt for purposes of preventing decay. The concrete seems appropriate as a material, however, and nothing contradicts the sharp verticality of the wall plane.

The reasons for this lack of outside use spaces seem to be two-fold. First, this sharp contrast between building and ground reflects the attitude of the designers of minimum disruption of the natural environment. The foundation system (grade beams and piers) demanded a minimum of excavation during the construction process, and the buildings were designed to avoid grade level changes around the perimeter. Actually, in many places, the interior floor levels are high above grade, as indicated by the window placements. Much of the wall surface is covering crawl spaces beneath the floors. Getting out to the ground from these units would have been difficult. Only at the low end of the building are the floors slab-on-grade, and the wall openings direct connections to the ground (fig.51). Secondly, and a bit more profoundly, the building/ground contrast brings out the fact that the building is a man-made addition to the landscape. It is made of materials which, while natural enough, are not ground materials either in form or composition. The skin of the building is tight to keep out the wind, and the

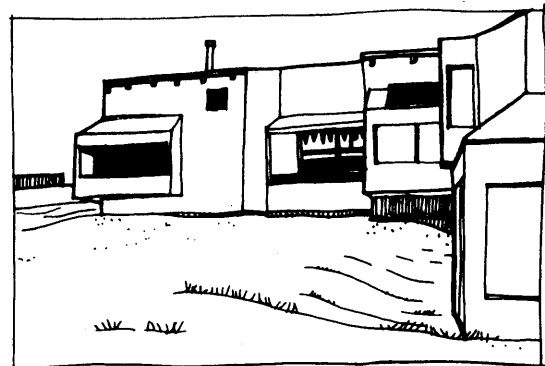


Fig.52 Northwest corner

ground around the building is windswept and generally better suited to grass and sheep than people in lounge chairs.

In another view of the exterior, we see this again (fig.52). There is hardly any way for people to move between the ground and the inside, and the grass runs uninterrupted. We do note, however, the overhanging bays which project out from the skin of the building as glass overlooks on the land and sea. From the inside (fig.53), these take on some of the qualities of a mountain eyrie.

They are up over the view, yet are enough enclosed to feel commanding rather than exposed. The height of the overlook here is not as important as the broad view and the uncluttered foreground. Not all units have



Fig.53 Interior of bay

this cliff-hanging vista--some look out on the meadow, some down the coast--but in all the view is important. A visual contrast between the enclosed interior and the wide-open exterior was consciously sought.

The interior of the cluster is very different from the perimeter. Here we find ground that is specifically altered for active human use (fig.54). There is paving, steps cut into the slope, level change transitions into units, and even a platform created for group use (lower right). The

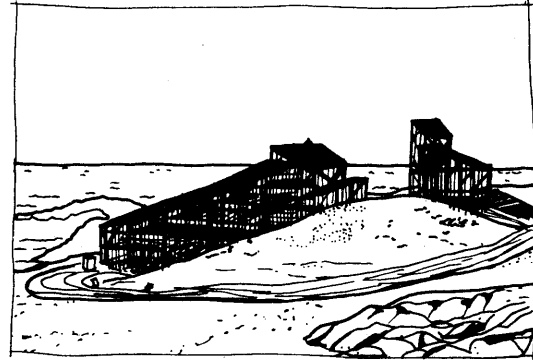


Fig.54 Inner courtyard

steepness of the slope is made tolerable by these devices, and the ground more useable. The enclosure adds to the useability by sheltering the wind somewhat while allowing in sun. The vegetation seems more civilized, and the environ-

ment less hostile. The differentiations in the ground surface become controlling facts of use and movement. They create a flow down the slope, around and by the use spaces, into and out of the entry porches, until one finally washes out through the scupper at the bottom of the enclosure onto the natural ground.

The actual process by which all this got built seems to have been consistent with the intentions of the final product. The basic foundation system succeeded pretty well in preventing massive disruptions during construction



(fig.55) There are the inevitable muddy roads and construction debris, but the usual deep excavations and bulldozer traces are missing, except for piles of dirt seen at the lower right. The vegetation there was undoubtedly unhappy, but in general the site seems comfortable with the work even while in progress. In the middle of the cluster, this seems to be less true (fig.56). Here there was complete disruption of soil, vegetation and drainage, and the finished ground has to be relatively artificial. This was probably unavoidable where it was necessary to run utilities, maneuver equipment, and build useable ground places on a slope. But, as we saw earlier (fig.54), the surface has healed and come to equilibrium with the building.

Fig.55 Construction view



Fig.56 Courtyard

The Sea Ranch Condominium, then, succeeds relatively well at accommodating the ground around it. Where the meeting is abrupt, it is with purpose: the more open

transitions of southern California, for instance, simply would not work with the site and climate. The overall form and the low impact foundations were both worked out to accommodate the natural ground forms. Where the ground was altered, it occurred in places already dug up for construction. The final result sits comfortably with its ground, and both ground and building provide associations and meanings that work to enhance the quality of the place.

IX. CASE STUDY: GREEN HALL

91

Green Hall, the administration building of Wellesley College, was designed by the architects Day and Klauder sometime around 1916, and built during the 1920's.(34) The architects carried on a rather successful practice building university buildings in a style that has been characterized as Collegiate Gothic, a rather romantic adaptation of Gothic vernacular vocabulary applied to the programmatic demands of the modern university. This building was chosen for analysis because of its rich stone and brickwork, the formal distinctions achieved by variations in the material usage, the imaginative adaptation of the building to a steeply sloped site, and the many bits of romantic imagery that turn up in the design. In addition, there are several different conditions of the building meeting its ground which occur around the perimeter and courtyards of the building, which should prove instructive to observe.

The first view of the building (fig.57) is from the broad, formal lawn in front of the main entrance. On this side, the ground is civilized, landscaped with large trees, smooth lawns, and criss-crossed with footpaths. The facade of Green Hall works with those of two other buildings to create an academic quadrangle, an area that feels enclosed, dignified, and comfortable. The fourth side of the quadrangle, just to the right of this view, is a tree-lined walk along the top of a retaining wall. Beyond this wall, the ground drops about eight feet to a drive, and from there slopes steeply further down. From the top of the wall, there is a pleasant view across the campus to other hills, the lake, and other campus buildings. The quad is at the crest of a small hill; it is a special place

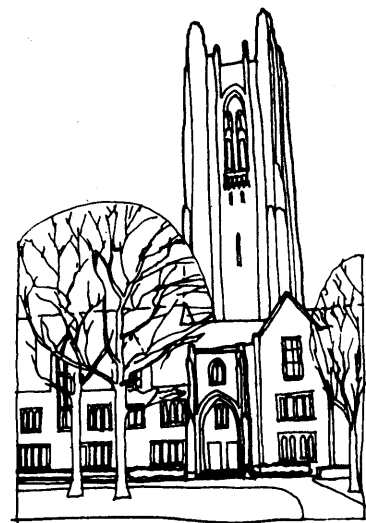


Fig.57 Quadrangle Facade

removed from the everyday world and sheltered from it by quiet buildings and the walled hillside.

Green Hall, then, has a rather dignified relationship to the ground in front of it, enclosing and defining its character. The repetition of small dormers and windows help to give a domestic scale to the quad. The main entrance to the building, with its arch overhead, and its two small towers on either side, serves to mark out a special place on the quad. The large bell tower rising from within the building somewhere, marks the place as special and visible for miles around. The fact that the base of the tower is not visible from the quad gives a clue that within the building there is another place.

