

PHYSICAL CONTEXT AS A GENERATOR OF ARCHITECTURE

Manipulation of built environment in harmony with nature

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A Dissertation Submitted for the Department of Architecture of the
University of Moratuwa in partial fulfillment of the
Requirements for the degree of
Master of Science
In Architecture



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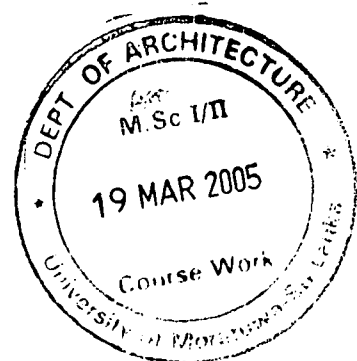
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DECLARATION

I declare that this dissertation represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this university or to any other institution for a degree, diploma or other qualification.

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ABSTRACT

Nature is a very complex entity regarding with its creation. It exists through its harmonious integrations of cosmic and physical rhythms, from the beginning of time. Man was has embodied in nature and dependent on natural forces. It gives the birth to all creations of man. He built his shelter obeying to these inherent characteristics of the nature.

Man interpreted his inspirations as an intelligent understanding of nature rather than a perceptible understanding. These experiences, studies the surrounding environment which gives the way to create harmonies built environments with nature, without simply having superficial imitations.

Any building to maintain a good conversation with the context, should respond to the essential character of the place. The essential character or the inherent quality of a place is generated out of a number of features such as physical and non physical components.

The harmonious integration of the built environment with nature always gives rise to a good piece of architecture. Such a harmonious product undoubtedly become meaningful and express its inherent meaning through its built form. Hence the built form becomes the resultant output of the certain generative forces thus it becomes a harmonious product with the context.





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INTRODUCTION

0.1 Topic explanation

Architecture is an important achievement of man. It should not only an eye catching object in a plot of land, but should exists as a dependent of that environment while also adding power to that environment. This co-existence can facilitate through the integration of built environment in harmony with its physical context: either man-made or natural. Hence the architectural creation should be a reflector of itself as well as its context or the specific setting where the architecture generates.

"....The context or the ambient conditions or the surrounding is a factor that we should be aware of constantly, when thinking of a building." (Tugnutt, 1978:70)

Man has derived ideas from working with nature. Nature is the main force to direct art and architecture. It can be understood in two ways, one way is the perceptible manner and the other way is the intelligible to fit in to an architectural work.

There are various points of views are available that can be looked at nature relate with architectural creations. This dissertation will examine the harmonious interaction of the nature with built environment. This consideration is discussed in detail under the title of "Physical context as a generator of architecture".



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0.2 Observation

It is appropriate to start this by saying that "today's" architecture has less sensitivity towards its environment. Often they are unsympathetic to its surrounding or at its worst 'alien". They do not enhance nor heighten the existing positive characteristics of the environment in which they are placed. If this situation continues, not only we will have to experience horrible set of buildings but we will not have enough natural environments to be seen. But theoretically the existing environment where any new building is to be placed is one of the major factors to be considered. The others are the activity pattern and the user category of the building which also have similar importance.

The reason for the above unsatisfactory or alien building types may be the less sensitivity or rather superficial understanding of the environment by the designer or sometimes due to less experience of handling the new materials which are pouring to the market today. The major issue could be lack of understanding to see what aspects and components of the environment or context should be taken in to consideration.

0.3 Scope and limitations

Architecture is not merely copying what is there in the surroundings on visual level but to take the essence or principles and use those in a meaningful way. So it is essential to understand, what harmonizing is? As an example "IMER MAKOVELZ" one of the Russian architects said "organic architecture is not merely copying the forms of nature but take its essence or merits or rather principles of the natural phenomena and include those in a design.

So to understand what harmonizing is, first one must know the components of harmony and, one has to understand or rather should have sensitivity to what the components of the physical context are? Identify them correctly and what aspects of the physical context are most critical for the building in hand. The understanding of the physical context and its various aspects is therefore essential. And this study will try to point out what harmonizing is in the physical environment and to achieve that what are the aspects and components one should really respond to, in design. In this study, only the physical context is taken in to detail consideration.

Though the study will talk about the physical context, its man made part will not be discussed in this study as it will give resources for a separate study. But the features one should look at when designing in man made environment are briefly discussed. And even the natural context has studied in micro level which one can perceive at a stretch not in macro level where it lead to master planning level.



Considering the examples, this study will not identify how each an every individual has responded to the physical context. It may differ from person to person. But the identification of the principles or spirit is the most important factor that a designer should be thorough with. The examples will be used only for that purpose.

0.4 Methodology

The study includes three chapters. The chapter one will try to understand what architecture is all about and the principle elements or generators which are affect to designer. From that the context has taken in to much consideration and contemplates on the physical context and end of that chapter the study will be narrowed down to the natural environment.

