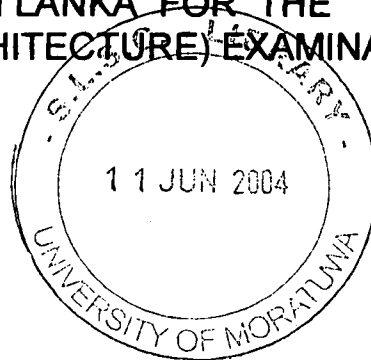


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**“DESIGN WITH NATURE”
INCORPORATION OF
NATURAL ELEMENTS IN
CONTEMPORARY ARCHITECTURE
IN SRI LANKA**



**A DISSERTATION
PRESENTED TO THE
FACULTY OF ARCHITECTURE
UNIVERSITY OF MORATUWA
SRI LANKA FOR THE
M.Sc (ARCHITECTURE) EXAMINATION**



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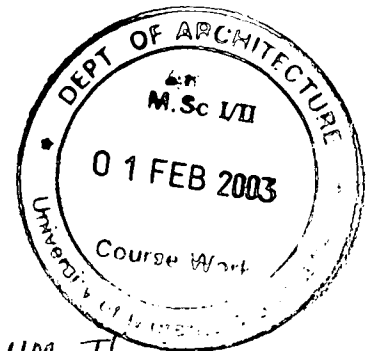
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**N.K.SENARATH
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INTRODUCTION

This dissertation intends to study the use of natural elements in architecture in order to address the issues relating urban built spaces and contemporary architecture in Sri Lanka.

Architecture can be defined as an impact on the nature, as a result of the interaction between man and environment. Due to limitations in human needs and the limitations in their technology, this interaction cause less damage to the natural environment at the earlier evolutionary process of human civilization.

As the civilization got sophisticated that equilibrium between nature and man had collapsed resulting damage to the environment. There are various examples that matured architects in earlier civilizations both western and eastern contexts have creations those in harmony with the nature. Even the forefathers of modern architecture like of Frank Lloyd Write or LeCorbusier had some of their master pieces skillfully blend with the natural environment.

Human being tended to create new technology and various forms of arts have been developed. Architecture is one of that directly affects the natural setting. In the process of creating the built fabric the nature get amended and loose stability. This phenomenon can be averted if the new creations were done accordance with the environment.

Every Human being tends to have some sort of relationship with the nature thou the competitive character of society prevents them enjoying the qualities fully, they interact with the natural environment as they were permitted. Many western urban centers developed with industrialization have incorporated many natural features as parks, water bodies and various types of landscapes to their urban planning and designing and also most of basic concepts for contemporary designs are derivative of the nature.

This study focused on exploring the possibilities of incorporating some elements of nature in the forms of water, vegetation, rocks and boulders to improve the quality of the built environment.

It is also try to understand the different ways of these elements been used and levels of assimilation.

Architecture had been created in different contexts and to facilitate different types of activities. Use of natural elements in these conditions varied in types, quality and quantity giving the built spaces different kinds of expressions. One objective of this study to introduced a typology for these natural elements and records the meanings and expressions they are generating.

Being a tropical country, Sri Lanka posse's diversity of natural environment and the different geographical conditions allowed vast array of elements that can be accommodated into the built environment. This is evident in the evolution of traditional Sri Lankan architecture and many ancient remains of urban contexts and buildings provides with valuable information regarding them. The influence of Buddhism on the Sri Lankan community may be a fact that island's architecture created in harmony with the nature also another aspect examine in this study.



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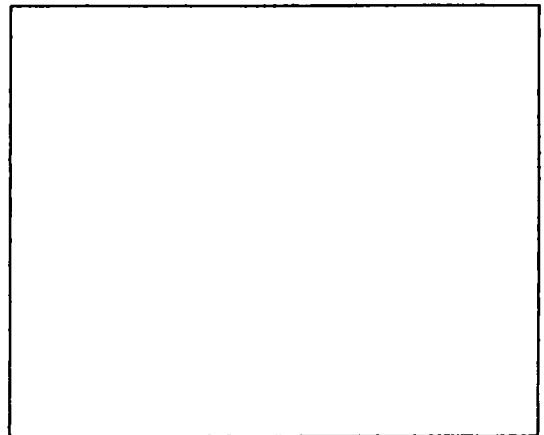




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CHAPTER ONE

NATURAL ELEMENT IN ARCHITECTURE



Natural Elements in Architecture

The use of natural elements were done in such a manner that might have due to the organic thinking. The effect of that natural elements considered as a moderator of building circumstances. That shows how best they were connected with the context. For example architects deal with natural elements always try to capture the rhythm of the environment or site in to their buildings.

Other wise in order to communicate effectively perfection of architectural language is essential. To create good architecture one should have a good command of its language which comprises of a vocabulary and grammar.

“Landscaping plays an important role in Architecture. Landscape architects have defined Landscape architecture as the art of design. Planning or management of land arrangement of man made and natural elements. Cultural and scientific knowledge with concern for resource conservation and stewardship will lead to a resultant environment which serves a useful and enjoyable purpose.”¹

In the broader sense architecture is the continuous establishment of relationships between man and his environment.

Architects employ a number of different natural elements to create meaningful outdoor and indoor spaces. These elements of architecture are analogous to the words of a poem or notes of a piece of music which constitute the composition.

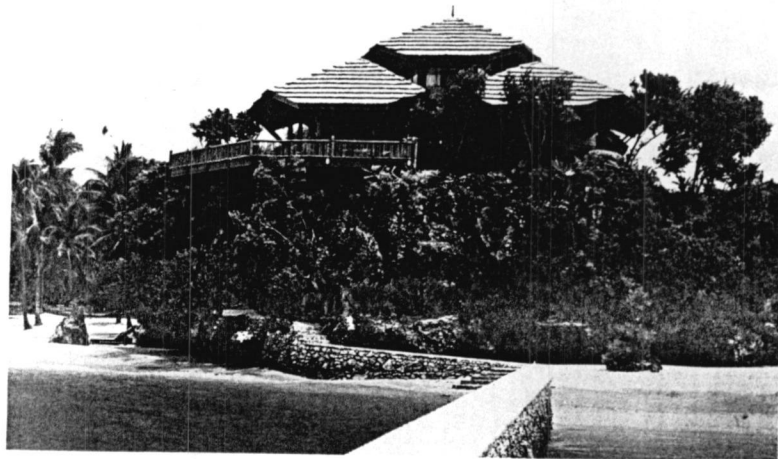


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1.Types and use of Natural Elements

In the analysis of Natural element's one can identified several types natural elements. Some are not directly related to the architecture. Some are directly involve to the architecture creating a spaces, places and aesthetics. These are major elements. Like wise water, rock and boulders and vegetation.

Fig 1 Use of natural element in
Architecture
The Floirendo House
Kaputian, Davao, Philippines



1.1. Water:

Water is one of the most important natural element used by architects in the design and management of the exterior environment. Water is a highly variable design element because of it's character. The character of water changes due to the characteristics of it's container. Therefore the same volume of water can have an unlimited number of different qualities depending upon the form, size, color, texture, location etc, of the container.

“Water not only derives part of its character from the materials lining it's container, but such materials under a thin film of water double their quality and attraction” 2.

Bricks, tile, sand, pebbles, stone, concrete, and animals all receive an exaggerated emphasis in color, texture when wet. This has been an integral part of the use of water in small quantities in thin and fragile portions in trickle and splashes.



Fig 2. Natural water is a major designing element

Because of the plasticity of the water it's partial or form and appearance in any given situation is determined by the rate and the direction of movement. It always seeks level, plane surfaces. When it reaches with gravity and when at rest incomplete balanced stability.

These further are directly relevant to the its use as a design element. They range from quilt, repose, depth, tension, solidity and the reflective qualities of its use in large or deep still ponds with track lining and to the lightness and sparkle of its use in motion in shall on busing with light lining.

Water has been used to create a various emotion in Architecture. It is a source of powerful fascination or peaceful inspiration. Its vital presence transforms the ordinary to extraordinary. It sight and sound captivates the eye of a distance invite, and delightful when near, cheers, the dreariness, enriches the mustarded wives. It may spread in a calm expense to sooth the tranquility of a peaceful scene or add splendor to a gay and extravagance to a romantic situation. The movement and sound of the rising and falling of water breaks the silence beginning a feeling of companionship.

Bernard volgensurager status the importance of water in architecture.

The presence of water will pleasantly cool the air in a hot climate, brighten the atmosphere and make a restricted, busy space look larger and nor relaxed,. A pond may be artificial or natural. It may by the dominate element in a garden setting the tone or it may be no more than a small fitting in to the whole concept..3

Water may be used in its static form to cal, the sense of sight and sound or it may be employed as a dynamic element of motion, exciting the eye in addition to providing a sound stimuli water plants such as lotus lily etc. and creatures in water add different character to the environment with smell of flowers and visual appearance.

Sometime designers has used sand, washed rock boulders to depict water in their dry landscapes, they were skilled in designing stone arrangements and raked sand to symbolically represent water falls, streams, oceans etc.

1.1.1. Water in static form

When consider the static flat, quiet body of water, it is obvious that two basic forms of water could be identified as pools, and ponds, depending on the plan shape and character of the container.

Bryson, E.Mc cutley in his article on water pool and fountains has defined the difference between pool and ponds as Pool is a body of water, of a size placed in a had well defined constructed container. A pond is different from a pool by being designed to appear natural or semi natural



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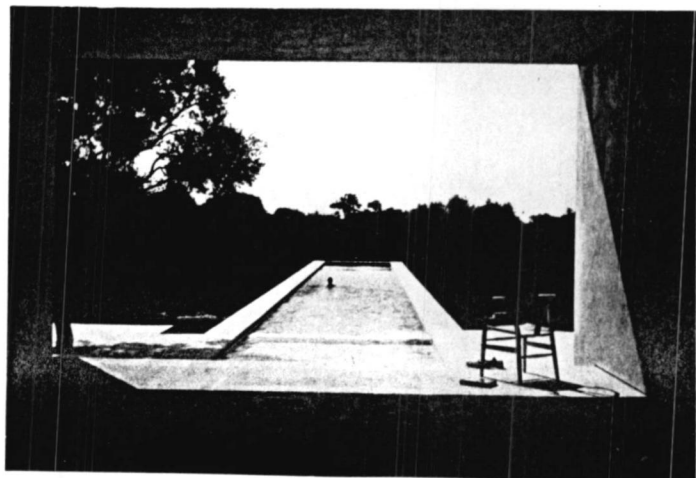
Fig 3 (left) Water in static form in Japanese Garden

Fig 4 (below) Water pool in geometric form



1.1.1.a Water pools

In most instances a Pool is a geometric shape But not necessarily to be Symmetrical or purely geometrical such as a circle a square or a triangular Pools are move or less artificial, while the design of which depends on the setting and other design determinant, of form and character. Pools quite visible in urban tight spaces where there is a necessity to express the human control over nature.



When the pool is in basic geometric shapes such as a circle or square such static shapes and static water together creates more tranquil and calm qualities while free dynamic shapes, with static water possibilities to create pleasurable and interesting qualities.

1.1.1.a.i Static water as a reflector

On a bright and sunny day a water body amidst a dense surroundings, the glooming surface of the pool creates a light weightless quality. The holes or voids on the solid mass of earth gives the same feeling to this effect.

The reflectivity of a pool depends on several factors, such as the level of the water surface depth of the pool or colour of the bottom and the size and location of the pool in relation to the object and the viewer.



Fig 5 Static water as a reflector

1.1.1.a.ii The level of the water surface

To get the maximum reflection of the object, the water level of the pool it should be relatively high. This is to minimize the shadow cast on the edge of the pool and to maximize the exposive surface of the water to the surrounding area.



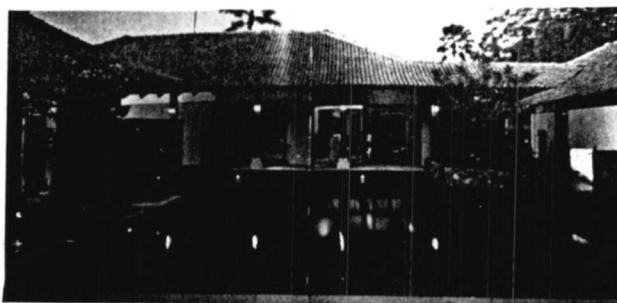
Fig 6 A water level help to get the maximum reflection;
Ralmira house, Guemavaca, Morelos, Mexico

1.1.1.a.iii Depth and colour of the pool

To get a highly detailed shadow on the surface of the pool should appear as dark as possible. This can be achived by increasing the depth of the pool or by painting the inside wall and the bottom in a dark colour. When the pool becomes shallower and the inside walls and the bottom light in colour. The image of the object will get blurred.

Fig 7 (right) A dark colour water create a highly detailed shadow
Traditional temple in Japan

Fig 8 (below) A shallow pool



1.1.1.b ponds

A shape of a pond will either be a free form or a curvilinear form, and it can be either constructed or natural to the collection

A pond is more effective in creating a feeling of repose and tranquility in an outdoor space. Which is more effective than a pool because its soft natural shapes. Ponds available to reinforce rustic feelings of undisturbed serenity when combined with terrain land forms and with natural planting. Ponds may be used in the landscape to establish a unifying link between different areas. This function is vital in the large scale. Where size alone can divide an area into unrelated segments. If a viewer sees a portion of a pond at one point and then travels a distance to another point where a different part of the pond is seen. The two areas will be unified by the viewer mentally recalling the view of the early location.

Another function of a pond is to provide intrigue and lead a person through a sequence of outdoor spaces. A sense of mystery and fascination is created when a portion of a pond is seen disappearing behind a hill or clump of trees. Therefore the viewer is enticed to solve the puzzle of what is unseen and out of view by traveling to a different point where new view is provided of that, which was previously only glimpsed.



Fig 9 A pond create a calm quality to the indoor spaces
The Eu house, Singapore

1.1.2 Water in Dynamic form



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1.1.2.a Flowing water

Flowing water is any moving water limited to a well defined channel. It moves in response to gravity. Therefore a certain slope is required. Streams and rivers are examples from nature, The behaviour and character of flowing water depends on volume of water, steepness of slope, channel size and properties of channel bottom and sides.

The smooth flow of water will create peaceful or casual environments. Where the water act as a natural element. This can be achieved by lining with slick material and the channel with the constant width and depth.

The move tumultuous and commotion effect of flowing water can be achieved when the channel alters back and forth between wide and narrow, bottoms and when the bottom is steeply pitched and also when the channel is composed of rough materials such as rocks and boulders. These factors either separately or collectively established obstacles for water to strike and flow around with resulting turbulence and sound.