When the building finally comes down to the ground, a similar kind of simple dignity exists (fig.58). Broad, horizontal bands of stone come up out of the flat earth of the quad, and imply a platform upon which the brick of the superstructure is laid. This band of stone is visible all along the facade except near the entrance doors, where it has been obscured by shrubbery. The shrubs fuzz out the transition from ground to building. At this point, the special stonework around the doorway and the three steps up into the building make up a vertical continuity from ground to pin-

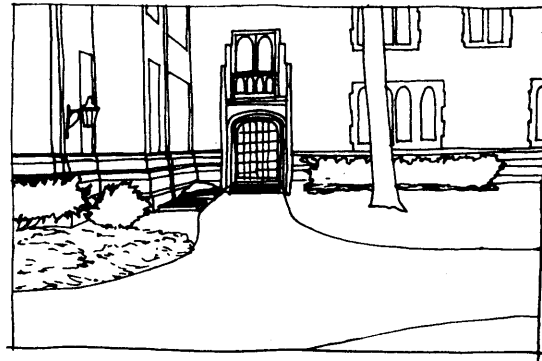


Fig.58 *Quadrangle entry condition*

nacle which is all the more striking because the horizontality of the foundation was broken off immediately adjacent.

Looking closer at the base of the building shows the formal intent better. The wall is broader the closer it gets to the ground, and the stone is

rougher and more durable, probably granite. This is intuitively satisfying: the wider base has to carry the accumulated loads of the building into the soil, and the rough stone is more akin to the uncut stone of natural ground. As the building rises further out of the ground, the stone becomes more refined and more molded until finally it gives way to smooth brick and carved limestone. Yet even here the massiveness of the wall is emphasized by the English bond pattern and the unusually thick mortar joints.

The base of the stone seems to imply an interior platform at the level of its top. The level of the entrance, however, is just a few steps up from the ground, and, it turns out, so is the first level of the building. The implied platform, then, isn't really there. The reasons for this deceit can be speculated. For one thing, having the appearance of a broad, sturdy base is satisfying, more so at least than it would be if the visible base was limited to just a foot or two above grade. Another reason, perhaps, was the visual desirability (to some eyes) of resting the stone window openings on the broad horizontal of the base, rather than floating them further up the facade on a relatively narrow band of brick. In any case, the stone base is not expressed in any way on the interior of the building walls, so it is clear that functional considerations and literal functional expression were not big factors in the design of the rough stone base.

Also visible here are two light wells with iron gratings covering them. These seem to be afterthoughts: they are constructed of concrete rather than stone, the stonework doesn't respond to them in any way. They serve the functional purpose of providing some light and ventilation to some basement space, and in so doing remind us that there is more building below the surface, and that there are people moving down there. The implication, however, is that

the spaces are rather utilitarian, and probably rather dark and dank.

The distinction between the rough earth material and the finished human material is demonstrated at the stairway which descends the retaining wall of the quad level (fig.59). Here, the construction is exclusively of rough stone used as thick, sturdy walls, platforms, and stairs. The formal intent seems to be that these are ground forms, built of earth and behaving in much the same way as natural ground. Except

for the walls running up like stair rails, the forms are all one surface; behind the surface is the ground. Even the low walls, though, are massive like rock outcroppings. The path up from the lower



level also is not one continuous flight

Fig. 59 Stone stairway and wall

of steps, but it stops-over on an intermediate platform, like a level spot on the outcrop. This platform has a stone bench around two sides and is enclosed by shrubs and low trees, providing a secluded spot off to the side of the large open lawn a few steps above.

The view from around the side of the building (fig.60), shows the drive curving up the hill and through an arched opening into an inner courtyard. The ground at this point has been manipulated considerably. The wall at the left is a retaining wall which supports a level change of over eight feet down to a steep slope that drops off even more. The trees in the background are growing at the lower level. The lower slope is reputed to be rampant with poison ivy. The high wall looks rather like a rampart from the lower level, and the poison ivy works almost as well as a moat for keeping the separation absolute. The roadway at the top of the wall is part of the long ramp for

cars between the lower level and the courtyard. The ramp rises gradually up the front of the building (see fig.60), passes under the archway at the left of the picture, moves beside the building for a distance, and then turns again under the building through an archway into the courtyard. This elaborate path

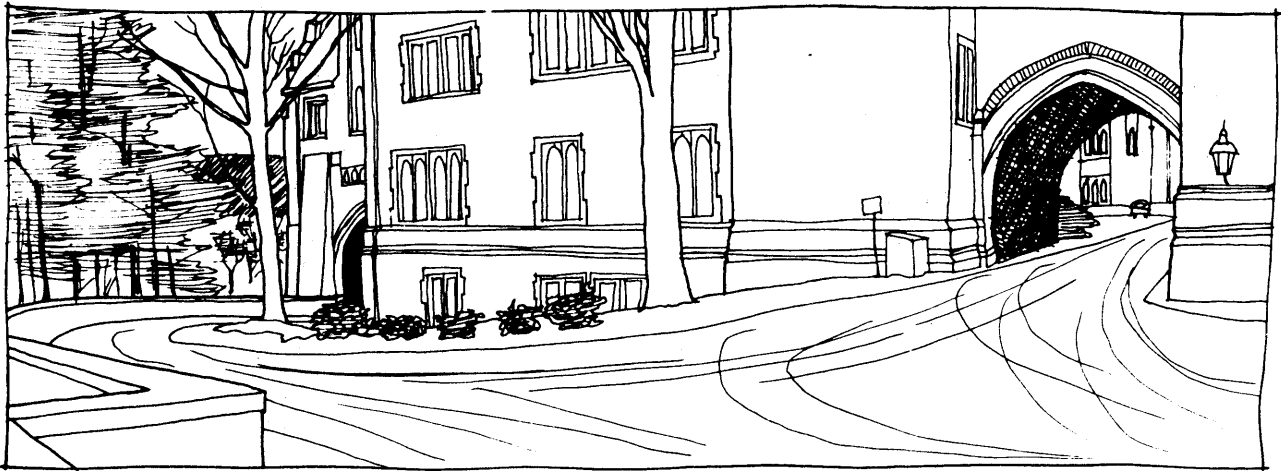


Fig.60 Side view and car ramp

makes for an interesting journey of entry, but it also points up the great difficulty inherent in constructing the gradual level changes on the ground required by automobiles and other wheeled vehicles.

The formal vocabulary works in an interesting way here, where the ground next to the building is sloping steeply. The rough stone base which is built up in suggestion of a platform continues across at the same level, showing more and more base as the earth falls away. The distinction between the finished brick and cut limestone superstructure, and the rough earth material below is maintained. As the amount of wall showing becomes large, however, windows begin to poke through to get light into the enclosed space within. Because they poke through the base, however, there is a strong suggestion that the windows open into basement rooms; rooms that are probably darker, perhaps damper than the rooms above. This is in marked contrast, for instance, to the

perimeter of the Sea Ranch Condominium (see Ch. VII), where there are several levels of the inner structure that are uniformly hidden behind a continuous (from ground to eave) skin.

The arches that lift the building up over the roadway are handled differently between the two shown here. The arch on the right penetrates up into the brick superstructure, but springs from the stone base. The arch at the lower level on the left is more of an opening in the base, with most of the brick building above it. Both are outlined in finished limestone, a material halfway between the rough stone of the base and the smooth brick of the superstructure. In their function, too, they are halfway between the solid base and the brick-surrounded window openings.

The design of the lower arch can be seen more clearly from the other side (fig.61). The massive stone retaining wall on the left, along with the stone wall that drops off on the right are meant to be seen as ground form, and the buttresses of the arch grow out of the stone as extensions of the base which holds up the protruding wing of the building above. This view also shows the battlement nature of the wall. The only plausible way to move up this steepness to the upper level is by the



Fig. 61 Battlement wall and ramp

ramp (or by the "secret" passages within the base...more on these below). The walls are battered and buttressed because of the tremendous weight of the soil which they retain, but these forms combine with the roughness of the stone to provide an image which is like a steep cliff. The ramp leads one past the base of the cliff, with the building out of sight above. The building wing

over the road reminds one that the building is indeed above, but more travel is necessary before the destination will be visible.