The second chapter is based on a detail study of the natural context related to generators of architecture. This chapter discusses about the harmonizing characters of nature which leads to generate architecture. This will be an approach to a theoretical frame work for the case studies discussed in the third chapter.

The third chapter is based on the case studies and an analysis to reveal the theoretical frame of the previous chapter. At the initial stage of this chapter will discuss the factors considered when doing the case studies. And then there are followed in the case studies to point out what all the components and aspects of the physical context that should be taken into consideration by the designer, by citing examples how the successful designers have picked them correctly and created architecture.





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CHAPTER ONE

Generators of architecture in built environment

1.0 CHAPTER ONE – GENERATORS OF ARCHITECTURE IN BUILT ENVIRONMENT

1.1 Man and the Built environment

Man is a natural creature. He has an inherent need to form an emotional relationship with his environment and thereby become part of it. Primitive man whose tie with the nature was stronger than modern man perceived every thing as being alive. He perceived the environment as a whole with himself as an integral part of it. The life giving water, the protective mountain range the wind that blew across the land, all these were seen as living things. With these he formed an intuitive relationship, which brought him in to the eternal order of nature. He arranged the elements around him to fulfill his needs and natural landscape provide the 'ground' for man's being in the world. When man deliberately arranges the elements of land to create a place for him, it becomes built environment.

Every person is sensitive in varying degrees to the built environment, he lives in. he create it modifies and changes it constantly. The built environment too, modifies him and changes him. This is a reciprocal process, the end result being essentially change in man. Built environment does change people, their behaviour most precisely. It can be life supporting or even crushing. As Christopher pointed out, the built environment is potentially a dangerous tool. It can be used to manipulate people. It can make people feel ill and make ill.

It can even be life enhancing and purifying too. There are example to be found in mundane life, the small township grown over time garlanded tenderly by rich green, paddy fields and water ways, the house- the home "my little corner of the universe" it's enhancing spaces- the garden, the courtyards, the living rooms, the bed rooms, the shrine- the warmth, the market place- friendly, cordial, inviting- filled with people, movement, voice and noise. The little shed under the tree shade- the little cool spot in the hot sun. Its welcome note to the passer by: full of humor full of silence. Life is enchanting, curative indeed: both to the body and mind.

But today man and his built environment becomes more and more alien to the nature. This is because of his egotism; he always tries to separate him from the first nature. Our actions are governed by ultimate realm of cosmic rhythm, our-self and our world become part of that cosmic nature, and hence the built environment should be 'unity with existing nature. If we achieve some unification with cosmic rhythm in our built environment that is the day we understand nature as it is. This means human beings and built environment become united like a snail and its shell.

1.2 Built environment and architecture

According to the "OXFORD" dictionary it says, "The art and science of designing and constructing buildings". The above mentioned is only a mere definition to the English word architecture. But it has been defined by architects themselves in various ways or within a various frames of minds. But for all those definitions, one thing is in common, that is to whom architecture is catered for? It is for "human beings".

Since man deviated from nature or from the time he left the forest, the period he upgraded himself from Homo to Sapiens he tried to build his nook. That is he tried to protect himself from weather, animals etc. from that day onwards "Architecture" came in to being.

".....The essence of Architecture is the conquest of nature, when man first moved indoors, seeking (as Albert put it) health and pleasure in addition to mere survival".
(Martin, C.1994:17)

First man began to live in caves that are basically served as a shelter but with the time he tried to personalize it and try to convert it into a living space by doing paintings in them. Making doors for the cave, making grip ledges on that etc. with time man improved his shelter; which changed his pattern of living. He began to live in shelters made out of leaves and wood.

Finally he used to live in shelters made out of wood, mud, timber etc. with an increase in population other types of buildings began to emerge e.g. commercial, religious, administrative etc., with time man tried to put more aesthetic value to his buildings. As a result of that he began to think and plan out what he is going to do or construct, before actually building it. This is the time when the word "design" emerges. We use to call the above situation designing. We often hear people saying that they plan to do, "this and that" we better say that these people are designing in their minds to do something about the problem confronting them.



Plate - 01

(01) Natural living of Aborigine Australia



".....The notion of the preliminary conception of an idea or the concept of the mind is the key ingredient of a design. The preparations of a plan a scheme or a descriptive document represent some of the means for the expression of the idea, not the idea itself." (Antoniades,A. C.1980:2)

Like wise in architecture or when people going to design or construct buildings, they come across several other problems. Finally the buildings come up after responding to these problems. These problems could be from the place where the building is going to build, or the persons or the person that particular building is going to occupy we can called these problems or factors as determinists.

Figure - 01



These constraints can be defined as the generators of architecture. Those constraints can be visible or invisible. But the very prominently, contribute to make a piece of architecture.