Fig 10 The smooth flow of water create peaceful environment

A constant volume of water flow more faster in a narrow channel rather than in a wide channel.

The turbulence is able to result the transition between narrow and wide channels abrupt. Disturbed, roughly flowing water creates a white water effect which is more eye catching and louder than smooth flowing water. Where the effect may be a stimulating element in a particular place attract that people to it to watch and listen. Therefore roughly flowing water can be used in outdoor environment where activity of motion is desired.

1.1.2.b. Falling water

The falling water expresses the force of gravity even more dramatically than flowing water and therefore is often a noticeable focal point in the outdoor environment, There are three basic types.

- Free fall
- Obstructed fall
- Sloped fall



Fig 11 A natural water fall Create a dynamic quality of water

1.1.2.b.i Free fall

When the water drops directly from one elevation to another elevation in an uninterrupted manner is called a free fall. The character of the free falling water depends on volume of water, it's velocity, level of difference of two elevations and the edge condition over which the water falls. The many different appearances and can be created with the possible combinations of above variables.

In an urban setting free falling water is used to provide a dramatic focal point and source of sound to shut out or discard the city noises



Fig 12 The free fall act as a natural water fall in the urban setting Palazzo Reale, Caserta, Italy.

1.1.2.b.ii Obstructed fall

This is caused by water striking various obstacles or planes while elevation to another. The obstructed falling water is apt to produce more commotion in terms of sight

and sound and consequently be more easily noticed than free falling water. Many interesting pompous effects can Be created by controlling the volume Heigh of falls and surfaces on which the water falls.

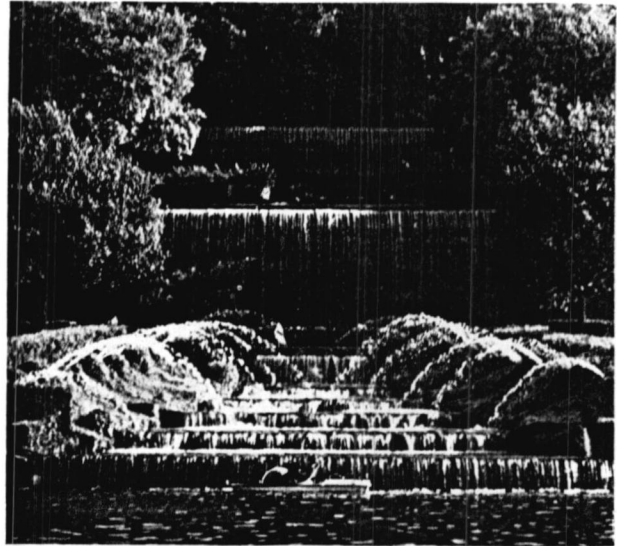


Fig 13 Obstructed water fall strengthen the dynamic Quality of water

1.1.2.b.iii Sloped fall

This type of falling is Similar to the flowing water but occurs on a steeper slope in smaller controlled volumes for smaller volumes of water, The visual result is a surface that merely looks . and glistens in the light while for larger volumes of water the result is the distracted patterns of moving water, where sometimes obstructions are also provided to enhance those patterns.

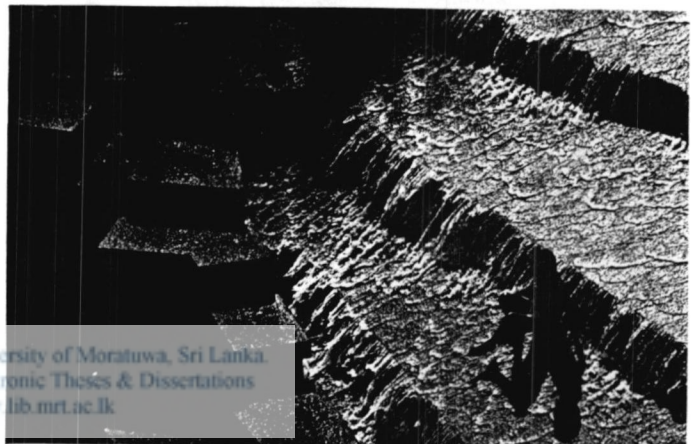


Fig 14 A sloped water fall create a more enjoyable environment



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The material and character of a the surface is effected on the behaviour of the falling water. The water can be made to fall in clear thin sheets in scalloped patterns or in miniature ripples of waves. The sloped fall tends to be more placid and reserved than earliar discussed types. All these types of falling water can be combined to create different effects within related sequences.

1.1.2.c Fountain Jets

A fountain jet is created by forcing water Up into air through a nozzle in defiance of gravity Most fountating jets are effectively used as focal points in the sourounding based on their verticality and its inter play with light. Those fountain jets can be viewed from a simple.



Fig 15 Ornamental fountain jet
Waddesden Mannor, Buckinghamshire.

Unpretestious element to a dramatic number of jets of all sizes and behaviours. Most fountain jets are located in a quite static body of water so that they can be fully appreciated against a surrounding.



Fig 16 Well carved fountain jets create different emotions
Villa Reale, Italy.

1.2 Rock and boulder:

Rock boulder related architecture has been practiced in many countries in the past particularly in Spain, France, Egypt, Syria and Greece as well as in Persia and India etc.

The history of use of rocks and boulders in designing built environment goes back to prehistoric times. Evidence has been found that primitive man had lived in 3000 B.C. In the caves of Lascaux in France and Altamira in Spain.

Fig 17 (right) Natural Cave
Fig 18 (right below) Rock cut houses

The paintings of Animals were found in these cave similar there were graves found in corners of caves in Thailand, These significant evidence Proved that the primitive Man also used rocks and boulders as their shelters. The rock and boulder related Architecture could be identified in Egypt and Greece of the Western world in 4500 B.C.

The Egiptian Civilization used rocks and Boulders as a medium to Build their great temples. The great temple which is Closer to the river Nile is carted Abusimbol. Ramesses had built this Temple by carving in to a Large rock boulder.



There were six statues of the king Ramesses at the front view of The temple made out of the same rock.

Chinese rock and boulder architecture is found abounded in sand hills at site road of Mongolia. The origin of Japanese rock and boulder architecture is very old. They have used rocks and boulders specially for out door architecture to show the description of the paradise and celestial life after death

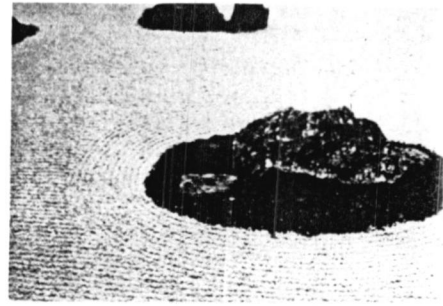
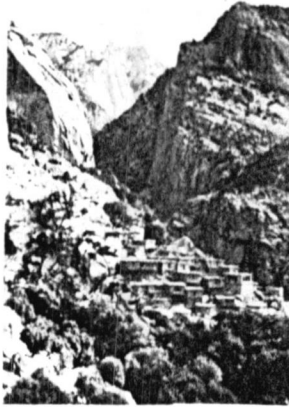


Fig 19 (above) Typical village with Rock boulder architecture

Fig 20 (right above) Japanese Zen Garden

Fig 21 (right below) Japanese Zen Garden

In the 10th century the Japanese rock and boulder architecture was used in "Zen garden's in this they used sand in a decorative way to indicate streams of water and rock boulders as large mountains in the paradise.

Rock and boulders are use of in a different concepts. Some time it utilized use as a symbolic or easthetic element and some time it was for structural purpose as a stone columns, pillars or platform. Most of the rock and boulder architecture in the world has been using a creating a spaces and strengthen the spatial quality.

The selection of a site for a building complex and its nature was main inspiration in creating beautiful architecture. The rock projections rising from the terrain surrounded by open spaces which give a sense of isolation and give the necessary promise for the religious requirements. The rocky ridges and the valley were made use to identify the correct lacion for ponds and reservoirs to store water

In most of the methods used in adopting rocks and boulders in natural elements no harm was done to the rocks and boulders. They were kept in act and the building were placed to suit it

1.2.1 Rock and boulder use as a Structural element

In practice in raw material of natural granite has been utilized an artificial refining to suit the structural as well as special requirements. Further dramatic composition of various carvings and art forms has been employed to smoothen the rugged quality of granite/rock boulder. Those carvings and art forms adapted in creation of structural element not only shows great philosophical thinking but also identity introgity and life stile of the creators.

Ex.: Red fort and the Taj Mahal of Mogal India are the excellent examples for utilization of natural granite in a politic manner by only changing it's natural hape.

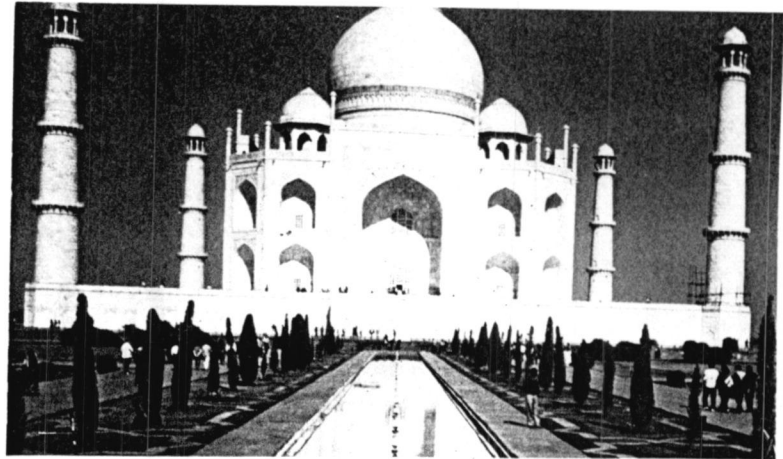


Fig 22 Taj Mahal of India

In these above mentioned gardens will be considered as spaces where the landscaping techniques with rocks and boulders have been used to derive different kinds of spatial qualities. Also an attempt would be made to understand the variation in the use of principles in an Architecture in order to satisfy different requirements.

In creating a serene spiritual environment the utilization of rocks and stone as natural element such as pathways, bridges, flight of steps etc. will be analyzed here.

1.2.1.a Paved foot paths;

In organic architecture it is evident that the paved paths are the main and important feature in boulder gardens. The major concept in these boulder gardens is taking the viewer through an undisturbed natural environment while giving him a sense of variation and surprise by taotful use of natural elements of the site such as boulders and by using other advanced techniques.

A similarity can be observed between these pathways and pathways of Japanese gardens, when the leveled foot path is sand paved normally, and also when it is retained by stone curbs. These paths are raised a little from the surrounding grounds in order to prevents cerpents coming on to it and to keep it grass free.

Levelled stone paved ramped foot paths were normally also. had to be done in the same meterial to make the whole path an unilthical feature. Therefore long landing areas become leveled stone paved foot paths.



Fig 23 Paved foot path in the Ritigala

The ramped foot path brought the Problems of soil erosion and this was tackled by constructing it out of stone,

1.2.1.b Stepped foot paths:

When the land is uneven and the level changes occurred they used a second technique Which is steps. By doing this they achieved variety in walking along the path.

Rock cut steps was very rare. They never made it unless it was unavoidable to hewn the living rock and they always tried to keep the natural elements as they were in most of these cases the visor of the step was very low.

Steps with stone blocks were also done where ever they could avoid digging the rock to make steps either they went round the rock making flights of steps with stone blocks or making steps by keeping stone blocks one on top of the other on the living rock.



Fig 24 Stepped foot path

1.2.1.c Bridges:

When ever the pathway cross a water body a bridge had to be introduced for the continuity of the path. For this purpose architects used stone bridges unlike the Japanese wooden bridges in paradise gardens, These are more similar to the bridges used in the tea gardens of Japan although instead of the curvature the sinhala interpretation used a straight flat slab.



Fig 25 Stone bridge at Isurumuniya

1.2.1.d Building or Shelters

A natural cave turned in to a dwelling place for monks after the drip ledge was cut. Caves that were large enough or those that were surrounded by boulders which prevented rain water coming in droplets as were inhabited a protecting shelter for meditating monks.



Fig 26 Shelters using with cave



Fig 27 Cave Temple

When the space inside the cave was not sufficient and also as a measure of preventing rain water coming in, walls and a lean to roof were introduced at later date caves. This marriage between built and inbuilt created a harmonious building type.

Building of top of the boulders was a special kind of a building type found on top of boulders in Ritigala and Kaludiyapokuna, which does not have a basal platform. It followed the original shape of the surface of the boulder and resulted in a combined geometric and organic building as both buildings and the rock gives the feeling of a unit structure and in some occasions double platform buildings were located on the top of rocks.

1.2.2 Rock and Boulders as place making element

In the most instances rocks and boulders has been utilized in their natural forms without refinements dually both out door and indoor space were created usually .rock and boulders. Depending on the function and location there can be small adaptations made to the natural rocks and boulders.

1.2.2.a Taking the viewer around the boulder

Among the many Special techniques used in order to create sense of surprise was talking the viewer spirally, upward around the boulder. The view on the other side is obstructed as landing the view opens out as a surprise.



Fig 27 Taking the viewer around the boulder



Fig 28 Taking the viewer through a stone passage

1.2.2.b Taking the viewer through a stone passage.

Another technique Which was used in taking the Person through a narrow Restricted passage The view at the end of the passage acts as a sudden surprise.

1.2.2.c S Bend

Cutting the view at strategic points which the use of two boulders was another such technique that was used to create and element of surprise, The view at the end of the path is sudden and exiting as the viewer who travels along and obstructed curved S shaped paths cannot perceive the view of ones.



Fig 29 "S" Bend in the Arankele Monastery

1.2.2.d Taking the viewer through a tunnel

A tunnel with boulders covering all three sides the top and both sides offer the viewer the same sort of sudden surprise at the end of the tunnel.

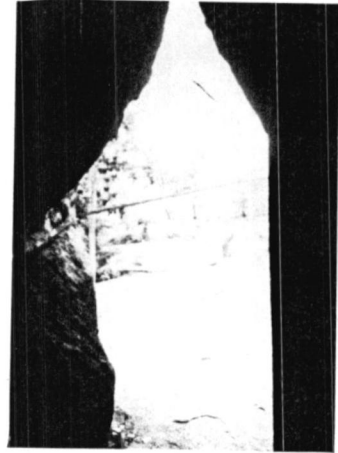


Fig 30 Taking the viewer through a tunnel

1.2.2.e Taking the viewer through a crater

A crater crossing a path was treated in another way in order to add more excitement to the viewer. Steps cut in the crater were deliberately made steep so that the viewer would have to concentrate on the steps he was ascending or descending and not the view beyond. The view was further blocked by placing a large boulder inside the crater. The view on the other side open out surprisingly as the viewer stop on the landing.

