

WATER: Forms and Associations in Natural and Built Landscapes



by
Laurene Anne Hungle
Master of Fine Arts
Michigan State University
East Lansing, Michigan
June 1975

Submitted to the Department of Architecture in partial fulfillment of the requirements of the Degree of Master of Architecture at the Massachusetts Institute of Technology

June 1986

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Signature of Author.....

Laurene Anne Hungle
Department of Architecture
February 11, 1986

Certified by.....

Imre Halasz
Professor of Architecture
Thesis Supervisor

Accepted by.....

Julie Messervy
Chairperson
Departmental Committee for Graduate Students

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Ice, Lake Ontario



TO TONY

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ABSTRACT

In nature, water appears as a drop, a trickle, a spring, a stream, a waterfall, a pool, a lake, a river or the sea. These myriad forms offer exciting visual and physical contrast within the natural landscape and evoke associations that nourish our creative and contemplative spirit. We need daily access to water; however, it is visually absent from most built landscapes. It flows in underground rivers. We are deprived of physical and emotional contact and the opportunity to experience it as part of an ongoing natural process.

This thesis examines water in the natural landscape as a basis for incorporating water into the built landscape. Water offers tremendous potential as an emotional link between people and nature. It is also a critical segment of the hydrologic process. Water has the potential of becoming one of the many threads that weave the physical fabric of our environment.

The methodology for generating this thesis involves the discussion of form qualities and associations as they apply to water in natural and built landscapes. Four sites are analyzed to exemplify effective and ineffective applications of water. These analyses discuss how water and the built landscape can be part of natural process and how water can enhance our understanding of place.

On the basis of this inquiry, the relationship between natural process and the city is discussed. Reintegrating water into the city is life-enhancing; it offers the potential for clarifying our movement within the urban landscape; it acknowledges the complex interaction between human purpose and natural process.

Thesis Supervisor: Imre Halasz
Title: Professor of Architecture

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ACKNOWLEDGEMENTS

- Imre Halasz For supporting and stimulating my ideas.
- José For his critical comments, encouragement, assistance and friendship -- but, most of all, for being a fantastic fishing partner.
- Ken For his patience, composure and endless hours at the computer terminal, without which this thesis would still be in progress.
- Joe For numerous hours of paste-up assistance and many hours on the tennis court, both of which helped keep me sane.
- Susan, Ariel For production assistance as well as friendship.
- Katiy For dinner and flowers when I needed them most.
- Burton 5 For their patience, encouragement and for providing a challenging and rewarding experience -- life will seem empty without 50 plus roommates!

INTRODUCTION

Water--universal symbol of purification and rebirth--is a source of power, delight, comfort; it is the source of life.

The oceans occupy three-quarters of the earth's surface. Here, in a chemically stable environment with little temperature fluctuation, life emerged. Nourished by penetrating sunlight and screened from toxic ultraviolet rays, life was created. Undisputedly, the ocean is our ancestral home.

Water permeates the air, the earth, all living organisms--it pervades the terrestrial environment. Body fluids of simple marine organisms are virtually identical to seawater; the saline content of human blood is similar to that of the sea. All living creatures are essentially aqueous solutions confined in membranes. Loren Eiseley maintains that the dimension of man's emancipation from the sea is the length of that cell which separates him from its source of blood, the ancient brine.¹ Like a primordial magnet, water pulls at a primitive and deeply rooted part of human nature.

Water is an essential resource. It appears as a liquid, a solid or a gas. It absorbs energy and transforms it. It transports other elements in suspension or solution. It sculpts the landscape. It sustains life.

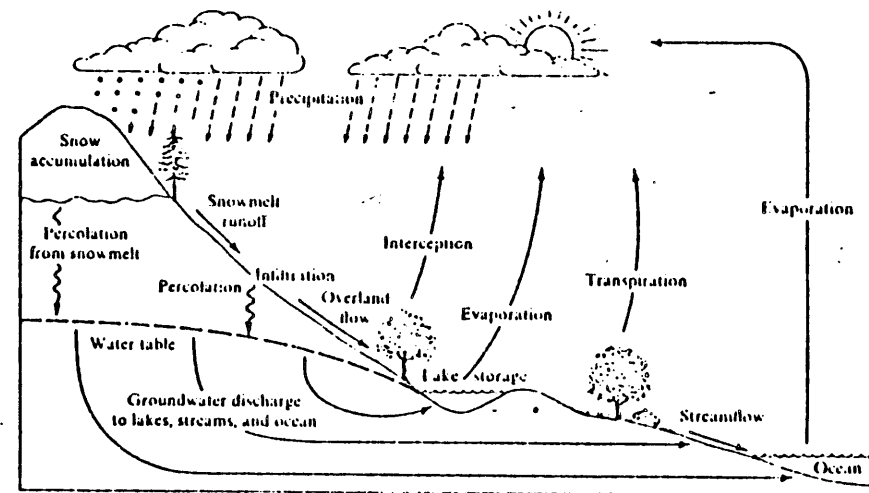
¹Ian L. McHarg, Design with Nature. Philadelphia: The Falcon Press, 1969. p. 47.

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The hydrologic cycle, fueled by the force of gravity and the heat of the sun, is an ongoing process. Rainfall is absorbed into the earth and the plants, flows into streams and oceans and eventually evaporates into the air. Of the rain that falls on rural woods and fields, only a fraction is rapidly assimilated into streams, rivers and lakes. Leaves intercept some rain; soil absorbs most of the balance. Some water is consumed by plants and subsequently returns to the atmosphere via evapo-transpiration; some evaporates directly from the soil's surface; the remainder flows through the soil as groundwater. Groundwater is manifest in two ways: it can intersect the land's surface at stream beds and springs or it can remain deep beneath the surface in vast underground reservoirs or aquifers.

Water flows off the ground's surface only when it encounters steep slopes, saturated soil or impervious rock or ice. Soil and its accompanying organisms filter water utilizing the inherent elements. This activity enhances water quality, mitigates floods and conserves and restores water supplies.



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We need daily access to water. Psychoanalysts have speculated that physical contact with water can bring people closer to the unconscious processes in their lives. Children delight in active association with water; water-play in preschool is an important part of a child's daily experience. "We cannot possibly have the daily access to (water) which we and our children need, unless all water, in all its forms, is exposed, preserved, and nourished in an endless local texture of small pools, ponds, reservoirs, and streams in every neighborhood."²



²Christopher Alexander, A Pattern Language. New York: Oxford University Press, 1977. p. 323

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WATER

SOME CULTURAL ATTITUDES ABOUT NATURE

History indicates that various cultures have espoused different views about nature. Some have assumed a position of domination over nature while others have sought a more harmonious relationship. A cross-cultural examination will illuminate those influences which have helped me formulate and clarify my own position.

1. 8th century - Japan

The Japanese attitude toward nature is based on the belief that humankind and nature are indivisible. Influenced by Chinese thought, the garden became the metaphysical symbol of society in Tao, Shinto and Zen--humankind in Nature. The garden landscape became a microcosm of the natural landscape. Katsura is a prime example and clearly expresses this symbiotic relationship. Japanese architecture, village and town planning use natural materials and natural processes with incredible power and sensitivity.

Water in Japanese gardens follows a very

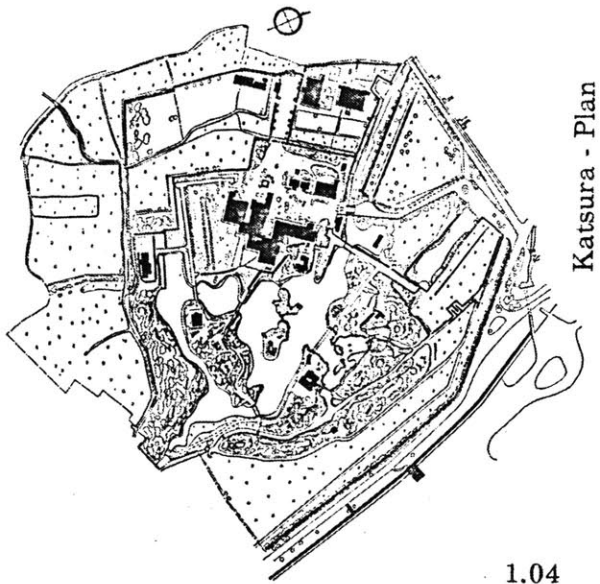
Katsura



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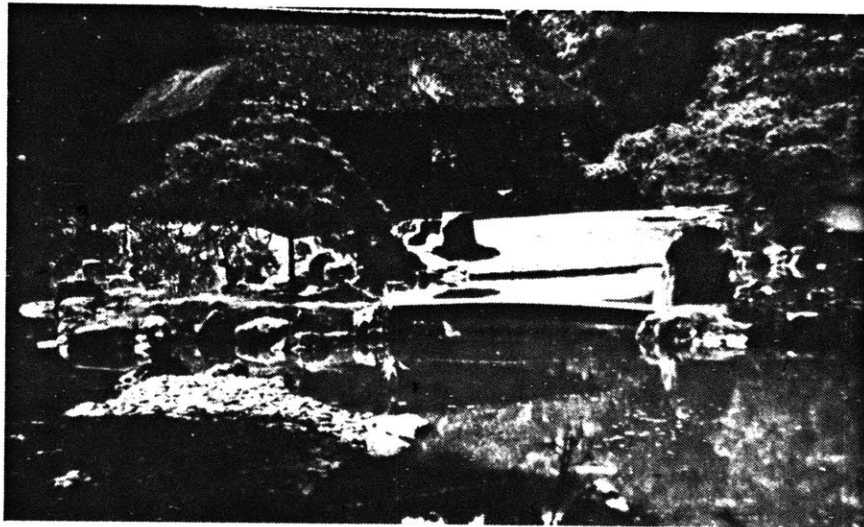
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Katsura - Plan

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Katsura - The Tea House

1.05

sinuous path, interrupted by strategically placed hills, mounds, rocks and trees. The experience becomes one of continually pursuing the unknown. Parts unfold and reveal themselves in succession and the entirety cannot be experienced from a fixed position.

Harmony with nature was an intuitive basic philosophy for survival in which the Japanese sought to understand the world, the universe and themselves through contemplation or by identifying themselves as a minute but integral part of a larger cosmos. Survival and health are therefore contingent upon an understanding of nature and her processes.

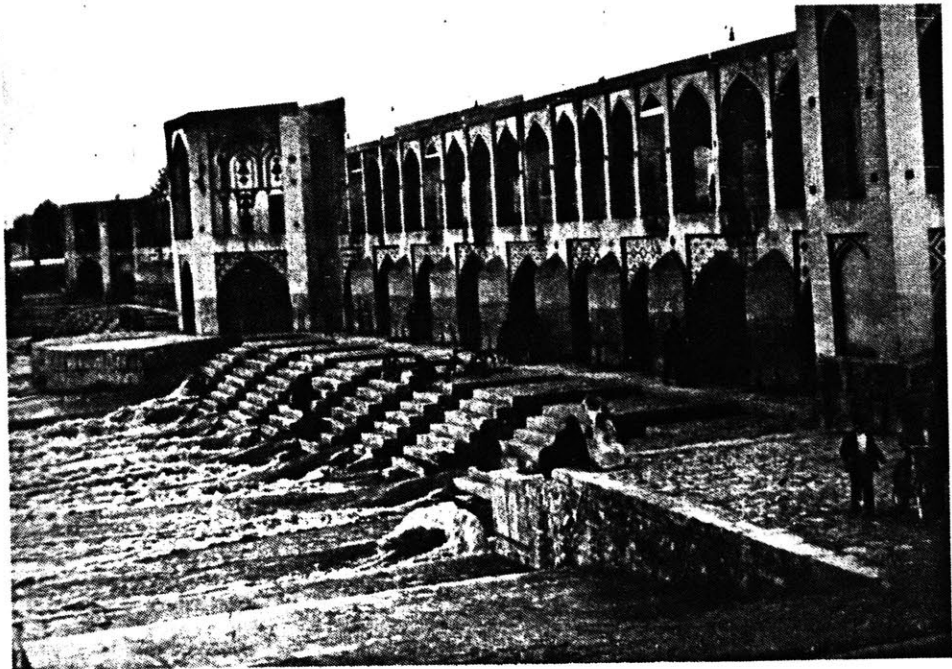
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2. 12th century - Islamic - Persia

In Persia, nature was transformed into a garden. Each garden was meant to be a piece of paradise on earth and was carefully enclosed within walls to exclude the noise and odors of the city. This paradise garden also became an ingredient of urban form.

Contrasted with the pastoral or wooded countries of Italy, France and England, much of Persia's land is arid and monotonous. Nature compensated by supplying oases but the Persians created the formal garden with special water installations as a higher form of relief from this formless and hostile environment.

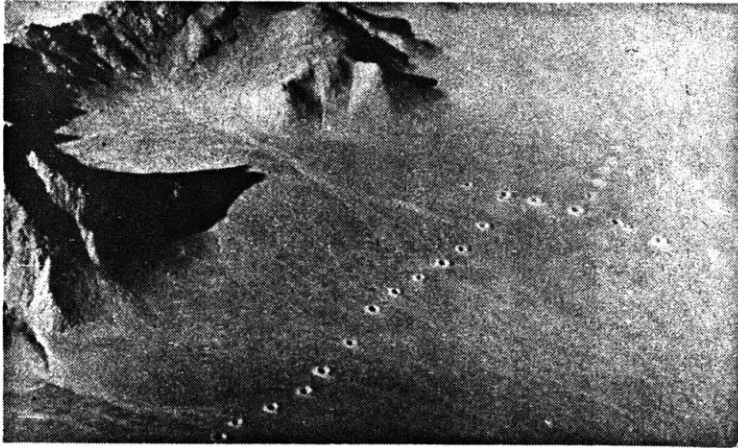
Isfahan, Iran - Khaju Bridge



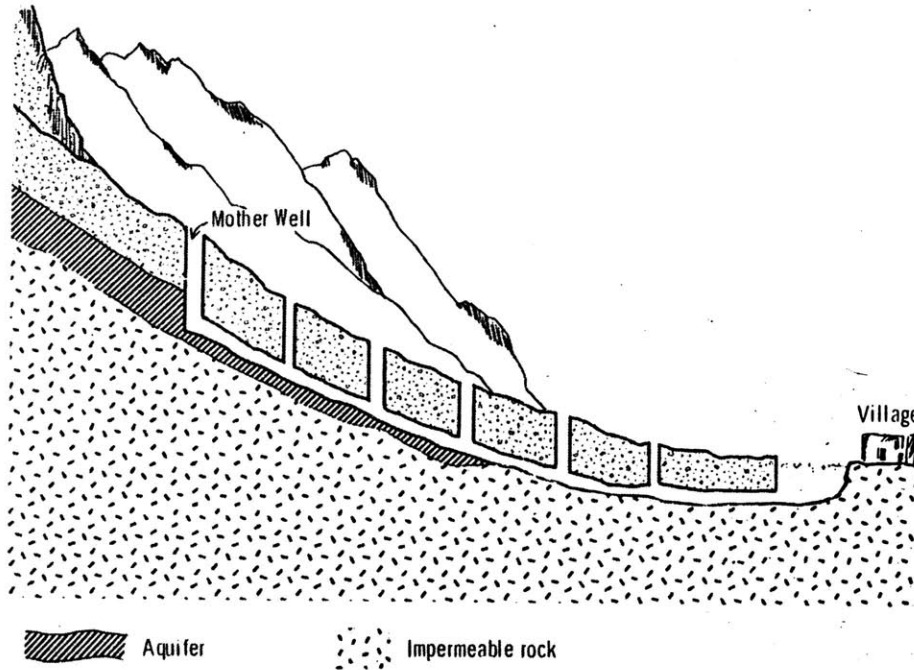
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Cross section of an Iranian qanat.

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Water, the nucleus of every garden, was supplied by the qanat. Canals of water divided the gardens into four or more geometrical sections. Central to Persian garden design was a tank or small lake of water; these were never 'freely' shaped like those of a Chinese or English garden. Commonly found in these gardens was a sloped water chute called a chadar. Its textured surface caused the water to flow in a more turbulent, foaming pattern. Waterworks and fountains were critical elements. "Water was used in simple fountains and in these very complex systems of pattern-forming jets; more simply in open channels lined with tiles, forming stylized streams and cascades; and in still surfaces--either in tiled shallow basins, or in deep tanks without tiles so as to give the water a deep, dark and mysterious look".³

³Edward Hyams, *A History of Gardens and Gardening*. New York: Praeger Publishers, 1971. p. 86.

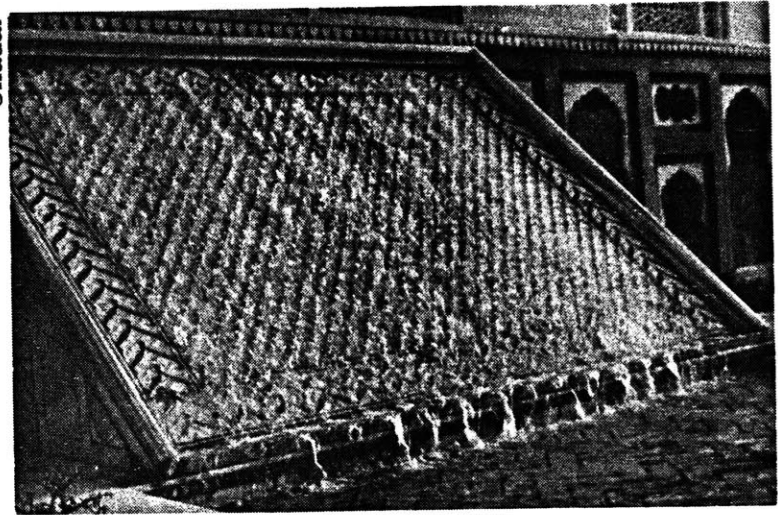
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Unlike Chinese or Japanese gardens, paths in Islamic gardens were never random or winding; they would lead the stroller straight to a goal such as a pavilion, a view through an ornamental unglazed window in the outer wall, or an arbor or kiosk, made of wood, stone or bricks, brightly tiled and covered with vines.⁴

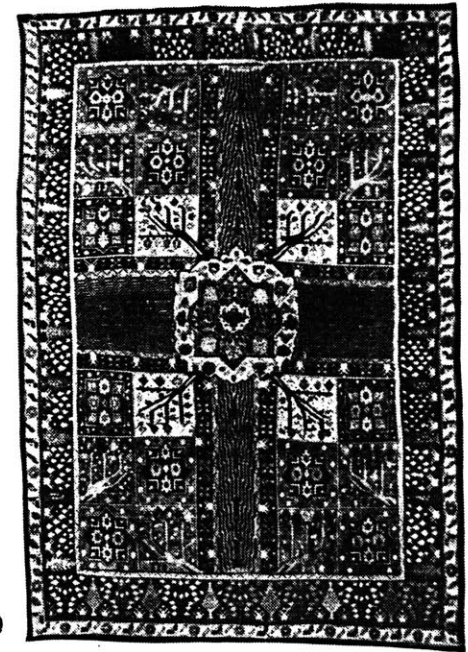
⁴Ibid., p. 84.

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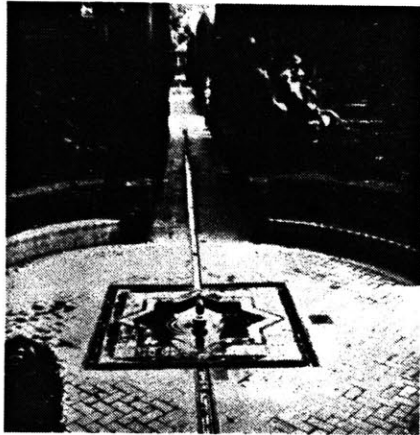
Chadar



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Seville, Spain - Alcazar Gardens

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Cordova, Spain - Court of the Oranges

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3. 12th century - Spain

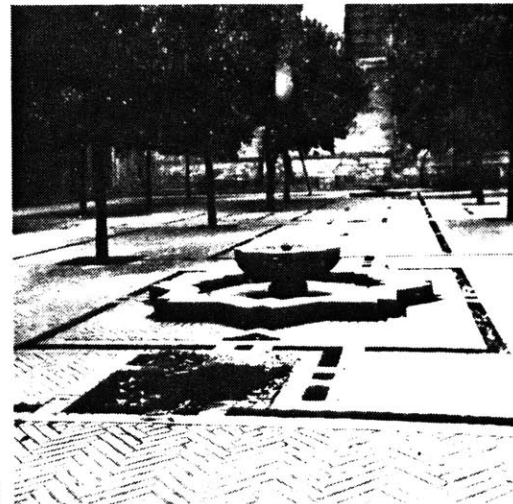
North African Islamic gardening reached its zenith in Spain. Like Persian gardens, waterworks and fountains were extremely important features. These gardens were always broken up into numerous small, interconnecting enclosures. The Moors made small amounts of water appear much greater in quantity. Irrigation was provided by small channels or narrow pools which ran from tree to tree. Water, contained in faceted or carved basins located close to the ground, spilled over into a secondary channel.

"The key to the Islamic garden, especially in contrast to later Renaissance and Baroque gardens and parks, is its essentially spiritual, poetic and contemplative purpose, completely opposed in nature to the social ceremonial, classical-inspired play areas of the Italian

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and French aristocracy....The western garden or park cuts through and overcomes nature, opening out broad vistas and avenues. The Arabic park, by contrast, secludes its spaces in hidden courts, with only subtle enframed vistas of distant areas here and there."⁵ When these gardens were built on hillsides as exemplified by the Alhambra and Generalife in Granada and the Alcazar in Seville, a small element of irregularity imbued them with an informality which was alien to most Islamic gardens.

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Seville, Spain - Court of the Oranges

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Granada, Spain - Generalife, Water-Staircase

⁵Craig S. Campbell, Water in Landscape Architecture . New York: Van Nostrand Reinhold Company, 1978. p. 29.

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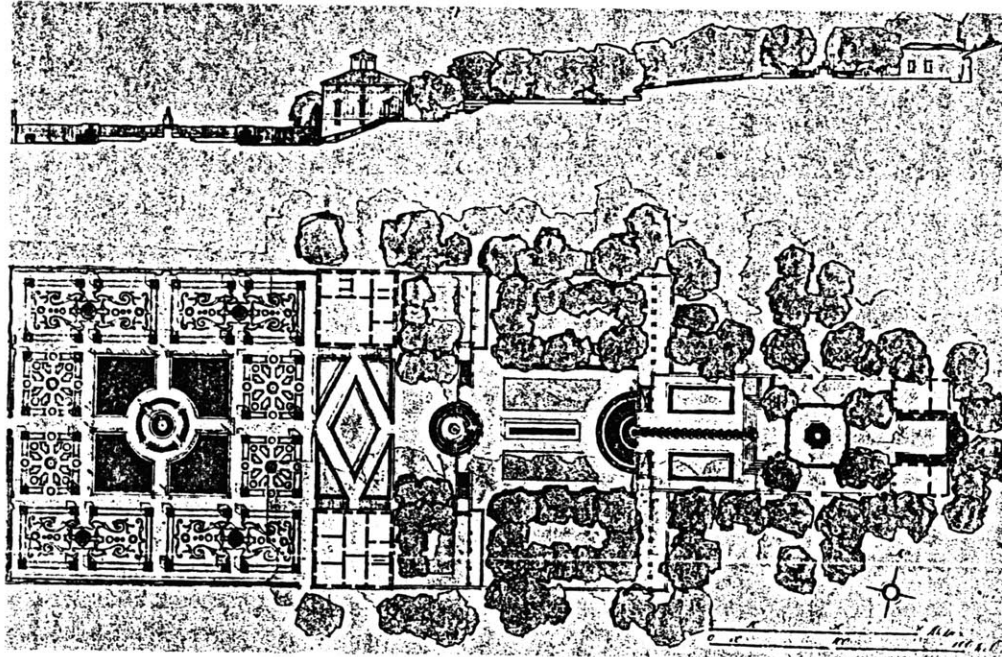
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4. 16th century - Italy

In Italy, humankind begins to inflict its illusion of order and control upon natural processes. The garden becomes the symbol of humankind's superiority over nature. The villas and gardens of Rome and Tivoli are indicative of this assumption of power made visible by the imposition of a simple Euclidean geometry.

Baroque gardens were symmetrically laid out and axially aligned with the architecture of the villas. Water displays, a significant part of many villas, utilized complex hydraulics to provide the massive quantities of water. "The most original contribution of Renaissance and Baroque gardens was probably the man-made cascade in which massive volumes of water are carried through stylized channels; over ramps, boulders, and walls; into basins and out of mouths; sometimes

1.15



Bagnaia, Italy - Villa Lante

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transported in this controlled way down an entire hillside." ⁶

Aqueducts brought incredible quantities of water into Rome from springs and mountain streams. These fed an unprecedented proliferation of fountains. The fountains were generally large in scale; the manipulation of the water unsympathetic to nature's processes. Water, forced to perform to the whims of humankind, was used to express an attitude of total domination over the natural landscape.

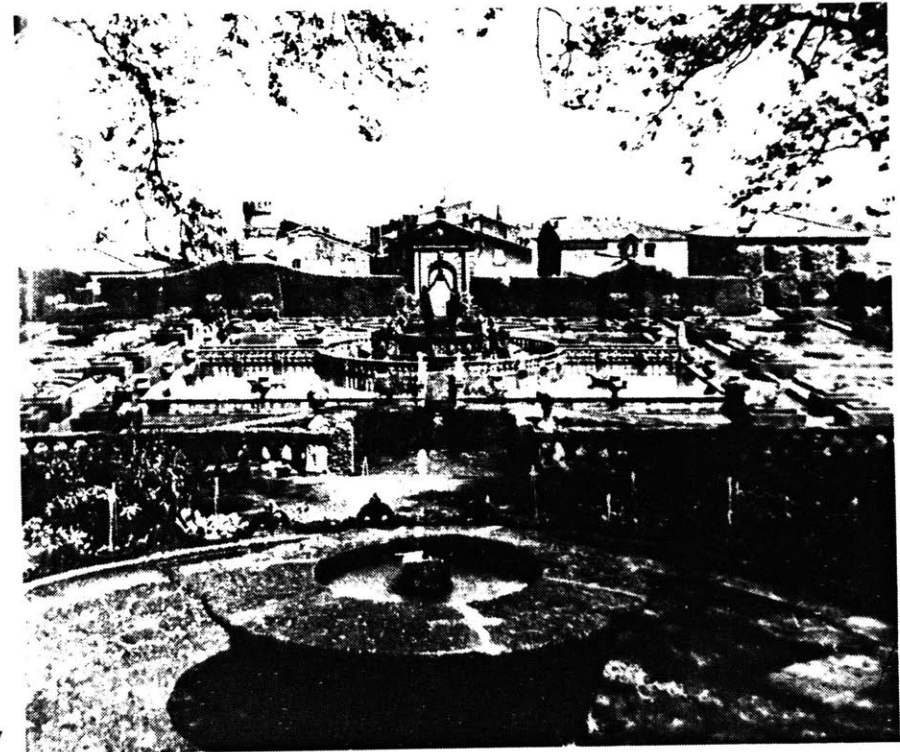
⁶Ibid., p. 32.

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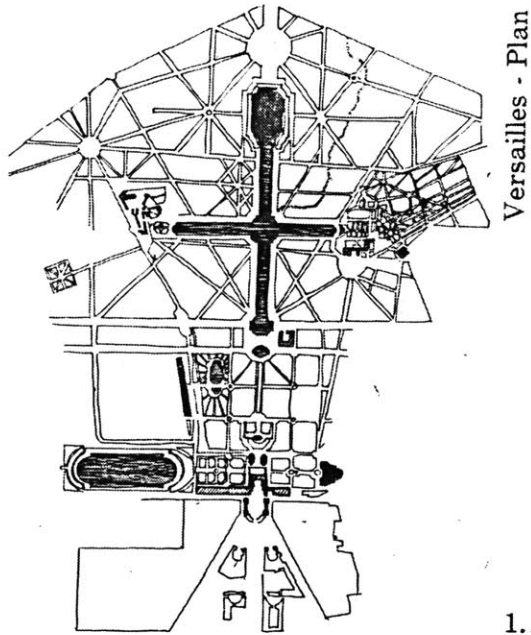
Water channel at Villa Lante, Bagnaia.



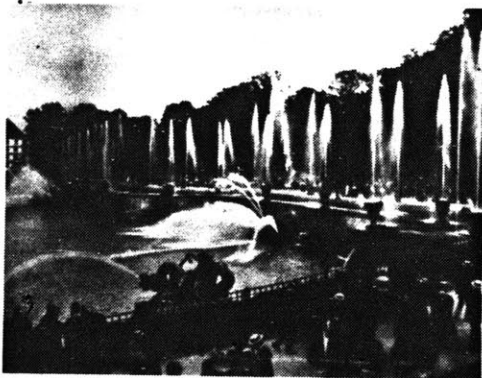
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⁷Geoffrey and Susan Jellicoe, *The Landscape of Man*., London: Thames and Hudson, 1975. p. 179.

5. 17th century - France

In France, the complexity of nature is reduced to a simple and comprehensible geometry. Andre LeNotre created a totally organized space. The principles of composition were simple: the garden was no longer a mere extension of the house; geometry was based on axially; highly ordered, crisply defined shapes were used; the Baroque quality of unity with sky was achieved by water reflection; sculptures and fountains provided rhythm and punctuated space; various devices directed the eye firmly without power to roam; the emphasis was on the apparent revelation of the whole project in one glance; the scale of all parts, especially steps and stairs was to be larger than life.⁷

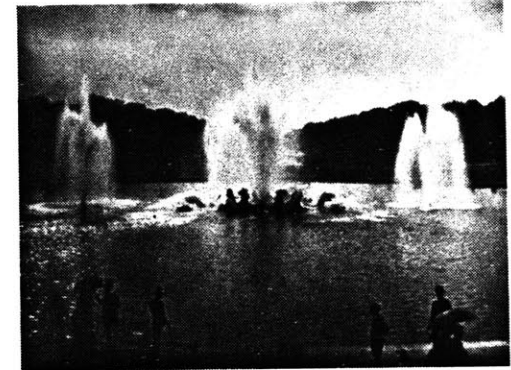
Gardens in France became the Italian counterpart with the exception of the treatment of water. Working with a comparatively flat landscape, the French

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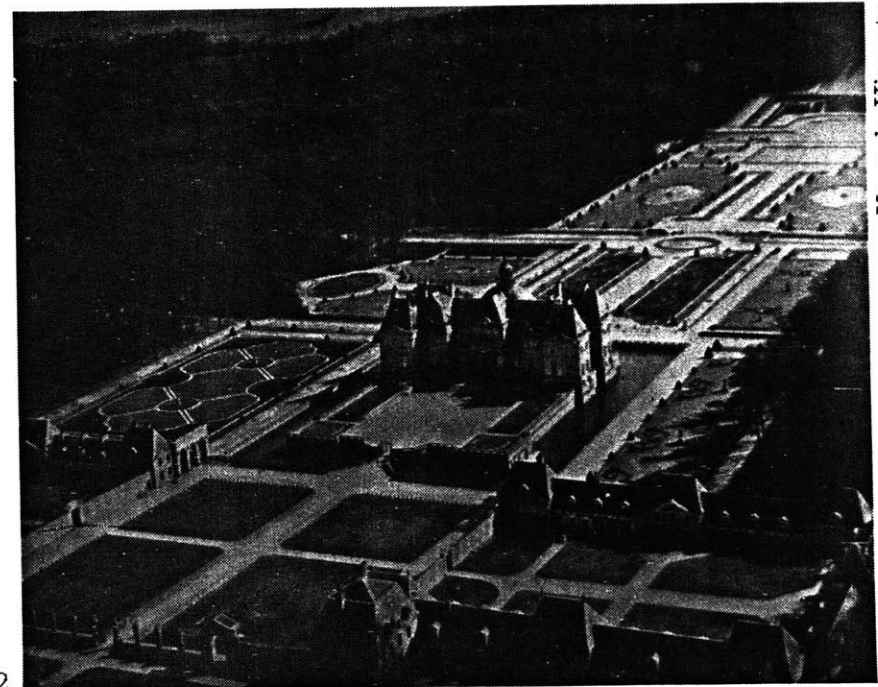
were unable to create cascades or exuberant water displays. Instead, they surrounded the chateau with large canals and moats capitalizing on water's reflective qualities. Rustic grottos patterned after Italian examples were often equipped with subterranean pools embellished by famous potters. Water displays such as fountains and jets depended upon pumps to transport water from rivers and reservoirs. Four hundred jets were installed for the fountains at Versailles but lack of sufficient water prevented their full potential from ever being realized.