1.3 Generative factors of architecture in built environment

These are the rootlets to give an idea, to create architecture. In other words they are the basic factors which give seeds to the architecture of a building. If we very basically define the word "generator", it gives the meaning; as any cause, fact or a reason, which bring a thing in to existence. The main generators of architecture discussed below are the user, activity pattern, purpose and the context.

(a) User as a generator

The person or persons, who will use or going to live in the building is meant by the user. The actual owner of the building and the user of the building can be different in some instances. (e.g. offices, housing scheme recreational centers etc.) As earlier said the resulted buildings cannot be considered as merely a symbolic element. It is an integral part of the truth of its creation. This truth is that it is built for the people, according to their nature of needs. Therefore when creating architecture, it's advisable to put more weight on the actual user of the building.

".....The environment is not random assemblage of things. It organizes both people's lives and the settings for there lives." (Cathrene, S.1997:7)

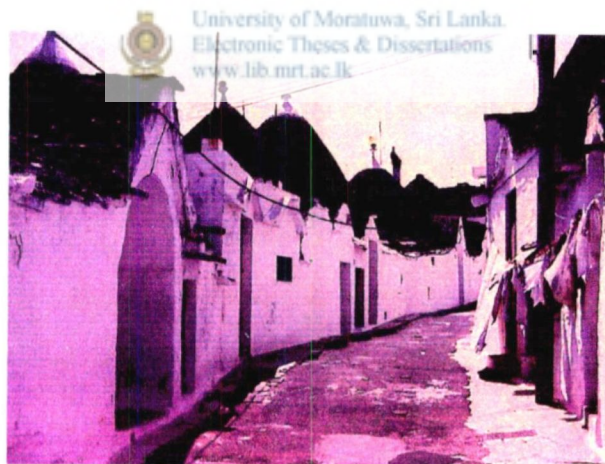


Plate - 02

User generates the architecture
A street house of Troli.
Street space is used as neighbour hood

Therefore the nature of the environment make specific connection with the user, and both will become intercommunicated. The emotions, reactions and behaviour of people generated on this basis; interact with these spaces that they inhabit and it may be said that such space get their meaning in accordance with the same emotions and behaviour. Such built environment of course varies in relation to different groups of people from hunters to agricultural settlers, city dwellers, etc.

(b) Activity pattern as a generator

Every living organism does certain things: they breathe, move, digest etc. So is the human species. Every moment of man's life is a moment of activity. He eats, talks, plays, studies, sleeps etc. Man arranges his surrounding environment to ease his activities. Architecture is the formation of space using tangible elements and they are with meaning created for different purposes to house different activity patterns of people.

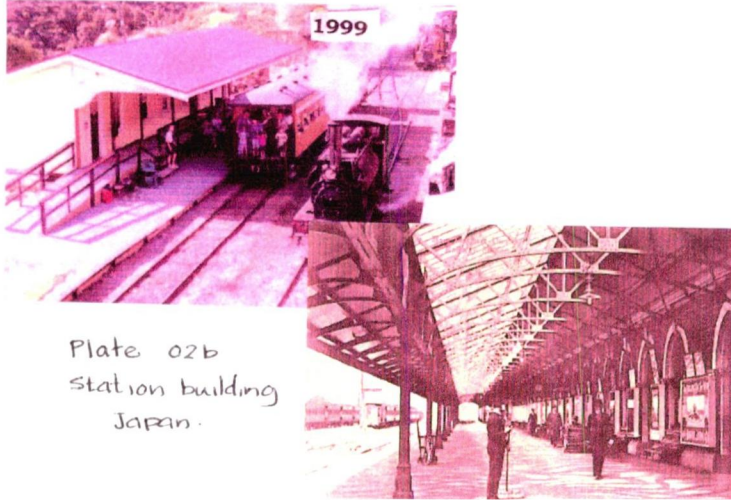
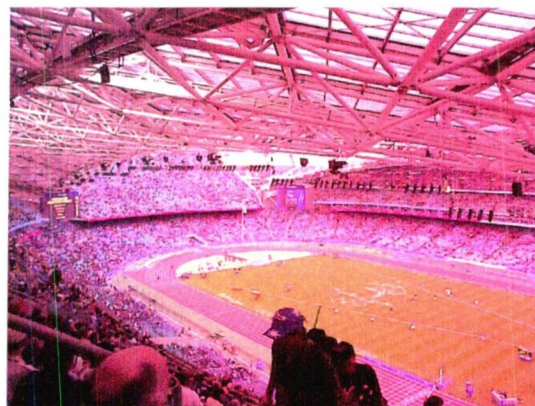


Plate 02b
Station building
Japan.