1.2.2.f Archways

In some cases archways are created by using two or more boulders. For an example boulder such way at Sigiriya boulder garden in one of the natural archways of the ancient era.

1.2.2.g Spaces enclosed by rocks

Caves spaces which is enclosed by rocks are very common architectural pieces. Some times these are natural caves and some times they are artificially constructed. Some buildings are built under the rock creating a cave. In some places arches built of boulders over paths. One such can be seen at Isurumuniya which is about 5 feet wide. This is made by a boulder resting on two other boulders.

Fig 31 Natural rock arch way in the Sigiriya boulder Garden

1.2.2.h Organic Ponds on rocks:

Where the necessity of pond was so prominent on an elevated rocky area. The only alternative was to make a pond on the living rock. Most of these were organic in shape and were done by enlarging natural hollows, which existed on the rock.

1.3 Vegetation

“Plant materials are extremely important natural element in the design and management of the indoor and out door environment. Along with landform and buildings plant materials constitute the major components used by architects in most projects to organize space and solve problems related to space making. And beyond serving essentially practical roles as structural or place making element of a design, Plant material provide a touch of life and beauty in an environment.”⁴

One of the best gifts of nature is the luscious green planting. The planting plays a major role in recycling the world resources. Pure sight of the plant world bring joy. The variety in plants make it more joyful. It must also be remembered that in addition to its visual effects, plants, materials constitute to countless number of different functions in the day to day functions of manking. Eg. Food, furniture, structural members of building, aestheti values etc.

The role played by plants are enormous In architecture the verietiy in plant materials help To create a variety of expressions to different spaces. The variety in plants include grass, creepers trees etc. These varying plants when used effectively could add enhantment to out door environment. All plants are dynamic. They are dynamic in the sense That they are living growing and have a lot of variety. Few it any other materials used in architecture or other design proffesions are living variable element. The planting materials used efficiently would create various spatial qualities.

“The architect can create numerous types of spatial character using only plant materials as the space defining elements”⁵

Out of all plants materials trees play the most important part in creating the spatial qualities in an environment. A tree could be defined as having a single stem and growing to a height greater than 10 ft. Trees with its height and configuration always stand out in a architecture.

Trees influence the scale and propotion in a garden where grass, plants and trees exist. Trees make the most impact in creating the scale and volume in a particular space.

As trees play the major role in creating the spatial quality in a architecture. The selection and



Fig 32 The forest, Lake Brutan, Bali



Fig 33 Trees use in internal space
Correa House, India

planting of trees should be done with uttermost care to create the envisaged spatial quality. Impact of a tree in a space is multifaceted.

Tree adds dept. colour, shape, volume create different lighting levels and also the sound(fluttering of leaves for the mid) to the space.

“We should use the luscious green vegetation that is around us. Trees that are ecologically suited to the area. Trees of various shapes size and colour adding depth, volume and shape to the space we design”⁶

The varieties in trees are almost countless which makes the selection very difficult and very important. Trees have their own habits and conditions. The soil condition, climatic conditions are root formulation are some of the conditions and habits of trees. But trees have a very strong sense of adoption to different condition. Trees should be a very strong and good reason for “the tree” to be in that place in a given space

“A tree should have a reason for being there as much as any other plant. Furthermore it should and can be the right tree for the range is almost infinite in size, shape, colour, texture of leaf, interest of form, speed of growth and time of flower. If we consider only one of these aspects usually it is either speed of growth of flowers that is given priority there may be a catch in store” ⁷

As the there are countless numbers of trees available the architect should understand and appreciate the expressive qualities of each tree. Any object has its own expression a tree as it self has its own expressive quality. As they are a variety of trees available there are such amount of expressive qualities to be made use of.

All the architects should recognize the expressive qualities of trees in order to create meaning full spaces with appropriate spatial qualities. Tree should be admired and understood as an art form. Which has its own expression and these expressive qualities of trees vary from tree to tree.

“Trees in the environment are living building materials used to establish spatial boundaries. They make the walls and ceiling of outdoor rooms but with more subtlety than most architectural building materials. They create spatial rythems to heighten the experience of moving through outdoor spaces. In addition to actually creating spaces trees are used to connect and extend the geometry rhythms and scale of building in to landscape. It is this function more than any decorative and softening effect that is of primary importance to architecture. (Arnold 1980)



Fig 34 Trees use in outdoor space create a various expression

1.3.1 Plant as a structural element

Plant in combination and individually create spaces beneath, between and some times within the bulk of their canopies. The planting designer uses vegetations create a structure which both define spaces and help to create places in order to serve the required human functions.

The planning structure can be observed at a wide variety of scales. At the largest wood land belts or even forest can build a landscape frame work within which large scale land uses. Such as industries housing and recreation can be accommodated without under visual intrusion on their environs. At the smaller scale of individually and small group of people planting continues to play a vital role in structuring the landscape. Play area or communal or private garden all require definition enclouse, privacy in veyring degrees. Therefore vegetation has the structural role of creating spaces in the place making.

1.3.2 Plants as easthetic Element

Plants offer an enormous wealth of spatial & easthetic characteristics. It's form the appearance of their leaves twings, bark, flowers and fruit the fragrance of flowers and aromatic foliage, the physical texture of bark and leaves even the sound they make when stirred by the wind, beathe by the rain.

Tree and shrubs with desirable Aesthetic characteristics can be planed to add Ornament to the basic structure planting. This would be analgues to the embellishment of a building façade or the decorating of interior and could be regarded as specifically ornamented planting. Another approach would be to rely on the aesthetic qualities of place and additional species would not be introduced purely to give variety or for their ornamental qualities alone. Thus would produce landscape of simpler character in the tradition of medernist architecture.



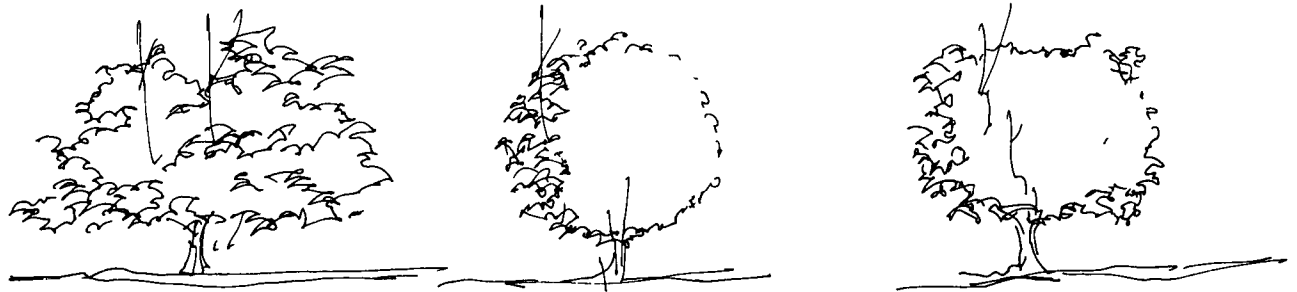
Fig 35 Large trees also use for create a space

When tree used as a single speciman in groups and clumps of as belts of wood land. These provide changing year round interest the texture and patterns of leaves bark and bare branches. A single tree can become the focal point of a court yard, small space or it can break line of a building .

The sculptural qualities of trees used in this way can be enhanced by night illumination casting shadow on surrounding building or grass.

Trees can be used in built up areas to direct movement clarifying the use of special and the purpose of building.

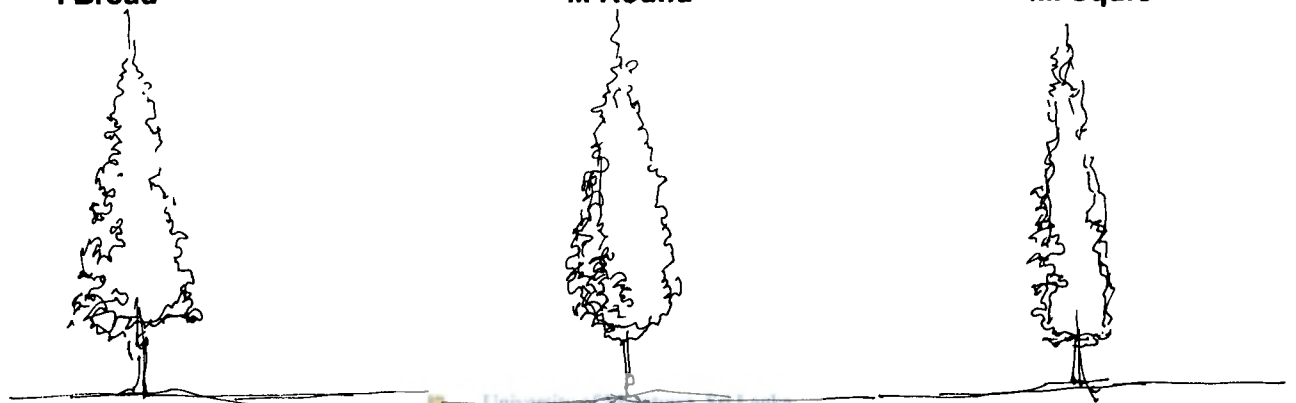
1.3.2.a. Forms of trees (Fig 36)



i Broad

ii. Round

iii. Square



iv. Tapering

v. Conical

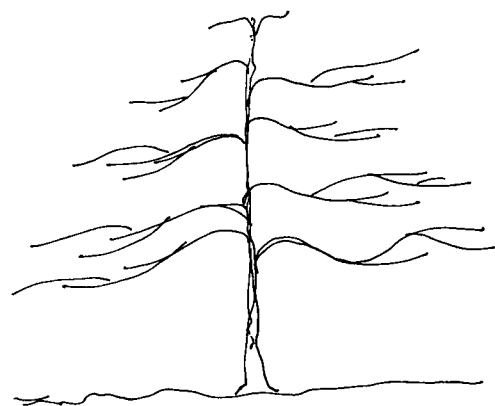
vi. Columnar

1.3.2.b. Branch formulating of trees (Fig 37)



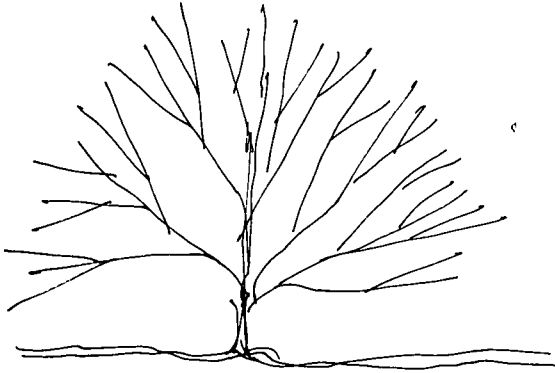
i. Weeping

The branches grow vertically downwards giving it on trees as moment clariting element.



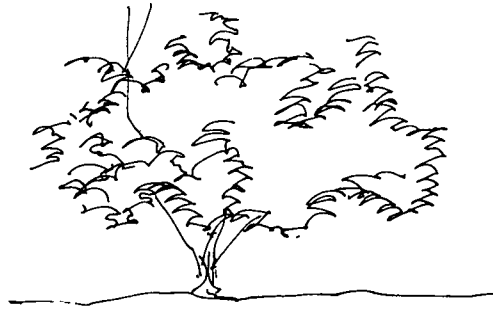
ii. Horizontal

The branch, branch off horizontally and gives an impression of horizontal hand holding a tray full of leaves



iii. Angular

The branches grow up wards at an angle to the stem giving the tree a soaring effect.



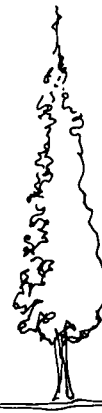
iv. Spreading

The branches spread to a distance this facilitates great overhang.



v. Contorted

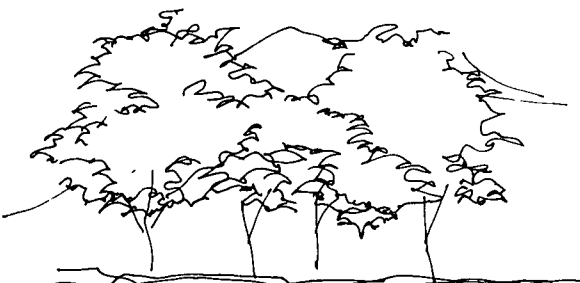
The branches branch off in no particular direction branches twist and turn giving it a mystique



vi. Arrow

The branch formation gives an arrow like form to the tree. As the height increases the spread of the branch decreases.

1.3.2.c. Trees as movement clarity element (Fig 38)



i. Block the view



ii. Frame a view



iii. Vertical definition of space



iv. Direction the movement



vi. Horizontal definition of spaces



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Trees can heighten the sense of Enclosure more or less space as desired. This can be reinforced by using colour, Grass etc. In this way trees make spaces easier to comprehend dividing large areas in to series of smaller spaces.



Spacing and pattern can be varied Uneven numbers for an irregular natural effect even numbers such as pair on each side of an entrance or an avenue. Where a formal effect is desired.



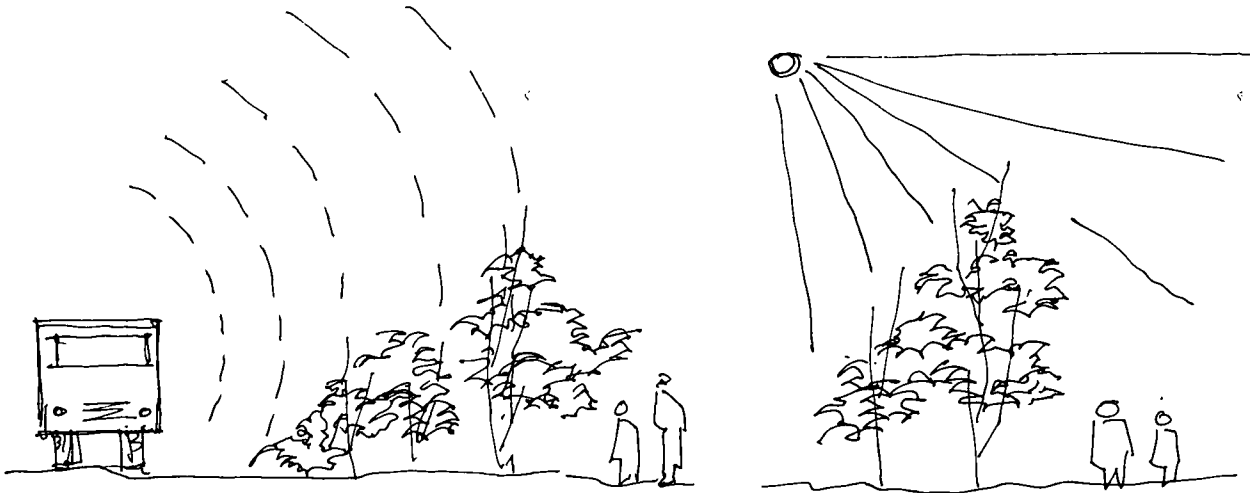
Fig 39 (above left) Chicargo river park

Fig 40 (above right) London plane trees, New York.