"At Vaux-le-Vicomte and Versailles, the ordered gardens below were testimony to the divinity of man and his supremacy over a base and subject nature."⁸

⁸Ian L. McHarg, *Design with Nature*. Philadelphia: The Falcon Press, 1969. p. 71.



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Vaux-le-Vicomte

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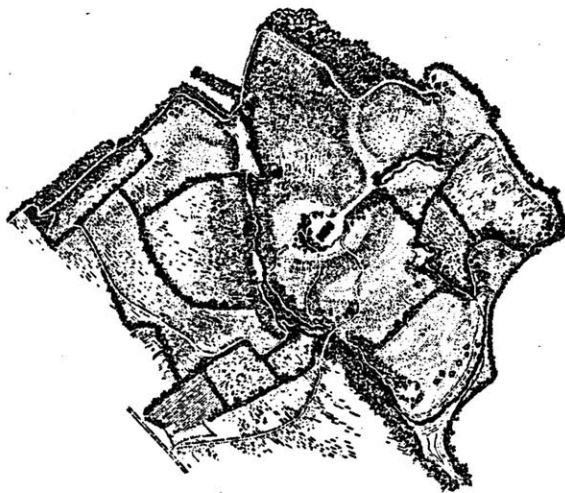
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Yorkshire, England - Castle Howard
Painting by Hendrik de Cort

1.23



Near Birmingham, England -
The Leasowes

1.24

6. 18th century - England

The English believed that some harmony of humankind-nature was possible.

Landscape artists inspired by the dreams of writers and poets, images from the painters Claude Lorraine, Salvator Rosa and Poussin, and the discovery of the Orient, "transformed England from a poverty-stricken and raddled land to that beautiful landscape that is visible today".⁹

This transformation, fueled by the romanticism of the age and its literary expression, resulted in the worship and virtual deification of nature. People were not treated as part of the totality of nature or considered biological organisms as grass, flowers trees and other denizens of the wild.¹⁰

⁹Ibid., p. 29.

¹⁰Norman T. Newton, Design on the Land. Cambridge: Harvard University Press, 1971. p. 208.

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Their beliefs found expression in such tenets as the dictum "Nature abhors a straight line" despite the fact that nature is essentially orderly and "straight lines" often occur in the wild, as well as in creations of the human organism.¹¹

Water was treated in a manner sympathetic to nature. Lakes were constructed and streams meandered. Ornamental sheets of water in the French tradition became lakes with brooks and waterfalls.

Unfortunately, the English landscape "tradition never confronted the city which, in the 18th century remains the Renaissance prototype. Only in the urban square, in parks, circles and natural plantings is the 18th century distinguishable from its antecedents".¹²

¹¹Ibid., p. 208.

¹²Ian L. McHarg, Design with Nature. Philadelphia: The Falcon Press, 1969. p. 74.



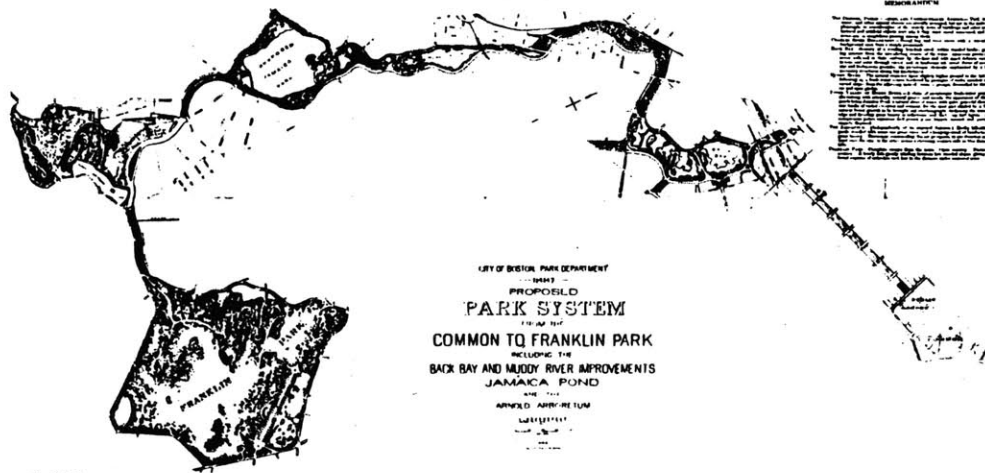
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- 411 Stours
- A Mansion
- B 'Entrance' pavilion
- C Temple of Friendship
- D Palladian bridge
- E Elysian Fields
- F Temple of British Worthies
- G Temple of Ancient Virtue
- H Temple of Concord
- I Queen's Temple
- J Gothic temple

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7. 19th & 20th centuries

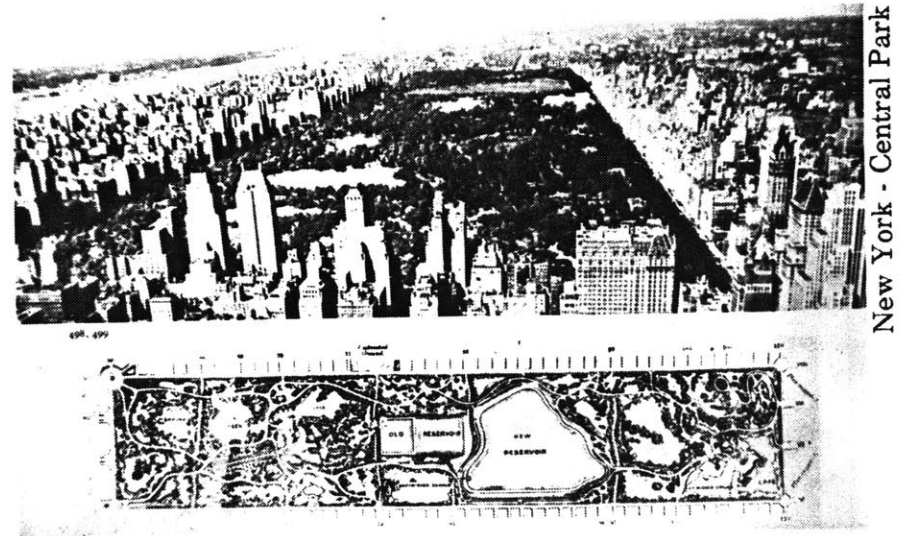
In the 19th and 20th centuries, public parks were built across North America and Europe. These were intended as "lungs of the city" and were part of a comprehensive effort to improve the quality of urban life. The majority of these parks were superficial manifestations of nature which disregarded the interdependency of natural processes. Olmsted's Boston Fens was one attempt to utilize natural processes to mitigate floods and ensure water quality. This was created primarily to combat the flooding and pollution problems of Boston's Back Bay tidal flats, although Olmsted objected to people referring to the Fens as a "park".

The present form of most cities indicates a blatant disregard for the processes of nature. These "granite gardens" merely

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incorporate the trappings of nature-- parks, gardens, lawns, trees and lakes. The city is regarded as a foreign organism and fragments of nature are haphazardly injected into its body.

Unfortunately, tradition has created a schism between nature and the city. The form of the city is generated by the dominant belief that it is an entity apart from nature. Nature is nothing more than a superficial embellishment, an extravagance; it is not valued as an essential process permeating the city, maintaining the link with a larger cosmos.



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Undisputedly, water is the source of power, comfort, delight, the source of life. It is part of an ongoing natural process. Additionally, it helps us navigate within the natural landscape. Consequently, to use water solely as ornament would be an opportunity missed. Water offers potential as a design element to clarify movement through the built landscape. In Chapter 1 the formal and associative qualities of water are defined and discussed. These are used in Chapter 2 to discuss various forms of water found in the natural landscape. Chapter 3 examines water in the built landscape utilizing four specific sites as examples. The conclusion summarizes my ideas on water, its immediate relationship to buildings and its role in the urban landscape as part of a more wholistic approach to design.

Artifacts should be measured in terms of their effect on life, not as independent objects. So the measure of creation used to value artifacts is the degree of apperception they reveal, their expression of working symbioses and altruism in the form of institution, and the extent to which these are enhancing to life, at the level of the individual, the family, the community and the society. It is life that endures, not artifacts. So, of course, the measure of cities is their culture, but this embraces the visible city as an expression of the given form and as an adaptation to it. This is a visible and manifest expression of the culture--the morphology of man-nature and man-city.¹³

¹³Ibid., p. 172.

FORMAL AND ASSOCIATIVE QUALITIES

INTRODUCTION

This chapter defines and discusses nine formal and associative qualities affiliated with water in the natural landscape--continuity, reciprocity, direction, movement, edge, orientation, object in a field, contrast and sense of place. To help understand and analyze water in the natural and built landscapes, I found it beneficial to formulate some definitions that have been used as a foundation for presenting my position.

CONTINUITY: A form of connectedness or succession of related parts.

Continuity enhances our understanding of, and movement through, a place. It implies the extension of some physical properties while allowing variations in others. Indigenous settlements such as medieval Italian hilltowns, exhibit a strong continuity with the natural landscape.

A. Linear Continuity

1. Meandering stream or river

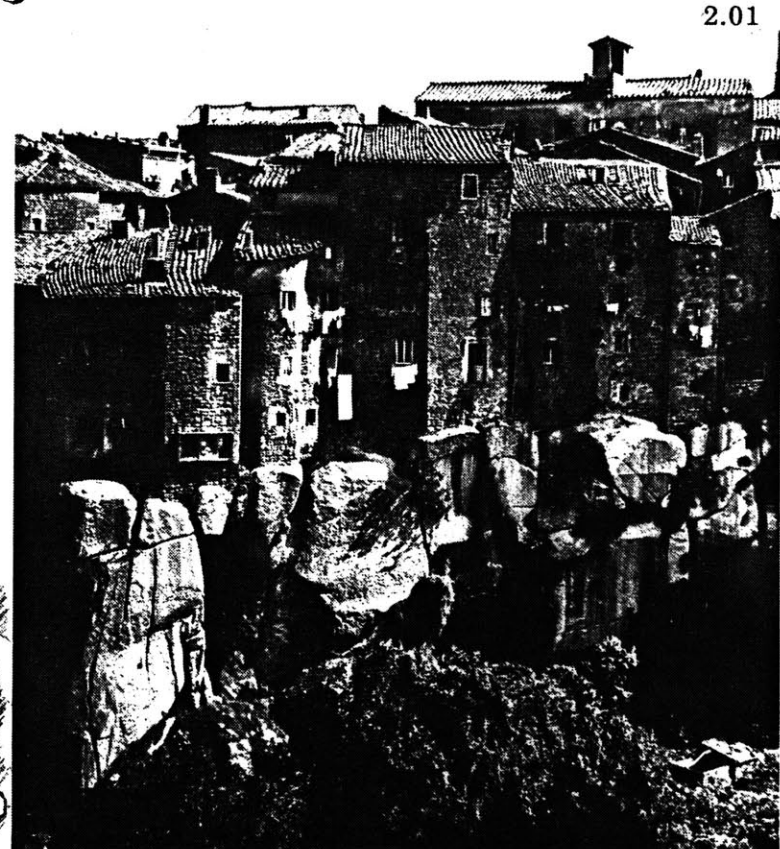
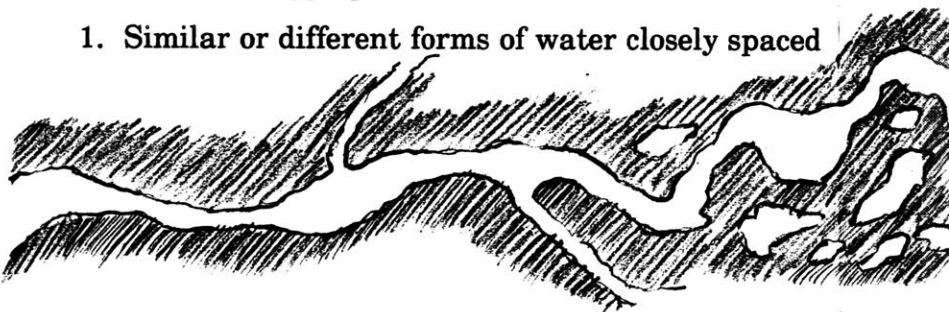


2. Series of directional bodies of water



B. Continuity by Aggregation

1. Similar or different forms of water closely spaced



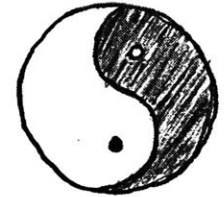
FORMAL AND ASSOCIATIVE QUALITIES

RECIPROCITY: One form extending into another.

Reciprocity is demonstrated by the Chinese Yin-Yang symbol. Reciprocal forms enhance the habitable qualities of a place because they maximize opportunities for association and increase the territory at the edge. Contrast this with a more linear edge condition where there is minimal chance for association and a much more limited edge zone.

In the relationship between land and water, the land becomes a protected, receptive form where the water becomes prominent, thus resulting in an interlocking, interdependence of parts.

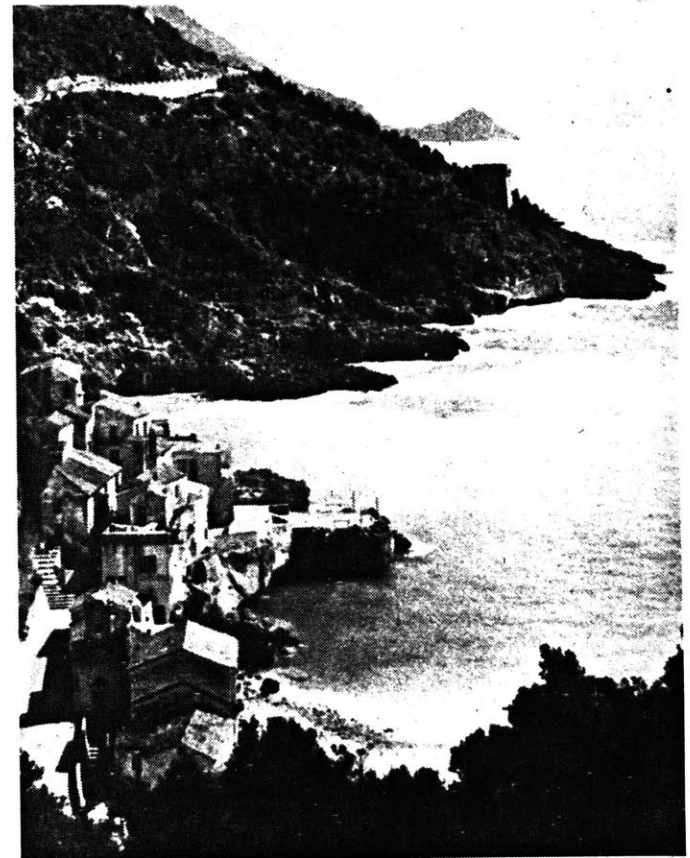
RECIPROCITY



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FORMAL AND ASSOCIATIVE QUALITIES

DIRECTION

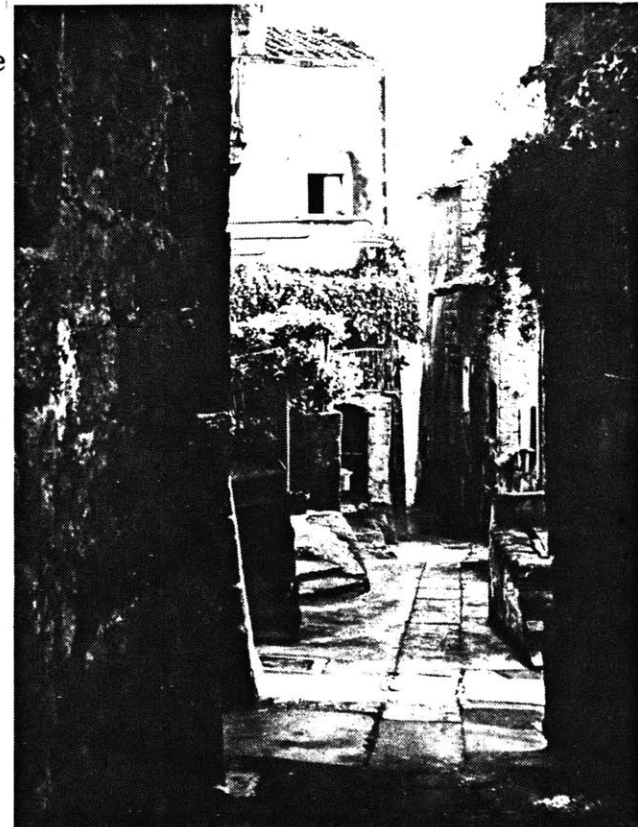
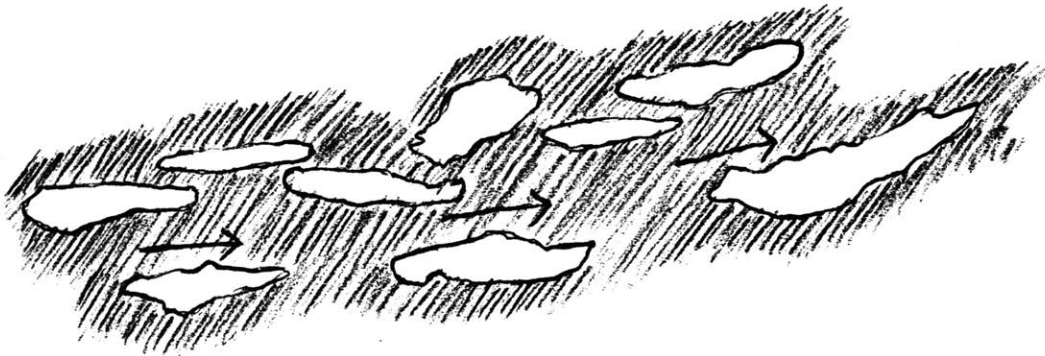
DIRECTION: The course of movement informed by the physical qualities of the space.

Denoting the direction of passage from one territory to another is a key element in clarifying our movement. In the landscape, mountain ranges, rock ledges and rivers define direction.

Three categories of direction follow:

a. Extension of existing direction

The primary direction is reinforced as a result of the orientation of the "bits" deployed in the space.



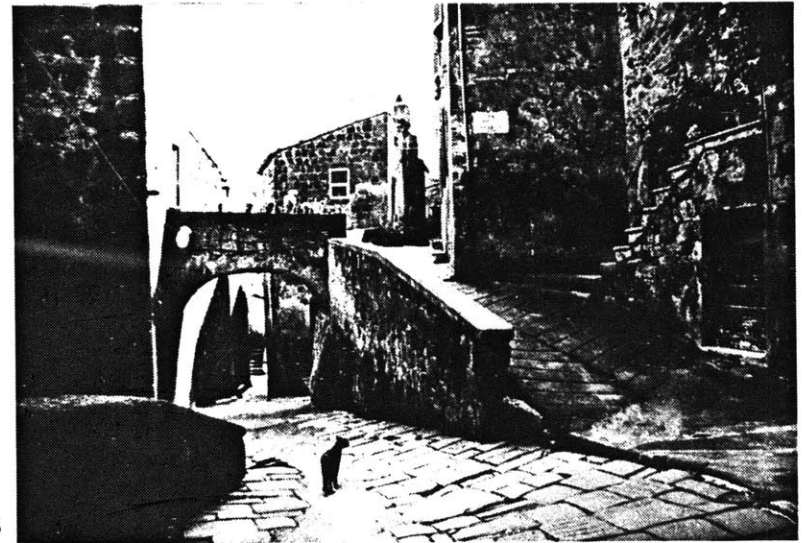
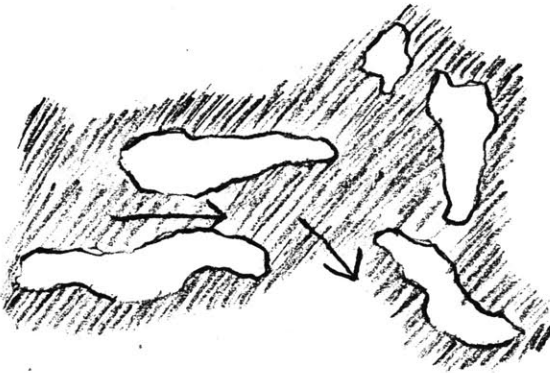
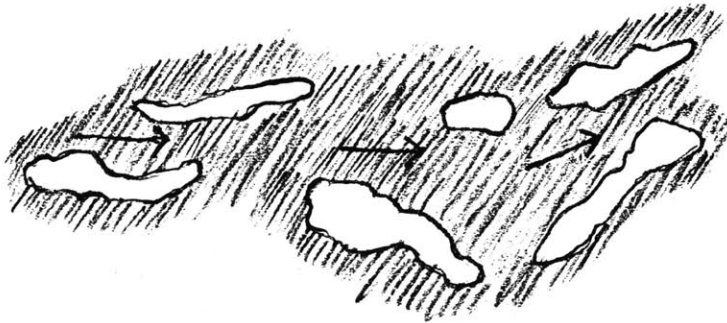
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FORMAL AND ASSOCIATIVE QUALITIES

DIRECTION

b. Shift or change in direction

A shift of about 15° or less is construed as a slight variation in the direction but still reinforcing the primary direction. Over 15° begins to signify a change of direction.



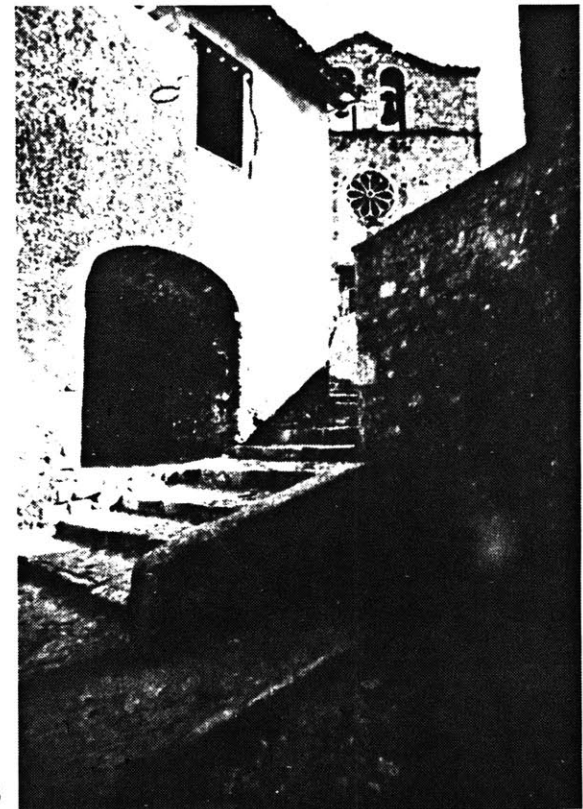
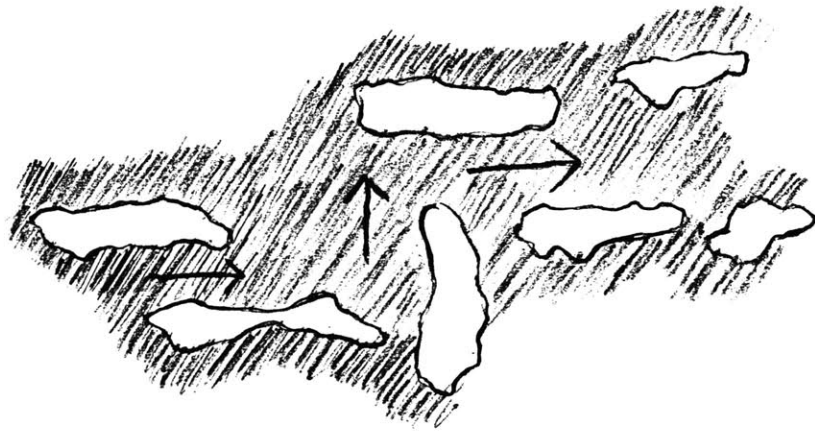
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FORMAL AND ASSOCIATIVE QUALITIES

DIRECTION

c. Halt or lateral shift in direction

Movement in the primary direction becomes discontinuous and one either pauses here or shifts to move around the "bit" to continue in the primary direction.



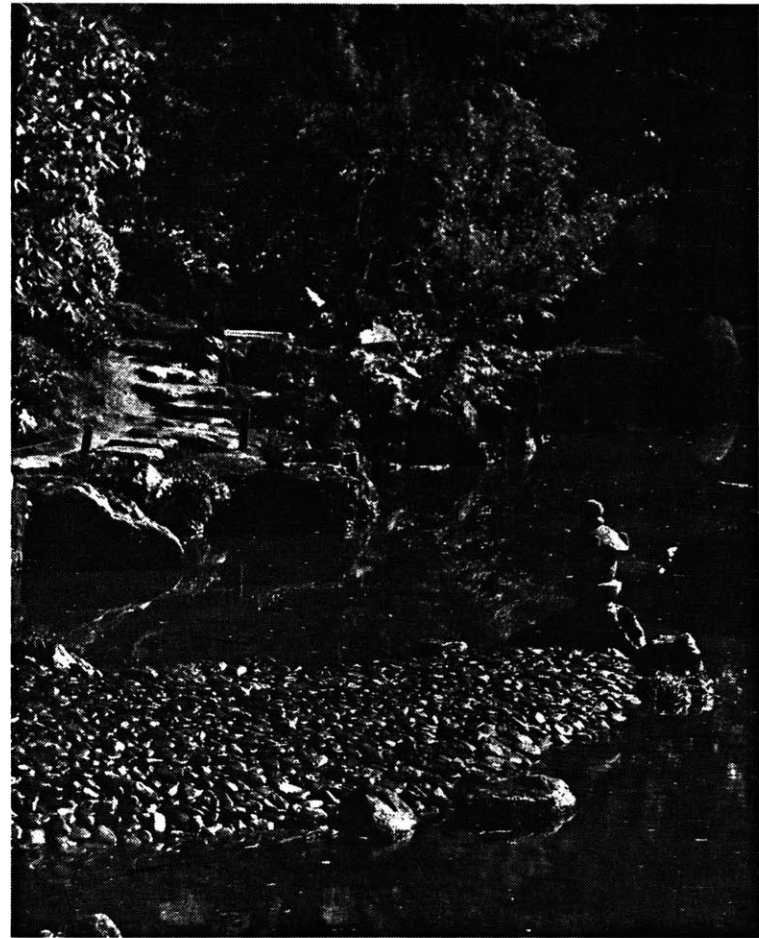
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FORMAL AND ASSOCIATIVE QUALITIES

MOVEMENT

MOVEMENT: Spatial navigation characterized by changes in rhythm.

Movement from one place to another is rarely constant. Changes in the physical qualities of the landscape attract our attention, varying the pace or rhythm of movement. Surface deposits along the water's edge, unique rock formations and local plant and animal life alter the tempo of our motion.



2.07

FORMAL AND ASSOCIATIVE QUALITIES

EDGE

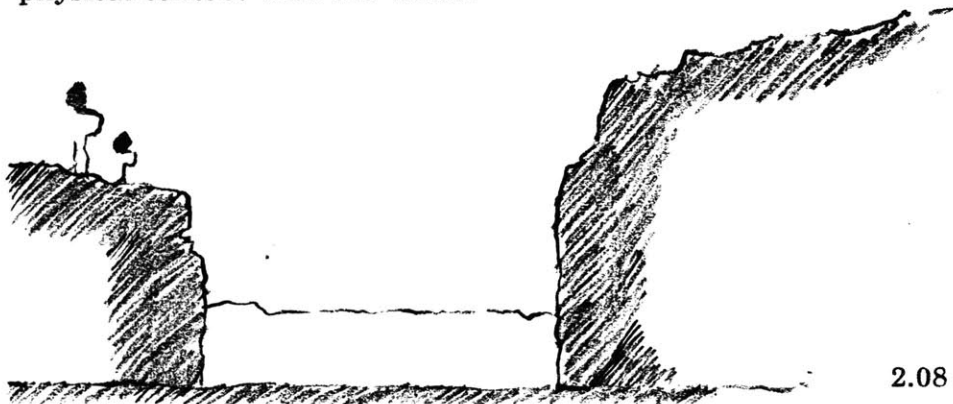
EDGE: The boundary between elements.

The nature of an edge defines the accessibility or inaccessibility to the water. The dimension of the edge, in addition to the scale and character of the surrounding landmasses, directly affects our perception of an area and the activities that it fosters.

Edges can be classified into four categories:

a. Abrupt

A distinct junction where the "mountain meets the sea". This provides no zone of transition; the steep face of the landscape directly confronts the water. This could be a cliff, bluff or palisade, bulkhead, hedgerow of trees or forest edge. In some instances, it may be possible to get to the edge but this would probably be solely for viewing purposes, as opposed to physical contact with the water.



2.08

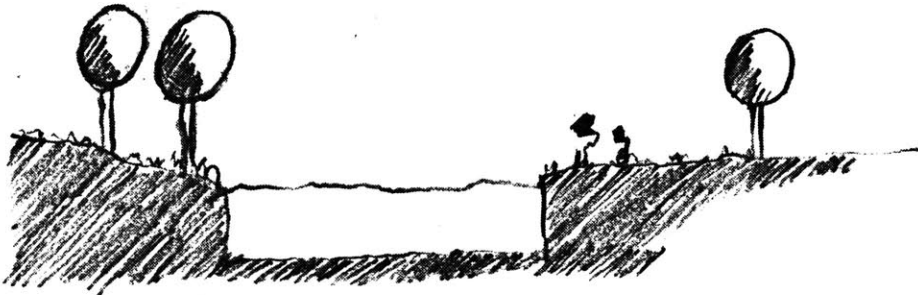


FORMAL AND ASSOCIATIVE QUALITIES

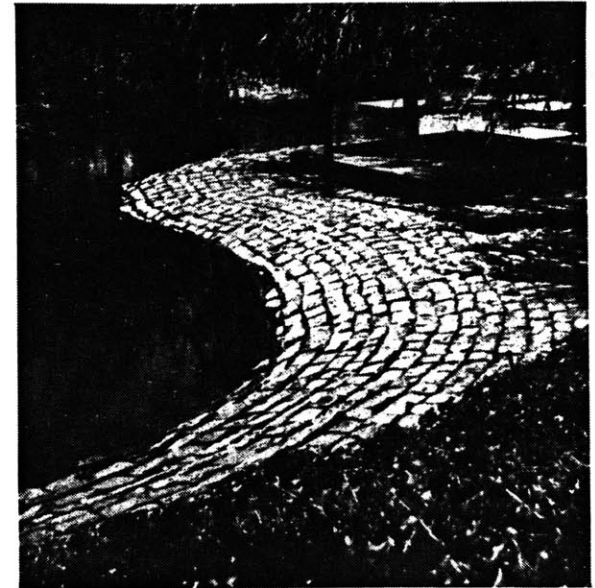
EDGE

b. Gradual

A zone of transition manifest as a gentle slope or horizontal plane and characterized by beach, marsh, rock formations, marsh-to-meadow verge or low profile levee.