The general view from the front (fig.62) makes many of these points more apparent. The building is sitting on massive earth-

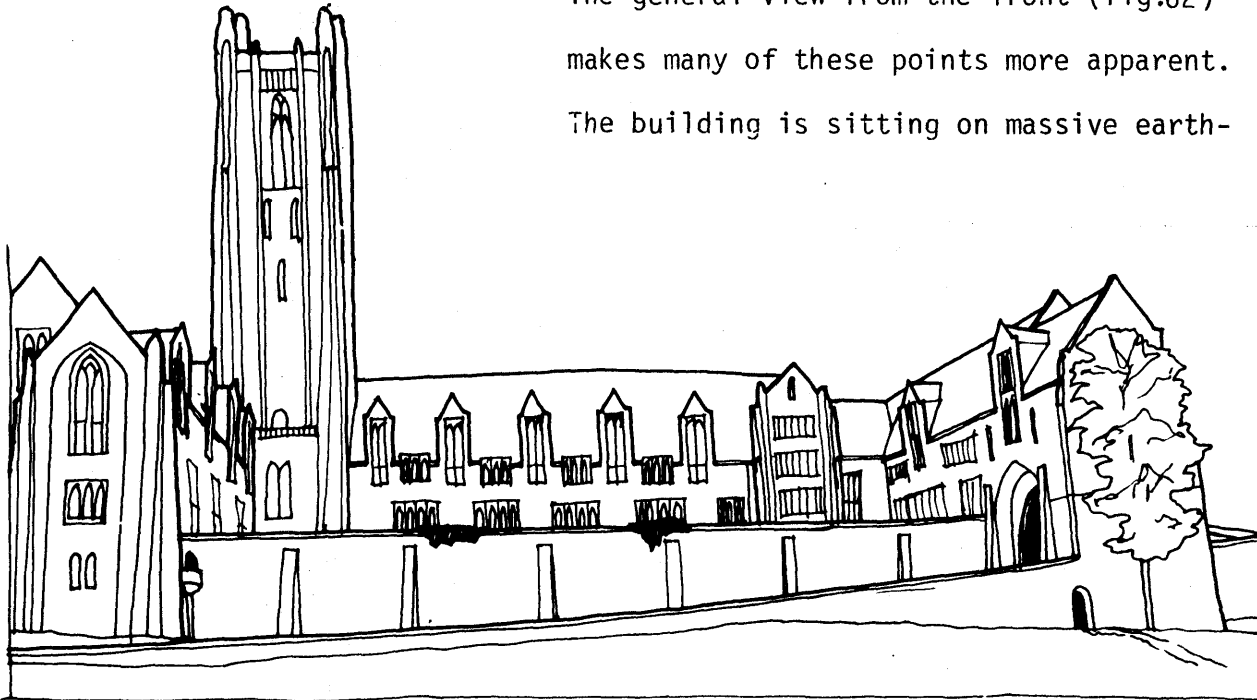


Fig. 62 Overall view from below

works, which are much more than basic foundations. Besides providing the journey up to the building, they support the building in a sort of horseshoe with a level area in the enclosed court. This area is indicated from the front by the level top of the wall with plants growing over the edge. Rising above the courtyard, but partially hidden from view, are the civilized walls of the building proper, standing in contrast to the rugged base. Rising higher still, is the tower. As from the other side, this tower marks the inner place of the building, but that place is still separated from us by other parts of the building. The tower makes a dramatic contrast to the heavy, horizontal forms of the lower parts of the building, as it reaches skyward away from the earth below.

The "secret" passage enters the stone base from a rough gravel path which wanders up the grassy slope to some shallow steps as it gets steeper (fig.63). When it arrives at the stone wall, there is a small (5 1/2 feet high), narrow archway leading to a narrow flight of steps within the wall. These climb through a dark passageway, jog several feet to the left, and continue up to the arched window opening visible at the right. From this point, the passage opens through another small arch onto the roadway under the overhanging building. Crossing the roadway, one can reenter the wall, climb another stair, and emerge finally at the courtyard above. The passage has a real feel of adventure to it...one feels like one is exploring the subterranean passages of the earthwork, a feeling that is reinforced by the masonry materials of the passage, and by the closeness of the walls. It is, after all, difficult to "carve out" material from a solid earth, which is the feeling the passage conveys. Castle images are apparent.

Another passage elsewhere in the wall begins like this one did, and brings the traveller out into the air again before continuing on to the upper level (fig.64). The passage begins at ground level (out of view to the left). It climbs a steep, narrow stair past the small archway and on up to the little podium. Here, one is above the roadway and next to the long, high, retaining wall.



Fig.63 "Secret" passage



Fig.64 Passage podium

The view along the battlement wall (fig.61) was taken from this podium. From here, the path turns, reenters the stonework, climbs another passage, and finally emerges at the inner courtyard.

When one finally arrives at the courtyard above, whether by walking the passage or driving, there is a definite feeling of arrival (fig.65). The place is surrounded on three sides by dignified buildings, the court is flat and landscaped. The wall along the fourth side looks out over the campus, but the view is from a point of detachment.

It almost feels like the innermost parts of a castle keep, the place sufficiently protected by the surrounding battlements that it can forswear all feeling of defensiveness. Like the front facade, the building is mostly



Fig.65 Inner courtyard

brick, except for a few courses of stone which make the first platform out of the ground. The entrance to the building repeats the experience of the courtyard entrance... one passes under an arch. Here, however, one also climbs up three or four steps to the platform level of the first floor. The feeling of the courtyard is akin to that of the sheltered valley: a special place, surrounded, but removed from the rest of the world, sheltered and peaceful.

To reinforce this sense of the specialness of the place, one discovers that this is where the tower is located (fig.66). The tower is visible for miles around, marking this place. It starts out, like the rest of the building, on a base of rough stone, with a couple of watertable courses of finished stone before it becomes smooth brick and starts its climb for the sky. In this case, however, the base is higher, more in proportion to the greater

weight of structure it supports; it is also broader. Above the base the brick piers retain the massiveness of the base for a good distance upward, only gradually tapering into the highly articulated and pinnacled summit. At the top, the brick gives way to carved limestone, and the mass is broken up and penetrated by arched openings. Bells send forth heavenly sounds from here.

Green Hall, then, provides a good example of transitions from the ground to the building. It recalls closely the images called up by Bachelard in his description of the vertical nature of the house: "It rises upward. It differentiates itself in terms of its verticality." He describes the contrasts in our imaginations between the clear-headed rationality of the roof and the irrationality of the cellar or "dark entity", the place "that partakes of subterranean forces".(35)

Green Hall provides us with images of the subterranean with its ground-form stone masonry and lets us participate by way of "secret" passages. But all of this is preparation for the vertical part of the building leading up to the lofty, filigreed heights of the tower, with its carefully contrived and sculpted Gothic tracery; a real contrast to the natural rough face of the stone base. Besides transitions of form and material, there are also transitions of level and of movement, both for the vehicles climbing up and for the pedestrians.