Fig 41 (below left) Central Park, New York.

Fig 42 (below right) Chicargo river park,

1.3.2.d. Some other effects of Existing trees on Design. (Fig 43)



i. Trees as a sound filter

ii. Trees as a light filter



iii. Trees as a wind and dust filter

The scale and density of modern development make trees important as a softening and humanizing element. They serve many functions other than purely esthetic, such as sound, light, and dust filters or as screens or to provide shade

REFERENCES

1. Booth Norman K. - Basic Elements of Landscape Architectural Design, Elsevier Publishing Co. Inc, New York, 1983 – p 01
2. Ekbo E. Garreti. - Landscape for Living, F. W. Dodge Co. New York, 1950- p 79
3. Volgensurager Bernard.
4. Booth Norman K. - Basic Elements of Landscape Architectural Design, Elsevier Publishing Co. Inc, New York, 1983 –
5. Ibid.
6. De Vos Asley. -Landscaping in Sri Lankan context, Paper submitted to the Seminar on “The architect in national development” S.L.I.A. 1982.
7. Booth Norman K. - Basic Elements of Landscape Architectural Design, Elsevier Publishing Co. Inc, New York, 1983 – p 31



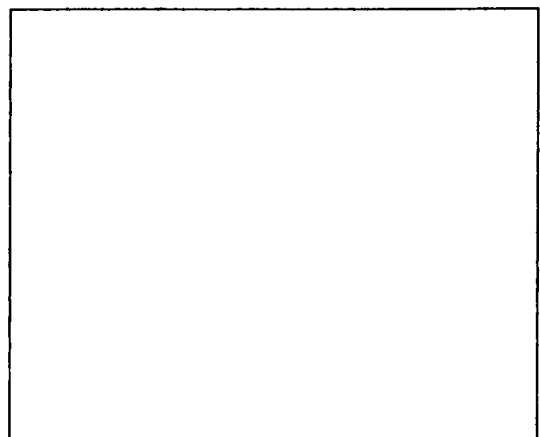
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CHAPTER TWO

NATURAL ELEMENTS IN SRI LANKAN ARCHITECTURE



2.1 Water in Sri Lankan Architecture

Sri Lanka has a long history of hydraulic civilization where people developed techniques of water storage almost to perfection with its origin in the dry zone, Till about the 12th century. The capital cities Anuradhapura and Polonnaruwa were almost surrounded by tanks.



Fig 44 Wewa , Most important element in Sri Lankan culture

It was use for domestic and agricultural purposes. As well as aesthetical and leisure. The lay out of Royal gardens such as mahamega Uyana(The garden of great rain cloud) Nandana Uyana(The pleasure garden) and Ranmasu Uyana(The golden fish part) in the capital of Anuradhapura in the pre christian era unmistakably point to the existence of exquisite water related architecture. That water made the creation possible in various manifestations.



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In Ranmasuuyana bathing ponds created a well integrated water architecture in the kings period. A very carefully modeled piece of organic architecture using water and the existing boulder to form water cascades private bathing areas pools and terraces.



The main principal applied in respect of Ranmasu Uyana has been it's location in a low level than a reservoir. Because of the gravity flow and the pressure from the reservoir supplies the water in various places Ex; Sigiriya was located below the Sigiriya wewa. The many function were even arranged with the pressure of water flowing from Sigiriya wewa to Sigiriya pleasure garden.



Fig 45 Ranmasu Uyana, The Royal pleasure garden.



There had been other water bodies like pools ponds and fountains with great engineering techniques built in the royal parks and great monasteries. Nelum Pokuna(Lotus pond) a small pond of high aesthetic value at Polonnaruwa is famous for its grandeur and high technique. It is a granite stature and its lotus shape probably has generated this meaningful name.



Fig 46 A natural water body with framed rock boulder

Kuttam Pokuna (The twin pond) is a part of a water garden in a monastery in ancient Anuradhapura This famous twin pond in the premises of Abayagiriya vihara is a unique pond comprising or two section and has earned its name from the duel structure built out of supposed to have been built for the bathing purpose, of the monks in Abayagiriya vihara. These are built of a acute geometrical symmetry thus the concepts of ponds and watergarden can be traced back to the Anuradhapura period in the pre christian era. Eth Pokuna also built out out polished granite, All these ponds and pools are constructed by using cut granite and using a water in static form. Some natural ponds also can seen using water in static form, like Kaludiya Pokuna, Isurumuniya and Ritigala.

The Ritigala monastery complexes are situated near two massive mountain summits it is frequently bathed in mist more especially during he southwest monsoon When the surrounding areas of country are parched and dry. When considering the lay out of Ritigala, It is evident that certain valleys had been selected to construct lakes and ponds due to the higher level of water table. Two types of water features can the seen in this monastery. They are pond and moat. The pond was constructed by using number of streams.

Isurumuniya also have a Static pond with the large rock boulder. its deepness and shadow of the boulder help to strengthen a dark colour of the water. The black colour effect of the water in the Isurumuniya adds gloominess to the environment.

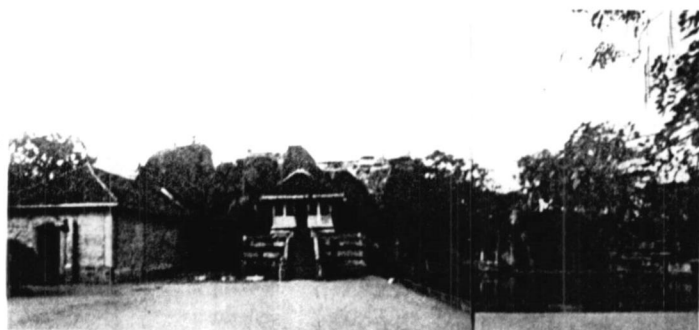


Fig 47 Static pond in Isurumuniya.

Kaludiya Pokuna has a few water bodies That are separated from the central pond has gain a prominence by the location it self. The other is moat. The rain water in rainy season flow, through the levels and stagnate in the pond as it is the lowest level. The original natural rhythm of this water body is not interrupted by the addition of artificial plat form that projected in to the water.



The black water pool was link in the Valley between "Athuvehera Kanda" and "Anoikuti Kanda". This pond has been build in an oblong Shape by making use of the natural setting of the rock as well as by using boulders. This again an another manifestation of water in static form.



Fig 48 (above) Kaludiya Pokuna
Fig 49 (below) Water body in Mihintale

Rock boulders and shady trees of the forest with along reflection in the dark gleaming water created mood of great tranquility and refreshment to the body and spirit essential for monastic life.

This pond created a pool atmosphere for the in habitations. The rain water was carefully channeled from one terrace to other terrace, through gargoyles and finally to the main pond. In this particular instance water has been use in dynamic form.

The centrally located pond at Kaludiyapokna is a good example where all activities of this monastery were planed around the pond. The residential section of padnagara of Kaludiya pokuna is surrounded by a moat. Which gives the effect that the building is floating.



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In Dambulla rock cave temple there is a unique water element. From the inception of the temple complex there was supposed to have is natural water flow from the cave roof (granite rock) A huge bronze pot had been placed to collect each Drop of water that falls down typical flora design found in other temples of the time. Only exception is the scenery depicted along this natural water flow. This place alone look likes scenery for arriver with its natural pond with lotus flowers and fish swimming across. This denotes that ancient Sri Lankan Architects valued the concepts of natural water element to enhance spatial qualities of indoor architecture.



Fig 50 Rock cave temple in Dambulla

Among the many other functions performed by water related architecture, cooling is a found to be very important. Especially in tropical climates this ability of water was considered to be a boon. Sigiriya is an ideal example to make a study of the Above function of cooling. There ponds and pools

have been introduced to control the temperature of the rock based environment with the help of the blowing winds pools or the tanks built over the living spaces shows the well developed techniques they.

In Sigiriya there are so many forms of Water used to create remarkable architectural features Like water ponds, water fountain, pools and moat etc. Top terrace of maligathanna also have a organic pond in static form..

A significant feature of Sigiriya water garden is the sequence of moated islands. Which follow the principle of symmetrical repetition. The two inner islands and the two outer island forming pairs.



Fig 51 Sigiriya water garden

Within the inner island is the summer palaces surrounded by water. Hence called in Sinhala "Seethala maligawa" (cool palace). During the hot summer season, the temperature humidity and purity of air would have been controlled for the comfort of the occupants with the cool breezes blowing over water pools and fountains.

These bodies of water in a complex variety with different shapes are located at different levels. Some shallow and reflective, while others were deep with fountains. Some with polished marble and mirror effect. Ponds with high boulders giving a dramatic effect. Moderate the temperature giving a cool effect to the summer houses with a network of under ground conduits origination from the tank (Sigiriya Wewa) and feeding the moats and fountains and also those on top of the mountain rock. All these help us to understand the uniqueness of the fifth century creation of the Sri Lankan master builders use of qualitative expressive water elements in architecture thus seem to be not a new concept in Sri Lankan architecture.



Fig 52 Upper water garden, Sigiriya

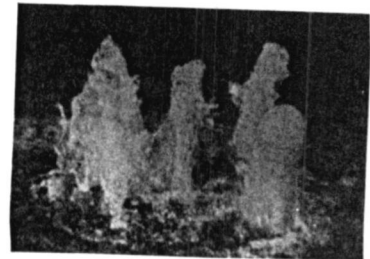
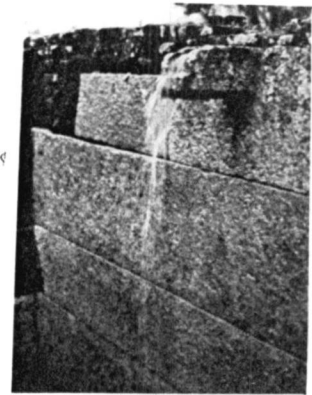
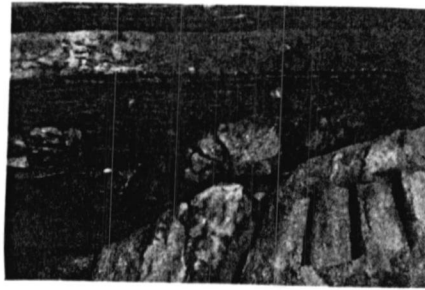


Fig 53 (left) Water fountains in Sigiriya water garden

Fig 54 (below) Fountain jet in Sigiriya water garden

In the kandyan period also use water as a natural element for creating a architecture in the royal palace, temples etc. Other wise Kandy is a hill country. So there is have high rain fall throughout the year. That reason help to make a many natural water resources like falls, lakes and fountain in the surround. Kandy lake is best example for using the water in creating a water related architecture. Its generator so many different meaning in that surrounds.

" The reflection of the cloud walls in water giving a floating effect to the palace building among cloud as a city visualized in the heaven"1.

The moat in front of the palace fed by Kandy lake also use strengthen and the calm and religious quality of the surround and other meaning of these moat use a security purposes. The temples of kandyan period so many organic ponds can see experience most of these are in static form

2.2 Rock and Boulder in Sri Lankan Architecture

On the map, the Island of Sri Lanka merely like a great tear drop falling from the Indian sub continent in to the equatorial vastness of the Indian ocean. In reality it is probably one of the most beautiful and varied countries of the tropics. To build was therefore in some way a harmony between a strong natural element such as landscape, trees, sea terraced paddy fields, serf etc. and a seemingly almost irrelevant man made object.

Architecture of every country is peculiar to that country as language dress or folklore. As a result all over the world, distinctive local forms and details in architecture exist.

Rocks and boulders associated With architecture can be seen adopted Periodically through out the history of Sri Lanka. The gradual development And the changes in rock architecture can be identified according to the different activities for which it has been designed. As an example to Royal palaces, they Have selected massive rock boulders with safety and for religious temples for selected rocky mountain with close connection with the village.

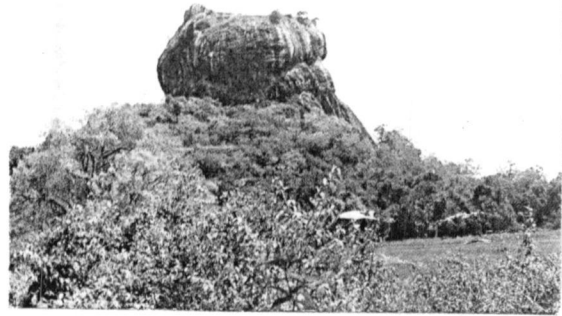
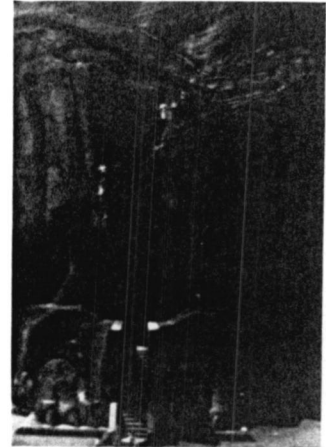


Fig 55 Sigiriya, The masterpiece of rock boulder related architecture

The rock and boulders associated with architecture in the past can be grouped as temples, meditation centers royal palaces and pleasure gardens according to their design and functional parameters. Further to spatial qualities rocks and boulders were used to give



a symbolic structural and a easthetic qualities to the environment and some times to demarcate the boundaries.

The caves abandoned by the primitive people used by the monks and became new dwellers of them. Later they were converted to meditation centers and the places of meditation were for monks. Meditation centers are mainly found at rocky sites and flattish, granite cut crops and they were located far away from the people and it was hidden in plains with rocks and boulders or slopes of hills. These were scattered and set up in forest areas open courtyard.



Fig 56 Rock cave Vessagiriya
Fig 57 Rock cave, Ranmasu Uyana

“No doubt many, similar sites were chosen in imitation or emulation of this history vihara. Other factors such as pre historic cave dwellings ancient religious beliefs and rituals connected with mountain peaks, boulders caves etc. The natural isolation and protection afforded to permit monks by these hillside caves and the examples of the similar monastic residence India specially sanctioned by the canonical texts must have played same part in the choice and preparation of the earliest monastic settlement in Ceylon. “2

Most of monastic complexes are used rock and boulders in natural form as architectural element and created different environments with different.

The rock and boulders used creating a pathways in very efficient and dramatic way in so many places. The best examples are Maligathanna, Arankale and Ritigala. Specially in Maligathanna monastery complex. There are various types pathways can be identified.