People sense, perceive places, built forms settlements in response to the activity pattern housed within the environment. Every man made environment has certain tangible elements repeating endlessly, combined in an almost endless variety of combinations. A town is made of houses, gardens, streets, side

walks shopping centers, work places, factories, perhaps a river, sport grounds, parking and so on. A gothic cathedral is made of a nave, aisles, west door, choir, apse, columns, buttresses, vaults. A modern metropolitan region is made of industrial areas, freeways, central business districts, supermarkets, parks, single family houses, gardens, high rise housing, streets, arteries etc. These elements in the environment articulate in certain patterns to form certain environmental quality for human behaviour in response to the activity patterns housed within the environment. For instance the traditional village layout where the dwelling units were set out in the form of a cluster or circling the central open area would have drawn inspiration from the behaviour and activity patterns of people living in such village areas. This is a good case showing the manifestation of the activity pattern. Such a situation can take place within the spaces of a building or of a several buildings.

Plate - 03
Modern examples - Sport stadium
Olympic stadium Australia



(d) Purpose as a generator

Every thing on earth has a purpose and a function. The flowers have sweet fragrance or honey to attract insects for the purpose of breeding its generation. As such man builds a shelter to protect him from outside forces as said before. But as time went on, with increasing needs he built places for various purposes. In every purpose he had a higher objective relevant to its nature. Thus higher objective is the higher purpose. To fulfill this higher objective they seek to generate specific condition. He uses signs and symbols to achieve this condition emotionally and spiritually. Therefore, resulted built nature is something with a magnificent out look and giving pride of place to achieve higher objectives and values. This quality is directed towards the deeper sense of its users and insists on a spiritual relationship between the relevant built form and the user.

The history of man following on the dawn of civilization provides abundant evidence bearing to this view; they include the Egyptian pyramids, Buddhist stupas, Christian cathedrals, Islamic Mosques etc.

**Plate – 04**

The different types of massive built forms achieve different higher objectives.



1.4 Context as a generator

A place a city or a town develops a certain character as a product of its history, geographical location, its original purpose and subsequent activities, buildings and its inhabitants, which in turn influence the appearance of the city. Such a setting, the surrounding or the framework, which is unique to a place, is termed as the context.

".....Architecture exist in relation to two sets of conditions, on the other hand building must respond to fundamental issues such as the need for shelter and for ideas to be symbolized whilst on the other they must relate to a region to a specific location to topography to the sun and to the movements of people" (Baker, G.B.1989:22)

It is evident that the context not only acts as a generator of but any architectural product, which is generated, by other generators of architecture should always respond to the existing context to make a coherent environment. This situation or the environment we concern, can be taken or evaluated in two ways. The definition is most probably a comparative one.

The wider context

The local context



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1.4.1 Wider context

The wider context is the broad consideration of a situation on an environment. The geographical setting of a town and its relationship to the rest of the district, province and the country, the town's origin and the original purpose, the historical growth and present functions, the socio-cultural and economical background, man and activities are the factors contributing to form the wider setting of the wider context.

As an example if we take a piece of land when a designer hopes to do a building, a detailed study of that particular area or even the region that particular site belongs to is taken as wider context.

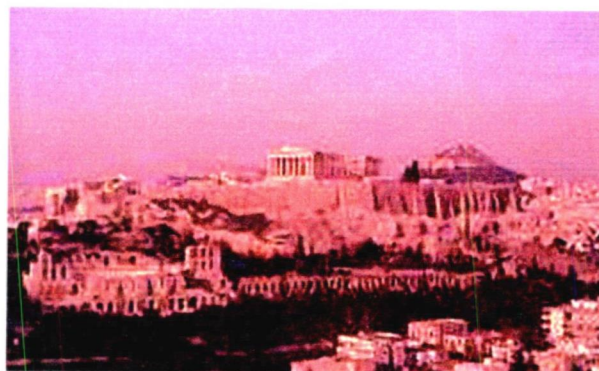


Plate – 05

Architecture generate responding to the wider context

1.4.2 Local context

The immediate surrounding of a building can be considered as local context, and due consideration given to it can help to maintain a character of a built context. If we take site as the situation, it includes site and its immediate surrounding. It constitutes the whole area that can visually perceive while being in the site itself. This is a most important matter to be considered when creating architecture on a place. It affects the human eyes, ears, body and mind. All his senses respond immediately.

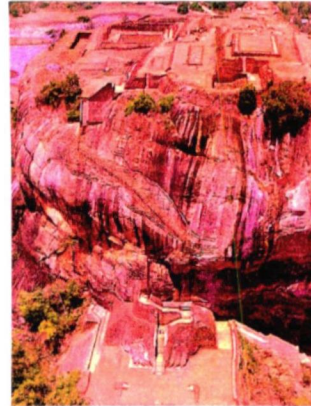


Plate – 06
Local context as a generator

On the basis of existence of this environment it can be described under two folds.