2.09



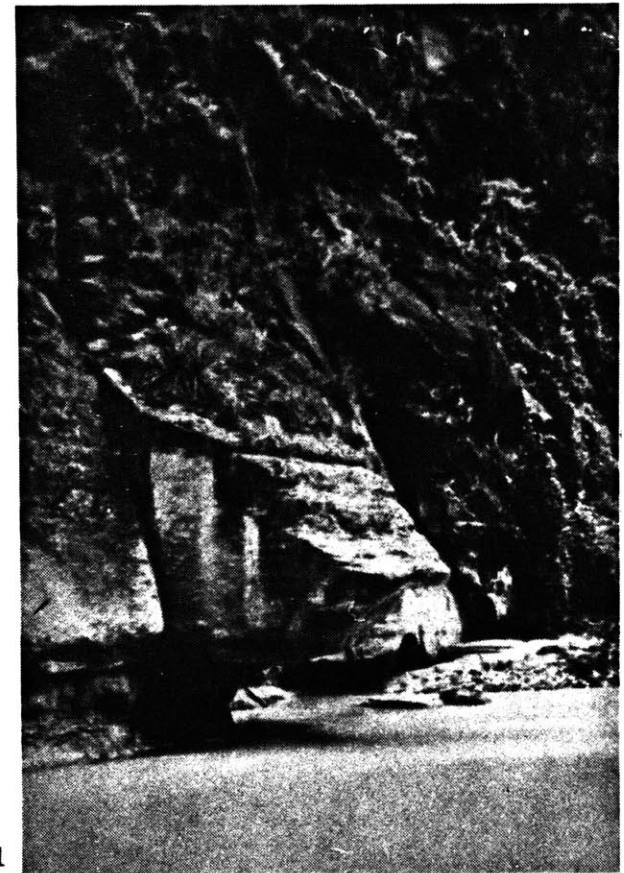
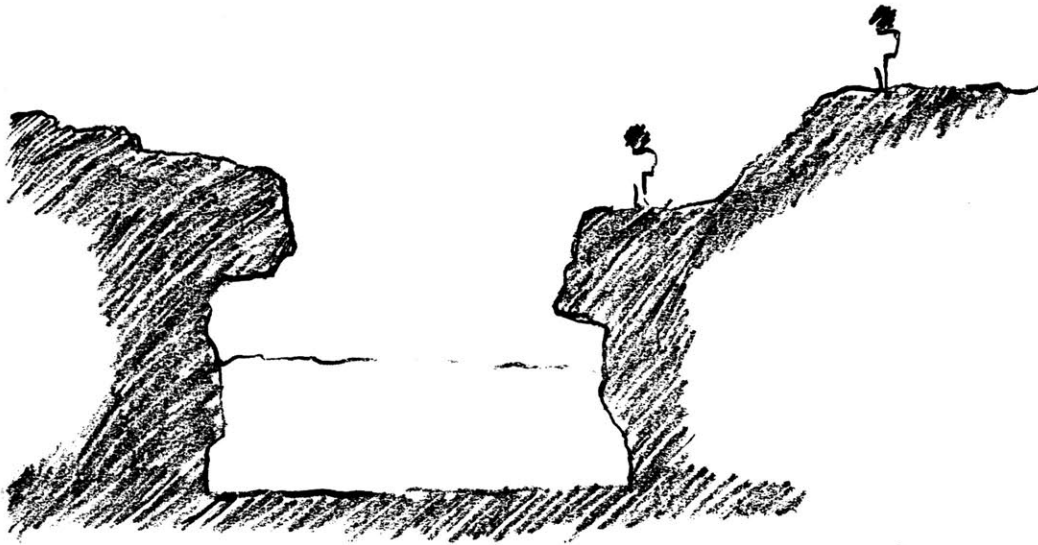
2.10

FORMAL AND ASSOCIATIVE QUALITIES

EDGE

c. Overhanging

A part of the landmass, usually rock, that has undergone considerable erosion. It may be possible to pass under the edge from the water, or to access it from the landform at some places. Direct physical contact with the water would be improbable most of the time.



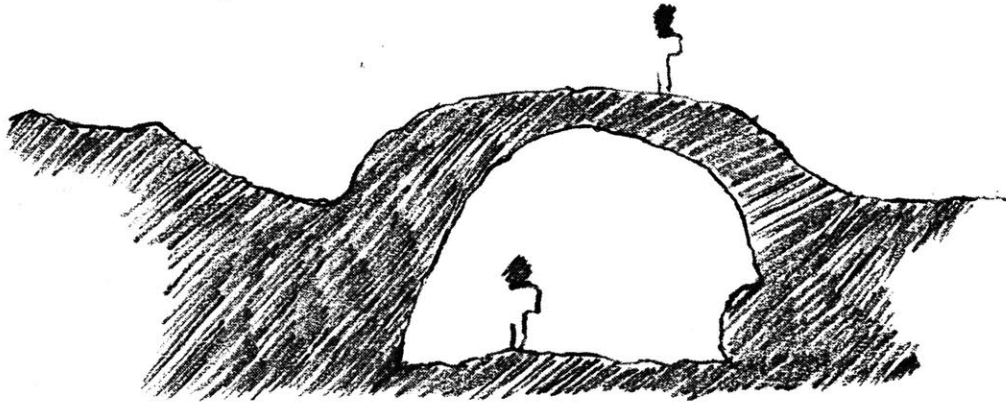
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FORMAL AND ASSOCIATIVE QUALITIES

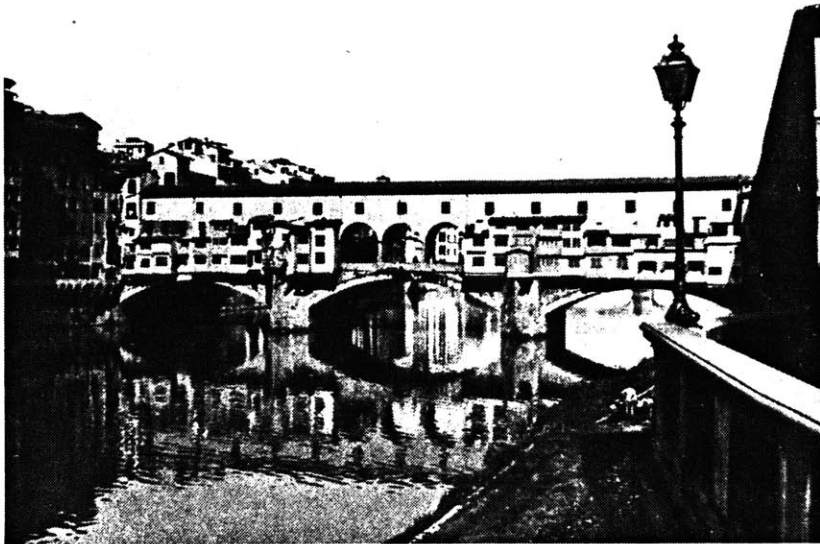
EDGE

d. Bridging

This is nature's way of "building" over the water; the edges connect and "bridge the gap".



2.13



2.12



FORMAL AND ASSOCIATIVE QUALITIES

ORIENTATION

ORIENTATION: An alignment or positioning with respect to a specific direction or reference system.

Easily distinguishable landmarks of various scales help to orient us in our passage from one territory to another. Mountains, islands, waterfalls, streams and coves are all used as references for movement within the landscape.



2.14



2.15

FORMAL AND ASSOCIATIVE QUALITIES

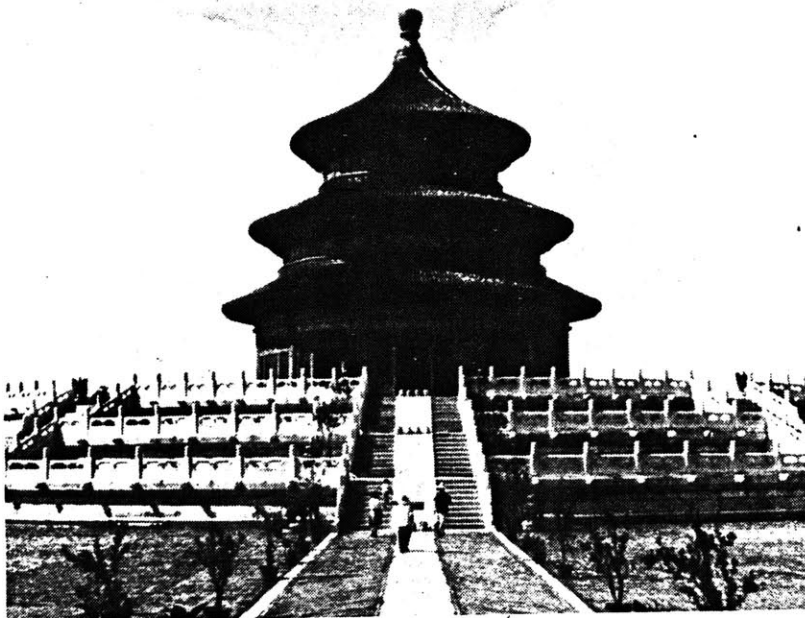
OBJECT IN FIELD

OBJECT IN FIELD (FOCUS): An object of easily identifiable shape (eg. circle or square)

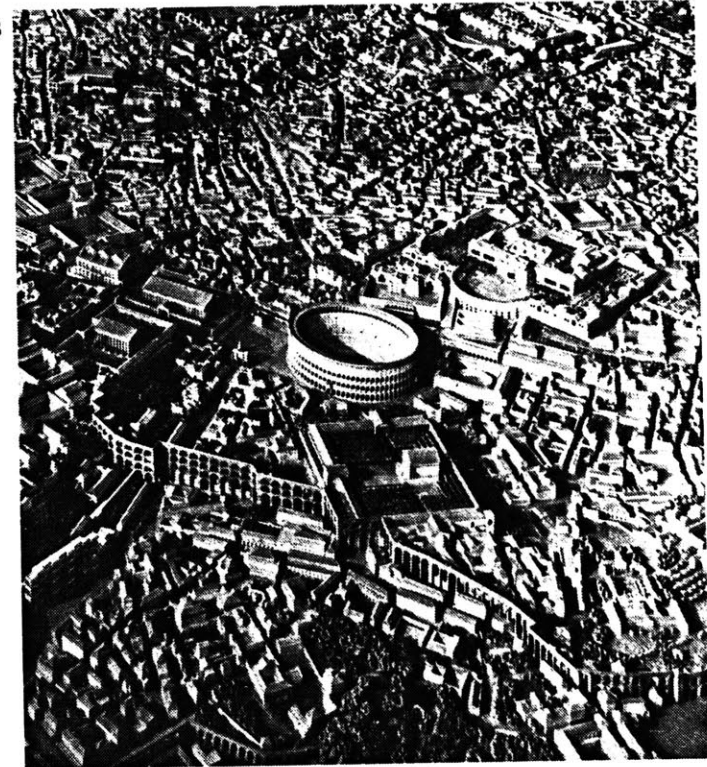
An object, whose form and placement make it easily recognizable in a field, is imbued with a unique identity. Its location is generally central or axial and it is either accessible within the field or separate from it.

The object which becomes separate from the field is a result of the following:

- a. great distance exists around the object
- b. the object is raised a significant amount above ground level
- c. an element such as water separates the object from immediate access



2.16



2.17

FORMAL AND ASSOCIATIVE QUALITIES

CONTRAST

CONTRAST: A juxtaposition of dissimilar elements

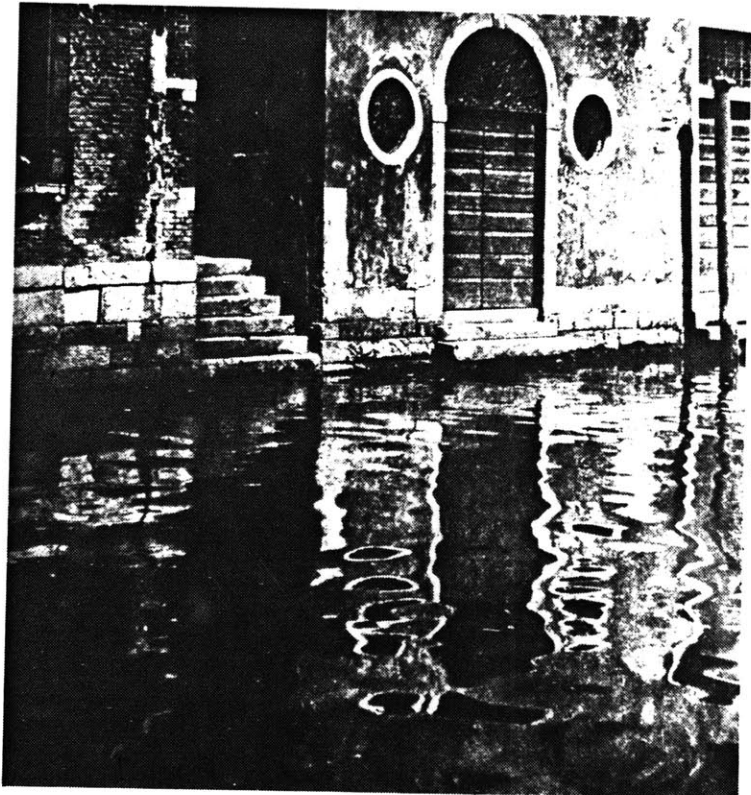
Contrast adds a dimension of mystery and intrigue to the landscape. The unpredictable behavior of water offers significant contrast to the stability of land. It responds to fluctuations in topography, wind, temperature and light.

The plasticity and transience of water offers a vivid contrast to the solidity and permanence of the landscape. Water moves through the landscape in gently rippling brooks, swiftly moving currents or tumultuous waterfalls.

Water reflects the images above or around it. A still lake mirrors the image of the surrounding snow-capped mountains and the billowy clouds floating overhead.

Water is transformed as a result of fluctuations in temperature and changes in wind velocity. One day it can become ice; the next day a gentle breeze creates ripples on its malleable surface. Contrasted with land, changes occur more frequently and are more perceptible.

The color and clarity of water is another variable that provides contrast within a landscape. The vibrant turquoise of Peyto Lake in British Columbia is a unique natural feature of this landscape.



2.18

FORMAL AND ASSOCIATIVE QUALITIES

SENSE OF PLACE

SENSE OF PLACE: A piece of the natural or built environment which has been claimed by deep associations and intense connections.

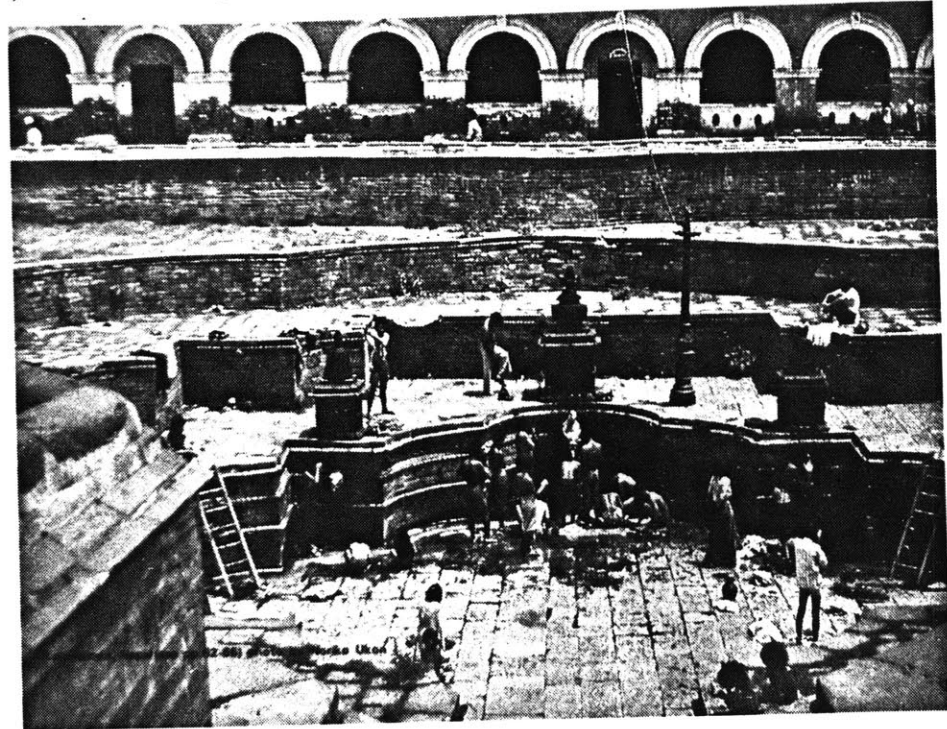
Viewed simply as a life support system, the earth is an environment. Viewed as a resource that sustains us, the earth is a collection of places. The catalyst that converts a piece of the physical environment into a special place is the process of experiencing deeply.

Many of these special places are by their very nature, private. They are the products of an encounter between a single individual and his/her surroundings. Other places, for one reason or another, become more public. It is the sounds, smells and sights of these emotionally and physically special places which haunt us and against which we often measure our present.

2.20



2.19



WATER IN NATURE

INTRODUCTION

"We came from the water; our bodies are largely water; and water plays a fundamental role in our psychology. We need constant access to water, all around us; and we cannot have it without reverence for water in all its forms. But everywhere in cities water is out of reach."¹

Water, in the natural landscape, appears in myriad forms. We can encounter it as a drop, a trickle, a spring, a stream, a waterfall, a pool, a lake, a river or the sea. These diverse forms can be categorized as Falling, Flowing, Standing or Spouting. The analyses in this chapter are based on my observations of, and interaction with, water; hopefully the associations presented will assist the reader in recalling his/her own experiences and associations. By understanding the forms and qualities of water in the natural landscape, we enrich our design vocabulary and increase our potential for sensitively integrating the built landscape with natural process.

¹Christopher Alexander, A Pattern Language. New York: Oxford University Press, 1977. p. 323

WATER IN NATURE

FALLING

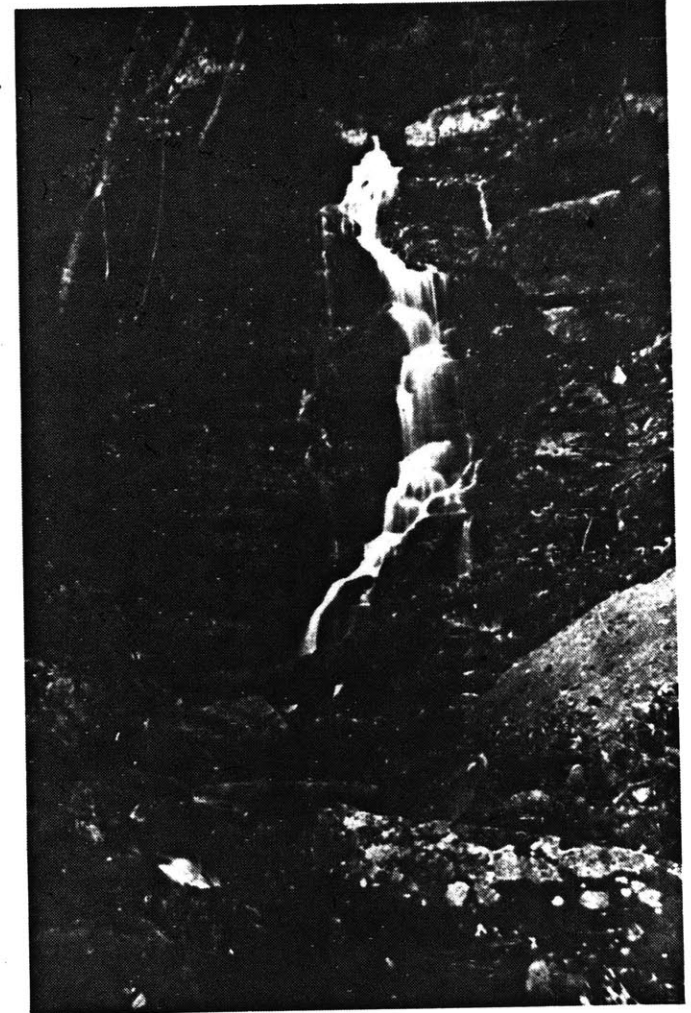
DROP: The quantity of water that falls in one spherical mass.

TRICKLE: A thin, slow or intermittent flow of falling water.

WATERFALL: A perpendicular descent of the water of a stream or river.

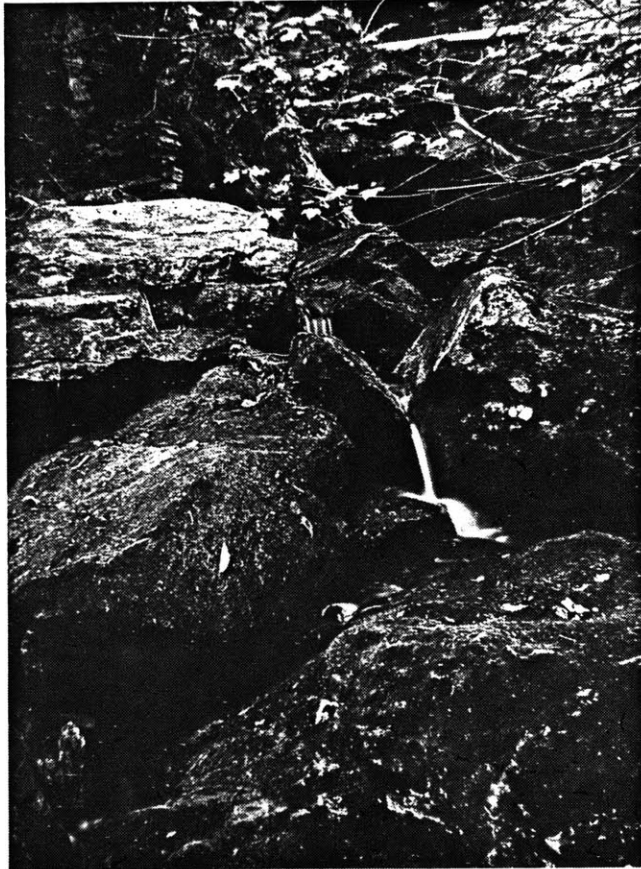
3.01

It was the increasingly thunderous roar that eventually broke
the silence
Never losing sight of my goal
It had been a long trek down the rocky path
The foamy white mass descended the face of the dark, craggy
precipice
Nature's raw beauty and mighty performance captivated me
The mist enveloped my body and the dancing water cleansed my
soul
A power much greater than mine



WATER IN NATURE

FALLING



3.02

The piece was a production composed and choreographed by
Nature
The sound of the dancing water serenading me as I climbed the
rocky ledge
Remnants of the spring thaw trickling down the vertical face of
the rock
Merging with the small pool hiding in the rock below
Close friends reunited

RAIN

Were they tears of joy or sorrow?
I felt the drop on my cheek
Nature's tears
Little by little, the drops began to multiply
My skin sensing the gentle pulsations
Welcoming the change
It had been sunny earlier in the day
Nature had a change of heart
We all do now and then
Not linear--cyclical
Not stagnant--changing

DEW

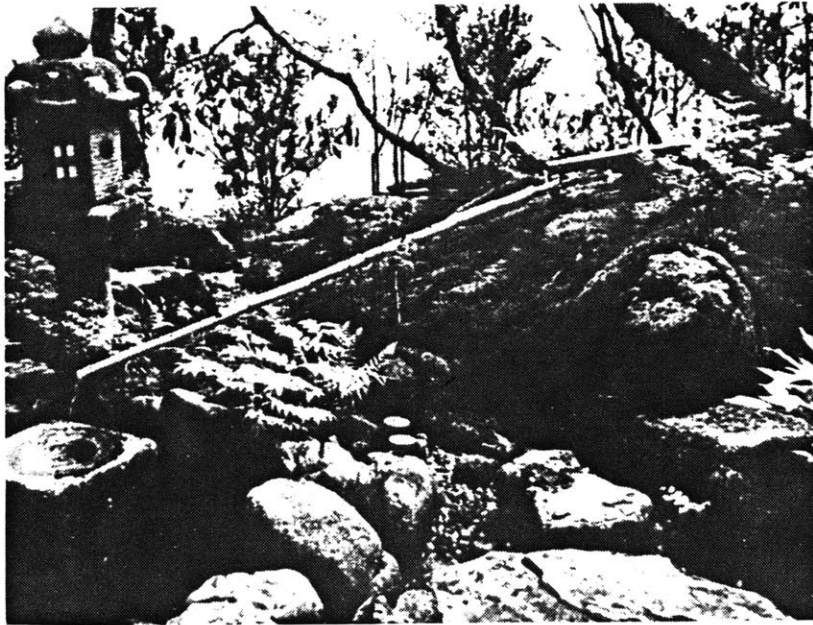
It wasn't here last night
Nature working overtime
My bare feet drenched by the foliage near the pond
It wouldn't linger much longer
The sun began to drink this morning's dew
Not a singular event
Security in the familiar

WATER IN NATURE

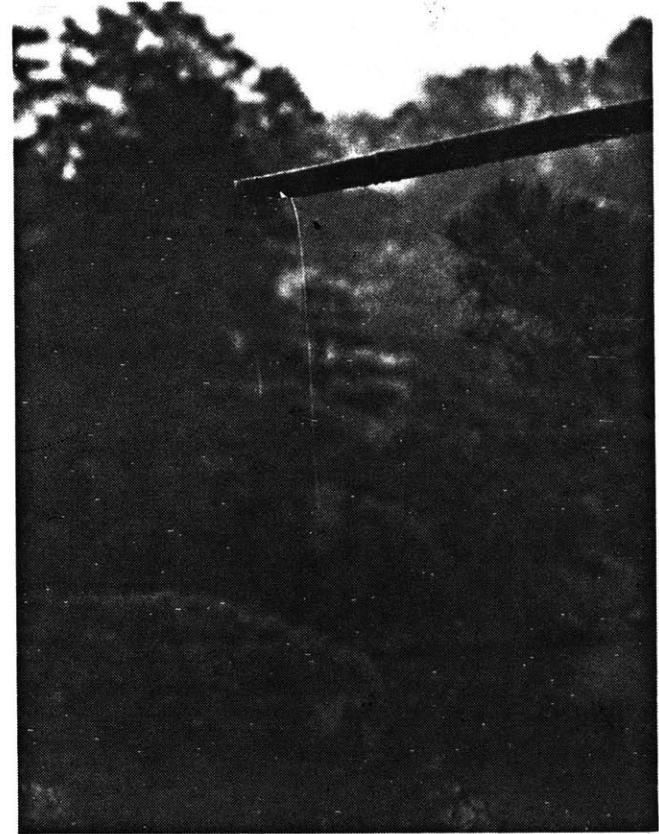
FALLING

FOG

It drifted in from nowhere
Like a million ghosts
Shrouding my world in a mysterious cloak
Distant vision obscured
More acutely aware of the river's edge and life existing there
Like a lens focusing on a more intimate world
When the view is overwhelming, detail often becomes obscured



3.03



3.04

WATER IN NATURE

FALLING

ASSOCIATIONS: A dark sky, clouds and thunder are familiar signs of impending rain. The significance of a drop of water can vary immensely with the time and the place. The indication of possible rain in a humid climate such as London, England has an immensely different connotation than in a more arid location such as drought-plagued Ethiopia. Here water becomes increasingly precious. The success or failure of food production and the life and death of a populous is totally dependent upon sufficient quantities of this miraculous liquid to maintain the delicate ecological balance. The Indian rain dance, the ensuing clouds and thunder, and finally the long-awaited outcome have more than ritual significance.

Children delight in playing in the rain and often simulate the experience with a garden hose. If we can find shelter from the rain under a nearby tree, we can take time to contemplate nature's changing sounds and moods.

Fog, mist and haze are drops in suspension. They contribute a sense of aura and mystery to a place. They can heighten an experience because the knowledge of a place is not immediately obvious but may be revealed in stages.

WATER IN NATURE

FALLING

ASSOCIATIONS: Dew is drops of water which have condensed on surfaces. Reflection of light from these surfaces can create a shimmering, jewel-like effect. Areas of moist leafy plantings near the water's edge or dew-drenched lillies floating in the water create a shimmering wonderland as light reflects from the drops.

Rain, fog, mist, haze and dew provide variations in our daily experiences. These stimulations titillate our senses and encourage us to linger. We are temporarily removed from the doldrum of daily life to experience nature's diurnal and seasonal changes.

WATER IN NATURE

FALLING

CONTINUITY: A drop in the form of rain, fog, mist or dew enhances our sense of continuity as it relates to the hydrologic cycle. The water seeps into the earth and reappears as clouds and rain, only to begin the cycle again.

Trickles and waterfalls establish continuity with the natural landscape through transformation--the underlying surface shifts, the fall of the water maintaining the link between the source and the sea.

To fully experience the continuity we should view the falling water from several vantage points. This allows us to experience the water as more than just an object--it becomes part of the natural flow of water coursing through the landscape.

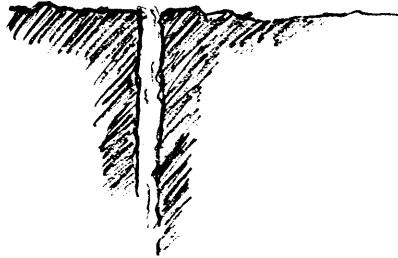
DIRECTION: When water falls vertically, it maintains a neutral direction. After falling, it can assume a new direction. Thus a waterfall becomes an element of transition which provides an opportunity for a change in direction.



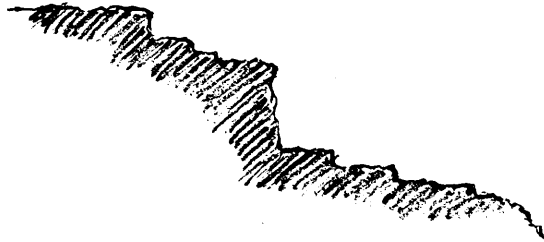
3.05

MOVEMENT: Falling water may be interrupted by one or more horizontal interludes. Changes in the rhythm of the trickle or waterfall result from variations in the dimensions of the horizontal or vertical surfaces. This creates three additional classifications of falling water:

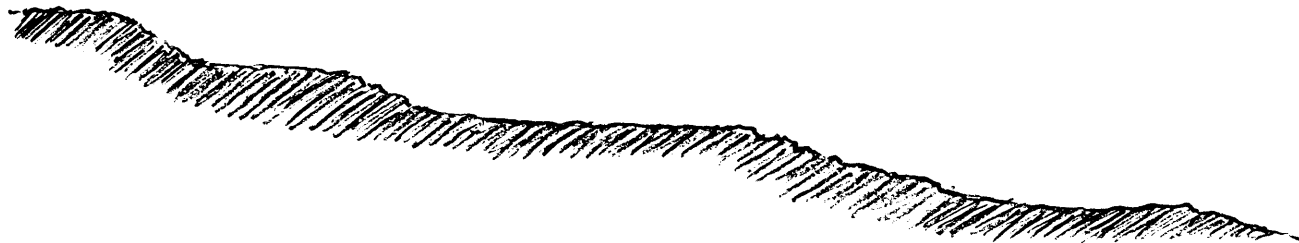
1. A cascade is a steep, usually narrow fall of water.



2. A cataract is a step-like succession of waterfalls.



3. Rapids are sections of the long profile in which the flow of water is broken by short vertical drops.



EDGE: The edge of the waterfall can be experienced in four different locations--in front of, behind, under and beneath--each having unique associations.