Fig 58 A pathway with steps
Arankele Monastery complex



Fig 59 A pathway with steps
Ritigala Monastery complex



Fig 60 A pathway with steps
Ritigala Monastery complex

The pathways of Maligathanna has played wonderfully with the positioning of steps, some times they are steep. Some time they are with a very little riser which gives different experiences. The playing around with regular and irregular steps is fantastic, while regular steps create a feeling of a walk or a run irregular steps are just like pebbles of a stream. They do not run but wonder. The long steps demarcating the boundaries of terraces.

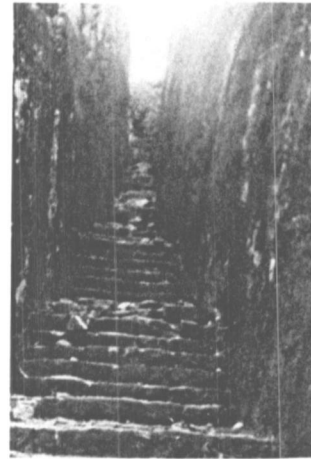


Fig 61, 62, 63 The special kind of path way
at Maligathanna monastery complex.



The middle terrace and upper terrace are Connected using a special kind of pathway, which is unique to Maligathanna. The architecture of Maligathenna consists of special techniques, which create a variety of special qualities. One such is taking the viewer around the boulders. This spiral upward lift around the boulder creates a thrilling experience, full of curiosity fear, wonder and surprise. It gives the feeling of embracing the giant boulder, where all the while there is communication between man and the boulder.

Fig 64 Pathway through the huge rock boulders Maligathanna monastery complex.



There is a more wonderful technique practiced in Maligathenna and one of the unique rare experience is the a passage through two huge boulders. This is one of the quite remarkable spacial experience. There perceiver is isolated by the out side world so much so that he sees only a stripe of sky with barrier boulder walls on either sides and steps. It creates such a universal experience that the language intensively between man and nature is made so high.

Where there are boulders are barriers the pathways given under that boulder which cut off the out side world and presents to a every private place. When coming out of it the presentation of light, the perception of the vast world out side that private place makes one to be breathless. Boulders stand in such away that they obstruct the visual continuity. This is caused by the famous "S" bend. Special techniques it present the viewer. The rythems of the journey. One become more and more speaking with the nature and its components creating unique language of architecture.

Ritigala and Arankale are also forest monastries also utilized natural rock and boulders for creating a pathways. They are located at the slopes of the mountains. There is a path leading to an open area which adds wealth of spacial qualities by making it narrow. Both in Ritigala a and Arankale narrow paths lead through the forest to the meditation areas.



Fig 65 Path way through the forest Forest monastery, Ritigala

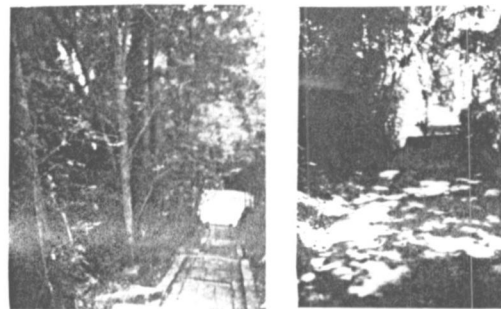


Fig 66 Rock Paved Path way Through the forest Forest monastery, Arankale.

Vessagiriya and Kaludiya Pokuna is located in the flattish rocks which are full of isolated & clustered boulders. Rocks and boulders were used to give a symbolic structural and aesthetic qualities to the environment and some times to demarcate the boundaries the natural rock and boulders were exploited in a very skillful manner at these two sites.

Unlike other monasteries the rocks and boulders at these two monasteries complexes are scattered all around the site. Without giving prominence to any particular rock and were made according to a different concept. Only few boulders have been used for building purposes while the others, stands isolation or in clusters of three or four.

Another rocky site called Isurumuniya which was the first of the many rock temples lies to the south of Anuradhapura. A path is a special feature between through two boulders with rock cut steps leading up to the rock.

Mihintale also large mountain with rocks and boulders. It has several peaks on which dagaba's stand is construction of the wide, long gentle stair way up to the hill, which gives the impression of open welcome.

"A little paths leads down yards beside a dressed terrace wall to one of the wonders of Mihintale an open air bath.

Natural caves have been developed by cutting drip ledge to prevent seepage of water in to the cave and to get more space, they cut the inside of the cave and burnt it to avoid gasses and splits of rock pieces. These cave have been developed by adding a wall to the mouth of the cave to get protection. Isurumuniya has an image house which is the middle of the rock.

Cave dwellings are the most natural reaction of human to environment which engulfs them. It is so natural and completely depending

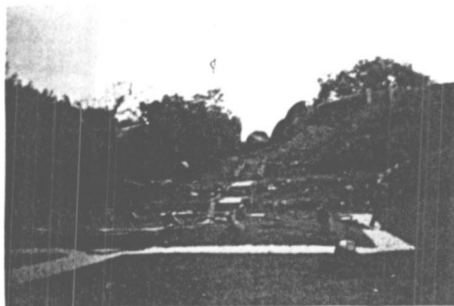


Fig 67 Vessagiriya forest monastery



Fig 68 Rock cave, Vessagiriya monastery



Fig 69 Sculptural boulder, Vessagiriya monastery



Fig 70 Rock cut steps, Mihintale

on the setting that way appear as if sprung up there very naturally by themselves. Some times where there is a cave dwelling under a boulder the top of the same boulder provides base for another building .

In Maligathenna site plan this can be detected easily when a cave dwelling is reduced to its vitals it only the lean to roof and front façade. Fifty present share of the roof of the dwelling it made by the rock it self. It is the very fine details of the natural rocks and boulders create such harmony.

Dambulla has five caves which have been made in a large single rock boulder with numerous statues and paintings of the life of Lord Buddha and the prachis.

With Polonnaruwa “Alahana complex” lies a cluster of rock boulders “Uththararamaya” (Gal Viharaya” which is at the north of the Alahana group is a large rock boulders carving with Buddha image.)

Ritigala and Arankale also has a caves using a natural rock and boulders. The main care at Ritigala is comparatively larger than that of Arankale and has stone paving on the floor rock and boulders. The main cave at Ritigala is comparatively larger than that of Arankale and has stone paving on the floor. Considering the secular architecture in the Sigiriya and Ranmasu Uyana is a best examples for relate various types of rock and boulders for creating architecture.

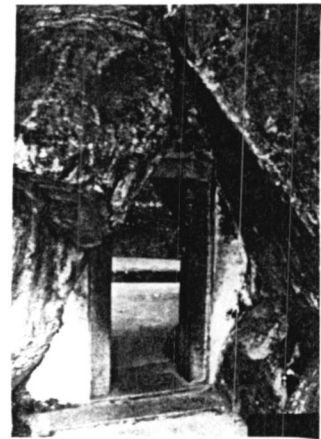


Fig 71 Rock arch converted to the entrance doorway Isurumuniya Temple



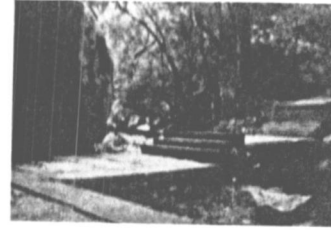
Fig 72 (above) Rock arch at Sigiriya
 Fig 72-a (middle) Rock arch at Sigiriya
 Fig 73 (right) Sculptural rock boulder, Sigiriya



In Ranmasuuyana natural rock formation and bathing ponds create a well integrated architectural spaces. Every where the natural had been integrated in to the built environment. Rock and boulders had been made use of in creating places of great beauty. The rock formation on this site had been well used to compose the park. The paths and the pavilions had been constructed without disturbing the natural lay out of the land.

Fig 74 (left) Rock bridge, Ritigala monastery

Fig 74-a (right) Rock bridge, Arankale monastery.



Sigiriya was a unique example to understand the principle adopted in conveying a different type rock and boulders to create one of the architectural masterpieces. The rock and boulders were nicely and carefully incorporated into built space, while creating a maximum leisure quality of the complex preserving natural environment.



Fig 75 Temple built on large rock boulder, Lankathilaka Viharaya,

In the Kandyan period there have been a large number of temples using a rock and boulders. Gadaladeniya, Lankathilaka, Hindagala and Degaldoruwa are some of the temples where rocks and boulders have been experienced in various ways. Lankathilaka and Gadaladeniya are built on large rock boulders with rock cut steps. The others are cave temples.

2.3. Vegetation in Sri Lankan architecture

“The architecture of Sri Lanka is not an architecture of buildings but one of spaces. It is an organic architecture that prizes multiple levels and terraces and different types of canopies. The roofing element varies according to usage. From timber framed roofs, rock ledges, trees and at times even the sky.”³

The architecture of Sinhalese were based on the way of thinking in Buddhism as all the other things in their life. Basically they wanted to get a building with the same quality as in the shade of a tree. It is determined by two factors. One is the Buddhist way of thinking. The other being Climatic conditions. Sri Lanka is a tropical country. With seasonal rains and wind

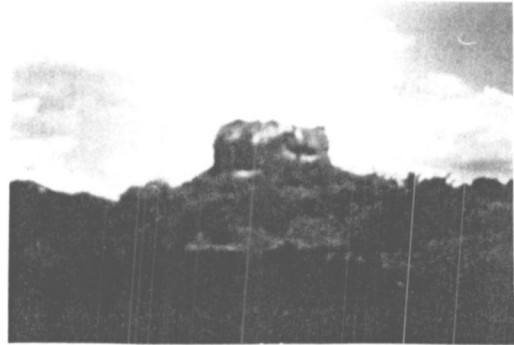


Fig 76 Sigiriya Rock with forest

patterns heighten and humidity etc. Specially ancient settlements were made at the dry zone which was the area with less rain. Due to these two factors the most suitable environmental quality and spatial quality was found under the shade of a tree.



Fig 77 Large tree at the Vessagiriya monastery.

Before introducing the Buddhism to Sri Lanka most people had a habit of venerating large trees such as Nuga Na, kumbuk etc. to promote their respect of the Ruksa Dewatha by lighting oil lamps under them. After the Buddhism was introduced Sri Lanka it became the main religion in the country and people used to pay their especial respect towards the Bo tree. As well as the trees and the nature become Buddha was born, attained enlightenment and passed away under a tree.

“Sri Lanka has the oldest historic tree in the world, Sri maha Bodhi, the southern branch of the Pipul tree under which the Buddha was seated when he attained the enlightenment, that was brought to Sri Lanka from India and planted at Mahamegha park in Anuradhapura, in the 3rd century B.C.”⁴

After Buddhism was established in Sri Lanka monasteries became the center of the national culture. Importance of the architecture of palaces. Cities and dwelling were very much less than monasteries. Therefore Sri Lankan architecture basically developed with the architecture of monasteries. The monastery was a place for living and practicing Buddhism for monks. Environment and building elements should be arranged to fulfill those needs. Later on when monasteries became complicated with several other activities. It became the center of education center for and crafts center for administration and foreign affairs.



In the Sri Lanka there were three types of monasteries. Pabbath vihara, Organic Monasteries, and Forest monasteries. The basic concept was the same for all types of monasteries.

Sri Lanka mainly followed and developed two concepts in the out of site selection which were derived from early Indian tradition. First one was a urban or suburban parks or grove which were a reasonable distance away from heat, dust and the noise of the city and normally used by kings nobles as well as ascetics and religious teachers.

The second concept was the forest grove, mountain or cave retreat very much away from human settlements and mostly used by ascetics and sages who concentrated on religious or philosophical pursuits.



Fig 78 Trees use as a religious purposes

According to the first concept Royal and suburban park which was called Mahamegawana, which was a reasonable distance away from citadel. Donated to the Maha Sangha as the first monastery in Sri Lanka. This is confirmed by the archeological evidence which shows the city of Anuradhapura surrounded by well planned monastic complexes in which parkland trees and water played an important role. Organic monasteries such as Abayagiriya, Tethawana, Mirisawetiya and Dhakshina Vihara have followed the same concept.

The second concept was used in the park or grove monastery. They may have been rocky mountain peak or a slope with caves and rock shelters sided with massive boulders. Mihintale was the first monastery to use this concept. Most pabbatha vihara and forest monasteries are the other examples.



Fig 79 Temple tree, Create a calm quality in religious places.

Both types of sites were primarily full of trees but with less amount of low level trees or shrubs. All buildings were arranged responding to the natural environment.

“In the architecture concept the rock itself at the end of the vista formed or constituted the architectural statement and feature that was exploited extensively in the later landscape garden. The arbitrarily placed pavilions and the luscious tree shapes helped to balance and soften this focal point at the end of the vista”5.

Therefore in monastic architecture there were no rigid arrangements. It was a more informal, flexible, organic layout. But sometimes there was one major axis and an arrangement which look place around it as in Mahavihara monastery. Arankale monastery and Sigiriya pleasure garden.

The traditional architecture of Sri Lanka is not static in concept, it is alive, full of surprises, it is dynamic. By introducing the elements of fun in to architectural spaces will make environment where people can feel safe, more relaxing and invigorating. These architectural spaces can refresh uses with in few minutes after they enter. This is the marvelous nature of traditional Sri Lankan architecture.

In the Kandyan period the natural forest which bounds the city of Kandy was used by Buddhist monks as a Thapowana or the meditation center.

Temple have its gardens with a vast diversity due to its hilly sloping sites which have brought a positive challenge to the designers to increase the devotional feeling.

Most of them were self sufficient communities of monks and they were designed according to the mix forest garden concept by integrating the existing natural elements and created a forest environment with ritualistic buildings and residential buildings for monks. In the ancient times some temples were basically identified by either flower garden or fruit garden (Pushparama or Palarama) according to its vegetation by the villagers.

Kandyan period temples had been provided a courtyard or an indoor garden for their monks resident or the “Awasage”.



Fig 80 Trees as create important role in the monastic Architecture
Entrance covered by tree, Kaludiya pokuna.

European interferences and finally being a colonial country was the second most event in Sri Lanka. Because the Britishers made drastic changes in all fields and the way of thinking in countries.

First maritime region was conquered by Portuguese and they introduced several new concepts in architecture but there was no clear evidence – After that the Dutch introduced much more to architecture and town planning than Portuguese. After that the British developed and alternate them according their concepts. Which were determined from their way of thinking and climate, During that time industrial revolution had taken place in Europe. Lot of unexpected problem occurred due to it. Such as environmental pollution, congestion high density of population less facilities etc. Importance of more pleasant environment was their basic need it had the people in Europe for thinking of improving their environment and using town and country planning system. Tree become a more important element in their achievements. Most good example was the garden city concept.