That is non physical context

Physical context

1.4.2.1 Non physical context



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Here it means the things that are intangible but yet named as the elements of context. Those elements or qualities one can experience it through built environments.

For example the organized communities, who lived together, form a society. But these communities are not same. They are different from one to another. So in a society there may be several cultures.

Therefore when people with different attitudes and ideas respond to various physical environments, the architecture should change. As a result of that we can find different architecture within the same area. Therefore when designing new buildings: non physical attributes such as cultural, historical, religious etc. contexts should be taken in to consideration. They will also be able to influence as a generator

1.4.2.2 Physical context

Here we consider the elements that are tangible and visible in a given environment. When a designer create architecture: the existing elements effects on the design. Sometimes the design comes out while responding to those elements in the environments.

Ex – A building done in the middle of an architecturally important build elements

A building done near or on a water body

1.5 Aspects of Physical context as generators in creation of built environment

The physical context can be divided into two according to their creation

1. Nature gives to the world – Natural environment
2. Man has brought on the nature – Man made environment

1.5.1 Man made environment

This is particularly defined as, the elements which are constructed by human being. From the beginning of time, man had recognized that to create a place means to express its embodied meaning. This meaning in structure reflects man's understanding of the natural level and his existential situation. Therefore man made place ought to have a natural basis.

"The architecture of towns and cities represent an elaborate lattice of symbolic meanings charged with emotional energy. Demolishing a single building may break the circuit and earth the emotional current." (Peter F.S. 1987:9)

When someone designs a building it is very important to consider on man made elements. Especially in a street, in a town or a city, the continuity of a place, balance, composition etc. have to be considered. Otherwise the existing character may be destroyed by the new building.

1.5.1.1 Composition

It is an arranging of two or more elements to please the eye. In architecture this is known as the three dimensional arrangement of physical elements of context. There are no limitations to the number of elements that may go to form a composition. Provided that this grouping be so arranged as to furnish a dominant focal point of interest which point should be the one to which it naturally returns after an examination of the various subordinate details of the composition.

1.5.1.2 Scale

This gives the meaning the relative size of the existing elements, in the built environment. For man to perceive any thing, the scale should be in a perceivable manner. It makes him easy to understand and relate himself. For this we call human scale.

"The first principle of an "attractive" environment is human scale." (Antoniades, A.C.1980:183)

But the concept of scale can also be applied where there's no fixed objective yardstick. In that instance scale represent the aggregate of the interplay between features which establish pattern and features.

1.5.1.3 Rhythm

To arrange any elements to an order how each and other element organized or composed on a given context, give life to word rhythm. In nature everything has its own rhythm. The way ocean make waves, the blowing of wind, the way animals walk. In human senses unconsciously seek for rhythm. In everything, especially the eye when it's fulfilled he is comfortable otherwise disappointment creates within his mind.

1.5.1.4 Texture

Texture can be taken as the more visual and tangible aspect created by nature and arrangement of smaller constituents/parts of the composition which further contributes to strengthen the meaning: the subjective component. Texture reflects the entity's more refined reactions to its internal forces and the immediate surroundings. For example a person can either be simple or sophisticated in his behaviour, his dress etc.



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Texture basically includes the roof, skin with entrances, openings, columns, and cantilevers etc. which dress up the form of the building contributing to wholeness of it consolidating the meaning. The dressing- shaping like adjectives, phrases, enrich the meaning given through the basic form texture is composed of features/elements such as roof, openings, color and texture etc.

1.5.1.5 Stance

Stance is the 'pose' of an entity: the visual aspect created by the assumed attitude towards its external forces and wider context. When it comes to built form it means posture of the building that can be on ground, in ground or over the ground.

1.5.2 Natural environment

Natural environment is comprised of all the physical entities created by nature such as topography, water bodies etc, and it could be basically divided into two sections; cosmic order and physical order. Natural forces which act in a very wider context could be described under the cosmic order, where as physical order consists of the natural forces that act in a smaller or immediate context.

1.5.2.1 Cosmic nature

There are two aspects of within the cosmic nature. They are the Climate of locality and ecology of locality. This climate and ecology prevail on a particular context over many years and unlike other entities climate and ecology seek a long period to be changed.

(a) Climate of locality

Climatic determination has been widely accepted in architecture as well as in cultural geography. It is an important aspect of the form generating in architecture. It creates a particular environment for every kind of civilizations. But in many parts of the world man has changed the micro climate of earth and has reduced its contrast by his drainage, clearance, and planting of standard crops. As a result of urban micro climate which created by man, the extensive paving and dense structures, the emission of heat; noise and impurities could be visible. Extensive city paving causes rapid run off, with a loss of local humidity and cooling, the depletion of ground water, and more frequent and disastrous flood down streams. Also the cities are warmer, dustier and yet have more rain and cloud than their rural counter part. The level of noise and air pollution is higher and there are more glares and less sunlight.