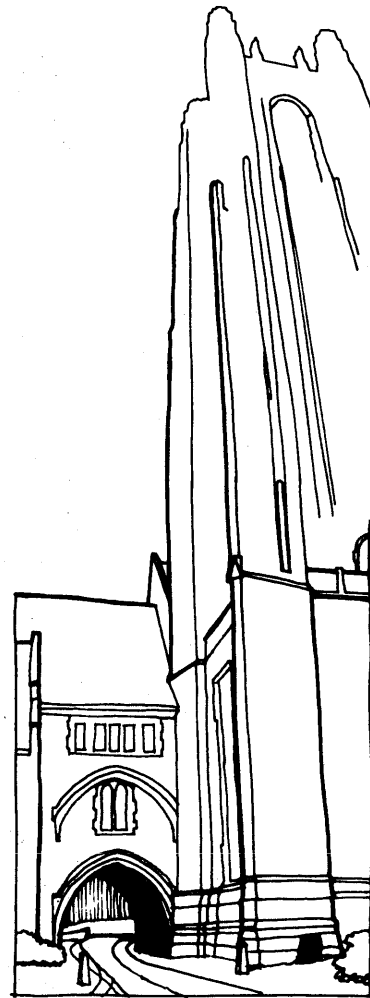


Fig.66 The tower

X. CASE STUDY: CARPENTER CENTER

101

The Carpenter Center, built in 1964, is the only building that was designed by Le Corbusier in the United States. It is located on the campus of Harvard University, along a side street near the Harvard Yard. The program called for an arts center, with studio and darkroom facilities, exhibition and gallery spaces, a large lecture hall, offices for the director and faculty, and a penthouse suite for the resident artist. It was conceived as an innovative project, and the architect was urged to make the building similarly innovative.



Fig.67 The Carpenter Center from across Quincy Street

I have chosen it for a case study because Le Corbusier had a strong attitude about buildings relating to the ground, and had the freedom here to build so as to express his attitude. There are a variety of different ground conditions associated with the building, which I find useful example to analyse from the point-of-view that I've been developing in this thesis.

The building sits on a lot that goes through the width of the block, from Quincy Street to Prescott Street. The ground at the site has been stripped

of most of its natural identity by years of urban use, and so was fairly neutral in its contribution to the architecture. Rather, it was the surrounding use patterns that made the major contributions. Across the street from the Center lies the Harvard Yard, guarded by its brick and iron fence. One of the paths across the Yard comes to a gate opposite the Center, and provides the impetus for one of the building's major elements; the ramp.

The ramp, conceived as an extension of the circulation system of the Yard, swoops up from the front sidewalk, climbs to an entry platform between the two studio masses, and descends through a large void in the building volume to the back of the site. Above the studio spaces is the penthouse, and below them the lecture hall and darkrooms.

Seen from the street (fig.67), the building makes a rather self-assertive presence. It contrasts with the dignified Fogg Museum and the Faculty Club buildings, which it sits between. They are traditional brick structures with pitched roofs and white, classical trim. The Carpenter Center is made entirely of cast-in-place white concrete, which is used rather like the cardboard in an architect's model; it makes up building masses, sun screens, floor slabs, thin columns, soaring ramps, and even handrails, all without the differentiations of texture and material which characterize the buildings around it. The Center is set back from the street edge. Only one, curved, portion comes forward to the sidewalk, and it is devoid of windows. Plants visible at its top give a clue about the garden terrace on its roof. Most of the windows which provide glimpses into the interior are set well back from the street. The vertical areas of glass block on the facade mark off the stairwell, rather than any of the studio spaces. The result is that the building seems rather opaque when seen from the street; one wonders where all the people are.

The circulation system of the building begins at the sidewalk on Quincy Street. At this point, the visitor is confused by two options for approaching the inner spaces: one option leads up the ramp and disappears into the building volume (fig.68), the other leads down an asphalted slope to a lower level of the building (fig.73). From here, the

ramp looks to be more promising. It starts up a solid concrete base, with large hedges on either side. For the first few feet, it feels solidly earth-bound, but upon emerging from the hedges, the ground drops away and the ramp continues a curving climb through space to the upper

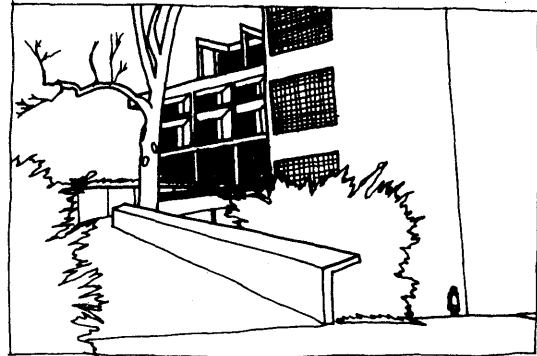


Fig.68 Ramp beginning

reaches of the structure. The rails at either side of the ramp work to reinforce the feeling of moving through space. At the beginning, there is a solid concrete rail enclosing the ramp. Just before the curve, this gives way to a thin iron rail and the feeling of enclosure disappears. As the top of the ramp is reached, the solid rails reappear in preparation for arrival at the platform at the top.

This platform is within the building mass, with structure above and at each side, and feels like the destination. The platform proves disappointing as a place to enter the building, however. One set of doors opens from it into a large gallery space on the left, but it often closed. The doors on the other side are permanently locked, except for emergencies. There is no entrance. The only real choices for the visitor are to turn around and go back to the beginning or to continue along the ramp, which begins its descent.

The last stages of the trip down the ramp are spatially quite interesting--a design intent that succeeded (fig.69). The ramp seems suspended between the building volumes, with views on either side into the studio spaces where artists sometimes are working. Because the ramp is supported by slender columns which can't be seen from above, it seems to fly out of the mouth of the building and land in a broad sweep of the ground, curving like a bird coming in for a landing. The movement is exciting, but it seems the architect didn't

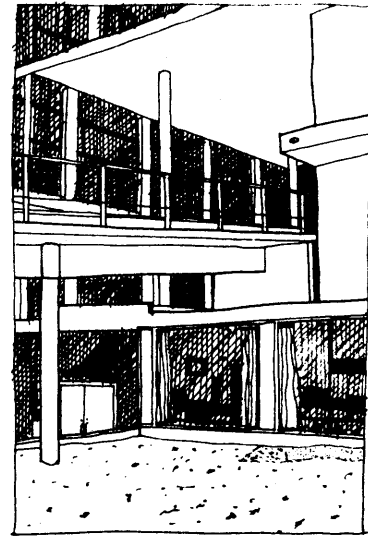


Fig.69 Back ramp

intend people to loiter along the ramp. It is narrow and continuous, and has all the inviting leisure qualities of an interstate highway.

The ramp was conceived as an interesting way to continue a path across the Yard, through the building, and on out to Prescott Street. As it ends now, however, one comes down to a courtyard behind the Fogg Museum, which is enclosed and cutoff from the street. To get to the street one must double back under the ramp and pick a path through the parking lot behind Carpenter Center (fig.74). In term of its relation to the ground, it begins firmly rooted and ends much the same way. For the rest of its length, it denies association with the ground, a denial which is both deliberate and effective. Walking the length of the ramp is exhilarating as a spatial experience, and would be even better on a bike or some other set of wheels. As a continuation of the University circulation system, however, it is hardly effective. The climb up and down is harder than picking a more direct route past the base of the building, and the novelty of the ramp would soon wear off for everyday users. As an

entrance to the building, as already mentioned, it is a failure.

There is a notion in Le Corbusier's architecture about buildings and ground, which holds that the building should sit high above the ground on slender pilotis. This is intended to free the ground from the mass of the building and let space flow uninterrupted beneath. Along with this notion comes the idea of roof gardens, to get some ground up in the air with the occupants of the building. We can see elements of these ideas in the Carpenter Center, and it is interesting to see how effective they are.

The roof gardens appear in several places, one of them being the garden terrace on top of the forward-projecting lobe of the studios. The top of the ramp delivers people to the level of this terrace (fig.70). The gallery space is also at this level, and is designed to have a direct link out onto the terrace. There are large glass doors which open out in much the same way as patio doors in a warm-climate residence. The surface of the terrace is covered with gravel, and there are shrubs in planters around the perimeter. Both work to associate the place with ground. Indeed, it is easy to ignore the fact that one is two stories above the real ground, until one approaches the edge of the terrace.