1. In Front of the Fall

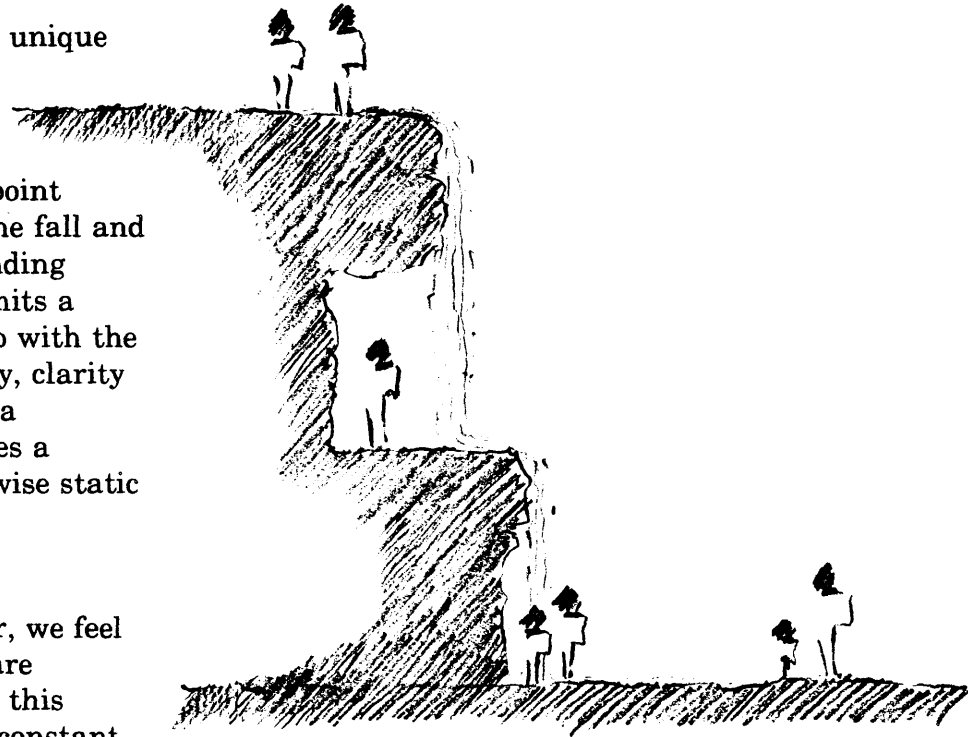
The experience from this point depends upon the size of the fall and our distance from it. Standing adjacent to the water permits a more intimate relationship with the physical qualities-- velocity, clarity and texture. Standing at a distance, the water becomes a moving object in an otherwise static composition.

2. Behind the Fall

Standing behind the water, we feel a sense of enclosure. We are sheltered and protected by this diaphanous curtain. The constant sound of the falling water masks the worldly intrusions making our focus more intimate.

3. Under the Fall

Standing beneath the water we feel its force massaging our skin. This type of contact has direct physical implications rather than spiritual associations.



4. Above the Fall

Experiencing the fall from above provides us with an increased awareness of the discontinuity of the edge. We are in awe as we witness the water flowing out of sight, plunging below.

ORIENTATION: The sound of falling water, whether the whisper of a trickle or the thunder of a fall, provides an audible reference. Larger waterfalls can provide visible clues for orienting us.

CONTRAST: The incessant vertical motion of a waterfall offers an exciting contrast to the stability of the landscape. A trickle appears as a thin band of sparkling water flowing down a craggy rock or as a glimmering liquid gnawing a narrow channel in the soft earth. Falling temperatures transform trickles into sparkling icicles and waterfalls into lacy screens.

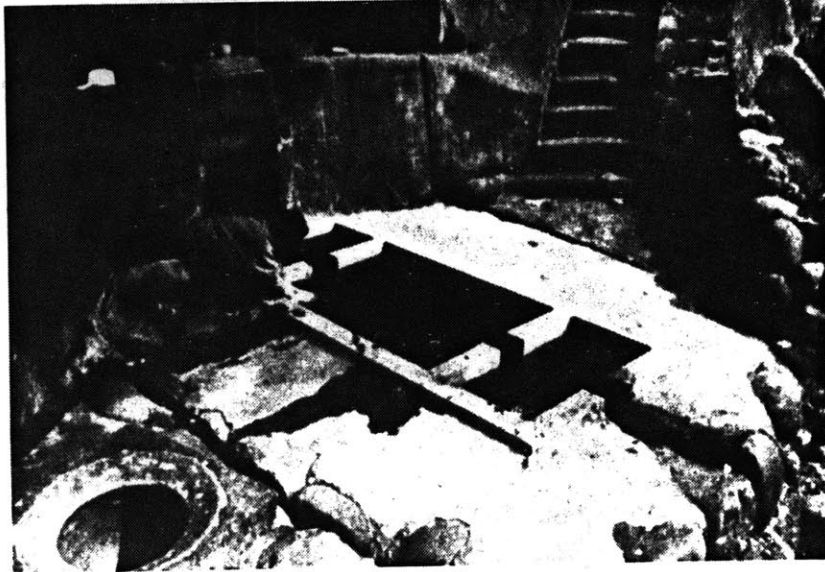
WATER IN NATURE

SPRING: A source of water issuing or flowing from the ground.

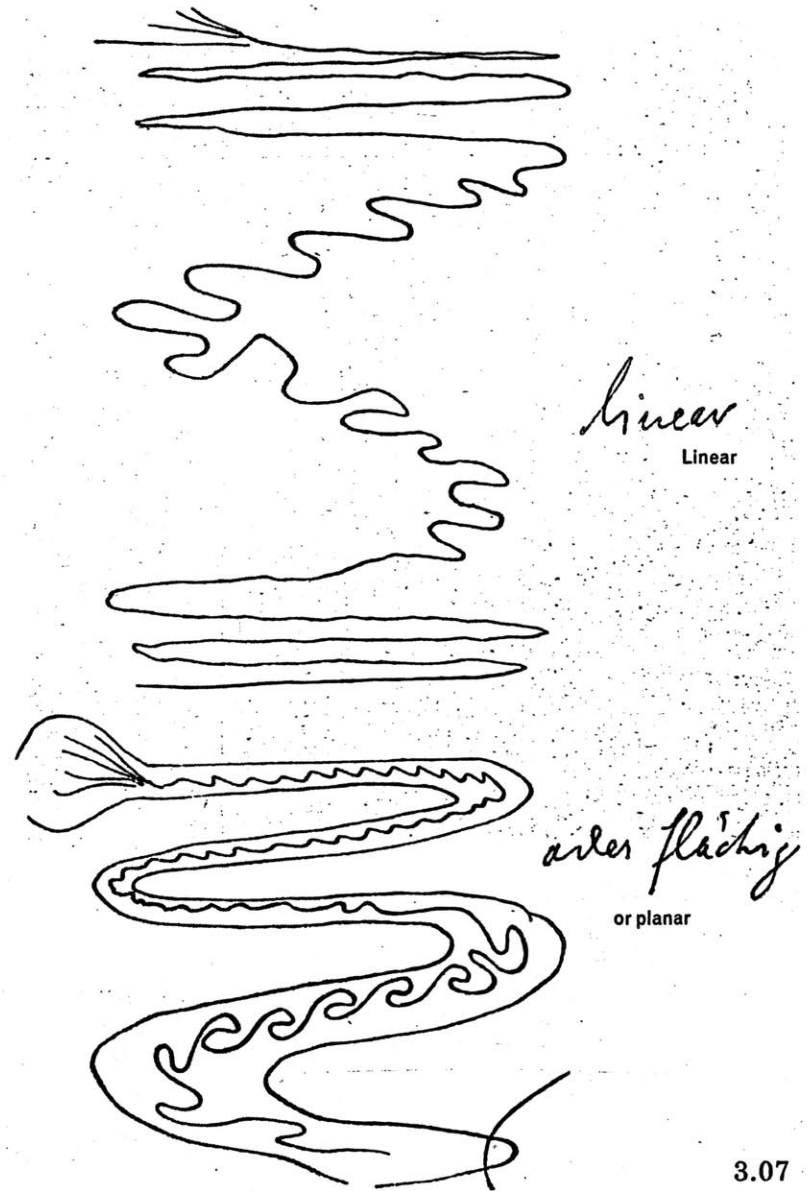
STREAM: A body of running water flowing on the earth.

RIVER: A natural stream of water of considerable volume.

FLOWING



3.06



3.07

WATER IN NATURE

From out of the parched desert sand rose a plethora of lush
green palms
The bus veered off the main road approaching this verdant
wonderland
Yearning to place my feet in the tiny stream that ran between
the trees
Wading through the water, feeling a cooler source trickling in
from the edge of the stream
Walking further along, a warmer source gently kissed my feet
Sensing a rhythm in these recurring sensations
The spring of life



3.08

RIVER

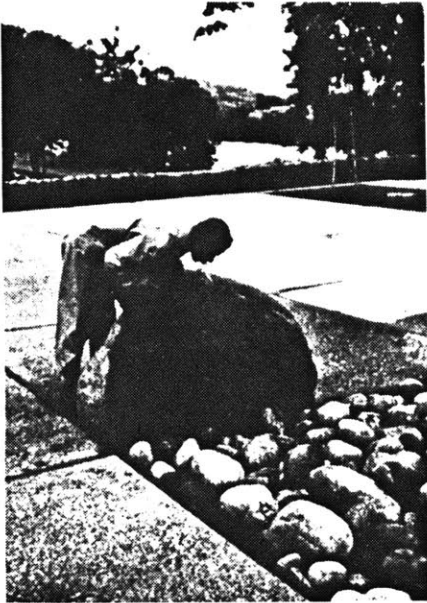
Regarded as one of the older architects
Standing straight and erect in its youth
Now curved and bent with age
An unforgettable journey through time and place
A lifetime of close friendships and chance encounters
From the moment of birth
Time gnawing away at our youth



3.09

WATER IN NATURE

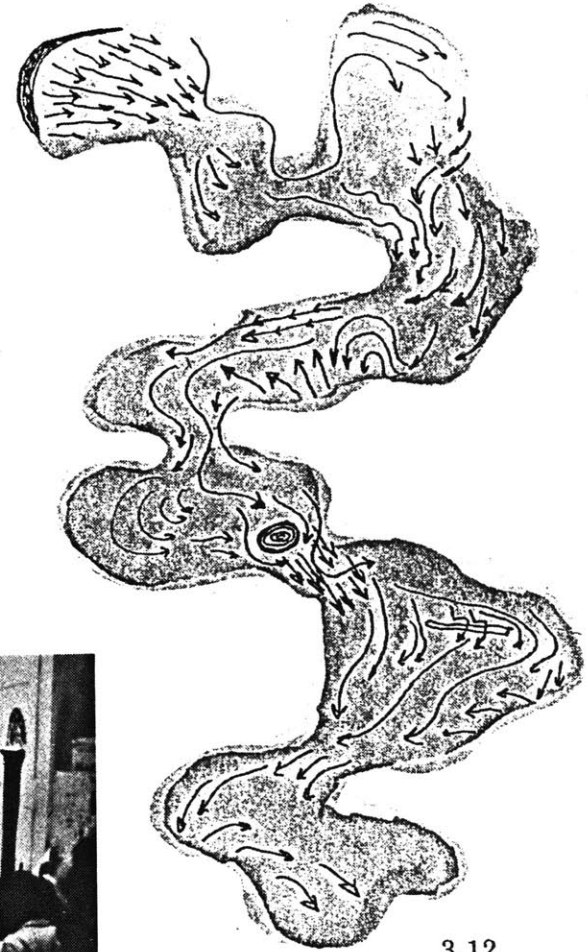
FLOWING



3.10



3.11



3.12

WATER IN NATURE

FLOWING

ASSOCIATIONS: During the California drought of 1977, I accompanied friends to a spring a few miles away from their home. There we joined several other people filling their jugs with the natural water gushing forth from a crack in the face of a rocky ledge. The tri-weekly trip to the spring, albeit a temporary event for these residents, was nonetheless a crucial one. That spring now represented a life-giving force to people who were generally accustomed to the simple twist of a faucet.

In Hangchow, China there is a natural spring located within the town. It is a local gathering place where people congregate daily for the primary purpose of drinking a special brand of native tea brewed from this natural water.

Hot springs are sought after for their healing qualities. The water is heated naturally in the earth's core and the temperature generally reaches over 100° F. Hot springs are heavily frequented by the public as resort areas whereas most cool springs are primarily local events and much more intimate in scale.

SENSE OF PLACE: In many cultures a spring is highly valued for its capacity to provide the local inhabitants with a source of clean drinking water. People travel great distances to fetch this water and gather here exchanging local gossip, washing clothes and dishes and bringing their animals to drink. Friendships are initiated at these special places and continue to grow with frequent contact.

WATER IN NATURE

FLOWING

CONTINUITY: The continuity of flowing water results from its linear or undulating course. Linear continuity is more understandable when the width of the water is less than its apparent length and bends do not shield its continuing flow from view.

If we can walk along the undulating edge or see the river at significant intervals, its ability to provide a source of continuity is enhanced.

RECIPROCITY: As a river ages, it abandons the linear quality of its youth and becomes increasingly more undulating in form. This contributes to a richer association between water and land by creating convex (prominent) and concave (protected) landforms. Reciprocal forms make places more habitable because they maximize opportunities for association. We feel more comfortable using the prominent form as a place to survey the surrounding landscape and the concave form as a place to dwell.

DIRECTION: In its youth, the direction of flowing water is more linear, its swift movement carving the landscape. As it ages, it begins picking up and depositing sediment, generating changes in direction and sculpting the landscape.

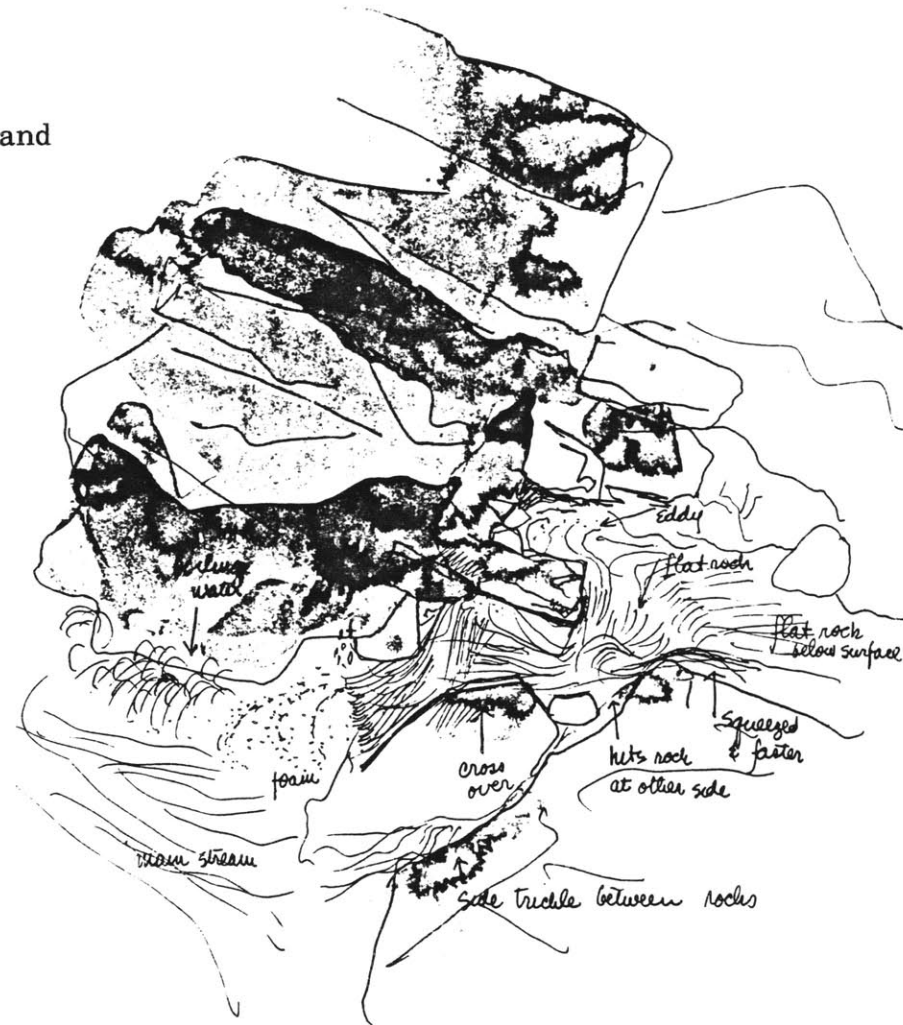
The plasticity of water allows it to create frequent shifts or changes in direction. The strong sense of continuity of flowing water allows for these myriad shifts while maintaining clarity of direction.

WATER IN NATURE

FLOWING

MOVEMENT: Changes in the rhythm of flowing water depends upon two qualities:

1. form--undulating or linear
2. subsurface topography--depth and texture.



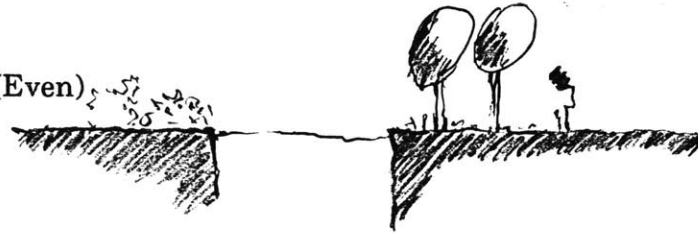
3.13

Halpmm

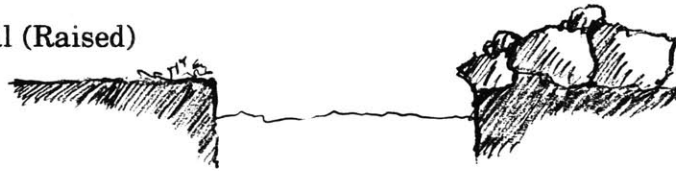
EDGE:

The degree of accessibility to the water is characterized by the physical qualities of the edge. The following four types of edges create a zone of transition:

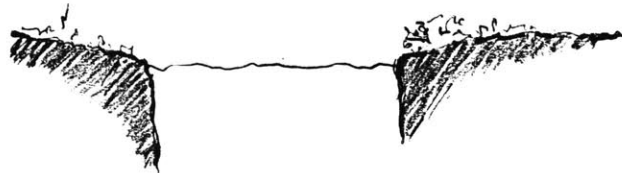
1. Horizontal (Even)



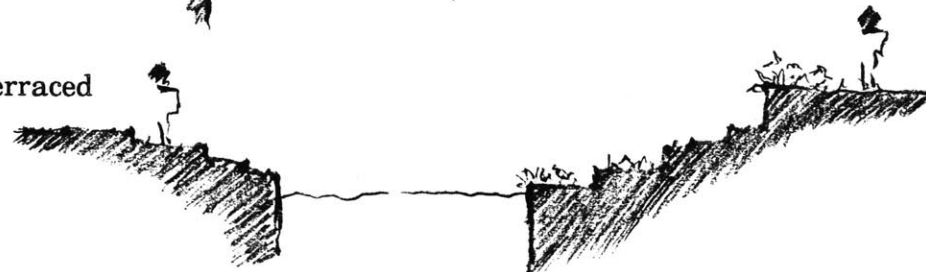
2. Horizontal (Raised)



3. Gently Sloping



4. Stepped or Terraced



The physical qualities of the edge change along the length of a stream or river. This contributes to a variety of experiences and associations.

CONTRAST:

Water flowing through the landscape offers an exciting contrast to stationary landforms.

STANDING

POOL: A small and rather deep body of unusually fresh water or a quiet place in a stream.

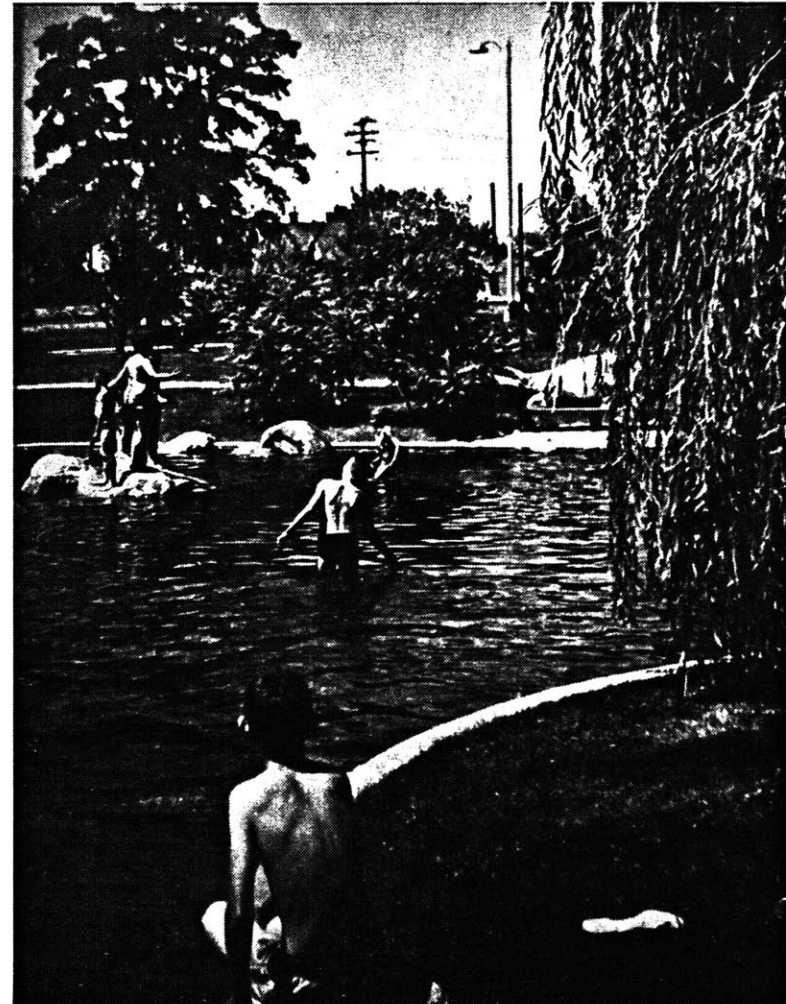
LAKE: A relatively large inland body of standing water.

Sparkling with light, the sun permeates its pores
Images of trees and sky reflect from its face
The whispering wind momentarily wrinkles its face
A world beneath revealed
Sand, pebbles, shadowy caverns
The image fading
In the mirror, time passes



3.14

3.15



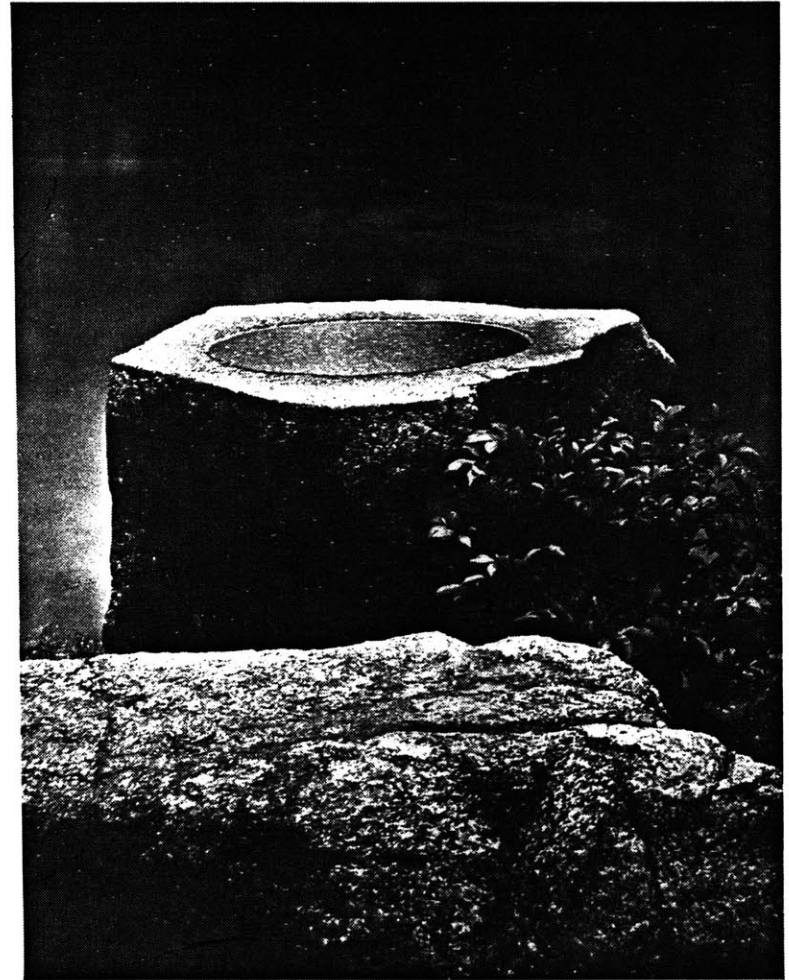
WATER IN NATURE

STANDING

LAKE

We were working on opposite shifts
Yesterday's sleepy calm transformed while I dreamt
Today's waves gnawing at my feet
Bringing new gifts
Absconding with the old
Yesterday's soft, warm sand
Today's pebbly mounds strewn about
Unforseen consequences of transformation

3.16



SENSE OF PLACE:

A quiet pool or calm lake can provide an intimate source for contemplation and pondering creative thoughts. Larger lakes can also be a place to swim, fish or sail--activities which provide a more public sense of place.

WATER IN NATURE

STANDING

- CONTINUITY:** The continuity of pools and lakes result from the wholeness of their surface.
- DIRECTION:** A pool or lake provides direction in one of two ways:
1. by elongation or linearity of its form
 2. by arrangement in a series, as in a directional field of pools
- EDGE:** Water runoff feeding a lake or pool along with wind driven waves gnawing at the shore are two erosive forces which generate beaches and gullies. These activities create undulating edges with varying frequencies and small amplitudes.
- OBJECT IN FIELD:** A pool or lake can be a singular event or the focal point of an area. The surrounding elements in the field, their texture and placement, can enhance this quality if their interaction clearly identifies the water as central or axial within the composition.
- CONTRAST:** The calm, shimmering surface of a pool or lake mirrors the images at the edge and the ephemeral musings of the sky. A gentle breeze ripples the water and reflections are fragmented like shattering glass. When ripples subside and reflections diminish, the water becomes as transparent as glass and we are captivated by the world beneath the surface.

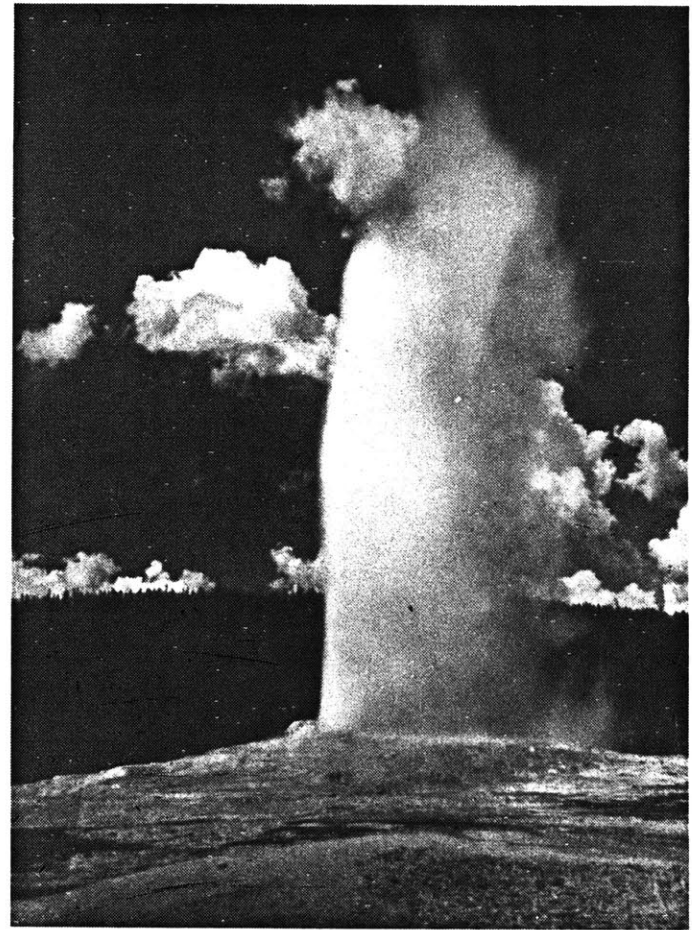
WATER IN NATURE

SPOUTING

GEYSER: A spring that throws forth intermittent jets of heated water and steam.

3.17

It had happened myriad times before
The voice disappearing
Not death, merely sleeping
The silence now shattered
Spewing forth, high into the air
The steam becoming a billowy mist
In the process of rejuvenation



WATER IN NATURE

SPOUTING

- ASSOCIATIONS:** Geysers are a form of water that we rarely encounter in the natural world. The three areas of highest occurrence are at Yellowstone National Park in the U.S., Iceland and New Zealand. Yellowstone possesses 200 active geysers, the world's greatest concentration. Hot springs and geysers tend to be located along the drainage basins of streams. Eruptions occur at intervals of several minutes to several hours. These jets of hot water vary in height from mere inches to hundreds of feet in exceptionally exuberant geysers. One waits with a heightened sense of awe and anticipation for that unforgettable moment when the steamy water bursts forth. At other times, geysers can be unusually calm or they can be gently perking or bubbling.
- MOVEMENT:** The spouting activity of a sequence of geysers separated by varying dimensions can set up a rhythm. Our pace can be quickened by a series of closely-spaced, frequently active geysers and diminished by less active, more segregated geysers. We pause to observe nature performing this rare, intermittent activity.
- ORIENTATION:** Spouting water has the potential for providing orientation due to the sheer height of the jets of water and their gushing sound. Similar to a waterfall, although more intermittent in performance, these jets provide us with visible and audible clues which orient us.
- OBJECT IN FIELD:** Steamy water spouting from the earth rarely occurs in nature. This enhances its object-like quality, making it an intriguing phenomenon.

FOUR ANALYSES

INTRODUCTION

Having examined water in the natural landscape, it now seems appropriate to use these categories to analyze water in the built landscape. Water can be used to clarify our understanding of place and to enhance the connections between the built landscape and natural process.

I have selected four sites which utilize water in different ways. I have visited all of these with the exception of Brion-Vega. My reasons for choosing them is as follows:

1. VILLA D'ESTE

This is a celebrated Baroque example of the abundant use of water.

2. FALLINGWATER

Architecture and water represent a strong relationship between built and natural processes.

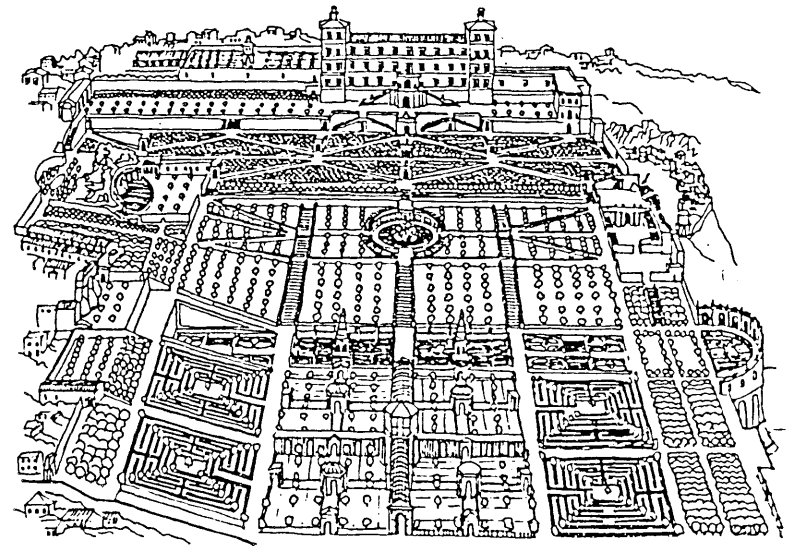
3. CHRISTIAN SCIENCE CENTER

This is a major example of an urban intervention which utilizes water as a significant piece of the architectural composition.

4. BRION-VEGA

This represents a strong architectural statement in which water is an integral part of the physical environment.