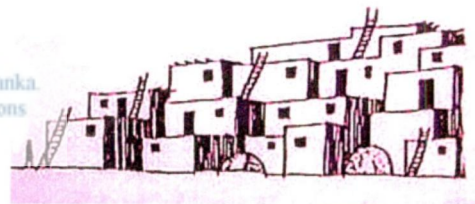
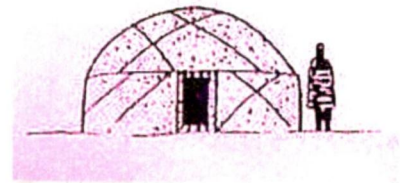


Plate - 07

Response to climatic differences

Therefore, for a designer what more important is, considering the above situations in the sense of responding to micro climate. Generally are various sources available to evaluate the micro climate of the locality; the weathering of old buildings, the knowledge of old residents, the appearance of plants etc.



(b) Ecology

Ecology is affecting factor to the wider context. It is greatly influences the regional architecture. Ecology brings forth designer's mind to think in depth about the relationship exist between natural environment and habitats of different communities. Because most of the designers seems to pay attention to the immediate context but not to the wider context, and as a result the aspects of ecology has been given a less importance.



Ecological Variations of Different Parts of the world.

Plate - 08

1.5.2.2 Physical nature

As mentioned above the substantial features rendered by nature is termed as the physical order. There are several components which deal with it and these components; most of the times motivate the designer for responding to the immediate context.



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(a) Land

The outer crust of the earth and it is the boundary between air and earth is considered. It is the zone rich in living things. Simply in architecture it is called as topography which includes hills valleys etc. Use and maintenance of the surface is dependent on the slop of the ground. When creating a harmonious built environment with nature, topographical conditions should be carefully observed by the designer to capture the real character of the location.

(b) Water

Perhaps the most important subsurface variable of all is the presence or absence of water; the moisture content of the soil, its internal and surface drainage, and the location of water table. The water table is that underground surface below which the interstices of the soil grains are filled with water. Normally, this is a sloping, flowing surface, which roughly follows the ground surface above and intersects with the ground at ponds, lakes, streams, seeps, or springs. Its depth can vary



Plate 09

Piles raise these dwellings above the river flood level

remarkably, however, and can fluctuate seasonally or over long periods. Impervious layers of rock or soil will modify its location by trapping water above or below themselves or by guiding it through seams.

Clearly a low water table is a problem for water supply and for vegetation. A fluctuating water table will cause a heavy day soil alternatively shrink and to swell, disturbing foundations just as a periodic frost will do. A high water table, on the other hand, makes for difficulties for excavation, as well as causing flooded basements, flooded utilities and unstable foundations

(c) Vegetation

The plant cover is a useful sign of soil and weather conditions. The suitability of particular plants for any position depends on drainage, acidity, and humus, as well as on temperature, sunlight, moisture and wind. Well adopted local flora may be best for new plantings, or they are guide to selecting new species of similar habit. The inner city is especially hard for them, due to the lack of water, light and humus as well as the polluted air, heat reflected from the pavements and the poisonous chemical which are used.

The existing plant cover is very likely undergoing succession and so will not endure in its present form. Certainly it will change as human use puts new pressure on it. Feet and wheel will destroy the native ground cover and compact the earth above the feeding roots, if nothing else. The water table is likely to fall, pollution to appear, the climate to change. Thus it is rarely possible to preserve the natural flora intact. At least in part, it must be replaced or modified. New plants are therefore chosen with two criteria in mind, there ecological harmony with the site and its intended use and there for a planned programme of continuous management.

Plate - 10



Harmony in boulders with vegetation

1.6 Concluding remarks

Man and the built environment have an intimate relationship. Every person is sensitive in varying degree to the built environment, he lives in, and he creates it, modifies and changes it constantly.

There are several **generative factors of architecture in built environment**, such as **user** as a generator, **activity pattern** as a generator, **purpose** as a generator, **context** as a generator.

When considering the **context**, as a generator it reveals that the **natural environment** has a significant role as a generator in creation of built environment.

Natural environment is an aspect of **physical context** and it is discussed in detail in next chapter under the title of **harmonizing characteristics of nature in creation of built environment**.





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CHAPTER TWO

Harmonizing characteristics of nature in creation of built environment

2.0 CHAPTER TWO – HARMONIZING CHARACTERISTICS OF NATURE IN CREATION OF BUILT ENVIRONMENT

2.1 Nature and architecture

Man and the nature has a very close relationship. Rabindranath Tagore in his book of "Towards Universal Man" depicts this as, "from the ancient times the eastern mind developed through close and unbroken contact with nature." For a creation of work of art man inspires and imitates the nature. Art also imitates in her process of creating a work of art.