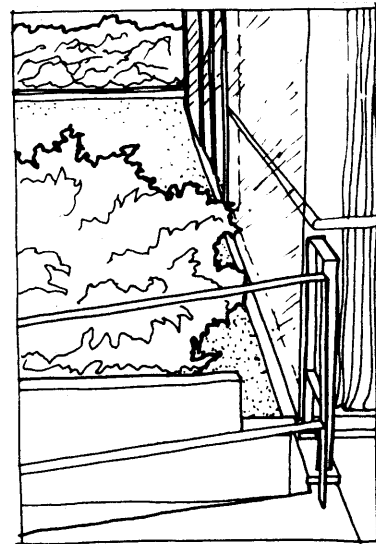


Fig.70 Terrace detail

Unfortunately, there is little indication that the roof terrace gets much use. The access points to it are locked, and except for the planters, it is barren of all but gravel.

Another piece of artificial ground in the building is even less successful. Within the large void in the building mass, one level below the ramp, is

located a large earth bed (fig.71). It is supported on a concrete slab at the level of a studio, which adjoins it through a glass wall. If one knows the building, one realizes that this slab is the roof of the large exhibition space at the lower level of the building, and not real ground in any sense. But even without this knowledge, one can see that this is roof, not ground (fig.70). The earth bed has a few remnants of dead plants; dead, presumably because no rain could reach them and very little sun. The area around the bed seems to be used only for storage and occasional projects. The only real association the bed carries with ground is its material; in terms of its form, location, support, and use, it is unavoidably artificial, and fails to effectively recall real ground.



Fig.71 Planting bed

The real ground next to the building works a bit better. Looking back at the back of the building (fig.69), one can see grass growing, and trees are planted. Behind the windows are the offices of the director, which sit about three feet below grade. The windows rise up from a low concrete retaining wall, and continue uninterrupted to the ceiling. The offices look out almost at eye level at this pleasant, landscaped area with the ramp soaring above. There is a feeling of being partly within the earth, but because of all the glass, the spaces feel expansive: a pleasant combination of enclosure and openness. The ground here is basically flat, with grass running uninterrupted to the building except for the last few feet where the grass gives way to gravel. This is because the building's drainspouts pour their contents down next to the building along here, and so it is impossible to grow anything.

Also, it would be impossible to leave soil exposed, because the erosive forces of the falling water are considerable. The only solution, besides gravel, for dealing with the drainage run-off would be installing downspouts, probably an undesirable solution given the uncluttered style of the architecture.

At the front of the building, the ground has been shaped somewhat to make a place for the paths to run, and, to a certain extent, to separate the building from the public sidewalk (fig.72). The mounded earth is covered with grass, although it is worn and poorly maintained. The asphalt of the path runs right next to the white concrete wall of the building, with no separation and no acknowledgement in the treatment of the wall that it is contacting the

earth: it simply plunges uninterrupted into the ground. Looking at the entry path as it descends to the main doors, we see the same thing (fig.73). The asphalt path, interrupted only by a manhole cover, runs down the slope from the sidewalk to the entry level, washing up against the walls of the Center as it goes. At the lower level, the path evidently becomes "architecture" again, for it becomes concrete slab, carefully detailed to work with the design of the rest of the concrete in the

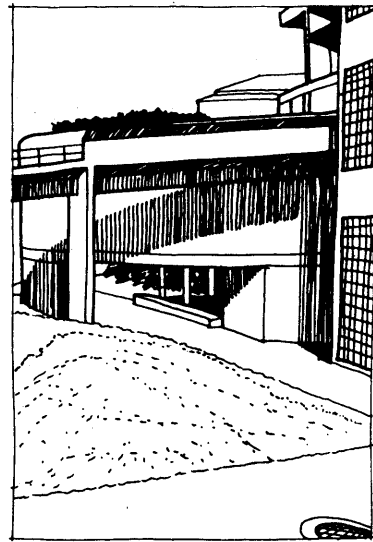


Fig.72 Front path

building. The main entrance to the building, which leads to the lecture hall, exhibition space, darkrooms, and the director's office, is located under the building to the left. This seems strange, because it is not visible from the street. Indeed, looking down this path, one would not be likely to guess that such an important entrance was down there. Rather, it looks like a secondary path under the building to the parking lot. The low retaining wall which

holds back the dirt and creates a degree of earth enclosure at the lower level gives a clue, but the wall also directs the path. Its straight continuum, if anything, suggests the importance of the through path rather than the left turn to the entry doors.

It seems as if Corbu was using the ground as a built material; clearly the building wasn't seen as ground. As a built material, it is treated in the same simplified, pure way as the concrete. The richness of Richardson's ground-work would be inappropriate here. The man-made quality of the ground was probably desired. The problem lies in the fact that there is no benefit given to either the ground or the walls by the presence of the other. There is much the same kind of abruptness found in the suburban foundation condition (fig.19). The benefits of abruptness were demonstrated at Sea Ranch: the contrast of the untrammelled splendor of the meadow and the man-made-ness of the redwood wall was meaningful. Here, the pristine white concrete is intersecting a neutral, relatively lifeless ground, and the results speak more of negligence than design.

As mentioned earlier, there are areas under the building where it has been lifted up off of the ground by pilotis. One such area is visible in fig. 73. The space does seem to flow under there, although the building sits quite low to the ground over much of it, more constricting than freeing it. The actual ground surface under the building is barren of vegetation, probably because of poor sun and rain (although the building adjacent shades the area also).

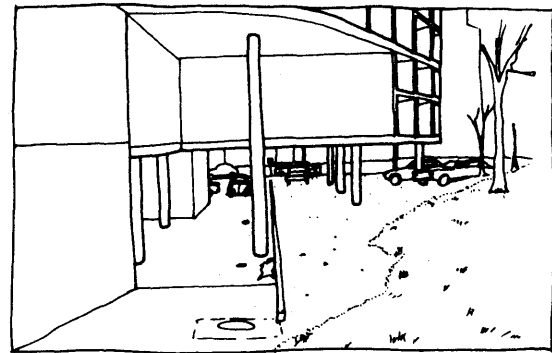


Fig.73 Path to main entry

It is also worn by foot traffic (on the right) which has made a shortcut to Prescott Street that ignores Corbu's circulation scheme altogether.

Another area under the building is just barely visible in fig.72. This was designed as a sheltered, open-air exhibition space that connects to the interior exhibition space at the same level. It is about three feet below the footpath level, enclosed by a low retaining wall. The environment is entirely of concrete: concrete walls, concrete slabs top and bottom, even a concrete bench for sitting. Unfortunately, the environment is also dark, because it is so far under the building. This open-air exhibition space is the only one I know which requires ceiling spotlights to illuminate the works on display. Perhaps this explains why it is seldom used. The space could be rich in its imagery of below-ground enclosure...it certainly feels cave-like...but the rigid white concrete surfaces defeat most of the pleasant and mysterious qualities of these associations.

A third area is not so oppressed by being underneath the building, Here, (fig.74), the pilotis are tall, and enough light and volume are present for it to feel genuinely open. The misfortune is that this is the back of the building, where deliveries of material are made, garbage removed, and cars parked. It is one of the few areas under the building where the ground had the possibility of retaining some vegetation and natural ground qualities. Instead, it is paved and populated, like so many bugs under a rock, by Volkswagens and other assorted vehicles.



Fig.74 Cars under building

The Carpenter Center, then, seems to have a poor relationship to its ground, except where it soars above it. The attempts at artificial ground up on the structure have produced areas that are unused and largely neglected. The ground next to the building is abstracted and undistinguished. Those areas under the building are dead from lack of sun and rain, and inappropriate use. Some of this undoubtedly has to do with the management of the building and ground, but much can also be blamed on a design which tended to treat the ground as a neutral material, rather than a living organism with its own needs. In addition, I feel that much of the design is inappropriate to the climate. Those areas under the building that are so dark would be much more pleasant in a strong Mediterranean sun, and the roof gardens and terraces are more appropriate to a climate that is warm for more than three months a year. Despite the architectural quality found in the plastic form of the design, I find the building hopelessly marred by its failure at the ground.