Use of tree in their systems took place in four environments. In public squares in public squares recreational places such as gardens or parks along the roads and finally in their home garden. Public squares mostly took place in front of monumental building for example opposite the town hall building. The independence square also follows the same concept.



Fig 81 Road framed with tall trees
Independent avenue, Colombo.



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Public open spaces were another important place where trees were used. Vihara Maha Devi Park, Garden gardens which was in front of queens palace, Gall Face Green were clear examples. At the same time they made three botanical representation three climatic zones. They were, Henarathgoda garden at Gampaha , Peradenniya gardens and Haggala garden.

“Within the castle they are many pretty walls of nut trees set in an uniform order but they bear no fruit only red and white flowers. The streets are pleasant walks themselves, having trees on both sides and before the houses”6

Finally in domestic situations they were interested in recreating their homeland than creating a new kind of architecture that was more suitable for the environmental and socio cultural situations in our country. There building were more compact and bulky units. Which were situated in the center of large gardens with a semi circular driveway.

These gardens were planted with a wide variety of shady and flowering trees with the traditional English lawns and sculptures statues and ponds.

With the gaining of independence in 1948 hopes and aspirations that were latent for centuries, surfaced and assumed considerable substance. This in turn had great impact on all sphere, including architecture. The national feeling and the strong urge to identity oneself with the past heritage was culminated in the independence square along Torrington avenue. This being a concrete replace of the timber framed audience hall in the hill capital kandy. Best reflects the value of a society that prevailed during independence.

The approach to this monument which stands to signify one of the greatest events in the history of the island, is formed of an avenue which has attained equal importance throughout the year. This was an instance where the conscious, manipulate on of the use of trees was evident in the city scape of Colombo immediately following independence. The avenue flanked by a row of tall evergreen trees by their very scale and form create a majestic entrance to the monument. Thus inducing a sense of formality and an axial progression along the driver. The continuity of the trees calls for attention where the capacity of the individual forms of these trees is used to its optimum for creating the required visual impact.

The tree played an important and prominent role in the emerging trends of domestic architecture which was developing during the time.

The vernacular tradition of Sri Lanka which was sympathetic towards nature was back is vogue. This time with a touch of modernity for accommodate modern life styles and aspirations. The form of the tree was well taken advantage of in doing so. Here trees were almost always preserved in their original locations and buildings were designed to enhance the unique qualities of each individual tree. Thus achieving a coherency that is functional and tranquil between the built form and nature.

Architecture of Geoffrey Bawa during the period best externalizes this way of thinking. Ena de Silva residence Colombo illustrates the above very well. It consists of a central courtyard, surrounded by several peripheral ones. A huge tree trunk passing through a pierced verandah roof is one of the striking features in this rather unorthodox house. Trees in the exterior of the house enhance and enrich the drab front façade. Also creating a transitional space between the inside and out side. Many such interesting features prevent here reflect an interpretation of modern life in the traditional way of living.



Fig 82 A house with large tree,
Ena de silva house, Colombo.



Fig 83 Ahouse at fifth lane
Colombo.

The four terraced houses built in fifth lane, Colombo also mirrors the extensive use of trees on the exterior of the building for added visual impact as well as for their functionality. Though designed twenty years ago. These trees have served as intended to date and stand as a model for future approaches in design.

It is interesting to note that the ultimate realization of the St. Briget's Montessori was inspired by the huge Banyon tree. That existed within the vicinity of the proposed building. This scaled down building with a dominant roof spread over a large expanse give the impression of being under a large and splendid tree. The sculptured plastic forms of the interior and the detailing add to enhance this effect.

A notable large scale project that was sympathetic towards trees, was the summit flats, designed for the Non-Aligned summit conference(1976). Set in an enclave of colonial bungalows. These four storied blocks were built around the trees on site. Which blend with the large shady branches.

In the contemporary concept of using trees there were two characters. Firstly the use of seasonal flowering plants, because the westerners wanted more colorful environment in between seasons specially soon after the cool and gloomy winter, Next was use of artificial mounts, terraces, pools and water courses, trees of various shapes. Sizes and colour adding depth. Volume and shape to the spaces they designed.

In the practice of using seasonal flowering trees they introduced several trees which could grow under the climatic conditions of Sri Lanka with fast growing speed and seasonal flowering with colorful flowers like Mai, Mara.



REFERENCES

1. De silva Nimal. -Concepts and Principles in Traditional Landscape Architecture
Journal S.L.I.A ,Vol No,
2. -Annual reports of the Archiological survey of Ceylon, 1984
3. De Vos Asley. -Landscaping in Sri Lankan context,
Journal S.L.I.A., Vol 100,No 11.
4. De silva Nimal. -Concepts and Principles in Traditional Landscape Architecture
Journal S.L.I.A ,Vol No,
5. De Vos Asley. -Landscaping in Sri Lankan context,
Journal S.L.I.A., Vol 100,No 11.
6. Schmeitzer Critoper, -Account of Ceylon
(1672-1682)



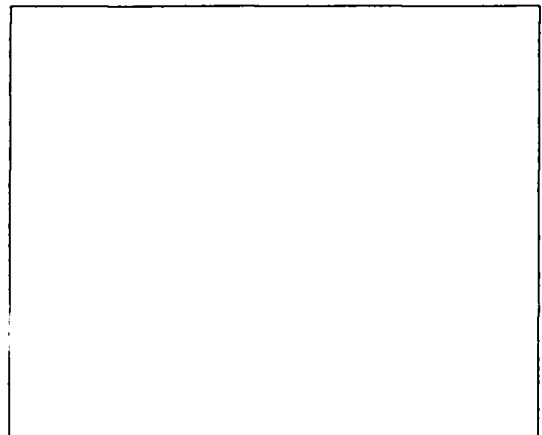
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CHAPTER THREE

NATURAL ELEMENTS IN SRI LANKAN CONTEMPORARY ARCHITECTURE



3.1. The House at Polonthalawa

Polonthalawa estate bungalow comes as the fruition of an architectural dream towards the continuation of, used a natural element with a discriminative approach. Today its architectural value is highlighted than ever as a masterpiece of contemporary architecture works keeping in harmony with the natural environment (maintaining a healthy balance with the surrounding natural environment) The spatial character of the site is the presence of large round orange red boulders sitting randomly all over the site.

Going to the analyses of method and element used in building. Polonthalawa as a house harmonizing effect can be seen in hole of the design. The most basic character that attention is attracted the building is actually is sunk in the vegetation mixing with it is rocky atmosphere. It is never to be contrasting in it's context.

The house plan spreads organically on the site. It is quite obvious that the setting of spaces were directed by the natural existence of the boulders on the site.



Fig 84 Plan – Polonthalawa estate bungalow



The house is remarkably designed by the duo Ulrich Plesner and Geoffrey Bawa. The designers use various types of natural elements for creating a space and harmonizing with nature. The main natural elements are Rocks and Boulders, Vegetation, Land form and Water.

The special character of the site is the presence of large round orange red boulders sitting randomly all over the site. Further, an isolated inner boulder erecting within the floor. This rocky environment performs on introducing physical visual barriers and function in structural requirements too.

When the viewer attempts to enter the house, he is not allowed to perceive the entire house at a breath. At the entrance, one sees the symbol of the possession. A symbolic boulder and the nicely branched araliya tree. The small white gate pillars are nicely harmonized with the araliya tree. The four columns which all celebrate the domestic character.



Fig 85 First glimpse of the house



Fig 86 Entrance structure framed in Araliya trees of the house

Once inside the boundaries only sees the small scaled version of a rock garden. Entering the house through boulder garden, where the steps are around a towering boulder resembling the special techniques used in Maligathenna. That space surrounding the steps, boundary wall and towering boulder create an entrance court shaded by a large tree. The continuation of pathway is muted by using a level change.



Fig 87 Entrance court shaded by large tree canopy and towering boulder

A small sitting arrangement is provided in a verandah type space under a simple roof surrounded by the boulders. The enclosure there created by incorporating natural boulders without using walls. A glimpse of the gateway which functions as the entrance lobby. The shade given by the boulder's are completed by creating basic roof over the space. The effect created by the stone steps



Fig 88 Steps around the towering boulder



Fig 89 The entrance lobby surrounded by boulders

The entrance lobby and huge living area is under one roof. But entrance lobby is scaled down using the level changes but under the same roof. The space is like a natural podium, surrounded by rock and boulders.



Fig 90 The entrance lobby and living room under same roof, But space volume is difference

From the entrance lobby perceiver is directed towards two boulders and the entrance to the living room, It is an archway created by those two boulders and a ridge beam. The volume of the living room amplified by using a level change again.

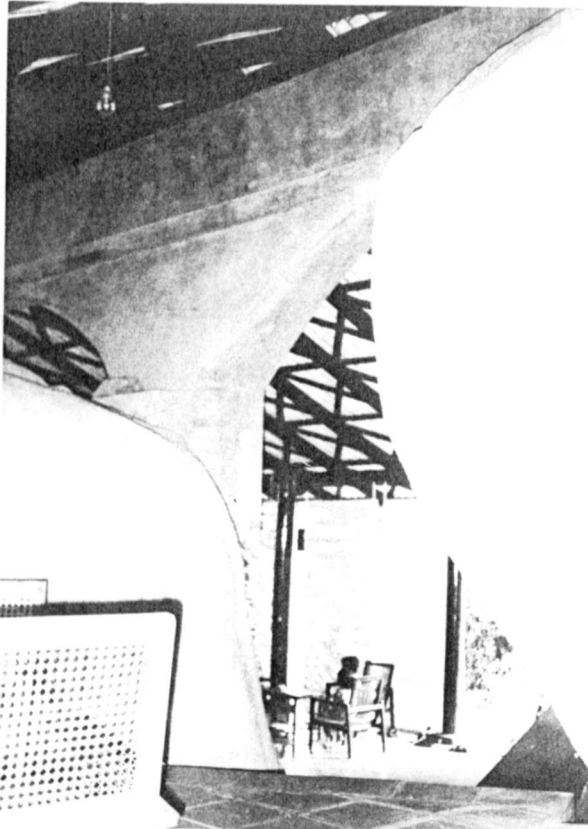


Fig 91 Entrance to the living area through the two boulders

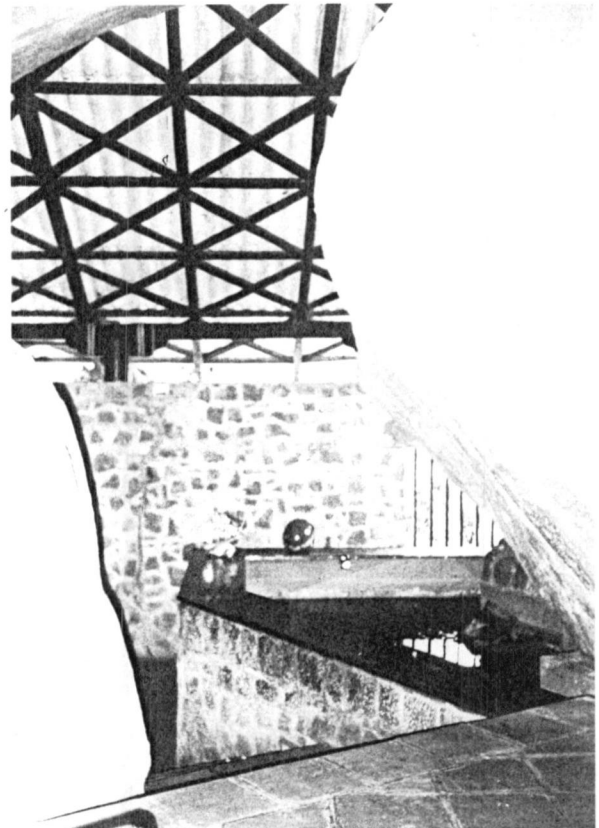


Fig 92 Static water pond bounded with boulders



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Even though one enters an open pavilion which is the living room, open view is barred by a crossly built rubble wall which expresses that still perceiver is not allowed to main space. One absorbs this not as a mere wall in this particular situation. But as an another boulder which is again quite commonly practiced as obstructing the view before giving the main dish in the tradition. Right side of the steps have a small static water pond bounded with the boulder. That water ponds help to reduce the heavy and darkness of the transitional space.

Living room is an open pavilion with huge boulders. The three boulders by which the living room is positioned act as three huge columns on one hand. Ridge beam spans as a connecting bridge among three boulders. The openness of the living room pavilion is exactly according to the tradition of rock and boulder architecture. The rough finished palm columns act as a trees repeated in the outer boulder garden. These features are help to blend man made environment with the natural environment. Floors are of clay tiles which takes the colour of red boulders that surrounds the site.

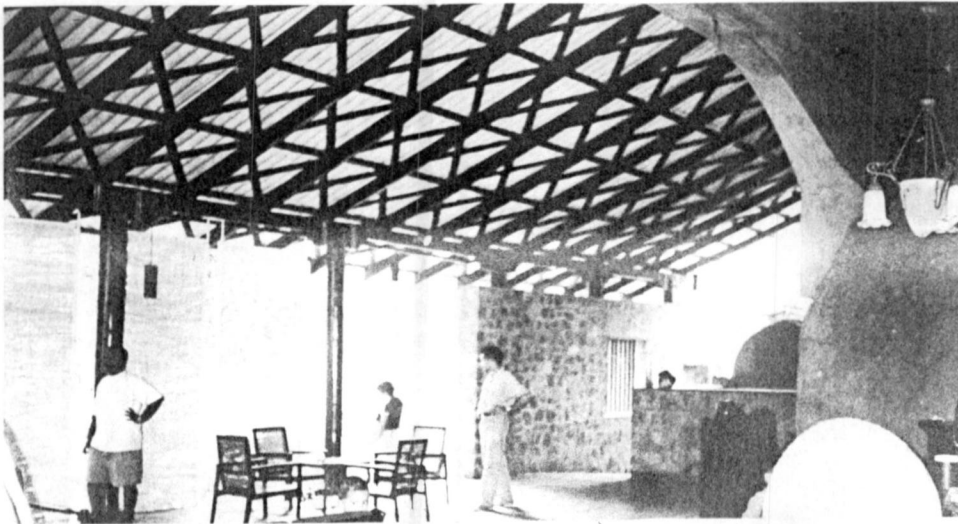


Fig 93 The main space of the house

The isolated boulder demarcates and fully encloses the living room. In one's mind it expresses that a whole is not necessarily needed to create sense of enclosure. While it resists the entry to the space and it gives a link (which is a bridge) to the bed room wing too. It is again another boulder that dominates, the bed room wing. It makes that wing be hidden and darker than the living room pavilion which gives a sense of privacy.