4.01



VILLA D'ESTE

VILLA D'ESTE

Tivoli, Italy
Pirro Ligorio
1550

HISTORY:

In 1550 the new governor of Tivoli, the Cardinal of Ferrara, began to purchase gardens and vineyards in the valley lying below the old monastery which was to become his official residence. "Even before all the land was purchased for the new gardens, great effort was expended to furnish sufficient water for the fountains. The immediate concern for this problem foreshadowed the importance of the fountains and the water displays in the over-all plan of the gardens. Two great sources of water-supply were utilized. From the distant Monte Sant'Angelo water was brought by conduit to the Piazza di San Francesco and thence to the gardens. When this supply proved insufficient for the numerous fountains planned in the gardens, the mason began in 1564 to excavate an underground conduit, more

than 585 feet long, from the famous Cascade of Tivoli in the river Anio where there was a masonry receptacle in which the water could be stored, to an outlet in the garden near the Oval Fountain." ¹

"It is the quantity of water at Tivoli that has charmed visitors of all periods. This abundance of water furnished the fontanieri a rare opportunity to create numerous effects. They treated the water as a sculptor might clay, molding it into a variety of forms. Tall, thin jets vied with transparent veils or heavy cascades of water. In the center of the Oval Fountain jets of water formed the lily of the Este coat of arms, matching the lilies and eagles created of terra cotta by the sculptors. The two dimensional rectangles of the central fish pools were vaulted over by streams of water. In most cases it was not the movement of the water that was being exploited as much as its malleability, so that the water assumed an architectonic or sculptural quality." ²

¹David R. Coffin, The Villa D'Este at Tivoli. Princeton: Princeton University Press, 1960. p. 9.

²Ibid., p. 38.

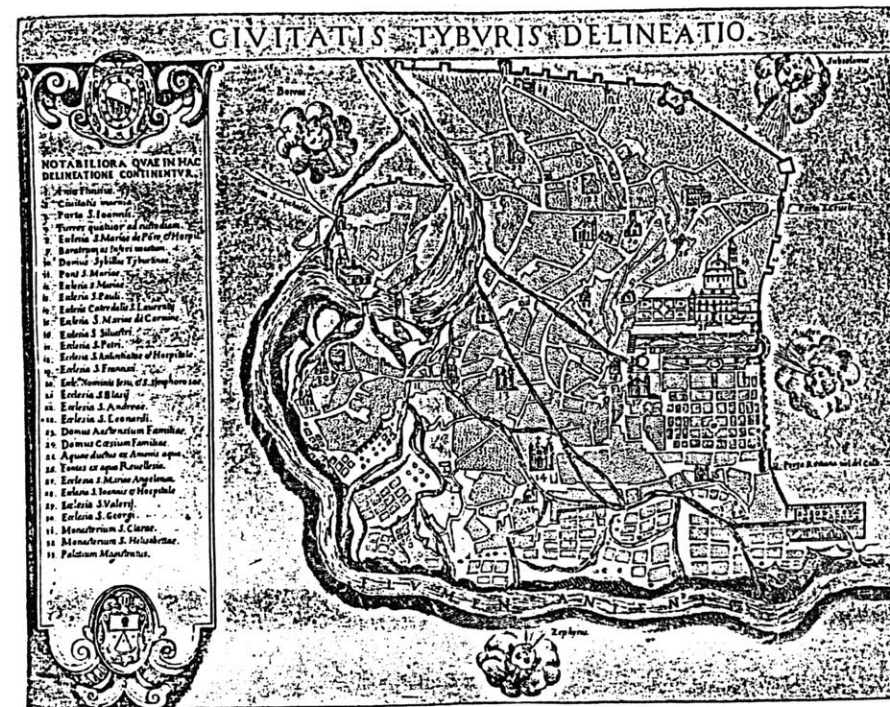
VILLA D'ESTE

INTENT:

"Italian sixteenth century gardens were simply to decorate architecture. In the tradition of ancient Roman gardening, all the elements of nature--water, stone, and verdure--were meant to reveal man's dominance. So at Tivoli the entrance under a long wooden pergola flanked by high walls proclaimed the control of man. As one stepped out upon the lower plain of the garden the steep slope up to the foot of the Villa was awesome not in the Romantic mode of nature's grandeur but in the power of man to shape nature to his will."³

CONTINUITY

A segment of the Anio River runs around the periphery of the Town of Tivoli. Finger-like branches of this river penetrate the town in straight or gently undulating gestures. One of these linear stream-like branches flows towards

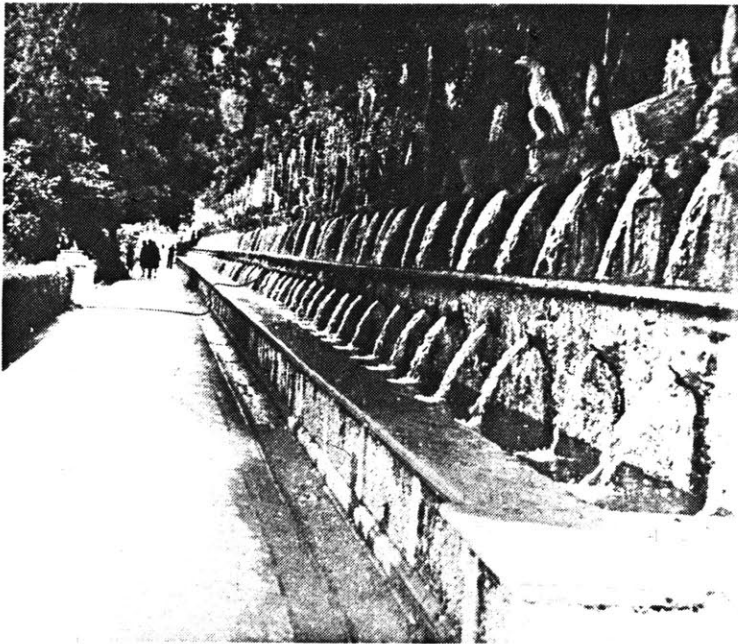


2. Map of Tivoli, 17th century

³Ibid., p. 38.

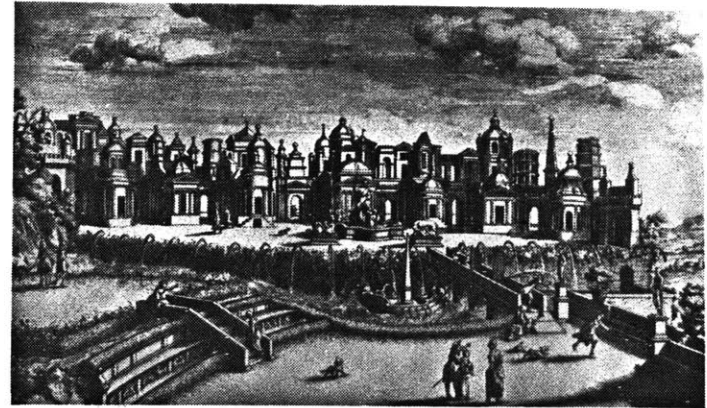
VILLA D'ESTE

the Oval Fountain on the southwest side of the gardens. After descending the vertical face of the Oval Fountain, the water has been made to disappear underground and emerges as the Alley of the Hundred Fountains along the southeast path at the culmination of the central axis. It reappears again at the east edge of the gardens as the voluminous Fountain of Rome.

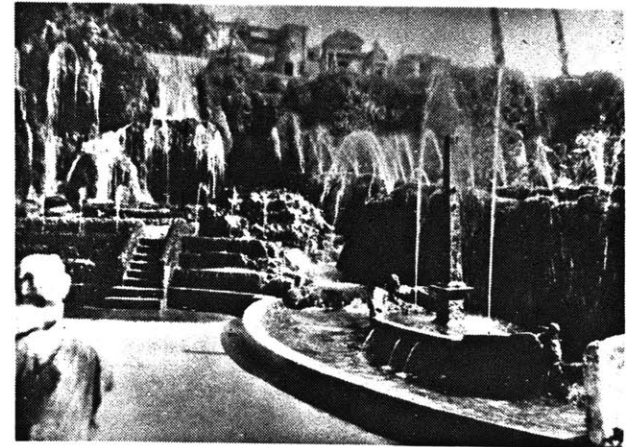


4.03

CONTINUITY



4.04



4.05

VILLA D'ESTE

Rather than incorporating the natural flow of this "stream" through the garden, thus reinforcing the continuity of the Anio River in the surrounding landscape, the water is forced to create an acrobatic extravaganza, primarily in the form of fountains. Obviously, this is water giving birth to other forms but this is a birth lacking sensitivity toward natural process.



4.06

CONTINUITY

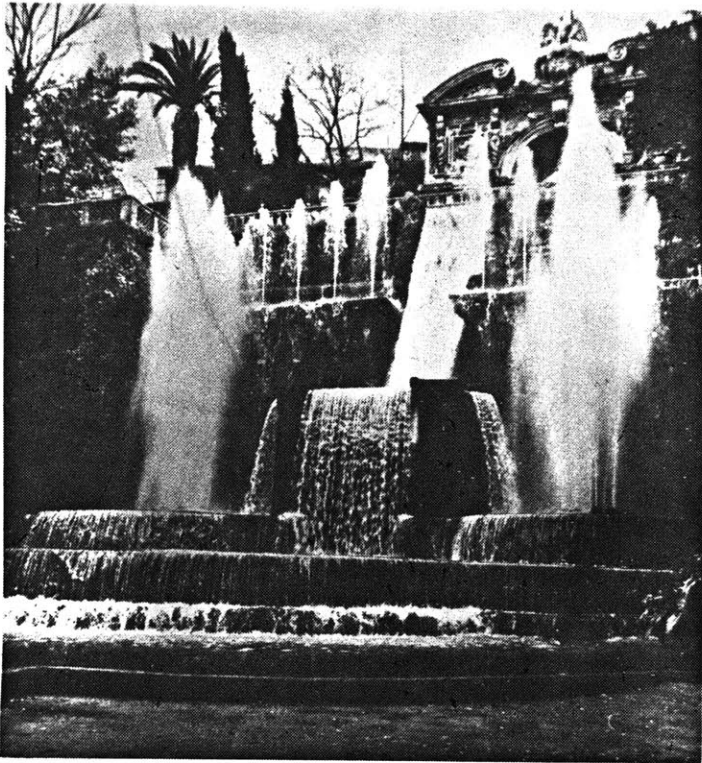
Water in the garden appears primarily as spouting forms although there are a few instances where pools and waterfalls have been utilized. When we do encounter these unique and isolated forms it is more by accident than by sensitive design. The intention to connect or relate them in any informative way is lacking. Their placement fails to enhance our sense of continuity or clarify our understanding of movement through this place.

Water is used solely as a dynamic audio and visual performance and the waterforms lack continuity as a result of their having been casually dispersed. The overabundant use of fountains, in addition to their disposition as isolated elements, constitutes a composition of dissassociative fragments which fail to build continuity.

Additionally, there is a lack of continuity between the parts which comprise the whole. Each form of water in the garden is an isolated

VILLA D'ESTE

feature; the garden disassociates itself from the architecture; the villa is segregated from the town of Tivoli.



4.07

CONTINUITY

The initial break in continuity occurs where the branch of the Anio River was forced underground. This water was used to create a segmented experience, an extravaganza of individual audio and visual delights.

Establishing continuity would involve building connections with the larger landscape context as well as incorporating forms of water in a manner sensitive to natural process. Water, as an integral part of this built landscape, could provide continuity by utilizing it in the following ways: by deploying water so that we can recognize a source as well as a destination; by incorporating forms of water that transform into others; by maintaining visual connection with water forms by placing them in strategic locations throughout our journey.

VILLA D'ESTE

DIRECTION

"The principle promenade of the garden, flanked by two minor ones, follows a major axis starting at a gate near the Porta Romana and terminating in the entrance to the Villa's two story portico. This lower entrance to the promenade gives the axis its principal direction since the view from here commands the southeast slope crowned with the Villa and reveals the entrances to the numerous grottoes recessed in the slope." ⁴

One visitor described the experience of walking through Villa d'Este as one in which the "constant deviation from the principal axis, whether forced or only suggested, prohibits the observer from fully experiencing the gardens in a Renaissance manner from a fixed objective viewpoint. His experience of the gardens becomes a much more subjective one of continuous exploration and surprise, unified by the constantly varying sounds of water." ⁵

My interpretation is that the "constantly varying sounds of the water" do not unify our experience here. They disorient us. One sound overlaps the other. The lack of any hierarchy of audible or visible clues in the deployment of the waterforms confuses our sense of direction. Using sound to clarify direction of movement would involve diminishing the sound in the immediate vicinity as it increases in a more distant location.

Size, location or literal or virtual connection of water forms has not been used as a means of informing our direction through the gardens. We are subjected to rigid use of the grid or chance discovery of the water forms to chart our course of movement.

⁴David R. Coffin, The Villa D'Este at Tivoli. Princeton: Princeton University Press, 1960. p. 14.

⁵Ibid., p. 15.

VILLA D'ESTE

The gardens of the Villa d'Este cover two steep slopes which descend like the tiers of an amphitheater to a flat terrace. The designer disregarded this as a positive natural amenity. Instead he chose to superimpose a rigid grid on the landscape ignoring the inherent irregularities in the topography.



4.08

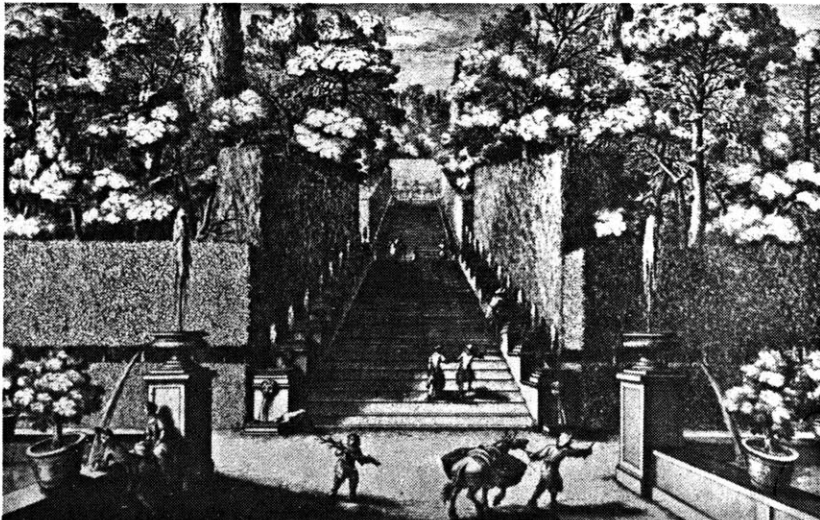
MOVEMENT

Level changes and vertical movement characterize a significant portion of Villa d'Este. Movement within these gardens is along axial paths which focus our attention on the villa and reinforce our movement in that direction. The major paths, intersected by evenly spaced secondary paths, clearly indicate a pattern of movement; they establish a rhythm, albeit a repetitive one. The casual dispersal of the water forms fails to provide any understandable system.

In most instances, the choice of waterforms and their placement does not relate to our own sense of movement, be it a gentle horizontal flow or a lofty ascent to higher ground. Lacking is a consistent vocabulary of sizes and types of water forms which would stimulate a rhythm in our movement. This would encourage us to pause at some water forms while quickening our pace along others, thus making the experience of the journey a more informative one.

VILLA D'ESTE

The Stairs of the Bubbling Fountains is a grandiose vertical ascent representing the first level change along the main axis to the villa. Numerous fountains, bubbling from stone pillars, make their ascent as they surround us on both sides. This form of water is inappropriate. Rivulets of water could have trickled down channels in the stairs thus enhancing our awareness of the change of level.



4.09

MOVEMENT

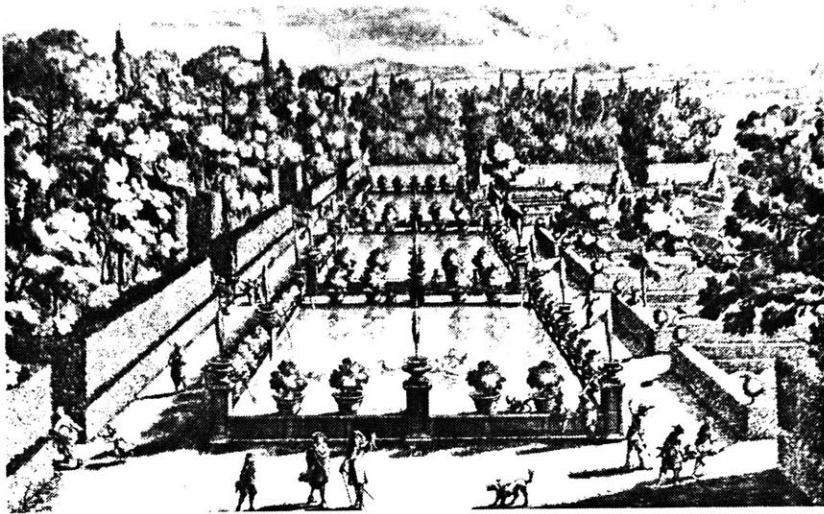
This would also serve as a simple pacing system for our vertical ascent. At the landing, the water could have formed small pools which would slow down our movement and allow us a brief pause. Rivulets of flowing water would again accompany us on our upward climb. The experience then becomes analogous to ascending a hill with water trickling down from above. There is a sense of mystery as we climb; our curiosity leads us on, seeking the source of water that feeds these rivulets.

At Villa d'Este water is used solely as ornament. Rhythm is not enhanced as a result of the casual deployment of the water forms. The gardens and the architectural forms are disparate elements unconnected by a coherent, rhythmic system of movement.

VILLA D'ESTE

The centrality of the palace and its placement on a raised terrace establishes the major point of orientation for the site. On a more local level, however, water has not been used as a means of supporting the central axis as a major reference point.

Due to the seemingly haphazard deployment of the water forms in the garden, our sense of orientation has not been clarified or enhanced. One may argue however, that the sheer size of the fish pools and the Fountain of the Dragon,



4.10

ORIENTATION

located on the main axis maintains our sense of connection with this major promenade. But size does not necessarily always command one's sense of orientation.

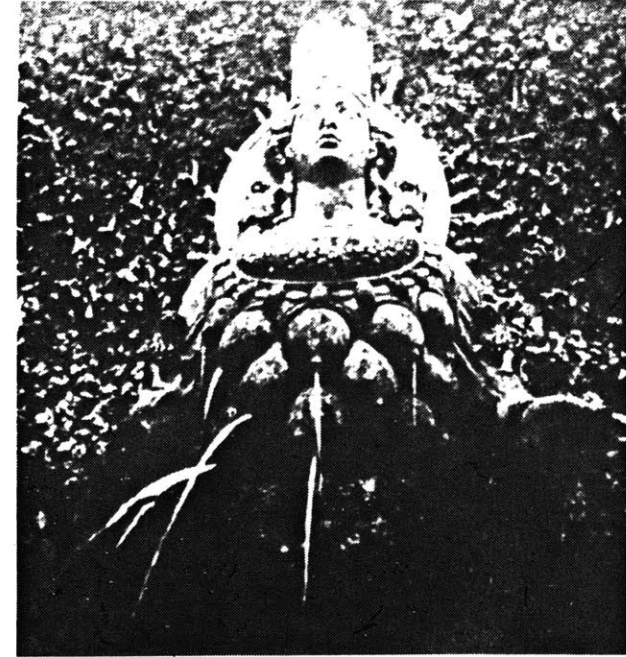
Reference to the main axis could have resulted from a series of waterforms which were in some way literally or virtually connected. Therefore, our understanding of the reference is not only the product of a singular event of a particular size, but could also be composed of a series of related parts which comprise the reference system. It seems that the latter becomes more interesting as an idea for a journey through a place and is closely related to the notion of continuity.

VILLA D'ESTE

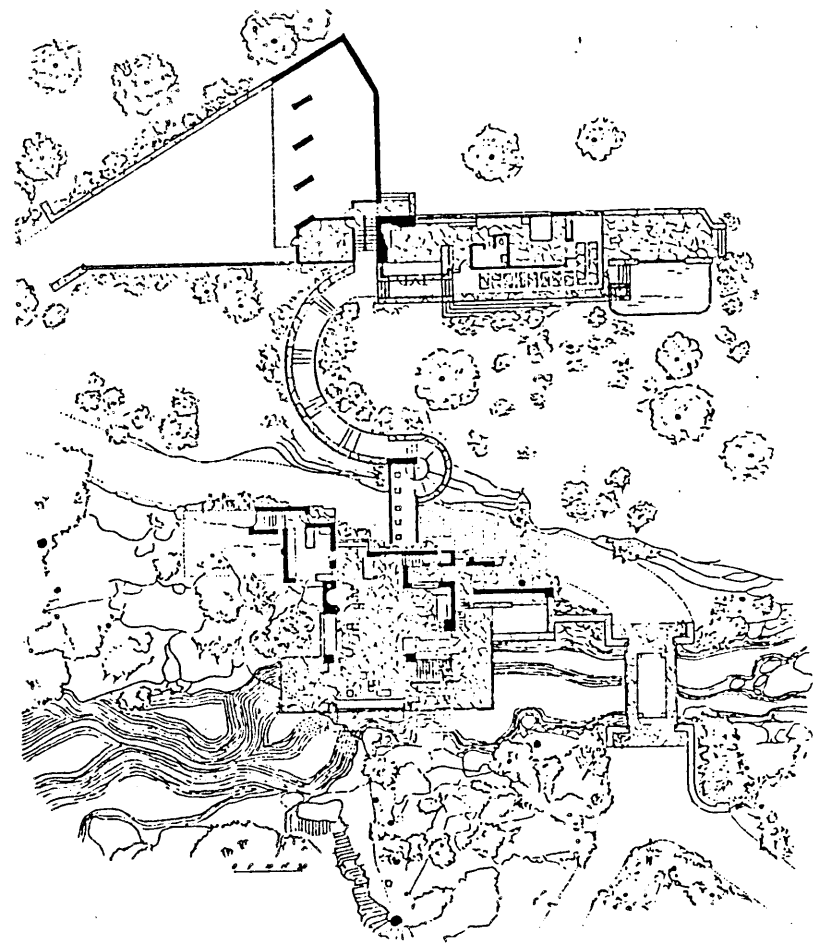
It seems unlikely that there is anywhere in Villa d'Este where one could experience a sense of place. Absent from this context are places where one can commune with nature or appreciate fully her diurnal or seasonal cycles. There is no quiet, contemplative place to which one gravitates as an escape.

This is a world of overabundance, an overstatement, a testament to abuses. The abuses have nothing to do with symmetry, for symmetry is not necessarily a negative quality. The abuses have little to do with the choice of materials for they are those within our daily realm of experience. The abuses have a lot to do with an attitude; an attitude of control, of dominance, of arrogance, of power. A sense of place becomes virtually impossible in such a setting.

SENSE OF PLACE



4.11



FALLINGWATER

FALLINGWATER

Bear Run, Pennsylvania
Frank Lloyd Wright
1935-37

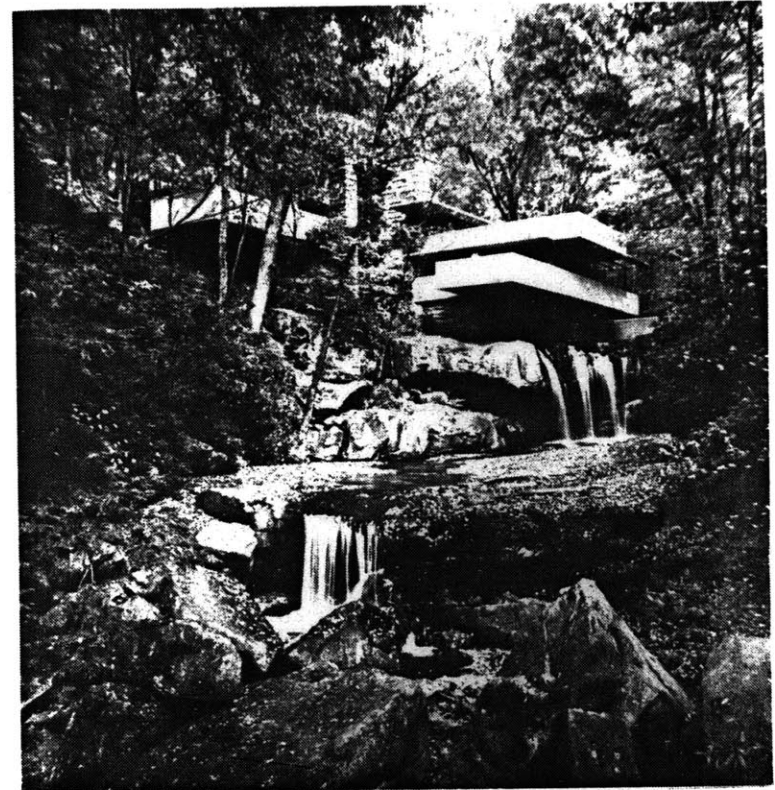
HISTORY:

In December, 1934, Edgar Kaufmann, owner of Kaufmann's Men's Clothing Store in Pittsburgh, met Wright to discuss a planetarium project and some new offices. His son, Edgar Jr., who had joined the Taliesin Fellowship in October of 1934, had recommended Wright. This first meeting impressed Kaufmann, so he and Wright drove to Bear Run. The site was a secluded retreat in a dense forest, its silence broken only by the rushing sound of falling water. Here, they discussed ideas for a year-round weekend house that the Kaufmann's were considering.

After inspecting the area surveyed on the contour map that he had requested, it became apparent to Wright that Kaufmann expected the house to be located downstream from the falls. Wright had a different idea.

INTENT:

"I want you to live with the waterfall, not just to look at it, but for it to become an integral part of your lives."⁶



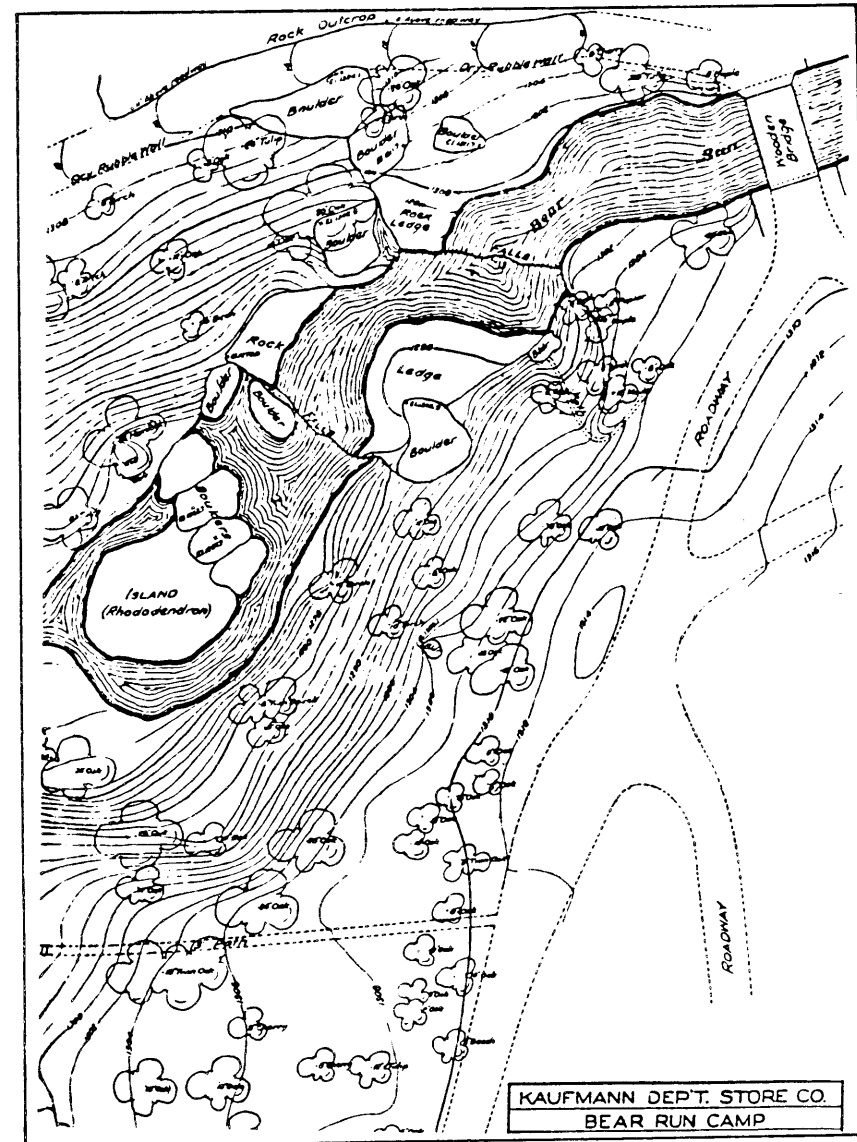
4.13

⁶Donald Hoffman, Frank Lloyd Wright's Fallingwater. New York: Dover Publications, Inc., 1978. p. 17.

FALLINGWATER

Wright's attitude was one of integrating human purpose with natural process; the building would be an extension of the natural landscape. This conviction motivated his architecture and in particular the house at Bear Run, known as Fallingwater.

Many times throughout his career, Wright compared his buildings to the experiential characteristics of water. For example, in *An Autobiography*, he wrote that his "Ocatillo" cabins in Arizona were "like ships coming down the mesa". Speaking of the Guggenheim Museum, he said "You will feel it as a curving wave that never breaks". In *The Disappearing City*, he attacked the overgrown city as "the dam across the stream flowing toward freedom."⁷ Clearly, Wright had water on his mind and this preoccupation inspired his thoughts and influenced his architecture.



⁷Ibid., p.35.

FALLINGWATER

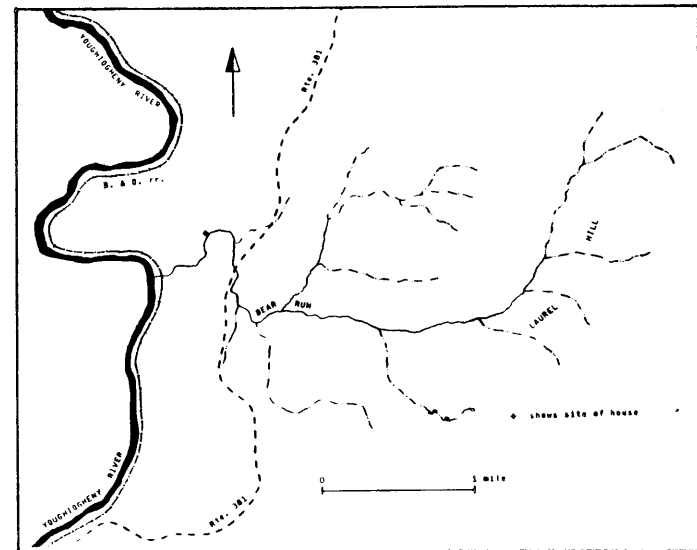
Wright conceived Fallingwater as living space extending into the forest, rising above the falls. The ledges of rock, suggestive of terraces projected into space, were translated into a series of interlocking rectangular units echoing the rock ledges beneath the flowing stream and along the precipitous cliffs. Wright eliminated the gap that normally exists between buildings and nature. Land, water and built forms achieve unparalleled continuity.

He explored a rather simple concept. The house represented a physical intrusion into a powerfully natural setting. It would be from the natural landforms that the form would emerge. This would require a sensitive understanding of the relationship between the natural parts; it would also mean applying this knowledge directly to the architecture.

The continuity begins with an understanding of the rock formations and the water coursing through them. Fed by mountain springs this 4-

CONTINUITY

mile stream called Bear Run eventually joins the Youghiogheny River. Over time the stream had gnawed through a flawed joint and Bear run "broke over falls". Many smaller falls appear all along this stream so the cascade became central to Wright's conception of the house. Above the waterfall rose a solid, high rock ledge nuzzled in a beautiful forest. The natural approach was to cantilever the house from this ledge out over the falling water.