XI. CASE STUDY: WELLESLEY OFFICE PARK

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The Wellesley Office Park is located at the intersection of routes 9 and 128 on the outskirts of the Boston metropolitan area. It is a collection of some half a dozen medium-rise office buildings, located on a hilly site between the highway interchange and a large swampy area. The building at 20 William Street occupies the highest piece of ground, a rocky hilltop near the entrance to the park. It was designed by the associated architects Pietro Belluschi and Jung-Brannen-Richard Reese Inc. The program evidently called for a high quality development, because many of the design features have been handled with care, and often at considerable expense. The landscaping, for instance, is extensive, and there is a large, kinetic metal sculpture at the building entrance. I have chosen this building for analysis because it demonstrates many of the problems and some of the solutions encountered in this type of development, which has become common in the last twenty years. The things that characterize this building are the pervasive presence of automobiles, and the alterations to the ground that were made to accommodate them.

The entrance to the office park required a sizable cut through the rocky hill that separates it from the highway

interchange adjacent (fig.75). Within the cut, a wide, smooth road has been laid.

This massive earthmoving, which cut some fifteen feet into the rock, was unavoidable given the necessity of moving several hundred vehicles through every day.

This is the only access to the complex,

the other sides being bounded by swamp or highway. It is clear that few people arrive on foot, although a sidewalk has been provided for those willing to risk

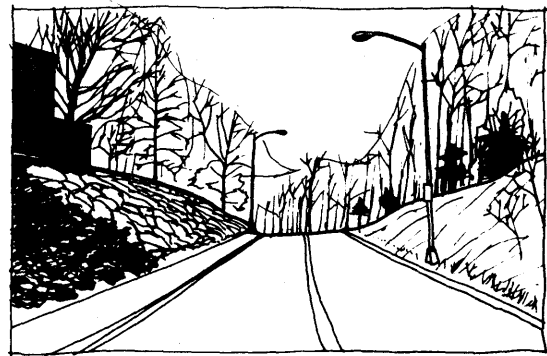


Fig.75 Access road

traffic crossings and able to walk the considerable distances to the buildings. The steep sides of the cut have been stabilized against erosion in several ways. On the left side of the access road, a spot that is something of a showplace, the slope was planted with evergreen shrubbery and mulched heavily. Further up the same side, the shrubs give way to heavy stone riprap. The right hand side, which slopes up steeply to an undisturbed woodland, has merely been seeded with grass and left to its own growth pattern, except for an occasional mowing.

The surface treatments have been successful in reintroducing small-scale vegetation, but all the large vegetation had to be destroyed by the earthmoving operation. A longer-term effort was begun to

dignify the drive into the office park by planting trees at intervals up the drive. The difficulty of doing this lay in the steepness of the banks of the cut, which have made it difficult to start trees growing. The solution (fig.76) involved the construction of small, undoubtedly expensive, retaining walls to hold back the slope and make a level space for a tree to be planted. It will be years, of course, before they have large, elegant



Fig.76 Tree retaining

trees to grace their entry drive, but a solid start has been made. The use of the same coarse stone as in the riprap allows the mortar and stone work of the tree retainers to blend compatibly with the slope.

After climbing through the cut, the drive turns and mounts the top of the knoll to the building entrance (fig.77). The two major masses of the building on the left and right are steel and glass structures housing standard office

space. The structure is exposed on the skin with a weathering steel, which gives a rich, red-brown matte finish to the surface. The iron oxide coloration is a tone we associate with earth materials, despite the highly refined technology of the actual material. Seen from a distance, the color readily blends with the stone and trees adjacent to the building. Between the two office masses is a large atrium (the top of which is visible here), and a

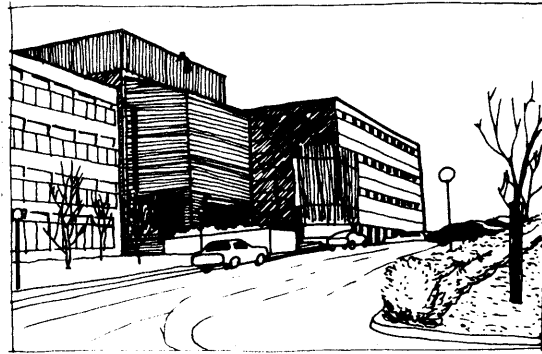


Fig.77 Entry drive

monolithic brick entry structure. The tall metal sculpture is also prominent (center). From its hilltop, the building surveys a broad view of the surrounding countryside, from the spaghetti-bowl interchange at its feet, to the distant hills beyond. (This view, incidently, seems to have been created by the clearing and cutting for the interchange. Without all that, the view would have been into a thick forest.) The landscaping along the drive becomes a bit more formal here than that along the sides of the cut. A small clump of decorative white birches is planted in the lawn to the left of the entrance.

Off to the right of the last view, is a large terraced parking area (fig. 78). There are five sizable terraces built into the slope, each wide enough for two cars to pass, with parking on either side. The earth between the terraces is held by native stone retaining walls. The use of this earth material, rather than the less expensive concrete, helps to soften the feeling of artificiality of the terracing. Stairways have been built of the



Fig.78 Parking terraces

same stone to allow people to get from their cars up to the entrance. Interestingly, they were built in a line along the center axis of the entrance, which gives them a ceremonial quality of ascending, stage by stage, to the climax. Also built into the terrace walls, are two large, semi-circular tree platforms. These are retaining walls around the bases of two fine old trees which were judged too valuable to cut down when the terraces were made. The walls represent a rather extraordinary effort on behalf of the trees, but it is not clear from the health of the trees whether the effort succeeded. Certainly the subsoil conditions of the slope everywhere but at the base of the trees has been altered dramatically. In addition to the terracing operations, an elaborate network of underground wiring for outdoor illumination and of storm drainage sewers was installed on the slope.

It is evident, then, that very little of the ground anywhere in the vicinity of the building is in anything like its original configuration. It has been shaped, resurfaced, landscaped, paved, drained, and built over. It is clear that the building could not function as it does without the extensive alteration of the ground that we find there. The vegetation was also accommodated, although very little of what is growing there now was there before construction began. The diversity of the original ecology of the site has given way to the small assortment of ornamental plants put there by the landscapers. There is no indication of animal life finding it a suitable habitat, and there is every indication that most of the rain water that falls there is carried away by the sewers. This is not to say that the project is any worse than others like it; indeed, it is probably more careful about its alterations than the developers of cheaper projects are. But the ecological concerns raised by Malcolm Wells (see p.57) and other conservationists are called to

mind vividly. Altering the ground at this scale is indeed profoundly disruptive.

This example also points up some of the problems vehicles create in terms of our experience of the ground. The ground here was altered primarily to accommodate the automobile. Much of the earlier discussion in this thesis about people relating to the ground and its images and qualities simply doesn't apply. The ground becomes a surface for storing and moving cars, and for getting people from them into the building. It has visual qualities, but they are experienced from behind the sealed glass of the office or the windshield. Loving, small details in design would go unnoticed, thus everything may as well be rendered in broad strokes. In less careful buildings, such as shopping malls and factories, even the remnants of ground quality exhibited here are missing.

Looking closer at the entrance to the building, we see an orchestrated transition from outside to inside (fig.79). One begins on the slope, either on the road or the sidewalk. At the downhill side of the entry area is a brick planter, which is filled with greenery and sits several feet above the pavement.