Coomaraswami A.K. states this as "Art imitates nature in her manner of operation" or the creation of work of architecture is also an imitation of the nature. Early day's man utilized materials from the nature to create architecture. And man understood the character of the nature is "transitory" and man uses transitory materials to create architecture as a respect to the nature.

As language derives from nature, architectural language is also inspired from the nature. Thus, the quality of repetition and verity are both in nature and in architecture. There is several techniques used in the correct deal with nature. Such as "Green architecture", "organic architecture", Vernacular architecture", "eco-sensitive architecture" and "Reflective architecture". In "organic architecture" the forms and layouts basically harmonizes with the nature. Frank Lloyd Wright is a pioneer architect who practiced organic architecture in the world.

"Vernacular architecture", the technology and materials were used to respond to the nature. Hassan Fathy is a pioneer architect that practiced 'vernacular architecture" in the world. "Eco Sensitive architecture", generates with care to the ecological systems of the nature.

In reflexive architecture, it imitates the biological forms of the nature to the architecture. Also some architects get inspire by some structural systems and details from the nature for their creations. Such examples are Renzo Piano, Santiago Calatrava and Richard Rogers. The structural details of "IBM traveling pavilion", "pompidou center" is inspired by the natural forms. In addition, Santiago Calatrava's some world famous examples are inspired by the nature.

In the modern movement period, there were several pioneers in architecture who used their creation to dominate the nature. This is exactly opposite to what was discussed above. In

addition, they need to show the dominance of the modern materials rather than dominance the nature. Le Corbusier's some masterpieces were failed due to this fact. "Chandigar" in India is an example that he tried to contrast the creation from the nature.

In accordance with this study "built environment in harmony with nature", is referred as the built environments which generate through natural environments and become harmony as whole within that specific environment. Hence from here the study further illustrated on natural context which rich with more natural features than the man made things.

2.2 Architecture, aesthetics and harmony

Architecture speaks with people. It is a medium of expression that like language relies upon agreed code. That's to say a mere building is not architecture, when a building possess and expressive potential at the level of aesthetic performance becomes architecture. We always come across buildings in our idly life. The buildings are part and partial of our life.

Some might say that the fundamental form of the architectural enjoyment is simply pleasure in the appearance of something. The architect's task is to construct some thing that, both pleasing to look at and at the same time functional. There are buildings designs for pleasure the buildings like falling waters of Frank Lloyd Wright. There is an important distinction between sensuous pleasure and traditionally called as "aesthetic". Aesthetic pleasure is not the pleasure of senses, but is dependent upon by the process of thought. It is linked to the classification ability of the human brain, it's an out come of strive between familiarity and novelty understand by brain when eye see things (incoming sense impressions/ information) it always weighs them, with brain's existing mental models. Where there's novelty the existing knowledge structure is modified. But the rate of novelty is excessive that's if it threatens the fundamental structure of information the novelty is rejected. That building is an eyesore.

What's it who has done it

That type of remarks we'll hear because of the excessive novelty that rejects from brain. This maximum margin of novelty that can bear to a human mind is the contrast. From this maximum margin (the contrast) to the lowest level of aesthetic pleasure (aesthetic pleasure is the threshold of familiarity and novelty) called as harmony occurs.

But familiarity and novelty are the original representatives of the basic information categories of orderliness and complexity. They are the progenitors of harmony. That's the aesthetic pleasure is the harmony or in other words both are same.

So at the end we can say, if the buildings to give an aesthetic pleasure for people should be architecture. Or buildings should be harming harmonize with what? ?

If architecture is a language, it should have an ability to express some meaning. In a language the expressions are done through a set of words finely arranged to give a meaning (sentence). If we remove words from here and there it'll lose its meaning or make a hodge-podge. That is, in a sentence all the words are inter-related or in one word give a background to the other. The background words are important (context), like wise for architecture to be in harmony with its own background is not a new thing but it is an accepted norm. During the past and more importantly and more frequently respected today.

So with the continuation of this study, we will look in to how harmony has occurred within the Nature mother and then how the designers have tried to harmonize their buildings to the natural environment. 11?

2.3 Harmony in nature

Nature is every where. It affects and can be found in every inquiry of creativity. The concept of harmony may have its strongest roots in nature, the survival advantage of a harmonious marriage.

An advanced organism also demonstrates the principles of harmony. Its individual organs have a clear identity and purpose and can be analyzed in isolation but they have no

value outside the gestalt of the whole organisms. Independent is subordinate to interdependence the fine balance between pertness and wholeness is at the heart of harmony in nature. In brief, in a given situation the nature has own balance in its elements.