4.15

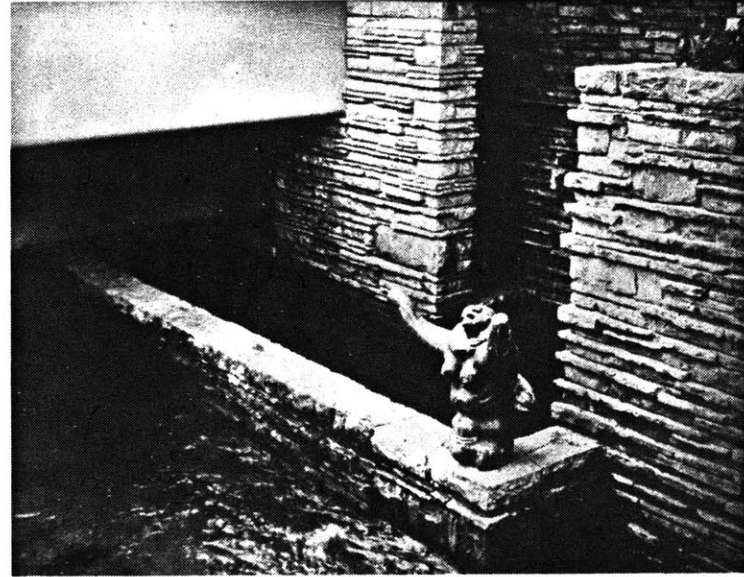
FALLINGWATER

To Wright, the dark boulders on the north side of the stream indicated the manner in which he should site the house. The buff-colored sandstone ledges which cropped out here and there along the stream became the reference for the staggered, exterior terraces. Wright succeeded in creating an architectonic continuation of these solid rock ledges. He described the house as essentially an "extension of the cliff beside a stream, making living space over and above the stream upon several terraces upon which a man who loved the place sincerely, one who liked to listen to the waterfall, might well live."⁸

Fallingwater represents a significant contribution towards building continuity at the site scale. To comprehend the full extent of the continuity warrants a closer examination at the building scale.

⁸F. L. Wright in The Architectural Forum, 68 (January, 1938), p. 36.

CONTINUITY



4.16

Wright's incorporation of small waterforms on the exterior and interior of the house extends the continuity beyond the confines of the natural stream. Viewed from the bridge over the water and the terraces above it, we can see a small reflecting pool contiguous to a long stone wall leading to the entrance. This motionless body of water, is juxtaposed against the moving water of the rushing stream. The

FALLINGWATER

gentle transition created by this still pool builds continuity with the moving stream; the fluid, transient water is calmed becoming the quiet, tranquil pool which then pauses and reflects the solid, permanent form of the house.

Approaching the main entrance a similar juxtaposition of water in motion and water at rest is repeated at a smaller scale. Water in



4.17

CONTINUITY

the form of a gentle trickle emits from the side of the loggia wall to fall into a small, calm, water-filled basin placed at ground level. This simple, thoughtful move enhances our sense of continuity through association with water in the landscape.

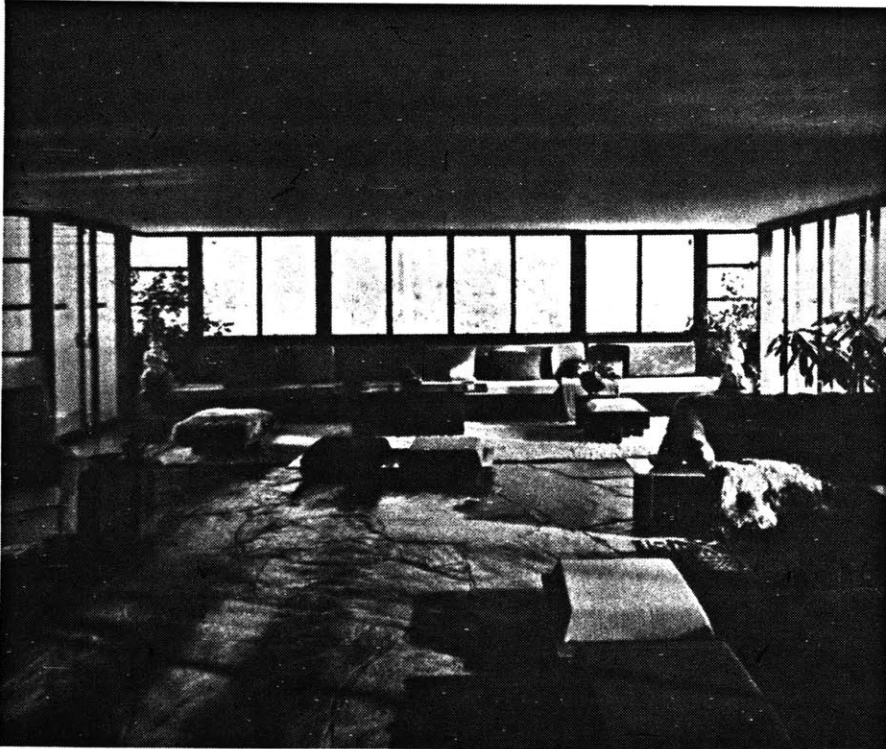
Inside, continuity is achieved by incorporating materials quarried from the surrounding environment. What Wright has accomplished here that is noteworthy is to use these materials in a manner sensitive to natural process. He assembles the pieces as nature would have, making the physical form of the structure an extension of the landscape.

Additionally, some of the materials are reminiscent of water or the natural surfaces coming in direct contact with it. The waxed flagstones comprising the living-room floor introduce the same color and texture as the glistening bedrock of the natural stream. A glance through the hatch reveals the

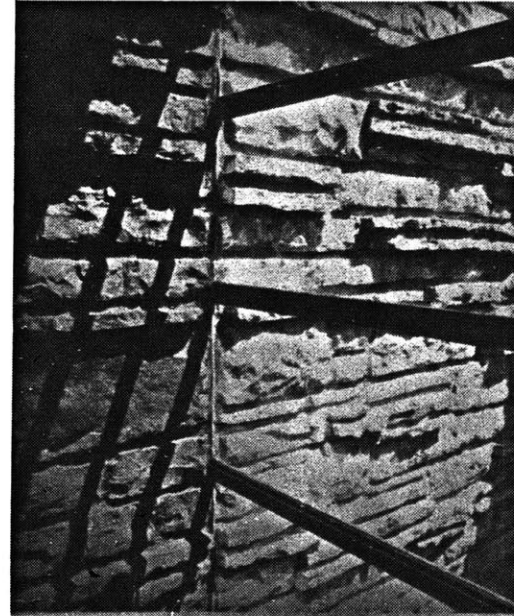
FALLINGWATER

relationship of the house to the stream and signifies the seemingly limitless spatial freedom which delights and inspires the romantic imagination.

4.18



CONTINUITY



4.19

Glass was another material Wright used to build continuity. In his opinion, glass exhibited those attributes of transparency so characteristic of water. Glass, like water, reflects the surrounding images as well as transmitting the forms lying beyond its surface. Consequently, Wright liked to think of glass in terms of "limpid surfaces playing the same part....that water plays in the landscape". He

FALLINGWATER

used glass as a vehicle for selectively transmitting views of the surrounding landscape. The juxtaposition of the transparent glass to the solid, opaque walls can be compared to that of the flowing water coursing through the rocky ledges.

Water appears as a natural element on the inside of the house in one location only. On the 3rd floor interior bridge which now connects with the covered walkway to the guest house, water emerges from the corner of the passage and trickles down a natural outcropping, building continuity by alluding to the moving stream and its eventual falls.

CONTINUITY

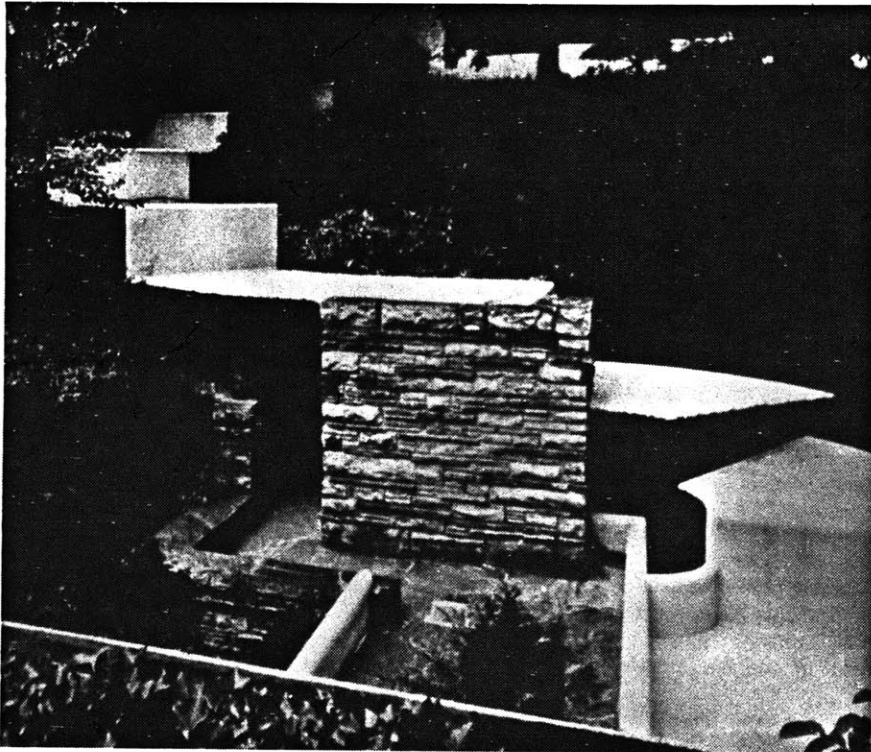


4.20

Bear Run abounds with falling water. As another gesture towards building continuity, Wright introduced the notion of the cascade into some of the architectural elements of the house. "The canopy above the walkway manifested every essential element of the

FALLINGWATER

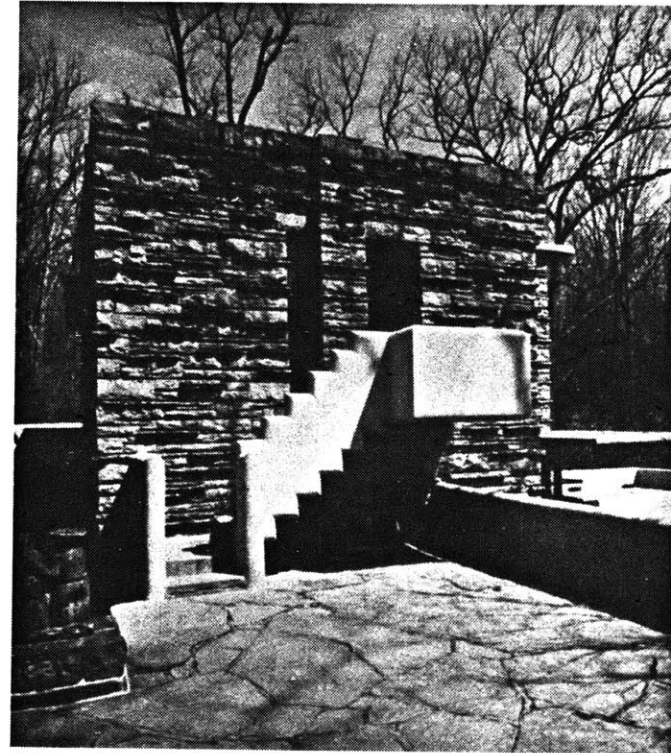
house. It was cantilevered broadly; the slab was folded for strength and in continuity; and it cascaded from the hill, tripping and spilling, as one last allusion to the falling stream."⁹



4.21

⁹Donald Hoffman, *Frank Lloyd Wright's Fallingwater*. New York: Dover Publications, Inc., 1978. p. 85.

CONTINUITY



4.22

Throughout the house, formal reinforcement of the cascading water was also integrated into areas of vertical access. The steps and stairs serve not only as passages but also as reflections of the cascading character of the site. This notion of the cascade is most

FALLINGWATER

CONTINUITY

forcefully expressed in the form of the west-balcony stairs, from the third-story bedroom (later changed into a study) to the west bedroom terrace.¹⁰

Ascending the hill to the guest house, the quiet, reflective, spring-fed pool at the east end represents the culmination of one's experience with water. This large pool, designed primarily for swimming, now stands still, calmly reflecting the surrounding images. It is only the sound of the gentle trickle emitting from a distant corner of the pool that breaks the silence. We are reminded of the trickle near the main loggia. The strength of the continuity at Fallingwater results from an interrelated set of pieces which comprise the totality.

¹⁰Ibid., p. 59.

FALLINGWATER

Fallingwater exhibits a strong reciprocal relationship between building, land and water.

The building becomes prominent in some places allowing water to flow around the form whereas it is receptive to the flow of water in others. The concave and convex forms of the building and the landscape calm the swiftly moving stream allowing momentary pauses in its motion. The subsequent undulating flow of the water is reminiscent of the natural pattern of a river's journey through the landscape.

Wright regarded the cantilever as a profoundly natural principle analogous to an outstretched arm, or a tree branch. In section, the cantilever allows the solid building mass to step out over the water, and the water to flow freely under the form. As the cantilevered terraces step up the hill in overhanging masses, the formal relationship between the rocky ledges and flowing water is repeated in this architectural gesture. This idea of extending

RECIPROCITY

the building mass beyond the landform is reminiscent of the topography created by the erosive activity of the aging stream or river. Water eventually gnaws at the landform until it has created an overhanging ledge under which it can easily pass.

By carefully articulating the building edge both in plan and in section, Wright has thoughtfully maximized the associations at the edge. Not only does he utilize this opportunity to increase the associations with the water, he also enhances the associations between various levels of the house and the landscape.

FALLINGWATER

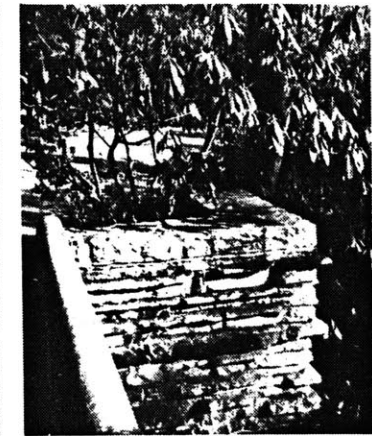
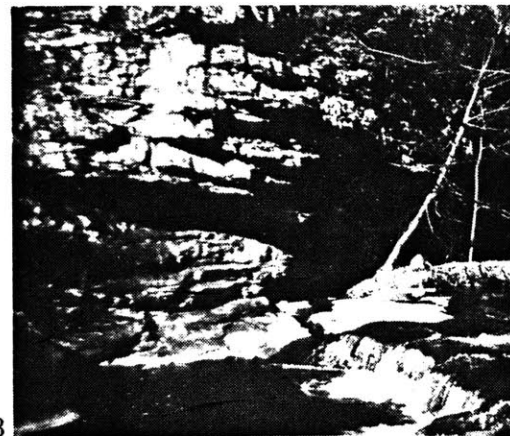
It is sufficiently evident that Wright possessed an intimate understanding of the landscape at Bear Run. He transposed this knowledge of the natural forms into a built vocabulary. The direction of natural landforms and rock outcroppings reinforce the direction of the flow of the water. Consequently, the direction of the built intervention would be sympathetic to the direction of both landform and waterform.

Wright utilized the directional quality of the stratifications in the rock ledges to generate the directional, interlocking, rectangular pieces of the house. Consistent with the overhanging rock ledges, he built up the elevations vertically by stacking and overlapping these large rectangular pieces. He reinforced the direction of the landscape by assembling these built pieces in an additive way. Therefore, the house has the sensation of cascading down the hill in a series of directional, stepped terraces.

The pieces of stone which comprise the exterior walls were quarried locally. On a much smaller

DIRECTION

scale these reinforce the direction of the natural rock stratifications. They are also aggregated so that large walls of the house are built up of a series of overlapping, overhanging directional segments. Using smaller bits to generate the larger form has its roots in the natural rock ledges. Again a deep understanding of the relationship of the parts to the whole becomes imperative in successfully translating nature's vocabulary into the built. This knowledge allows such an intervention to become an integral part of the landform re-creating a symbiotic connection between the parts.



4.23

FALLINGWATER

At Fallingwater, the relationship between forms creates a gradual flow in our movement analogous to that which occurs in the local landscape. Wright has designed the horizontal and vertical movement to reinforce the direction of the water.

On the interior, horizontal movement runs primarily with the water's flow. The vertical shifts of the stairs also run parallel to the water. Our own movement becomes sympathetic to water coursing through the stratified landforms. The relationship of horizontal movement to vertical ascent repeats that of the stream and its eventual falls.

The sizes of the interior spaces are analogous to the size of the the waterform in relationship to the pace of its flow. Moving from space to space with varying rhythm, we feel constriction and increased pace in some places and the expansion and decreased pace in others.

MOVEMENT

On the exterior, movement is analogous to ascending or descending a series of stepped landforms rising above the water. It is at the points of vertical access connecting the terraces, that Wright begins to turn the stairs perpendicular to the water's movement. Here, as well as under the canopy of the covered walkway to the guest house, the movement sequence becomes similar to that of water flowing down a series of staggered cliff ledges. It must be absolutely delightful to walk under this canopy during a gentle rain, the water trickling softly above our heads as we ascend or descend the hill.

The flow of the water communicated an attitude of movement at Fallingwater. By thoughtfully accentuating differences in movement between the interior and exterior, Wright has heightened our associations with the natural landscape both inside and outside the building.

FALLINGWATER

By utilizing his knowledge of the physical attributes of the natural edge zone and its relationship to the stream, Wright sensitively and harmoniously integrated Fallingwater into the surrounding landscape. The form of the building echoes the cliff ledges overlooking the stream and its subsequent falls.

The interlocking, juxtaposing rectangular forms of the building evolved from an awareness and understanding of the landforms which constitute the natural edge of the stream. The evolution of building parts so specific to this site, could only be accomplished by careful observation of the natural edge as it relates to the water. The cantilever evolved from the overhanging rock ledges and Wright used it to integrate Fallingwater with the natural landscape.

The bridge over the flowing water was primarily a means of providing access but also becomes an architectonic gesture which bridges the gap between edges and is reminiscent of the

EDGE

bridging of naturally eroded landforms.

As in a natural edge zone, the stream and the falls can be experienced from myriad vantage points inside and outside the house. The cantilevered terraces provide various levels where interaction with the water could occur. It is possible to see the coursing stream from a terrace far above the water, or to touch it by descending the stairs of the hatch.

Wright's intervention has extended the natural edge zone by enhancing the opportunities at the edge in a manner uncompromisingly sympathetic to nature's process.

FALLINGWATER

Reinforced by the direction of movement through the house, the falling water continually orients us as we travel from room to room.

By utilizing large areas of glass and exposed terraces, Wright has opened up the house on the side adjacent to the falls to permit the sights and sounds of water to penetrate the interior and exterior spaces. The gushing and gurgling of the water produces various sounds which continually orient us to the moving stream.

ORIENTATION

FALLINGWATER

At Fallingwater, Wright has counterbalanced the confined with the spacious, the sheltered with the exposed, the private with the public, the light with the dark, the human size with the landscape size. By designing such a rich and varied setting, he has allowed for diverse interactions in the spaces. Consequently, this provides each person the opportunity to discover his/her own sense of place.

Additionally, "The house would welcome the changes of season, of weather of the light of day; at the same time, in those darker and more secure spaces shaped by the great masses of stone masonry that counterbalanced the cantilevered terraces, there would be comforting warmth and a sense of shelter and refuge, where the steady sound from the falls would reinforce the forest quiet."¹¹ By nurturing our soul with these amenities, Wright has provided ideal conditions for experiencing nature's processes.

¹¹Ibid., p. 21.

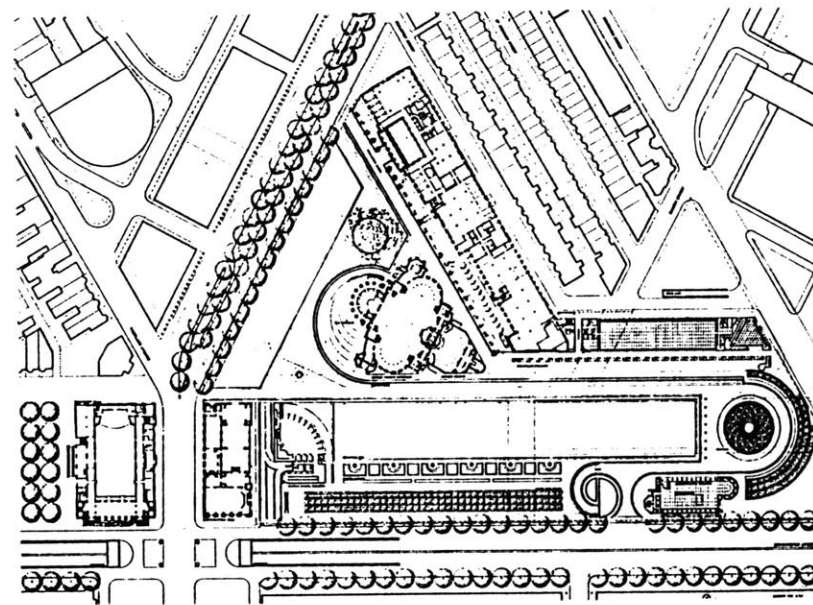
SENSE OF PLACE

On October 29, 1963, at a dedication ceremony placing the house in the care of the Western Pennsylvania Conservancy, Edgar Kaufmann Jr. stated his feelings about the house at Bear Run. "Its beauty remains fresh like that of the nature into which it fits....House and site together form the very image of man's desire to be at one with nature, equal and wedded to nature....Such a place cannot be possessed. It is a work by man for man, not by man for a man....By its very intensity it is a public resource, not a private indulgence."¹²

Walking through this "public resource" for a few brief moments, one understands how this building, so intimately a part of nature, could provide a sense of intimacy and security for those who lived there.

¹²Ibid., p. 92.

4.24



CHRISTIAN SCIENCE CENTER

CHRISTIAN SCIENCE CENTER

Boston, Massachusetts
I. M. Pei & Araldo Cossuta
1962-72

HISTORY:

In 1962, the Christian Science Board of Directors, "intent on a less cloistered space (and image)" decided to build on the 15 acre site bounded by Massachusetts Avenue and Huntington Street. This was consistent with a more enlightened attitude toward architecture and urban planning espoused by the Christian Science Monitor, an international daily newspaper. A planning contract was awarded to I.M. Pei, who subsequently appointed Araldo Cossuta, a graduate of the Ecole des Beaux Arts and Harvard and who remained in charge of the project for its 10-year duration.

The Center's initial fabric includes the original Mother Church (1894) and its Extension (1905), and the Christian Science Publishing Society Building (1934). The 1972 addition consists of the 28-story Church Administration

Tower, the 3-story Sunday School and the 5-story, 525' long Colonnade Building. The rectangular reflecting pool occupying the center of the composition is 670' long, 110' wide and 2' deep. Beside the Administration Building and at the east end of this reflecting pool is a fountain, 80 feet in diameter, with a semi-circular dome of spray 40' high.



4.25

CHRISTIAN SCIENCE CENTER

CONTINUITY

INTENT:

The Christian Science Center was designed to bring science, religion and art together with the daily life of Boston's Back Bay. The composition of the buildings was intended to create "an interplay of form, view, perspective and space that is almost Baroque in its majesty".¹³

Central to the design was Cossuta's desire to engage the inner structure, the spaces and streets and surrounding scale and borders. He saw the relationships between the parts as analogous to a cast of characters and a supporting chorus. At times, some are called upon to be the leading actors while others become the chorus. Who leads and who supports is totally dependent upon one's location at a given moment.

The Christian Science Center buildings, its waterforms and the space between are a series of disconnected, disassociated fragments. The monolithic, poured concrete forms of the most recent buildings, their placement on the site, the form and location of the water and the uniformity of the paving materials are an unsuccessful attempt at providing continuity.

The buildings and waterforms belong to a centrally focused, introverted world which contributes to their lack of continuity with the surrounding city fabric. The buildings have little or no dialogue with each other; the water talks minimally to the surrounding forms. Absent are the threads, elements that weave the parts together--materials, details and forms which eventually create an intricately woven fabric. Consequently, the Christian Science Center becomes a discontinuous world, an island in the city.

¹³Futagawa, Yukio, ed., Global Architecture ,No. 41. p. 4.

CHRISTIAN SCIENCE CENTER

A massive, rectangular, reflecting pool is the central focus of this architectural composition. The size of the pool overwhelms us, as well as the space. This rectangular pool, along with the semi-circular domed fountain at its east end, become two disassociative forms. Cossuta attempted to make a formal connection between these two waterforms; the diameter of the fountain base duplicates the width of the pool; the band of granite encircling the fountain repeats the dimension of the two granite borders of the reflecting pool. Relatively speaking, the fountain and the pool are closely spaced, but physical proximity and repetition of dimensions fail to build continuity here.

The large, rectangular reflecting pool endeavors to create a linear continuity by means of the boldness of its statement. Subsequently, there is a lack of additive continuity. This deficiency of formal and experiential richness should not be attributed solely to the size of the pool. Absent is continuity resulting from an

CONTINUITY

interconnected set of built and natural parts--parts related by various scale relationships, associated material properties and familiarity of use. Such connections would stimulate a richer dialogue between the cast of characters, of which the space is a crucial actor. Flowing from one space to another, some of the pieces could remain recognizable and associative as we experience alterations in the forms, materials, movement patterns, etc. Change evolves gradually and subtly as opposed to harshly or abruptly. Water could become one of numerous threads weaving the urban landscape building a continuity with the architecture.

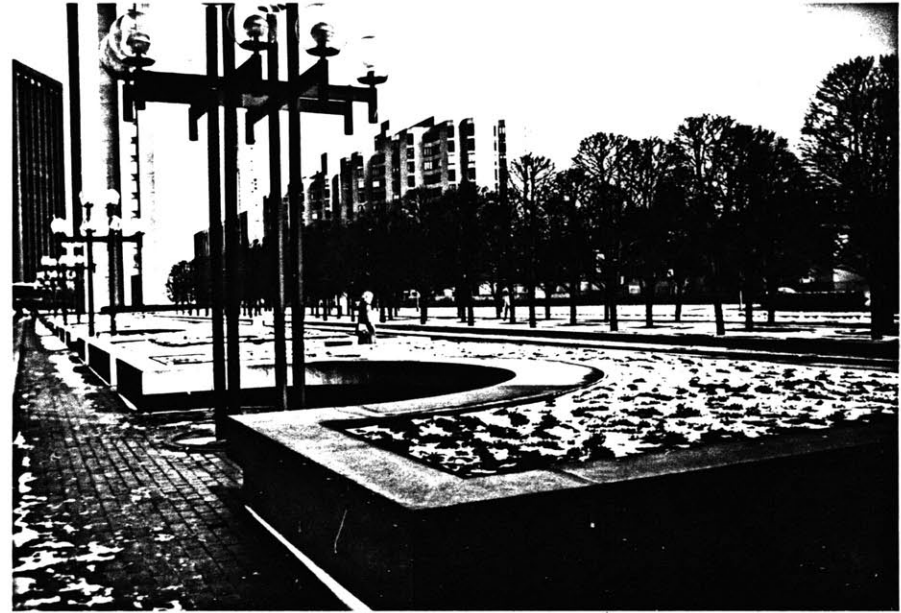
The south side of the water could make more positive use of the transitional space between Huntington Avenue and the water. Continuity from the street edge to the water could be enhanced by extending the water beyond the edge in some places. Small rivulets or channels in the pavement could supply nourishment to the linden trees. Continuity would be

CHRISTIAN SCIENCE CENTER

comprised of virtual or literal connections between waterforms as we move from the more public realm to a somewhat more private experience.

This space offers tremendous potential for providing a zone of transition--a means of providing continuity within the urban landscape while heightening awareness of and participating in nature's processes.

CONTINUITY



4.26

CHRISTIAN SCIENCE CENTER

The clear delineations of the territories and the planar qualities of the built edges of the Christian Science Center exclude any territorial reciprocity. Each form is a separate entity and therefore excludes a reciprocal relationship between the parts. Most people seem to be quickly passing through the space along one of the axes on their way outside the site. Their passage from one place to another remains virtually unchanged along the length of either of the axes. They are not drawn into receiving forms nor do they move around prominent ones. Territories are not shared and there is little, if any, overlap.

The Mother Church and its extension has turned its back on the space; it fails to engage the path or water in any type of reciprocal dialogue. The Sunday School Building which focuses out diagonally onto the path co-exists with the water remaining silent and non-communicative. Additionally, the isolated, planar buildings and the strictly geometric

RECIPROCITY

forms of the water, fail to communicate with each other or the surrounding city fabric. Consequently, these forms do not engage the space between in any reciprocal manner. Rectifying this deficiency would help integrate them into the urban landscape and would make the space seem less hostile.



4.27

CHRISTIAN SCIENCE CENTER

DIRECTION

The orientation of the pool and buildings establish the primary direction which permits east-west movement solely along either of the two main axes. Entrance onto the site at any point perpendicular to this east-west axis results in an abrupt direction change forcing one to circumnavigate the reflecting pool. The direction of this axis is further reinforced by the static, linear placement of concrete flower gardens and three rows of linden trees. This continuous linear formality and overreinforcement of the primary direction creates a composition lacking in experiential richness.

The primary direction could be reinforced by establishing a series of moves which build the direction. This would allow movement transversely across the site in places and provide the opportunity to "be in" the water by being surrounded by it. As a result, we would encounter and utilize human scale landmarks that enhance our movement and make a journey of this magnitude more manageable and interesting. Neither the two waterforms themselves nor the articulation of the building edges alert us to changes in the direction of our movement.

Water could be used to direct us through the site and signify changes in our movement off the main path. A vocabulary of various waterforms and an understanding of the conditions of their placement could have been utilized to signify changes in direction.

CHRISTIAN SCIENCE CENTER

The peripheral east-west borders of the pool signify the axial paths along which we gauge our movement. These two parallel movement systems consist of a major axis which is located on the north side of the pool with a secondary axis on the south edge. Movement through the site is strictly horizontal with no vertical shifts. This horizontality is reiterated in the uniform surface of the reflecting pool. Were it not for the water's ability to reflect and transform the static images of the surrounding forms and to respond to the ever-changing moods of the sky, the sun, and the wind, movement down these axial paths along lackluster planar edges would be uneventful and uninformative.

Any change in the rhythm of our movement stems from our fascination with the vastness of the pool itself, in addition to our involvement with the reflected images and surface ripples. Additionally, the placement of the fountain allows us to discount it as a clue to movement. We can easily complete the axial path without

MOVEMENT

utilizing this waterform as an opportunity to alter the course of our movement.

Modulations in the rhythmic sequence of our movement does not result from modifications in the articulation of the forms, or variations in level or paving materials. Consequently, passage from one place to another remains uninterrupted by noticeable landmarks.

The two axial, east-west paths represent the shortest distance between two adjoining segments of the city; such considerable distance unpunctuated by varied and attention-grabbing landmarks constitutes a lengthy and unfulfilling journey. The consistently planar edges of the buildings and the pool fail to make a significant formal contribution for enlivening our journey. Consequently, the barren space is most often used as a short-cut in moving from one section of the city to another.

CHRISTIAN SCIENCE CENTER

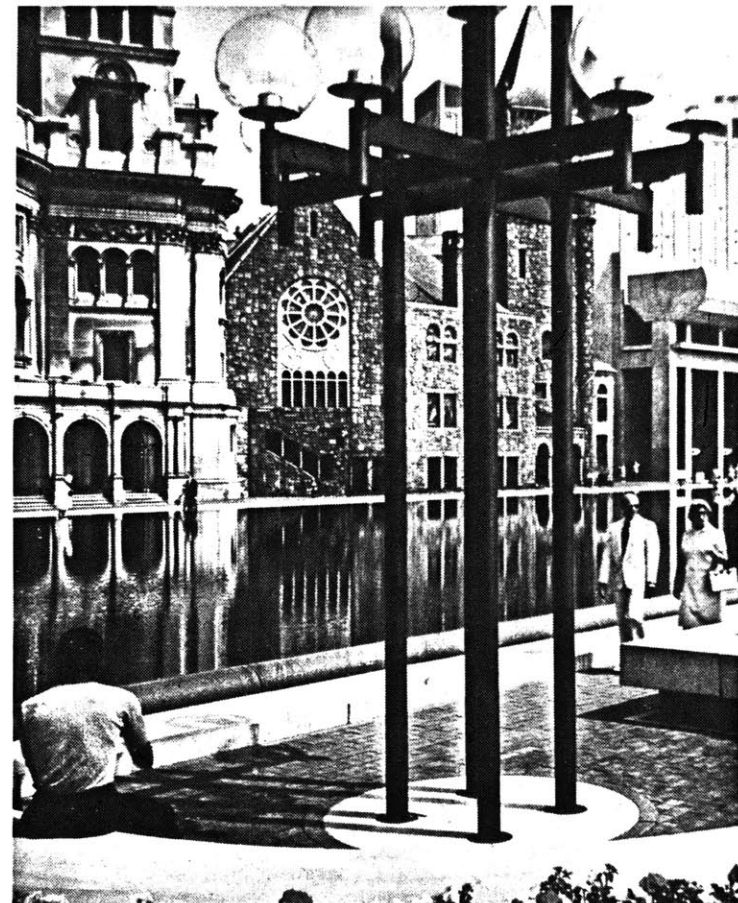
EDGE

The calm, reflective nature of the pool conjures up images of a lake. A body of water of this magnitude is rarely found in an urban landscape. When we reminisce about our experiences at a lake, we recollect images of the physical characteristics of the edge.