Two court yards at bedroom wing are being captured by the two isolated boulders. They as simple get powerful elements contribute to the character of the passage of the bed room. They attract and create privacy at the same time. It is quite evident that in this spaces particular boulders cannot be used structurally. But they are used aesthetically as well as functionally. This court yard helps to create a entrance lobby for the bed room wing.



Fig 94 The isolated boulder of the living room



Fig 95 Isolated boulders create a entrance lobby for the bed room wing

The open verandah in the master bed room wing open to the exterior boulder garden and it's timber column without base and head like a natural tree, nicely harmonize with the exterior vegetation. Other end of the verandah carefully hitched to the another boulder.

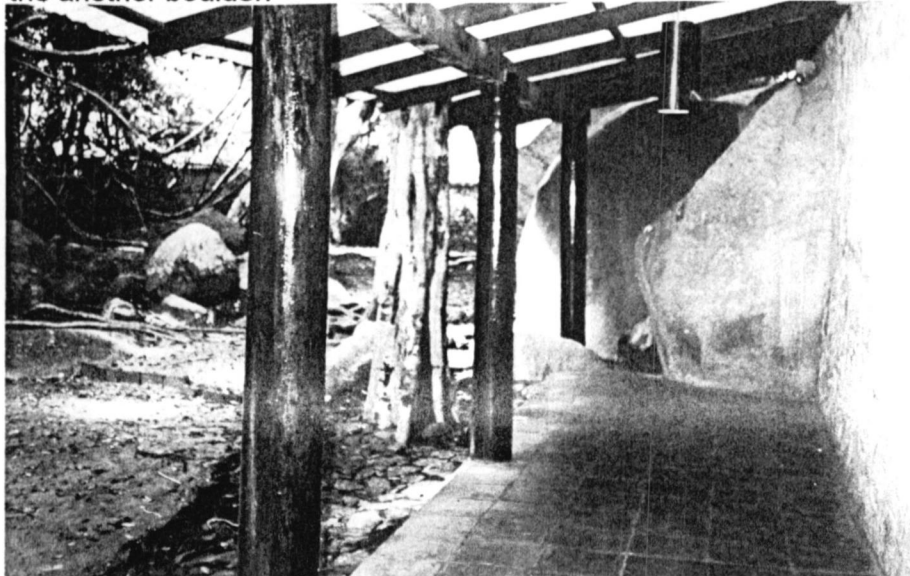


Fig 96 Open verandah of the master bed room wing

In the master bed room, a boulder springs act as a wall which governs and furnishes the entire room by its positioning, size and proportions of the room. Other bed room wing locate on the another boulder changing the level. Using that different levels designer creates a balcony and terraces for the bed rooms to get a maximum views of the boulder garden.



Fig 97 Interior view of the master bed room



Fig 98 Create terraces and balconies using a natural level changes

Supervisors bedroom is built on a high rock and it is open to a view over the jungle and small interior courtyard.

Finally the Polonthalawa house taken conceptions not from the predominant cave dwellings, but conceptions are taken and incorporated from boulder gardens and special interest creating special techniques that were commonly and skillfully used in rock and boulder architecture.

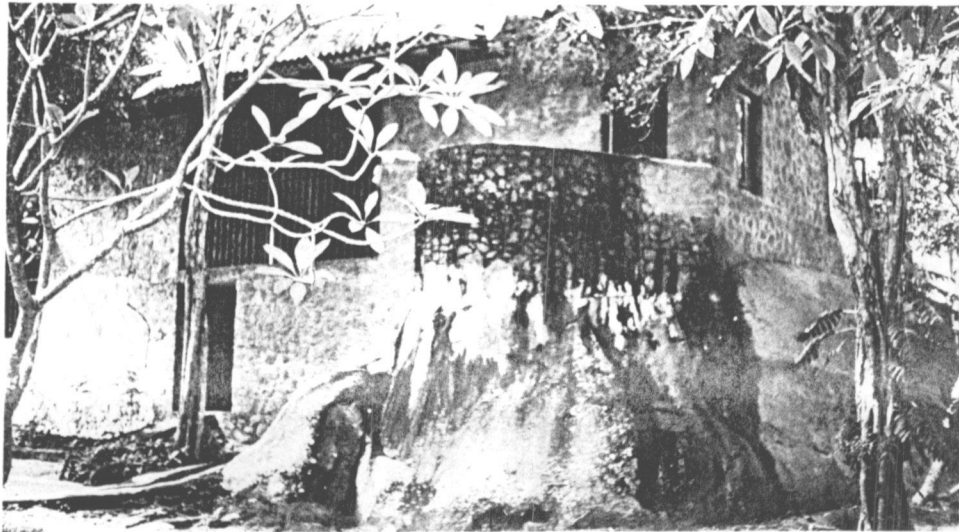


Fig 99 Exterior view of the house

3.2 A house by the Lagoon at Moratuwa.

The house at the Lunawa is one of the excellent example of "Design with the nature"

The designer has an excellent talent of selecting the very place of Lunawa to built the house. The house reside in the district of Colombo. One of the most strong reasons for existence of the building on that location is the environment. According to the tropical climate . The water courses and vegetation in harmony are most preferred.

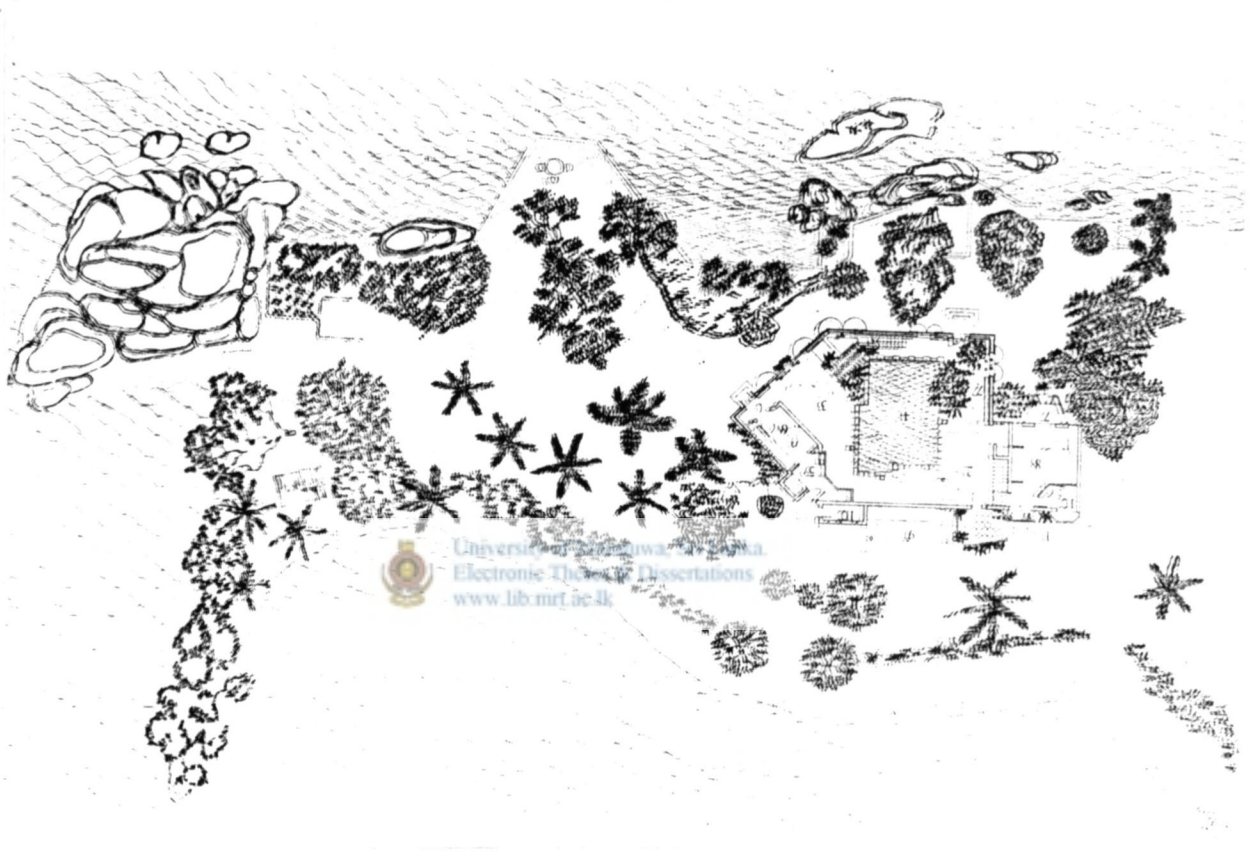


Fig 100 Floor plan, Lunawa house.



The designer, Arch. Rathnavibushana use a different kind of tangible and intangible natural elements to strengthen and create spatial qualities of his own house. That site is like an island surrounded by a lagoon with various kinds of tangible natural elements like wise vegetation, rock boulders and water etc. He touches it very gently and very carefully, to organize his spaces with genuine purpose of his world integrity. It has an extremely personal statement resulting from above for the tranquil enjoyment of living architecture, and the inevitable respect for the need of climate, site geography and surrounding.



Fig 101 Exterior view of the house.

The approach of the house the entrance pathway help to transform on mind set from highly contested area to the calm quiet environment. The narrow sandy path running through densely populated area. It has a sense very hard dense feeling on path through the hustle – bustle narrow winding path. Suddenly at a glance sees a widely open pathway decorated with purple flowers, rubble wall and huge clay pots. Slowly steps towards the rubble wall faced white main entrance gate is each ego's. Passing the gate way steps on to compound with patches of light penetrate through dense tree canopy. The stillness of wall setting suddenly breaks up by the cool air blowing through the lagoon.

The dense tree canopy help to break the sea breeze. At the straight forwards sees a coconut tree framed the main entrance lobby the home in side spaces enclosed by its blind wall from the noisy shanty frontage further the house facing to the non balanced environment hidden by the deft and dumb wall with projected elements and thick foliage. Then moves toward it sharp turn to the right is exposed to the shiny lagoon water through the sweeping lawn. It gives advantage of move generously increase the visual boundary of the site.

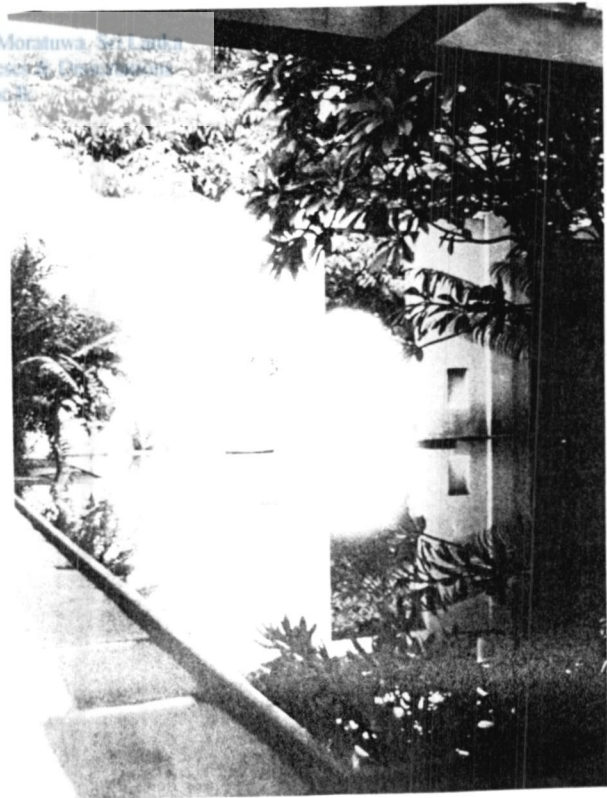


Fig 102 Internal static pond

The house opens out to views of the ocean and yet can be closed so that views are internalized. Views of the sea are framed by tall openings. That tall opening lines are repeated of the mangrove tree lines. The whole house is a express the vertically of the surround environment.

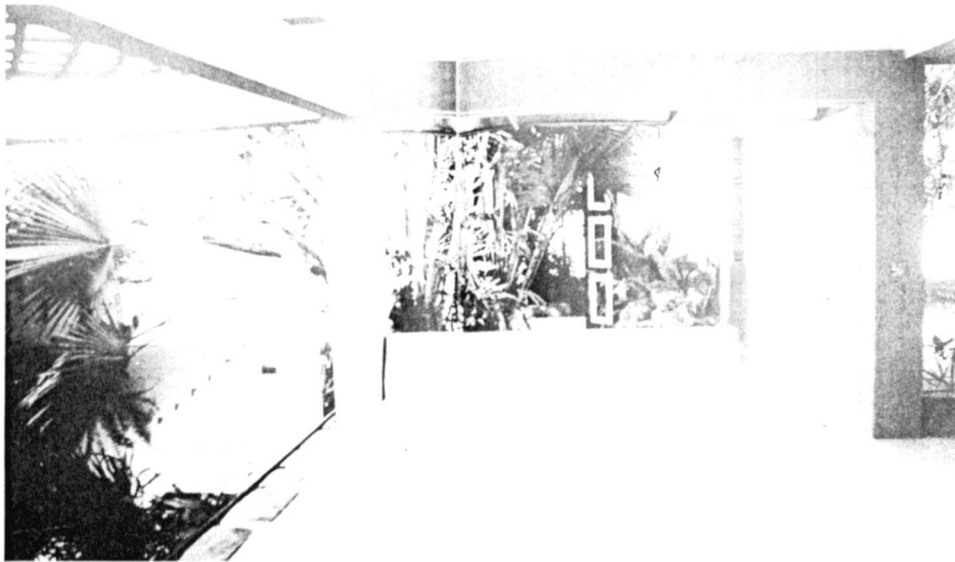


Fig103 Internal pond and Court yard create a natural environment in the house

Tall doors can be thrown open on the south and west sides to reveal apart at the heart of the house a shimmering reflecting pool flush with the floor surface which changes colour with the condition of natural light at different times of the day.



Fig 104 View of the lagoon, from living room

The waving water in the lagoon and static water in the inner pool is shows the difference of dense tensioned feeling in exterior and calm quite feeling in the interior environment. An architect nicely visually incorporate to the house that two difference qualities of water by using the tall narrow openings.

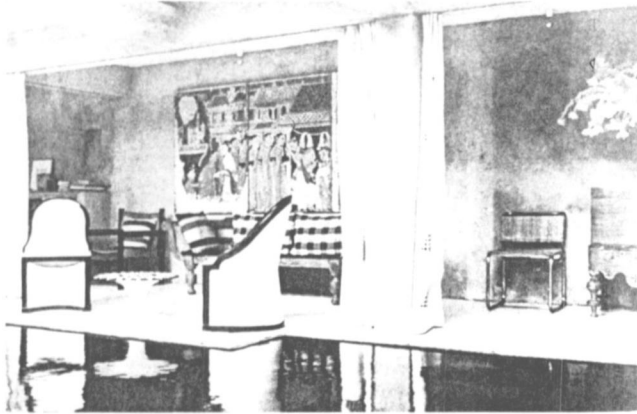


Fig 105 The static water pond give a maximum reflection of the water.