Stairs begin their climb from the sloped sidewalk to the front door just past this planter. Their intersection with the slope is rather awkward, with the flat top of each step tapering off into a thin wedge

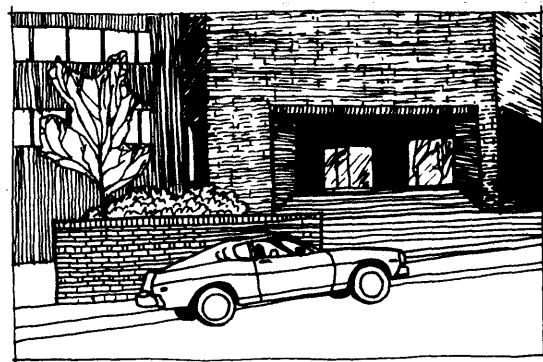


Fig.79 Entry steps

as the slope rises up to it. There is a level area before the final flight of steps, and it is in this area that the metal sculpture stands (off picture to the right). It is mounted on a low podium made from the same brick as the

planter on the left. These two uses of brick seem to prepare the way for the monolith of brick that one encounters above the entry doors. This huge structure provides a sheltered entrance, and marks that place even from a distance. It rises out of the steps on thick piers, before becoming a solid mass. The steps are made of travertine marble, which continues into the entry foyer as floor finish. This, presumably, is to give the proper image of corporate success. The entire entrance sequence is built from earth materials, which provide a contrast to the steel and glass of the rest of the building. They are also shaped with much greater plasticity than is found in the pure geometries of the office structure. Nevertheless, these earth materials are much more civilized and refined than the raw stone of the ground form terraces. They provide a transition in material quality as well as in form from ground to building where this happens.

The experience of entering the masonry monolith calls up images of burrows, of getting into someplace enclosed and solid. The scale of the doorways is human sized, a contrast to the openness of the highway and parking lots. One is lead through the low stone and brick surfaced spaces of the entry to a ramped brick walkway. This goes to the elevator lobby or opens out into the high airy atrium within the building. The images and spaces succeed rather well at bringing people in with a flourish.

Looking at a more typical foundation condition (fig.80), we see that the building joins the ground abruptly. The steel structure seems to have been designed on the assumption of flat ground, as the lower band of steel is perfectly flat. It is

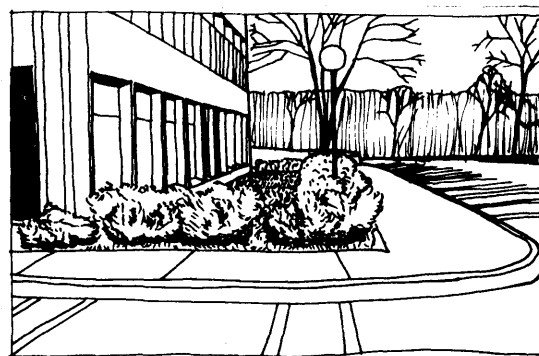


Fig.80 Building, lawn, pavement

supported on a few courses of brick, presumably a veneer over the concrete foundation which pokes a few inches above grade. In front of the wall is a narrow strip of mowed grass, bordered by low shrubs. Next comes a sidewalk and curb, and finally the parking lot. The building is indeed like an island in a sea of parking lots.

One area by the building has ground that is not quite so contrived (fig.81). This is a small knoll, with a stand of natural trees growing on it. The building is close by, and the knoll is surrounded on its other sides by parking lots, but it was not significantly disturbed. Some of the underbrush

was removed to open up views for the offices, and grass and some decorative shrubs have been planted. The building adjacent to this area, however, acts the same as it does everywhere else. It has a flat bottom with brick showing below. Where the ground undulates gently, the difference in height

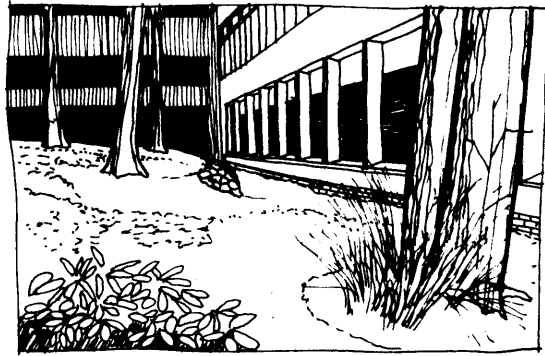


Fig.81 Building, knoll, trees

is made up with a few more courses of brick. There is no access from inside to outside that takes advantage of the natural amenity of the place, except for an emergency door that opens in the corner of the building. There is no sign that the occupants of the building ever make use of this ground that has so generously been preserved. It becomes, in effect, as artificial as the other landscaping around the building: it's there to look at and to set the building off, but has no function beyond that.

This same statement can probably sum up the attitude of the owners and designers toward all the ground that relates to the building. The ground is not particularly valued for its own qualities or associations. It is treated like

an amenity rather than a vital part of the design. Where large-scale alterations are made in it, they are healed and patched, but only, again, to recover amenity. The ground is not even there to be used by people; it is simply part of the image of the building, something that lends a feeling of an orderly natural world outside the windows of an orderly business world.

XII. CASE STUDY: BLACKMAN HOUSE

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The Blackman House, designed by Maurice Smith, was built in Groton, Mass., in 1963. It is a large, rambling, complex house, sited near the crest of a heavily wooded hill, at the end of a long, winding drive that makes it far removed from the people below. I have chosen it as a final example for analysis because the ground and its inherent qualities are a major component of the overall design attitude. Ground, both natural and man-made, is integrated into the structure to a greater degree than in any of the previous examples I've discussed here.

The house cannot be seen from any appreciable distance, because it is so surrounded by trees: it is meant to merge with the woodland. Even if it were possible to see the house from afar, it would be fairly unobtrusive. The overall forms of the building are complex and broken up. The colors and materials are compatible with the surrounding woodlands. The main interest of the building, however, is from closer up.

Seen from the uphill, or entry side, the house is partially sunken into the slope (fig.82). The drive and parking area are located beyond the small entry roof (at right). The entry path is two or three feet below grade as it moves



Fig.82 Entry yard and garage

past the garage (center) on its way to the house and the front door (out of view left). The ground of the entry yard is cleared of shrubs and underbrush, with only a few large trees remaining. This makes it a sunny, open place, enclosed on two sides by the building and on the others by woodland; qualities of the snug valley are recalled.

As the entry path gets past the garage (background), it descends a few

steps to a covered passage (fig.83), which leads to the front door (out of view left). This passage is three to four feet below the ground level, and paved with flagstone. The ground is shaped and held back by concrete block retaining walls, which take an active part in the architecture by varying the experience of this basically linear space.



Fig.83 Covered entry passage

They vary the width of the passage, the amount of enclosure, and the degree of separation between yard and passage. For most of their length, they are too high to easily climb. At one point, however, the walls open up to a set of stairs and stepped planters which allow people to move up to the yard, and bring some of the vegetation down to the passage level.

This uphill side of the building, the north side, is quite closed and sheltered compared to other parts of the building. The concrete block has been introduced as ground material in the retaining walls, and continues to be used as such throughout the building. It is obviously not a natural material, either in its manufacture or in its rectilinear geometry. It is, however, a masonry product and it does convey association with the earth: it's durable, hard, permanent, and heavy. The fact that it rises abruptly out of the ground is because concrete block is laid in straight, vertical courses. It would be impossible with block, for instance, to achieve the rough-textured, battered walls that Richardson built from split-faced stone (figs.15 & 16). The architect here could not make his material itself be more ground-like, but he does make its use ground-like. The concrete block is restricted to a formal vocabulary that is related to the natural vocabulary of ground forms. They are

treated as continuous surfaces, which rise up occasionally, and which behave very differently from lighter, non-earth construction.