The pool spills over the gently curved edge of its container in a simple and elegant manner. But this edge treatment responds as much to pragmatic concerns as it does to aesthetic ones; the pool serves as a cooling tower for the center's air-conditioning system.

As much as the edge is elegant it is particularly disappointing when compared to the edge of a lake. The form and the materials render it untouchable and warrant a hands-off approach. Absent is an invitation to physically experience the edge. We can't meander along a fluctuating edge or sit beside the water lapping back and forth beside us. Nowhere does this edge inspire delight and participation. And

nowhere is this edge used to make a formal connection with the surrounding buildings or city fabric.



4.28

CHRISTIAN SCIENCE CENTER

Formal and associative differences could be created on the north and south sides of the site; waterforms could have been utilized to enhance these variations. Formality in some parts of this site could co-exist with informality and more participatory spaces in other areas.

The north side of the water could remain more formal, thus maintaining a somewhat planar edge. The colonnade building could then register off this edge allowing the facade to become less linear and more freely articulated. The space between would encourage more association between the building and waterform.

The informal edge could be the softer edge inviting us in from the Huntington Avenue side thus enhancing accessibility. This would require substantial changes in the location of the parts, choice of materials and articulation of the forms--more amenable benches (not concrete), trees arranged in a more random pattern, and additional waterforms to increase

EDGE

the continuity from the street edge to the water. The experience at this edge could be that of meandering, sitting, contemplating. We could relate to the water's presence not only in the larger waterforms but also in the smaller "bits". These have the potential of contributing to a more personal and varied array of experiences.

The essence of a lake and the experience at its edge could be re-created as an integral part of the urban landscape. So rare are places in the city where one finds sizeable bodies of water; it seems imperative to weave these into the urban fabric and provide diverse experiences within the city.

The east edge of the site attempts to become more closely associated with the city fabric. One positive feature of the fountain is that the edge is delineated solely by a change in paving materials. This lack of a raised surface invites participation and children delight in running through the spray in the hot summer months.

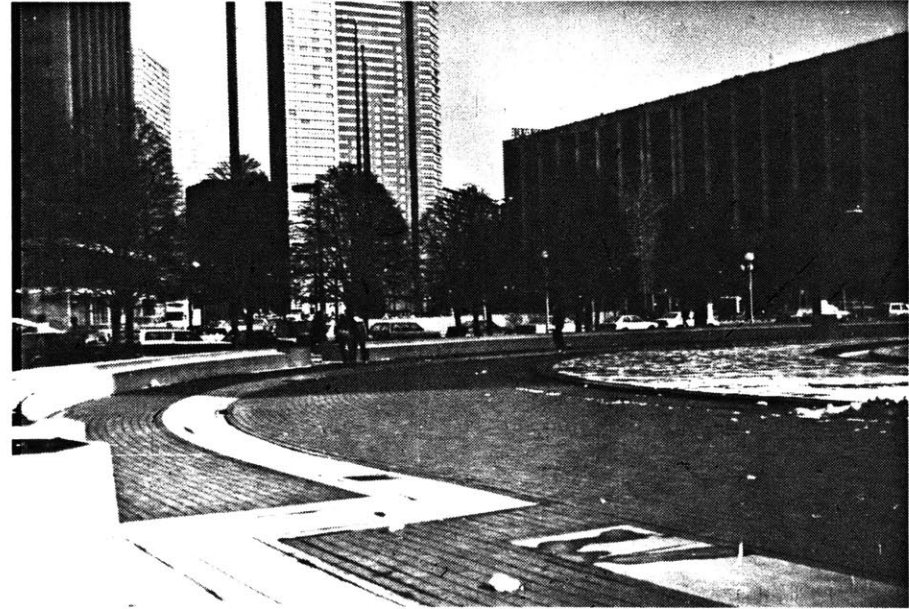
CHRISTIAN SCIENCE CENTER

EDGE

It also becomes a dynamic, spouting form masking noise from the street and terminating the calm reflective pool. But are we to interpret this fountain as an attempt to provide some kind of participatory gesture? Is it there solely as a counterpoint to the calm provided by the reflecting pool? Or is there some significance in comparing the reflecting pool to the nave and the fountain to the apse?

The juxtapositioning of this highly-active domed fountain next to the large reflecting pool is inappropriate and insensitive. We need a zone of transition from the quiet, reflective pool to the exuberant spray of the fountain.

Unfortunately, the edge directly beyond the fountain discourages visitors due to the raised concrete forms and the shortage of entrances into the site.



4.29

Sensitive articulation of the edge plays a critical role in integrating this site with the city fabric. The existing space is an island separate from the city, overpowering and static, exacerbated by inappropriate forms of water and architecture. We feel distanced from this place but the feeling of distance results not only from a failure to integrate the edges but also from our lack of positive and meaningful associations with the place.

CHRISTIAN SCIENCE CENTER

Approaching the Center from Massachusetts Avenue, the Mother Church and its Extension, in addition to the Administration Building become our primary sources of orientation. Often we are attracted to this space by the shimmering surface of the reflecting pool.



4.30

ORIENTATION

The gushing sounds and leaping spray of the fountain help to orient us as we approach the site from Belvidere Street. Such identifying landmarks at the city scale and human scale provide meaningful clues which inform our movement.

Unfortunately, the site fails to provide us with smaller points of reference. We are continually surrounded by large scale interventions--the Colonnade Building, the Administration Building, the reflecting pool and the fountain. It becomes imperative within a site of this scale to utilize more human-scale landmarks. These devices orient us as we travel through the site. This space is devoid of such references and therefore suffers from an extremely vacuous quality.

CHRISTIAN SCIENCE CENTER

If we accept the definition of a sense of place as "a piece of the natural or built environment which has been claimed by deep associations or intense connections", the Christian Science Center has not provided such a place. One would consider this as a primary goal of a religious organization. The monumental, impersonal quality of the buildings along with the magnitude and forms of the water encourage us to search elsewhere for a special place.

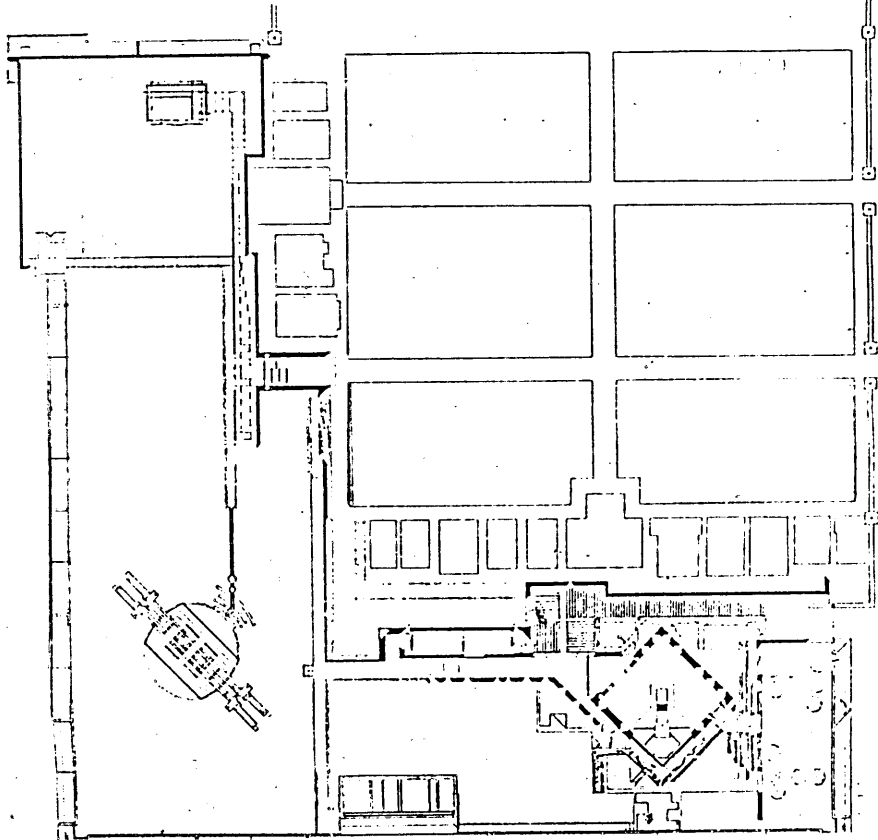
There are no private places here; no place to commune with nature or nurture one's contemplative spirit. Here, we always feel very public, very vulnerable. There are no intimate places to sit by the water and lose oneself to memorable associations. There are no human scale waterforms which build continuity and provide private places to foster the growth of personal associations.

If any place were to provide these qualities, one

SENSE OF PLACE

would hope to find them here. This could be a place with active and passive edges--a place which satisfies a variety of human needs. Cities desperately need such places--many of them--nature's process interwoven into the urban landscape--the ephemeral, cyclical qualities of nature as the counterpoint to the solidity and permanence of the buildings. We need quiet, contemplative places juxtaposing the continual din and chaos of the city. At a site this size, in a prime urban location, it is disillusioning to be confronted with a world that attempts to exclude. We need places that invite and extend that invitation over and over again, each time allowing for new discoveries, unforgettable associations.

4.31



BRION-VEGA

BRION-VEGA

Treviso, Italy
Carlo Scarpa
1970-72

HISTORY:

Scarpa accepted the theme of the small family cemetery desired by the founder of a successful Italian industrial enterprise, the Brion-Vega. Here he created a rare environmental complex of exceptional and amazing complexity and density. "For Scarpa Venice was a way of seeing and using, a way of connecting things in function of the values of light, texture, color, capable of being grasped by an eye used to observing water, glass, together with stones and bricks exposed to an inclement atmosphere which doesn't allow the material to hide its structure, but continually forces it to discover, by consuming itself, its most hidden qualities. In the Brion cemetery, this Venetian-ness is again...."¹⁴

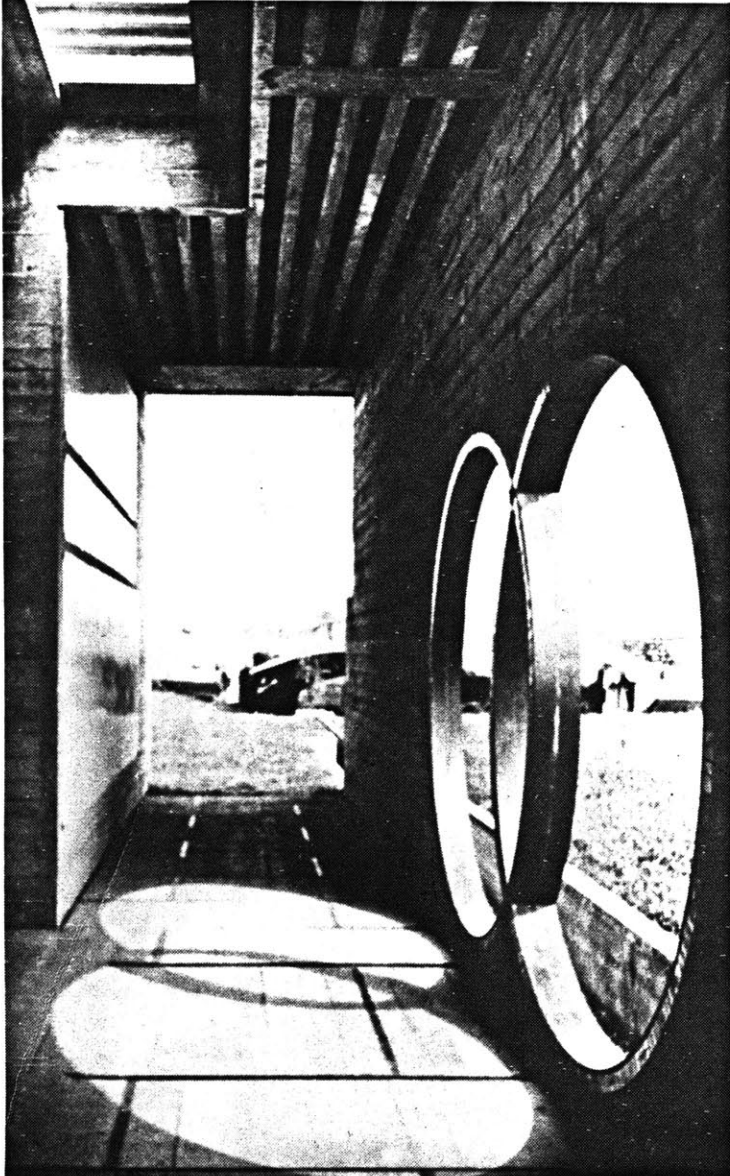
¹⁴Futagawa, Yukio, ed., Global Architecture ,No. 50. p. 2.

INTENT:

In 1978 Ellen Soroka interviewed Scarpa at his studio in Vicenza. In talking about Brion-Vega, he said that his intention was "to create a place to come to celebrate life, and therefore the entire plan is symbolic."¹⁵

The large pool is meant to symbolize the beginning of life before birth. The dual sarcophagus, for the couple Brion-Vega, was meant to symbolize the material end of life. The water surrounding the Tempietto (a small Chapel symbolizing eternal life) is intended to represent the beginning and end at once--or the infinite. Therefore, the cemetery entrance is in a position between the beginning and end of a lifetime.

¹⁵Ellen Soroka, "Carlo Scarpa, Connections in Design: A Generic Attitude". Master of Architecture Thesis, M.I.T. 1979. p. 103



4.32

Through sensitive introduction of waterforms such as the spring, the rivulet, the stream and the pool into the architectural composition and through purposeful juxtapositioning of water forms and architectural forms, Scarpa has built continuity at Brion-Vega.

Upon entering the cemetery, the first passage leads us into the narrow corridor of the Cloister. From this position, our view is focused on the cemetery through two large, interlocking, circular openings in the wall. A small channel of water runs between the wall and the landscape. On our left we can see the "stream" become a "rivulet" as its width diminishes. We sense the continuity of the "stream" in the local landscape, as well as its association with the "rivulet" and the distant mountain range. We become part of a more intimate world without losing sight of the larger landscape context.

The stream and the Cloister wall form a symbiotic bond. Turning right, we lose sight of

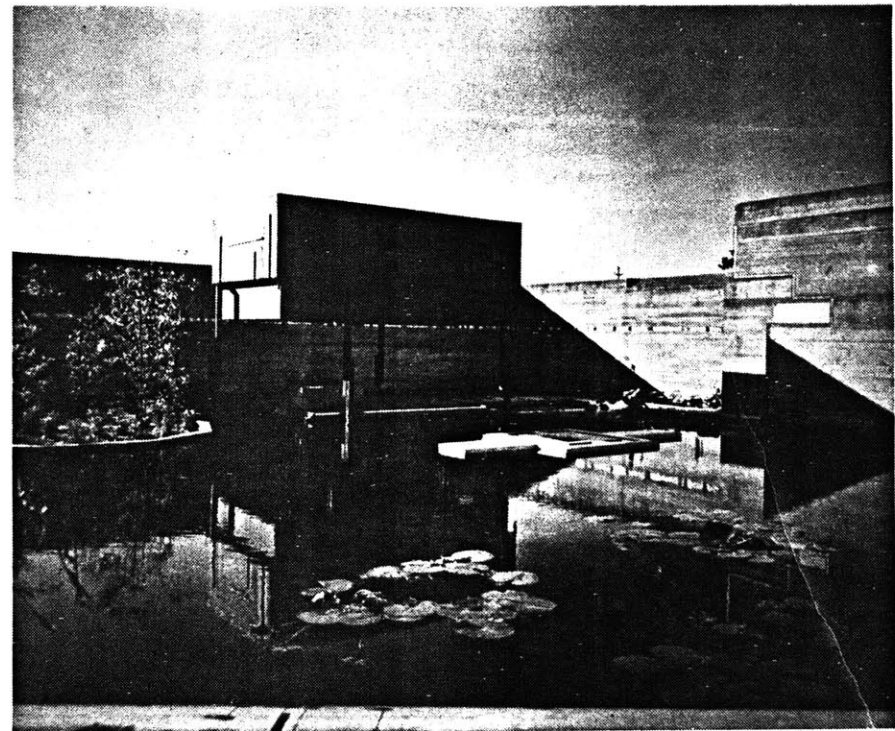
BRION-VEGA

it behind the solid Cloister wall. Eventually, this wall erodes providing us with a view of a large pool, its calm surface reflecting the surrounding images. On our right, the wall continues for a short distance shifting back allowing the water to surround us. This shifting punctuates and clarifies the passage from the Cloister to the pool. The solid Cloister wall had shielded the stream from our view so that we remained unaware of its continuing journey. We suspected the connection between the stream and the pool but we were uncertain. Only as we ventured into the pool along the narrow path were our suspicions confirmed. The continuity is enhanced by the transformation of the stream at the commencement of our journey into the pool at our destination.

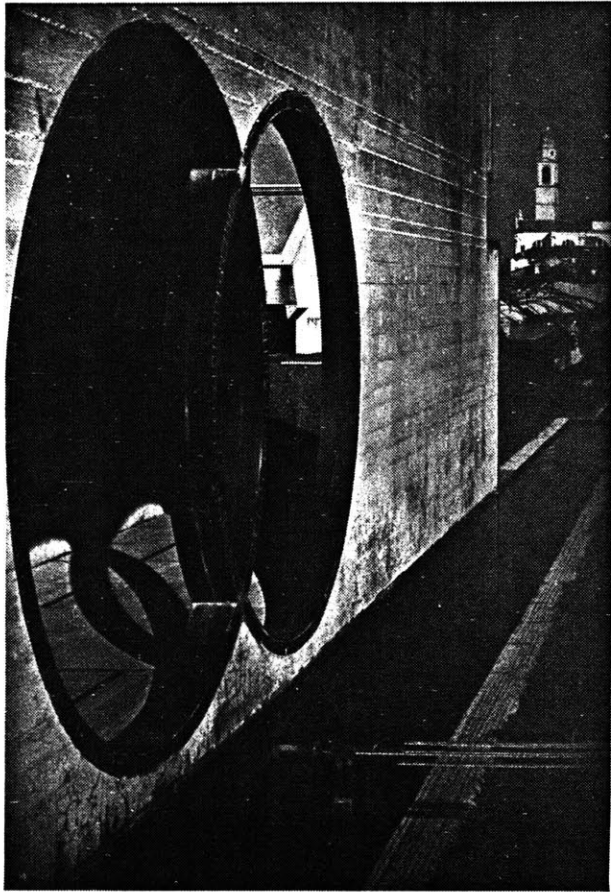
The Cloister path moves along the surface of the pool eventually ending at the Aedicule. Movement toward this "island" results from these changing connections--a shifting of parts

CONTINUITY

that informed our journey. Some elements building continuity by maintaining their familiarity while others transform. Consequently, our understanding of movement is enhanced by this continuity of related parts.

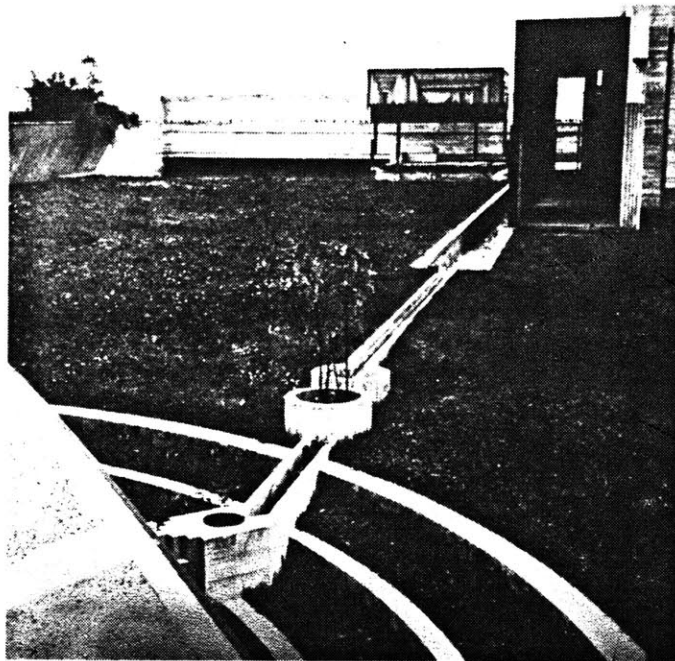


4.33



4.34

We return to the interlocking circular openings of the Cloister. Looking left we can see the "stream" coursing its way to Brion's tomb. Moving closer to the tomb, the linear "stream" undergoes another transformation, becoming a narrow "rivulet". This rivulet subsequently becomes a small circular spring near the point of descension into the large circular base of the tomb.



4.35

BRION-VEGA

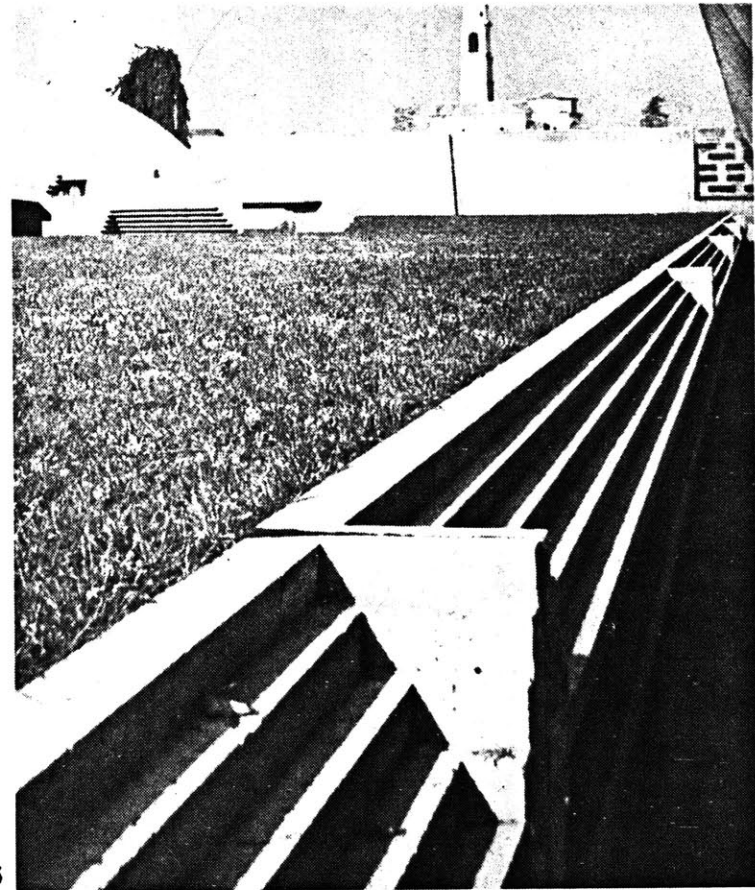
We finally discover the source of the water; we understand the sequence--the spring, the rivulet, the stream, the pool. With these transformations Scarpa continues to build continuity. The relationship between the parts clarifies and enhances our understanding of passage from place to place.

The large circular base of the tomb, shifted off the axis of the linear "stream", builds continuity through its association with the smaller circular form of the spring. The presence of the spring symbolizes the continuity of life. That which is lost in death, issues forth again in life.

Formal continuity is also achieved in the coherent articulation of the built pieces. The way Scarpa has utilized the concrete forms and fragments enhances the continuity by association. The large horizontally striated concrete walls are reminiscent of natural landforms; the texture simulates natural erosion caused by changes in water level along

CONTINUITY

a riverbed. Additionally, the stepped concrete forms recall natural landforms created by flowing water and its eventual falls, again establishing continuity through association.



4.36

BRION-VEGA

Scarpa has been consistent in his use of striated and stepped concrete forms throughout Brion-Vega. They are used on the wall which encircles the cemetery, on the exterior walls of the buildings, on the edges near the water, on the forms in the water itself, as well as on the interior of the buildings. He has not only built continuity with these pieces, but has used them to formulate a vocabulary out of which he constructs his language of form making.

Scarpa also builds continuity through similarity of dimensions. The width of the "rivulet" is repeated in the dimension of the steps down into the tomb, as well as in the concrete ribs of the arch spanning its length. This dimension occurs again in the width of the linear stepped concrete forms, in the segments of the walkway to the pre-existing cemetery and in the width of the "rivulets" of water surrounding the Chapel located to the east.

CONTINUITY

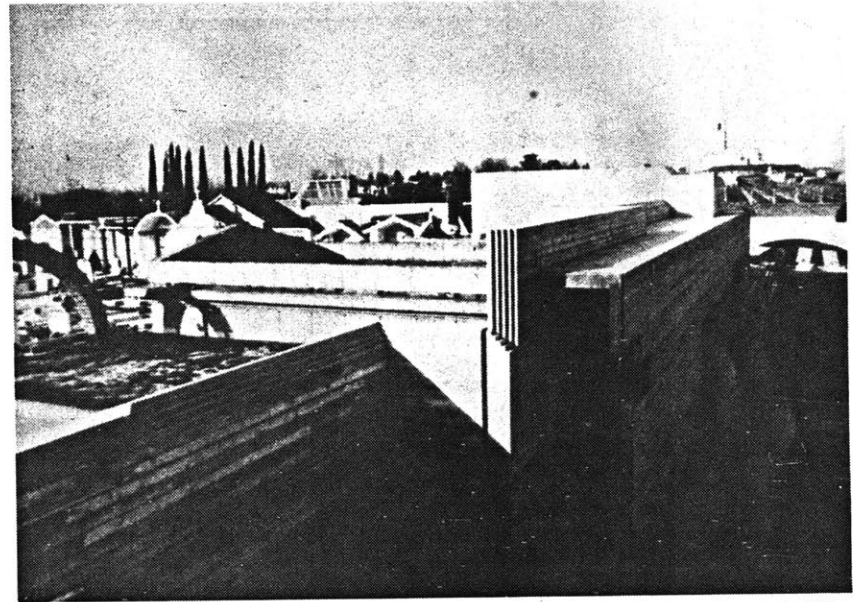
Standing at the edge of Brion's tomb, continuity is reinforced by the view of the reflecting pool surrounding the Chapel. We turn left at the tomb and follow a path which leads us to the Chapel. Walking through this Cloister, we catch momentary glimpses of the water through the tall, vertical openings in the wall. Nearing the entrance, the wall shifts, and the water disappears from view. Inside the Chapel the water surrounds us on three sides re-establishing the continuity through our association with the pool, the stream, the rivulet, and the spring.

Formal continuity is enhanced by the relationship of the parts. The square shape of the Chapel and its diagonal disposition in the space are reinforced by the angularity of the segmented concrete forms and the quadrangular shape of the surrounding water.

BRION-VEGA

At Brion-Vega, Scarpa has built continuity through the physical relationships between forms--architecture and water-- or through our associations with water in nature. The built forms have an actual or implied connection with the water and demonstrate Scarpa's understanding of natural processes. Brion-Vega is a private, secluded environment which maintains continuity with a larger landscape.

CONTINUITY



4.37

BRION-VEGA

The first major change in direction occurs in the linear passage of the entrance Cloister. Following a momentary view of the adjacent "stream", the walls immediately become solid to focus our attention ahead towards the pool.

Turning right, the corridor eventually diminishes to half its original width. The left wall erodes as the right wall assumes the task of directing us forward. Surrounded by water, we are soon alerted to a perpendicular turn. This change in our our direction is informed by the placement of the water and the solid enclosure created by the concrete walls.

Returning through the Cloister passage past the interlocking circular openings, the solid wall continues for a short distance but disintegrates to expose the linear stream and the subsequent rivulet. The semi-circular form of the steps at the entrance to the tomb are placed diagonally to the rivulet signifying a change in direction. The diagonal concrete ribs of the arched roof denote another change. The

DIRECTION

space formed by the rivulet and the arched roof clearly leads us on to the Chapel path.

The Cloister enclosure directing us to the Chapel maintains its axially; we are alerted to a shift in direction as the right hand wall angles 45 degrees away to expose the diagonal entrance wall.

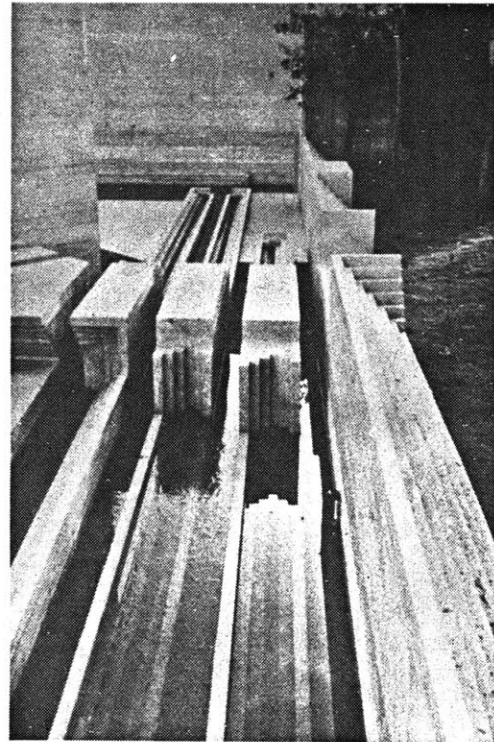


4.38

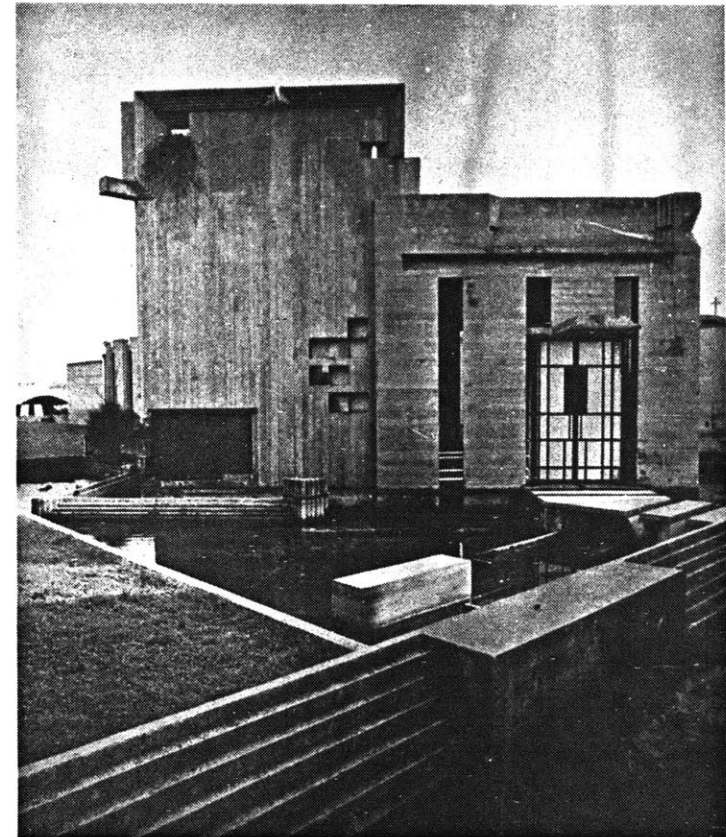
BRION-VEGA

DIRECTION

Our eventual transition from the interior of the Chapel to the priests cemetery is over the orthogonal pool surrounding the Chapel. This passage is composed of a series of alternating stepped concrete forms and rivulets of water which shift their placement in deference to the change of direction.