Trees and ferns surround the pool ,The effects is to merge the interior and the exterior So other wise that vegetation is create a non build environment for the main space of the house. Rough uneven huge Araliya branch curving through entire open spaces filter sun rays and any other bushes and plants making a greenish colour composition. An increasing sense of this by the blue timber column and bluish decorative door. The eyes moves with the rythems of the branches suddenly stops at the roof terrace in front of the bed room the open volume full with Araliya flowers and green leaves.



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3.3. Laki senanayaka house – Dambulla

Diyabubula house is an ideal example for the discussion of incorporation of natural elements such as water with vegetation and rock and boulder etc .It's an enhancement of a natural water park once part of a natural forest and water body.

The house is located near a natural water fountain (Diya Bubula) which provides a continuous water supply at an extra ordinary rate. This water resource seems to be the reason for him to build this house in a place which is in the dry zone of the country.



Fig 106 Ground floor plan

Laki Senanayaka renovated his house very recently. The site he acquired 15 years ago during his life as a planter. He has dammed certain points along the water cause to create three lakes to make the proximity house to be in an island but with minimum damage to the existing vegetation and topography and rock boulders. Thick shrubs and other vegetations (most of them were planted by the owner himself) which characterizes the dry zone are characteristics of this site too. The thick vegetation and the water bodies isolated the site from the rest of the world.



When the viewer attempts to enter the house he is not allowed to perceive the entire house at a breath or any other natural element like water or rock and boulders without trees. The entrance pathway running through a thick vegetation like a natural forest. It's help to enhance the calm and quietness of the mind.



Fig 107 Entrance to the house

After the passing the forest, pathway open out to the still water pond ,It's physically act as a barrier within the house and surround and visually help strengthen to the harmful environment creating a various types of vistas and glimpses.

The house consists basically of two levels, such as ground and first levels. The ground level consist of an open lobby area. A water pool and a toilet the only enclosed area.



Fig 110 Water pond and lienear rock boulder



Fig 108 Diyabubula Natural water fountain



Fig 109 A pool with natural rock

A pool is created at the ground floor level of the building by letting water to flow in through a crack on the huge rock which act as the wall or barrier between lake and one side of the ground floor.

The shape or the plan configuration is with rectangular shapes in harmony with the column lay out of the non building. One side of the pool in the rock the relationship between the informal building with rectangular column lay out and the informal lake and between the rock and rectangular shaped pool makes peculiar contradiction which enhance the communication on of the architectural message of "INFORMALITY"

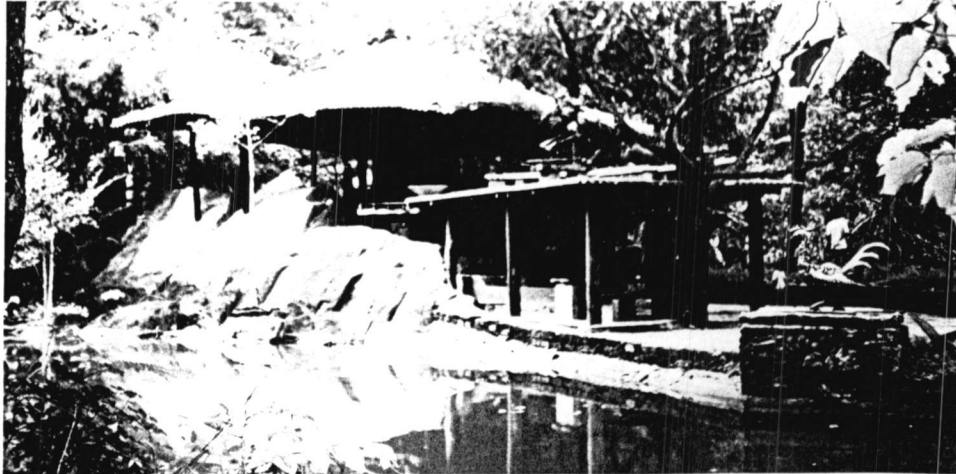


Fig 111 Exterior view of the house

The first level consist of an enclosed pantry and multy-purpose area which is a timber deck at two levels with peripheral areas of a viewing deck and a cantilevered diving platform. The house is almost open in all sides which provide views to the surrounding thick vegetation and man made lakes which are in harmony. And other wise the informal timber deck are well bounded together in natural trees are incorporated the design and linier rock boulder.

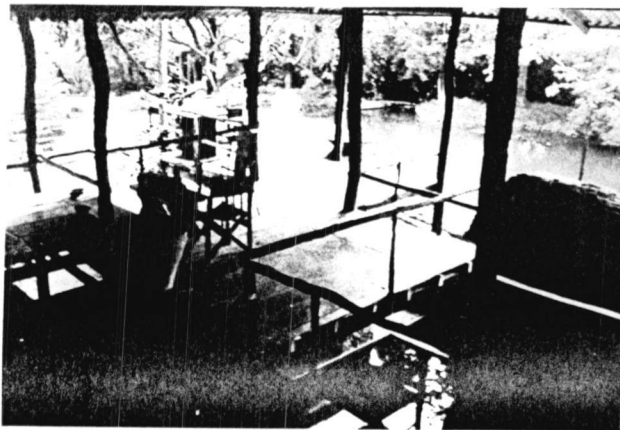


Fig 112 Timber deck open to the surrounding



An architect maintain the same level in rock boulder and timber deck to get maximum experience of the lake and forest.

The construction of the house is mainly of timber posts on rubble pillars. The natural timber posts are like a continuation of the trees in the forest. The hay spreaded over the corrugated asbestos roof reduce the contrasting between corrugated roof and natural rocky forest

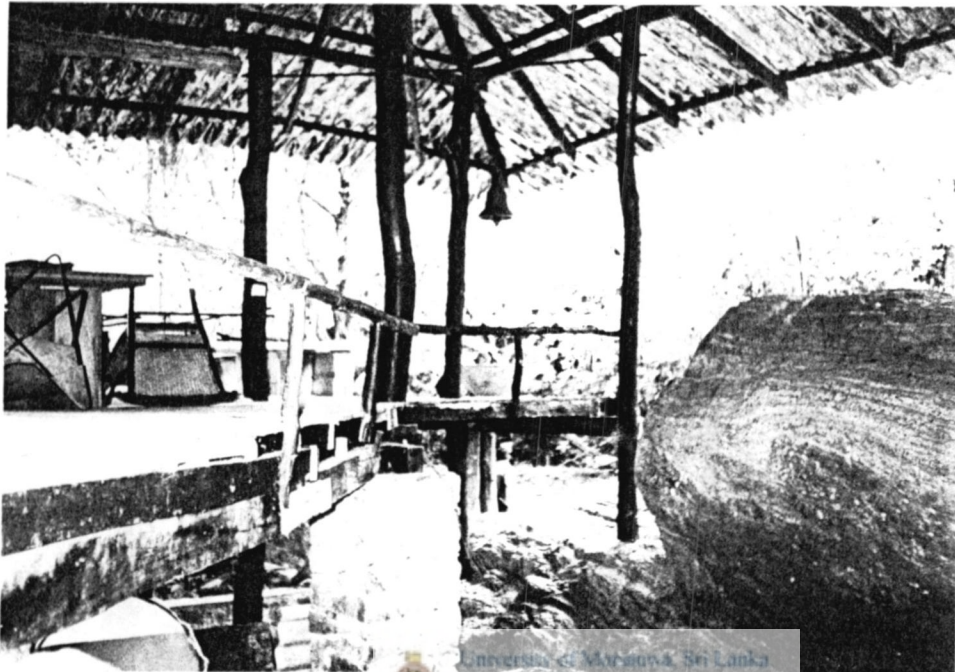


Fig 113 Timber deck jutting out from the rock

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Fig 114 Timber column as a tree

As mentioned earlier the streams of water that flows out of Diya Bubula is blocked by a dam and the lake is made to take the shape of the natural topography and forming cascades of spill over, the areas in lower elevation.

This remind us of the Japanese landscap^e gardens with even lesser visible human involvement. Yet the architects origination would have been at its best to day this recreation of nature.

Although the main water body is a static one the natural dynamic shapes of it enhances more in formality in overall quality of space. The holiday home which is almost a non building with dynamic spaces which are flowing towards the water has around increases the informal quality and the totally encourages an informal way of life. Experiences of the informal spaces induced, a freedom a pleasure, a relaxation from the burden, bonds and limitations of day to day community life.



Fig 115 The main water body and house

Although the environment is quiet and calm the informal forms of water body and building does not induce a king of relaxation one would except at a forest monastery.

CONCLUSION

This dissertation proposed to investigate the use of natural elements in architecture in Sri Lanka. The intention was to create an understanding of the ways that nature can be accommodated into architecture, as to overcome the grave situation; present urban built spaces and contemporary architecture are facing with.

Since the built fabric cannot survive independently of the natural context it is vital to understand the harmony between built and natural environments and can be considered as an essential objective in architecture. Any sort of too artificialness and incompatible with the context and becoming too distant from the nature can create definite unease. It is revealed in this study, in order to avoid this spatial discomfort, some natural elements in certain proportions and certain techniques can be incorporated into the built fabric. These natural elements have been categorized in the study according to their nature, availability, durability and the expression they would create in the built context.

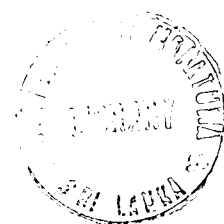
Water, vegetation, level of sun light, qualities of the atmosphere (wind, rain, snow, haze), geological elements (sand, soil, clay, silt, pebbles, rocks and boulders) and their character and the land form of the context and also the visual character of the natural environment were identified as the natural elements that can be incorporated into architecture. From these elements water, vegetation and some forms of geological features (rock and boulders) were identified as the main aspects of nature that can be incorporated most conveniently in the contemporary architecture. This study have done comprehensive analysis on those chosen elements, their different character, their behavior, sub-varieties and the ways they can be used in creating spatial qualities. The study mainly focused on using the elements in their original form as possible, since many building materials are modifications of their natural forms. An artificial pool of water considered as a natural element for this research whereas timber or granite tile have been ignored. The first chapter of this dissertation is a typological examination on those selected natural elements. This typology based on the architectural expression they have generated in the built environment.

The second chapter has been observed the use of those selected element in the evolution of architecture in the Sri Lankan context. Even the existing evidence of earlier built context and buildings were limited to some religious sites and royal palaces, they provide various ways of incorporating the nature into the architecture in a predominantly Buddhist civilization.

The concepts of using these natural elements in the contemporary architecture in Sri Lanka and the manner they have been incorporated in the domestic environment, has been subjected in the third chapter. Three different private residences were selected for the case studies; one house from urban context in the Colombo suburbs and other two houses isolated in rural areas far from the urban centers with the building sites contained specialized contexts with natural features.


Nature was frequently highlighted in landscaping but the use of natural elements in architecture can produce harmony between the built spaces and the natural environment. These case studies disclose that tranquil environmental expressions can be created in domestic spaces even in tight urban sites. It also reveal that the said spatial qualities can be retained in the built fabric by carefully implementing the design principals and concepts to make use of natural site conditions to the maximum effect.

To utilize the findings of this research for the benefit of the contemporary spatial creation there are some gaps to be filled by conducting human behavior studies in some of these specific sites. A comparative study on human behavior patterns between these specific architectural examples and common built fabrics in the urban areas would be very valuable for finalized a complete set of design guidelines for a nature friendly architecture to suite the contemporary Sri Lankan society.



BIBLIOGRAPHY

1. Alexander, Christopher
1. Pattern Language
Harverd University Press,
Massachusetts.(1964)
2. Timeless Way of Building
harverd University Press,
Massachusetts.(1964)
2. Antoniades A.C
Architecture and Allied Design
Kendall/Hunt Publishers
Canada(1980)
3. Booth Norman K.
Basic Eliments of Landscape
Architectural Design,
Elsevier Publishing Co. Inc, New York,
1983
4. Borlin B.C
Architecture in Context
Van Nostrand Rein Hold Com Ltd
New Yorc.(1980)
5. Ching. Francis, D.K
Architecture, Form Space and Order
Van Nostrand Company,
New Your(1979)
6. De silva Nimal.
 University of Moratuwa
Electronic Theses & Dissertations
www.lib.mrt.ac.lk
-Concepts and Principles in Traditional
Landscape Architecture
Journal S.L.I.A ,Vol No,
7. De Vos Asley.
-Landscaping in Sri Lankan context,
Journal S.L.I.A., Vol 100,No 11.
8. Edirisinghe K.S
An Architecture in Harmony with
Nature An Examination of the
Concept of intimacy in space
Making
Unpublish MSc.Dissertation
University of Moratuwa(1996)
9. Ekbo E. Garreti.
- Landscape for Living,
F. W. Dodge Co. New York,
1950
10. Engle, Heinrich
The Japanese House
A tradition for Contemporary
Architecture Charles E. Tuttle
Company Inc.(Tokyo(1964)

11. Gunarathne, R "Light House"
Fired earth on aquamarine
S.L.I.A. Journal
Vol. 101, No.20
12. Jacob Michael The Most Beautiful villages of
Provence, Thames & Hudson Ltd.
London(1994)
13. Norberg – Schulze, Christian Existence, Space and Architecture
Studio, Vista London(1979)
14. Perera D.G.N.A Spirit of place as a Spatial Quality
And unpublished MSc. Dissertation
University of Moratuwa(1993)
15. Powel.R The Tropical Asian House
Thames & Hudson Ltd.
London(1996)
16. Rapport. Amos House Form and Culture Prentice
Hall, New Jersey(1969)
17. Roger, Scruton The Aesthetics of Architecture
Methuen & Co.Ltd.
London(1979)
18. Relph. Edward  University of Moratuwa, Sri Lanka
Electronic www.lib.moratuwa.lk
Place and Placelessness
Pion Ltd.London(1976)
19. Rasmussen Steen Experiencing Architecture
First MIT Press Paper
Backed in on
U.S.A(1964)
20. Schmeitner Critoper, -Account of Ceylon
(1672-1682)
21. Simonds J.O. Landscape Architecture
U.S.A Mc Graw Hill Inc,(1983)
22. Taylor, Brian Brace Geoffrey Bawa
Revised edition
Thames & Hudson Ltd.
London(1995)