At the kitchen entry (fig.84), we can see that the block is carried up out of the ground to different heights, with the wood and glass superstructure filling-in and growing-up from the masonry. The top course of masonry is laid with single blocks, to mark the end of ground mater-

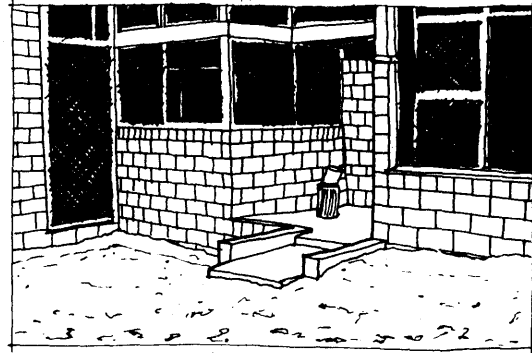


Fig.84 Kitchen entry

ial and the beginning of a different kind of structure. The variety of wall size and shape is analogous to natural forms of the ground such as rocky or eroded terrain, which is seldom uniform in height or singular in its enclosure. The difference, of course, is that natural forms respond more to elemental forces than human needs, whereas here the masonry responds to the uses and needs of the living spaces within. In most of the cases here, the masonry makes vertical enclosures, but at the steps, it rises only as high as necessary to create a low platform. Within the house also, the masonry is used to make platforms and level changes. It is a complete system for beginning the creation of spaces which are completed by the lighter wooden superstructure. In a sense, the masonry acts as a base for the building, but the base is as full of richness and activity as the structure which grows from it.

On the southern, downhill side of the house, the structure is much more open and variegated than on the north (fig.85). The masonry is used in the same general way, but the wooden structure it supports also moves up and down, in and out, in response to the position of the masonry walls and the different human uses. This projecting deck is an example. It is firmly supported on

the masonry at its inboard end, in a place where the block walls turn inward to create a small, enclosed bay. The wooden deck allows the citizens to get out past the masonry enclosure and up over the ground on a surface that is deliberately un-ground-like. It seems that, if it had been structurally realistic, the two posts would have been left out entirely to enhance the feeling of hovering over the ground. The round concrete piers on which they are supported, sitting free and independent like two rocks that happened to poke up at just those points, are dissociated from the continuous rectangular ground forms of the house.

The connection between pier and post seen here at the base of the columns, is used throughout the house (see also figs.83 & 88). It consists of a short length of square steel pipe, embedded in the concrete and bolted to the wood. There is a good technical reason for this kind of connection: it keeps the wood up off the ground safe from decay. But I think it carries peculiar formal implications. The thinness of the steel and the square-cut bottom of the wood column tend to minimize the visual connection between column and ground: indeed, it seems to float above the ground. In other parts of the building, the wooden framework is allowed to sit directly on the tops of the masonry walls, with a formal acknowledgement in the top course of the block that a change in construction is about to occur. It seems that a similar treatment of the pier, as it goes from thick concrete below to thin wood above, would be more satisfying, and would acknowledge the transfer of weight from superstructure to ground much better than the thin steel pipe does.



Fig.85 Projecting deck

The view of the living room exterior (fig.86), shows more of the context on the south side. The ground is dropping away from the house, which sits up higher over the land than it does on the northern side. The spaces here have a view through the trees down an increasingly steep slope to the forest below. In winter, when the leaves are down, the view extends to the hills beyond; in summer, it is much more contained. At no time, however, could it be described as a grand view. There is none of the egocentric clearing of grand alleys through the trees, yet there is enough view to give a sense of the hill and to see where the birds go when they leave the many birdfeeders around the house.



Fig.86 Living room

The Blackmans and their house are comfortable with nature. Trees, shrubs, and underbrush grow close by at most places around the house, and there is no trimmed lawn to speak of. Their "comfortable distance" to nature and the ground is, if you will, quite intimate. People who don't feel as comfortable with natural surroundings would probably find the house overgrown and hemmed in by the forest, but for the Blackmans it seems to work well.

The view from the dining room gives an idea of what the house feels like from the inside (fig.87). There is a strong contrast between the block walls and the wooden framework it supports. The masonry is used in simple, solid masses, without openings or transparencies. The earth materials are also used as flooring (flagstones and ceramic tile) on the lower levels of the house, which are treated as ground form. On the upper levels the flooring becomes wood and, occasionally, carpet.

The wooden framework of the walls and roofs, which is made of linear wood elements, glass, and panels, has considerable transparency. From most parts of the house, one can look out to another part of the building, and see through its framework to yet other parts of the house or the forest beyond. The sticks of the framework share some of the visual qualities of the tree trunks in the forest: they define the immediate surroundings, yet allow one to see for some distance through them.



Fig.87 Dining room

The screened porch (fig.88) is one place where the definition of inside and out is limited exclusively to this type of stick enclosure (with the addition, of course, of wire screening). The ground materials rise only high enough to create a low, level platform, surfaced with rich, brown ceramic tiles. The masonry doesn't rise up to make enclosure, as in the rest of the house. The porch feels outside without being outside. The



Fig.88 Screened porch

flat floor makes it useful for human purposes, and the wooden framework works to create enough sense of enclosure for people to feel protected, yet there is ample openness and contact with the outdoors. Other parts of the house do this to a lesser degree, with the result that there is a whole range of places from open and airy, to close and snug.

The Blackman house is extremely (some would say excessively) rich in its spaces and materials, but it is also rich in its associations with the ground.

By using ground materials, and by adapting some of their forms to human purposes, the house achieves a variety and sympathy to the ground that is impressive.

By now, it should be apparent, as I wrote earlier in the thesis, that the issues of buildings and ground are inextricably related to most of the other major issues of architecture. It should also be apparent that this point of view is quite useful for looking at buildings and thinking about their design. Since I started with the idea for the topic, I have been looking at every building I encounter to see how it meets the ground. There is almost always some bit of insight waiting there to be discovered.

Before finishing, I would like to include a few thoughts on writing a thesis in general, and this thesis in particular. If you have gotten this far, chances are good that you are a student preparing to write a thesis yourself, so perhaps I can be of assistance. A thesis semester is a sore temptation to take everything you have learned in architecture school, and try to integrate it with everything you know from outside school. While I hope I avoided the manifest problems of being this global, it turned out that there were many problems in being merely general. The problem is that if a topic is restricted sufficiently to be do-able in one semester, it is so simple as to be boring or of limited usefulness. On the other hand, if it is general enough to be interesting, it will be impossible to do justice to. Of these two, I think the best tack tends toward the latter approach, if you accept the fact that it will be only a beginning, and then do your damndest to make it clear. You will have done something worthwhile, if only for yourself.

I think there is an argument that should be made for doing a written thesis. This goes against the historical and prevailing tendency for students to do design theses, but the reasons for writing are worth considering. For one thing, doing a design is not all that different in a thesis context than in

a studio context: in both cases, the situation will be make-believe. In addition, there are none of the benefits of doing a make-believe problem with a group of like-minded fellow students. There is an argument against written theses which goes that we are trained as designers, not scholars, so why should we spend our time and talents on writing (which we usually do badly anyway) instead of design. I would answer that a written thesis provides a possibly unique opportunity to explore architectural issues at depth as issues, without all the constraints of a design format. It obviates the need for lots of drawings and models, and allows one to read extensively and integrate ideas far broader than a single design would allow. My own literature search turned-up very little that was directly applicable to my topic, but it greatly helped me in determining what my topic was not and in the process greatly helped to increase my literacy in architecture. Besides, few architects can avoid writing entirely, so why not get better at that too?

If posterity is considered, a written thesis is more broadly useful than a specific design thesis. In recent years, there has developed a set of written theses that begin to add up to a valuable body of the thought of the department (Bartos-Packard, Loftness, Papadakou, Anderson, Coonley, Goldstein). This thesis was conceived partially as a contribution to that set.

If you are setting out to do a thesis, no matter what sort, I wish you the best of luck, and hope that you will get as much out of your work as I've gotten out of this.

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- 35) Bachelard. op.cit., pp. 17-18.
- 36) (reference on p.57) Wells. "No where to go but down", p. 175.

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