4.39



4.40

The waterforms in tandem with the architectural forms inform our direction of movement by maintaining a reciprocal dialogue, one never consuming or overwhelming the other.

BRION-VEGA

Scarpa has used the waterforms at Brion-Vega to vary the pace of one's movement. A pause or cessation in movement is associated with the larger pools. Narrow, linear waterforms are suggestive of movement. A change in dimension or form of water prepares us for a variation in movement.

The calm, reflective quality of water surrounding the Aedicule and the Chapel encourages us to stop and contemplate. The view of the "stream" from the interlocking circular openings in the entrance Cloister wall initiates a pause in our movement as we choose a subsequent course. Sensing the continuation of the "stream" and its connection with the pool on our right and the rivulet on our left, we choose one direction or the other.

We associate the linear quality of the stream and rivulet with that of the swiftly moving water coursing through the natural landscape. This triggers a subconscious desire to quicken our pace. We pause at the circular spring

MOVEMENT

before descending into the tomb.

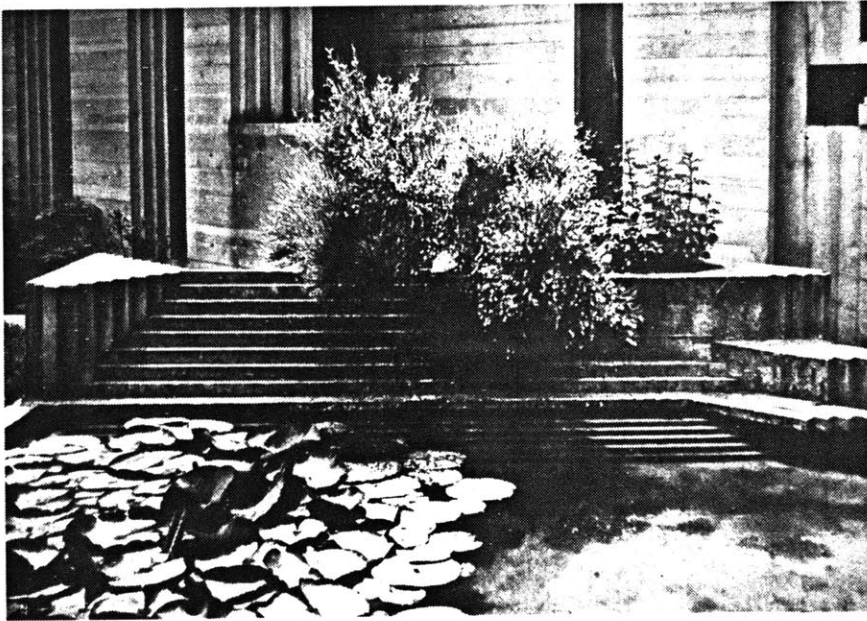
Movement is also regulated by the openings in the walls. Moving through the Cloister towards the Chapel, the frequency of views serves to increase or diminish our pace. The "window" is splayed so that we catch a broader glimpse of the landscape.

Inside the Chapel, the shape of the openings is repeated but they are turned in the opposite direction. The narrower openings focus on the surrounding water with the wider portion being placed on the interior. This signifies a different attitude toward movement--it communicates a pause, a time to contemplate.

BRION-VEGA

Movement is primarily horizontal with some vertical shifting up or down into the tombs. The stepped concrete forms are reminiscent of the vertical descent of cascading water in the landscape; the presence of rain making this a much more tangible reality. Sometimes, movement is informed by elevating the stepped and striated concrete forms along the path. The borders of these raised mounds of earth delineate and clarify our motion towards the tombs.

The associations with natural processes reinforced by the consistent vocabulary of architectural forms inform our movement through the site. Yet, amid all the complexity of the forms, there remains an underlying clarity in the way the parts interact.



4.41

The stratifications in the concrete are characteristic of edges and landforms created by the erosive activity of water in the natural landscape. These striations reduce the seemingly monolithic walls to more human-scale components. When segments of these forms extend into the water, the edges engage the water in a dialogue sympathetic to natural process.

Stepped edges of the Chapel reach out into the pool and are submerged beneath the surface, reappearing as distorted images. Near the Aedicule the landscape edge meets the pool as a direct extension of the horizontal plane. The concrete retaining wall is the sole element of transition here and the level of the water is virtually even with that of the landscape. As a result, we can get to the edge, touch the water or sit near it.

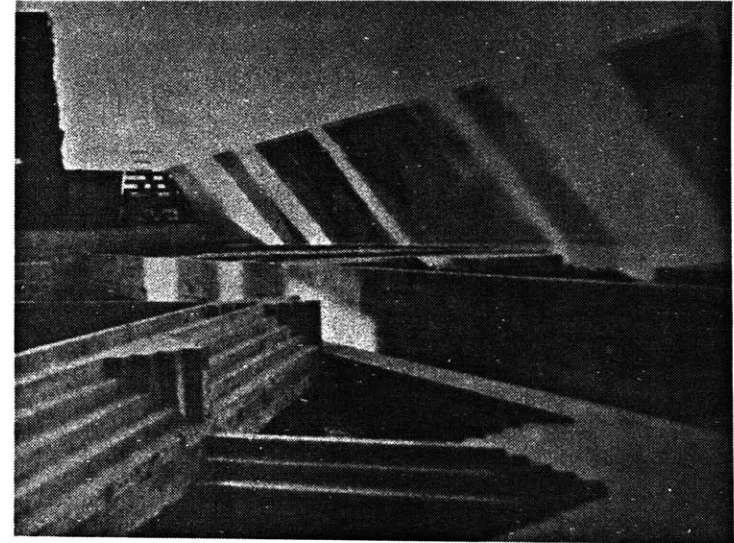
BRION-VEGA

EDGE

The contiguous placement of the "stream" as it relates to the Cloister wall creates a more abrupt edge with no zone of transition. The sheer magnitude and solidity of this cliff-like wall diverts our attention to the water as we follow its edge moving toward the pool or the rivulet.

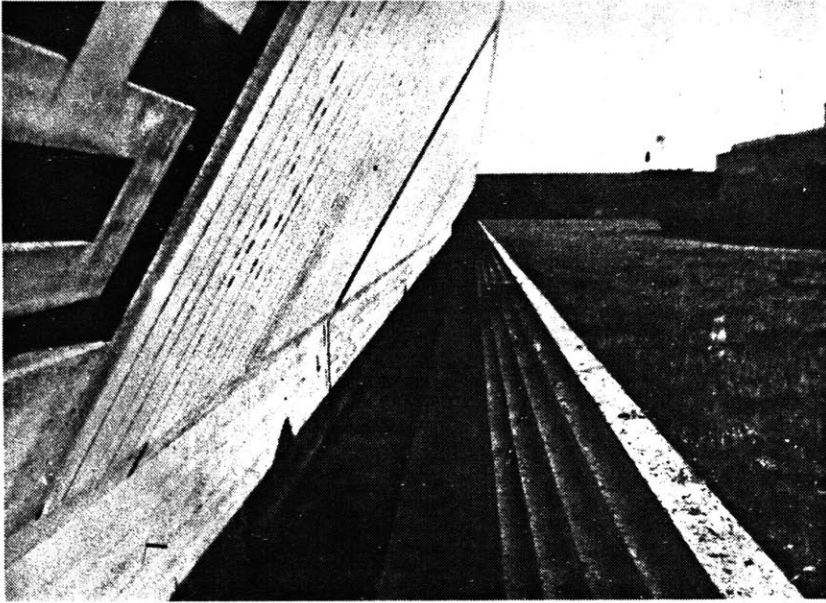
Water becomes an element of transition between the natural landscape and the built form. The sequence of built forms and water has its source in the natural landscape. The building followed by the water, then the earth and ending with the wall.

The relationship of forms to edges clearly expresses an understanding of nature's building processes. Scarpa allows us to get to the edge and experience it. He also extends the visible edge, creating a world beneath the surface of the water.



4.42

BRION-VEGA



4.43

ORIENTATION

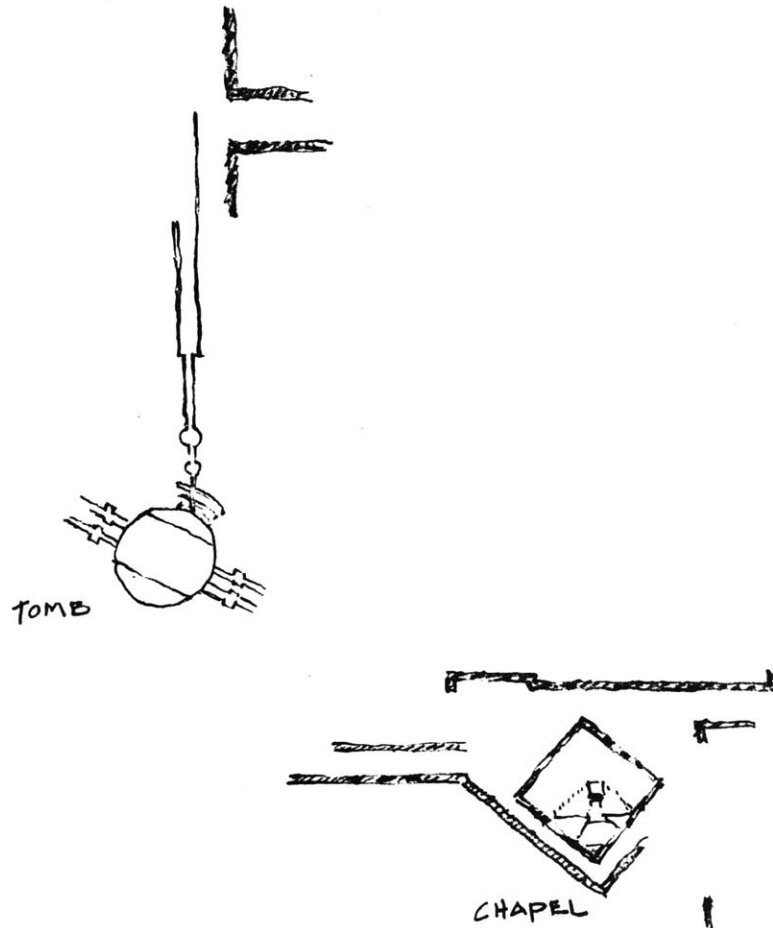
From our initial vantage point through the interlocking circular openings, it is the impermeability of the exterior boundary wall which orients us and defines the physical limits of our more immediate world. This wall becomes analogous to the distant mountains; the enclosed cemetery becomes part of this larger context.

Within the cemetery, orientation is achieved by large-scale architectural moves --the Aedicule, Brion's tomb, the Family tomb and the Chapel-- punctuated by the waterforms which orient us more locally.

BRION-VEGA

Using a coherent system of elements to build up the direction, Brion's tomb and the Chapel become objects accessible in this field. The solid directional wall of the Cloister continued by the direction of the "stream" and subsequent "rivulet" enhance our accessibility to the tomb. Similarly, the linearity and clarity of the deployment of the parts lead us to the Chapel, square in form and placed diagonally in the space.

OBJECT IN FIELD



BRION-VEGA

SENSE OF PLACE

Brion-Vega is a secluded space which encourages meditation and contemplation. Scarpa's choice of tranquil, often reflective, waterforms strengthens this quality; one would not expect to find highly active waterforms here. Water represents the source and continuity of life. It is in the presence of these forms of water that we are reminded of our own transitions, our own life/death cycle. It is in such a solitary, contemplative environment that we have a chance to renew associations.

CONCLUSION

LACK OF NATURE IN THE URBAN LANDSCAPE

Humankind has transformed untamed nature to serve its own needs. The city is one by-product of this transformation. Conquest is the game most often played and contenders conform to rules of greed and exploitation. Consequently, nature receives attention only as a strategy for winning. Exploitation enlivens the conquest and provides a financial reward for the conqueror.

Unfortunately, cities have rarely utilized the natural processes within them. Some have chosen to destroy or disfigure them beyond recognition. These processes represent a significant opportunity for shaping our environment. Disregarded, they pose potential threats--polluted water and air, floods and landslides. "Underlying the city planners' deep disrespect for their subject matter, underlying the jejune belief in the "dark and foreboding" irrationality or chaos of cities, lies a long-established misconception about the relationship of cities--and indeed of men--with the rest of nature."¹ The recognition and integration of natural processes becomes a critical component for producing healthy, habitable cities. "The city is a granite garden, composed of many smaller gardens, set in a garden world. Parts of the granite garden are cultivated intensively, but the greater part is unrecognized and neglected."²

¹Jane Jacobs, The Death and Life of Great American Cities. New York: Random House Publishers, 1961. p. 443.

²Ann Whiston Spirn, The Granite Garden. New York: Basic Books, Inc., 1984. p. 4.

CONCLUSION

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PROBLEMS RESULTING FROM LACK OF NATURAL PROCESS

We have produced a system sustained by massive importation of energy and materials. Changing human cultural processes responsible for the growth of cities have created a place drastically different from settlements which depended on nature. Utilizing modern technology and ignoring natural processes, humankind transforms the topography. The natural processes of a particular region are not an integral part of city design. The result is an urban landscape which demonstrates little respect for natural process. Cities are no longer unique entities. Disregarding geographic location, climate or culture they are acquiring a frightening similarity. "The potential of the natural environment to contribute to a distinctive, memorable and symbolic urban form is unrecognized and forfeited."³ Our incessant refusal to recognize and incorporate the inherent natural qualities of each urban environment results in the lack of "a handsome visage for the land of the free, the humane and life-enhancing forms for the cities and homes of the brave".⁴

The profusion of impervious surfaces in the city, together with the storm sewers that drain the

³Ibid., p. 10

⁴Ian L. McHarg, Design with Nature. Philadelphia: The Falcon Press, 1969. p. 77.

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run-off, short-circuit the hydrologic cycle. This alters the character of streams and lakes, makes clean water more difficult to obtain and forces cities to seek resources in distant locations due to increased water demands. These factors change the water balance of entire regions and nations and dramatically alter the natural ecosystem. Human purpose and natural process are involved in unnecessary conflict and neither one is emerging as winner.

The cost of disregarding nature also affects the quality of life. As population and density increase, the additional strain on the earth, air, water and life within and around cities produces severe environmental problems. Our persistence in degrading the urban environment continues to take its toll on the physical health and emotional welfare of city dwellers.

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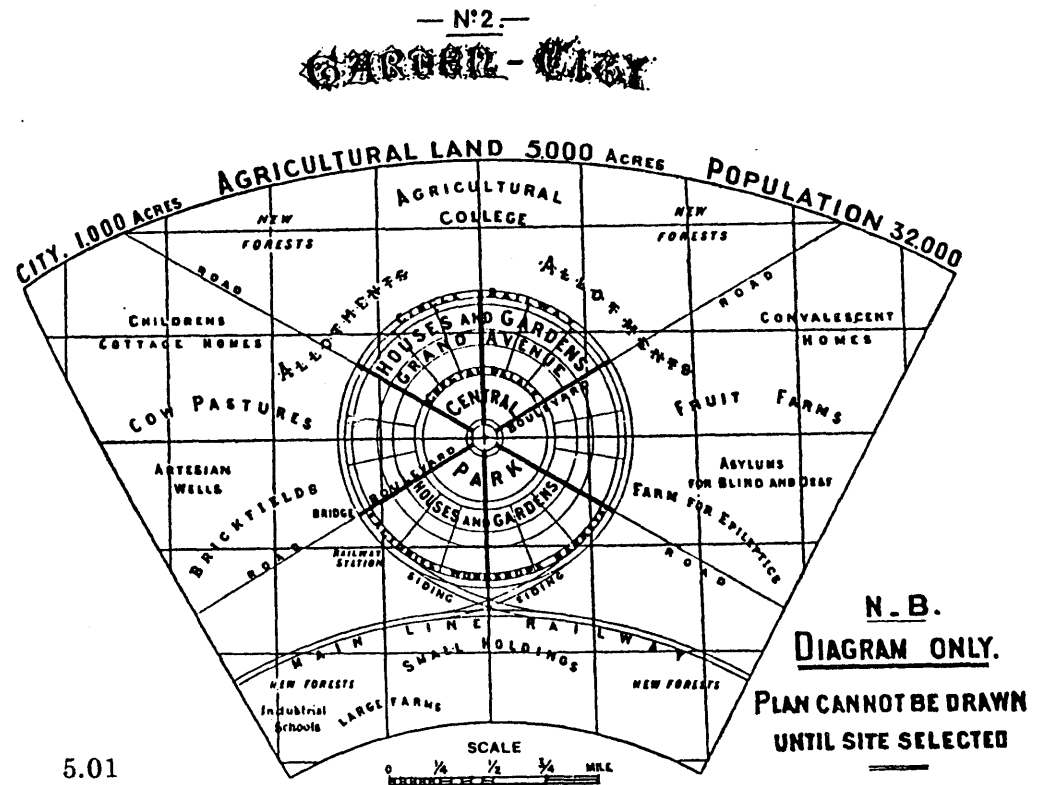
WATER

RE-EVALUATING OUR GOALS

Water has tremendous potential as an emotional link between people and nature. But prevailing attitudes towards nature in the city have short-circuited the hydrologic cycle. Some cities have offered individual solutions to re-establish this process. Nature is a complex, interactive, interdependent system; changes to any link affect the operation of the whole. The city is part of this whole--it is urban landscape integrated with natural landscape and informed by the processes of nature.

We need to temper our economic obsession with a commitment to reshape the urban landscape in harmony with natural process. Every built and natural component of the city, the country and the suburbs must be recognized as a critical part of a complex, interdependent, continually evolving system.

We have persisted in clinging to romantic, illusory notions about nature. This shortsightedness has permitted us to think of nature primarily as ornament rather than as a vital process for shaping the urban landscape. Throughout history, city dwellers have sought to incorporate natural features into their



5.01

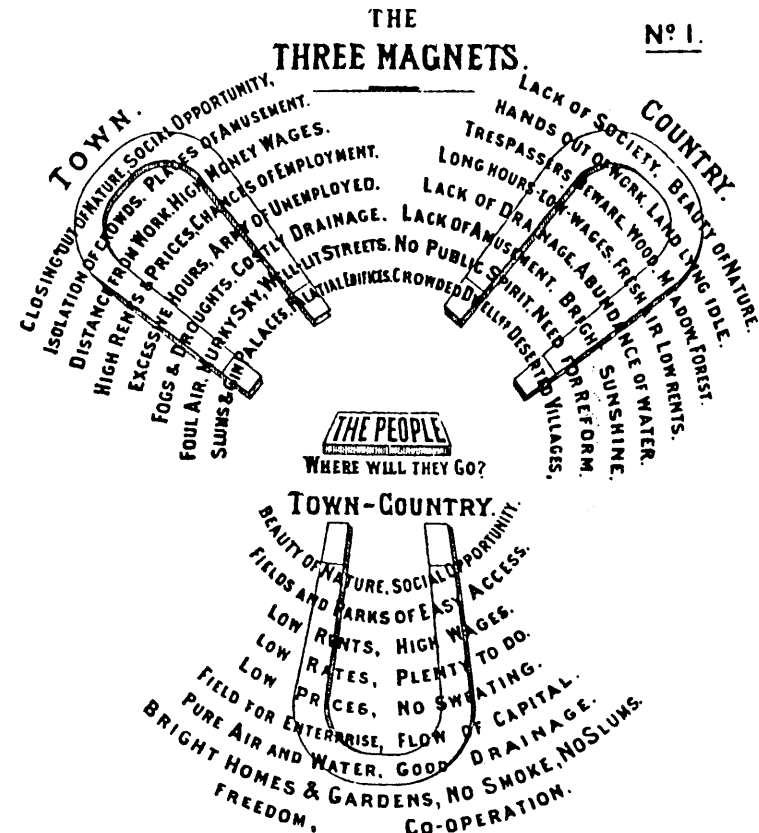
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physical environment. This can be evidenced in public and private parks and gardens and in proposals such as Ebenezer Howard's garden city of the late 19th century. Still, it is evident that we have concerned ourselves more with the preservation of nature at the edge of the city and have ignored and often destroyed nature within the urban confines. "Certainly we can dispose of the old canard, "form follows function." Form follows nothing--it is integral with all processes....If the purpose of fitness is to ensure survival and the evolutionary success for the organism, the species, the community and the biosphere, then adaptations are primarily directed toward enhancing life and evolution." ⁵

The natural environment of each city is unique; it offers the potential of becoming an enduring framework within which humans build an identifiable urban landscape. Creative solutions result from a comprehensive understanding of the problem. This involves thorough analyses of the components that comprise the system. It also involves the combined efforts of myriad experts to define new goals that integrate human purpose with natural process.

⁵Ibid., p. 173.



5.02

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"Nature can be considered as interacting process, responsive to laws, constituting a value system, offering intrinsic opportunities and limitations to human use....We can take our knowledge of nature as process and apply this to a problem--to discern the place of nature in a metropolitan region."⁶

⁶Ibid., p. 55.

CONCLUSION

REINTEGRATING WATER INTO THE URBAN LANDSCAPE

The flow of water into and through the city, its source, its location and type of use, along with seasonal variations of this pattern depend upon the topography, climate and urban culture of a region. The siting of ancient cities and the buildings which comprised their form was defined by the availability of water. As previously mentioned, the Persians utilized qanats to carry water from distant mountain slopes to cities at the desert's edge. The wealthy, whose houses and fields were located uphill, used the water first and passed it on to those of lesser means. Living higher up on the hill became a symbol of social status, this custom still being practiced today.⁷

Persia, as well as other urban cultures that arose in the arid and semiarid climates of the Mediterranean, have learned how to conserve and display their water. When water is no longer readily available or cheap to provide, it will be imperative for us to formulate new goals. We will learn to conserve rainfall, utilize runoff and reduce flooding. Water will become a cherished resource. Measures will be taken to protect it from contamination and to permit its re-use after treatment. Architects, ecologists, environmentalists and engineers will work together toward a common objective--using water in the city in a sensitive manner, harmonious with and informed by nature's process.

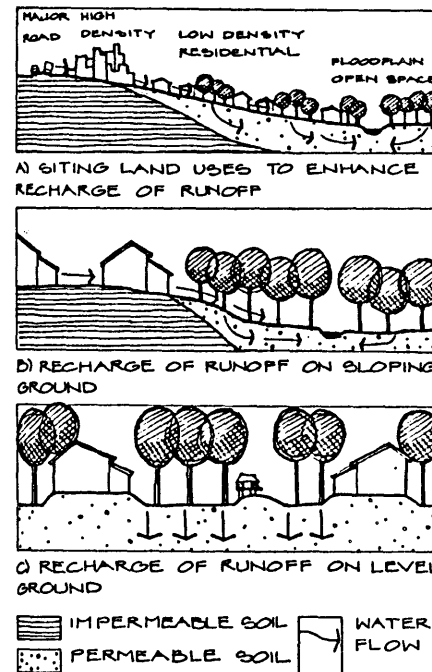
⁷Ann Whiston Spirn, The Granite Garden . New York: Basic Books, Inc., 1984. p. 143.

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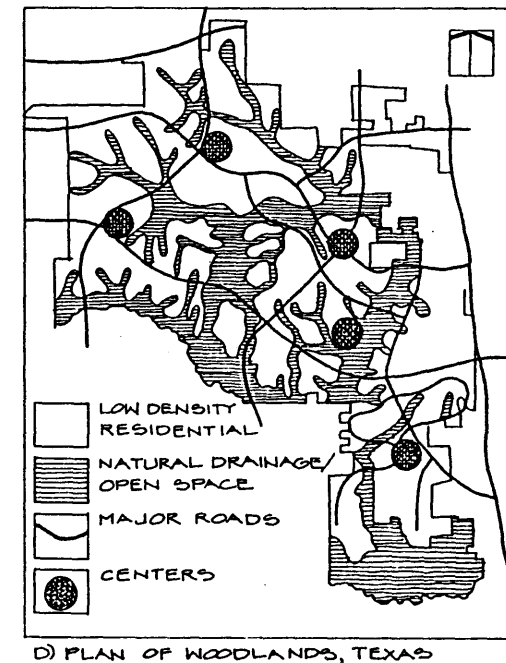
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Some have already deemed this a necessary and worthwhile task. Cities such as Denver, Colorado have reclaimed their rivers for recreation while implementing measures to mitigate floods and improve water quality. Woodlands, Texas has implemented an exemplary system of storm drainage, flood control and water quality and conservation in their new town. Additionally, some cities have exploited the flood storage and water treatment potential of wetlands to demonstrate how parks and urban wilds can become positive and highly desirable urban amenities.

Projects such as these generate favorable social and economic benefits. However, many such models consist of solutions to only one aspect of the problem. They attempt to solve problems of storm drainage or flood control or sewage treatment or water-supply and conservation. The decision-makers fail to realize that each is part of a more comprehensive set of issues requiring a more comprehensive solution. A more wholistic approach to the problem is imperative. All physical components of the city--buildings, streets, parking lots and parks-- must be designed to prevent or mitigate flooding and to conserve and restore water resources. "Whatever the scale--from the



5.03



The "natural drainage system" at Woodlands, Texas, exploits well-drained soils to absorb rainfall and wooded swales and stream valleys to carry off the stormwaters, thereby preventing floods downstream. Using existing, wooded floodplains for the storm drainage system secured a linked system of parks and trails throughout the town and saved millions of dollars.

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design of a drain or a fountain to a plan for an entire metropolitan region--the key to devising efficient, effective and economical solutions is an understanding of the many ways water moves through the city." ⁸

The reintegration of nature into the city is a multi-faceted challenge involving such things as flood control and the restoration and conservation of water resources. Flood control is achieved through the retention of water until the risk of flooding has passed and then either slowly releasing the water into the ground or storing it in pools, lakes channels etc. as an urban amenity. Additionally, obstacles within the floodplain must be eliminated or designed to withstand possible damage from the water. Cities also need to establish land use and building regulations in floodplains.

Conserving and restoring water is imperative in this age of impending water shortages. Other cultures have sought to utilize water with great economy while enhancing the emotional and aesthetic effects. Many Islamic gardens have used water to create a cool atmosphere of serenity and retreat. Water cascading down channels or sparkling in brimming basins, catches light in diverse ways. Rainwater seeping through narrow channels in the pavement nourishes the plants and trees. Closer to home, New York's Paley Park, a much-frequented urban retreat, offers a refreshing contrast to its dense, hot, dry, noisy surrounds.

⁸Ibid., p. 144.

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Parks, parking lots, plazas and rooftops are prime candidates for detaining or retaining stormwater. Existing building codes in most American cities require that roofs hold the equivalent of six inches of water usually for a twenty-four hour period. Some city building codes have made stormwater detention a requirement.

Parks have the capacity to mitigate flooding, improve the quality of water and provide recreation. By careful observation of the various characteristics of water in nature, the designer can capture the exciting, unpredictable, approachable nature of water for use in the urban landscape. Boston offers its inhabitants and visitors physical access to the water while targetting specific areas for flood control. One third of Boston's "Emerald Necklace" park system was designed as a flood control and water quality project. The thirty-acre basin of the Fens was designed to permit the quantity of water to double without raising the water level more than a few feet. An additional twenty acres could accommodate severe flooding. The Muddy River penetrates Boston and flows into the Fens. In the 19th century its steep wooded banks were regraded, paths installed, vehicular and pedestrian bridges provided and vegetation planted to form the "Riverway". This seemingly natural floodplain has become an urban retreat. The Melvina Ditch Detention Reservoir in Chicago, a large stormwater detention basin, provides both flood control and recreation. Children use the slopes of an earthen mound for skiing and tobogganing and a large paved area near the inlet for an ice skating rink.⁹

⁹Ibid., p. 150.

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Parking lots offer an excellent opportunity to detain water. Since they account for a significant amount of the paved surfaces in cities they remain a relatively untapped resource for collecting and slowly releasing stormwater. It is beyond the scope of this thesis to redesign city parking lots but a design which incorporates stormwater runoff could also serve to enhance the aesthetic qualities of such places. By nature, parking lots aren't required to be unsightly; with nature they can provide a pleasant necessity.

Plazas are an additional source of temporary or long term detention of water. They present exciting opportunities to use water in diverse ways. Water in "plazas" can be a part of the water quality/flood control program of an area as well as becoming a means of defining space, informing movement, providing orientation or establishing a unique sense of place in the city.

Rooftops offer tremendous potential for detaining stormwater. Additionally, "wet roofs" can reduce a buildings heat load thus decreasing energy consumption. Rooftops also present a valuable opportunity to incorporate stored water into the design of the public and private outdoor space of apartments, offices and retail establishments. Transported several floors above ground and redeposited in a "vacuum sealed" room, most of us soon begin to sense the absence of nature. The sun's rays warm our skin and nourish the plants but we yearn for natural air, trees and water. Cities desperately need buildings in which the natural process is an integral part of the built landscape. Wouldn't it be wonderful if inhabitants could walk out their office or apartment door into a piece of the natural environment. It is in these outdoor spaces, many levels above ground, that nature should exist--rainwater running in channels, spilling into pools, the sun shimmering from its rippling surfaces; water cascading from one

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building level to another, making soothing, gushing sounds on its journey; the flow of water permeating the urban landscape, the circuit of natural process re-established.

In as many areas as possible, cities should attempt to retain water long enough for it to penetrate the soil. Many European cities and a few American cities have utilized a pavement of lattice concrete blocks with soil and grass in the interstices. Gravel, porous asphalt and pavement, and modular paving units are some surfaces which will allow water to seep into the underlying soil rather than draining into the sewer system.

Finding solutions to flood prevention and the conservation and restoration of water in the city is a multi-disciplinary problem. Some cities have already begun this challenging task.

In 1967 the State of Michigan threatened to cite the city of Mt. Clemens for pollution of the Clinton River. The city averted this penalty by combining a new sewage treatment system with a park. Sewer overflows during rainstorms had been responsible in part for pollution of the river. The city constructed its new sewer overflow treatment facility with three small lakes and a park on a former sanitary landfill site. Sewer overflows spend one to four days in the first lake. They are subsequently treated in the processing building. The water then aerates in the second lake for seven days. The third lake, 2.3 acres and 9 feet deep, is appropriate for spring and summer boating and fishing and winter skating and ice hockey as well as for irrigating the parks landscape. Eventually this lake will be stocked with fish and a dock constructed. This solution offers two main advantages: it was more economical than separating the storm and sanitary sewer systems and it provides public access to water within the city.¹⁰

¹⁰Ibid., p. 151.

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Bishop's Lodge is a resort located 5 miles outside of Santa Fe, New Mexico. The resort's sewage treatment facility demonstrates a creative solution in a water-poor landscape. Landscaping and earth mounds shield the treatment plant from view. Treated wastewater tumbles down waterfalls and cascades through sculpted channels and streams into a large pool. The "seven magic pools" provide tertiary treatment by aerating the wastewater and exposing it to sunlight. The water cascades one hundred feet to the resort's entrance. The benefits of this solution are twofold: water is conserved and re-used to irrigate the lawns and the cascades and pools of water offer a refreshing and delightful amenity.¹¹

Densely built urban areas challenge designers to create healthy, comfortable, inviting and stimulating built environments which are an integral part of the natural processes of a region. Human purpose and natural process must be engaged in a common goal--the creation of a humane, life-enhancing urban environment.



Sante Fe, New Mexico - Bishop's Lodge

¹¹Ibid., p. 151.

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Water is a unique element. In its many forms, it should be an innate part of a designers vocabulary. The potential for water to provide public sources of recreation and private areas for communing with nature is significant. All too frequently, it has been more in the engineer's hands than the designers. As a result, lakes and rivers have been buried underground, far removed from our daily lives. Water furnishes a critical link to the natural ecosystem. When sensitively used, it can enrich and enliven the urban landscape as well as providing valuable clues for movement through the city.

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