".....If we take a spruce forest, shadowy ravines are chocked with great boulders and fallen trees, snow drips or trickles from the crevice or gurgles underneath tangled forest duff. White water rushes and foams from high

Harmonious integration of natural elements



Plate - 11



ledge to chasm...here all is in harmony, all is complete even the bear lumbering close to shore is clearly native to this place." (Simonds, J.O. 1983:13)

As mentioned in the early chapter of this study, man also a part of the nature. Architecture is the part and partial of the man. Therefore nature and architecture are inseparable.

"...The act of architecture continuous to have inexhaustible resources and means which flow directly from nature and the inexplicable reactions of human resource." (Antoniades, A.C.1992:22)

2.4 Identification of harmonizing characters of nature in generating architecture

Nature can be understood aesthetically in two ways, one is the symbolic aspects of nature and the other one is the visual aspects of nature. All those aspects are determined by nature. Nature, that means the flora and fauna. It is the life of man. Man also is a part of the nature. Nature directs the man's life in everything. It is the main force by which working of the universe is determined.

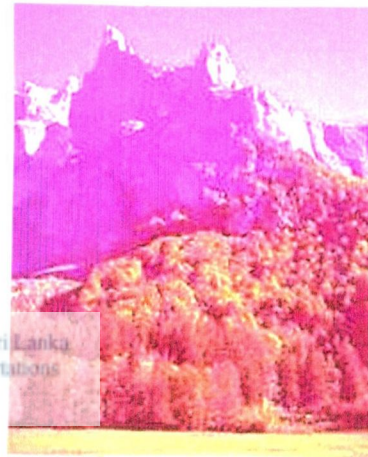


Plate-12
Manipulating
the harmony
in nature

"....Nature is in a sense unclassifiable, for it touches everything, giving the blow of life and shaping the prerequisites for the existence and the growth of things." (Antoniades, A.C.1992:233)

Nature as an architectural determinant, provide the aesthetic quality of the building in an intangible way. Creating of various moods of various places according to the character of the surrounding environment. In some areas if follows the nature's principles of creation, experience and the correct composition with the help of scales, proportions, rhythm, transformation and hierarchy. The sensitivity one experiences from observing an object in nature is similar to

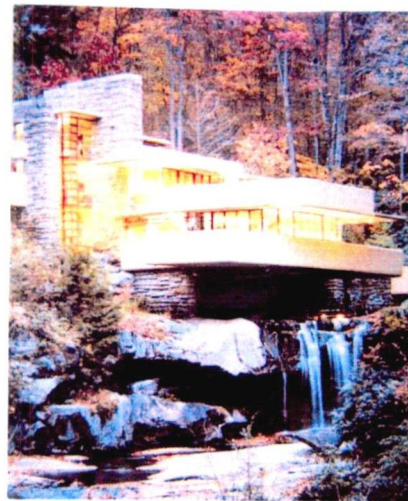


Plate - 13
Built in harmony

that one experience when observing a piece of architecture.

Every thing in nature is proper in scale and proportion. The elements can not be separated. When it is separated it will disrupt the whole composition and the balance. The operation of everything born is suitable to the location. So, observing and examining everything in nature is very valuable in arranging design with nature.

".....The truly react designers arrived at there conclusions through the observation of nature: there masterpieces show close kinship of form and design with plants or animals which have similar problem to overcome."
(Grillo, P.J.1960:9)

as an aspect of determining architectural principles in several features of natural objects, the composition of the human figure, the scale and the proportions of the

every part of a human being, the composition of the animals and the plants, flowers, the composition of the mountain, forest etc. are well composed in the universe, so that architecture also follows that principle of nature. It is the main force that determines the architecture.



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2.4.1 Symbolic characteristics in nature

Apart from the usual aspects, there are some imaginative and intangible aspects of nature. That catches the sensibility of our body and mind. Various naturally created places give some moods, emotions and the spirit of there particular places or spaces. All those intangible qualities or attributes in nature can not forget about similar to the natural spaces it resembles the architectural situations in several places. These relationships of architecture and nature give a deep understanding of the inter relationship of nature and architecture.

".....The art of architecture continuous to have inexhaustible resources and means which flow directly from nature and the inexplicable reactions of human emotions." (Aalto, A.1979:246)

All those emotions of the human being are generating from the nature. That is directly related to the emotions which were generated from the places where architecture, operate according to the manner of operation. All those aesthetic aspects of the nature can be experienced, examined, observed in and by intellectual way. All moods and the spirits

changed due to natural factors. But that can be experienced in various places in various times. The emotion and the feelings are changed due to the time and the space.

The formation of various natural entities the light and the filtering through a canopy of leaves over the elements and the serenely were made and composed by nature. All art and architecture have material physical basis and is stirred by material elements and it is composed of elements of nature. Most of the imageries are made by the phenomenon of nature, such as sun and stars, the sky, light, fire, rain, rivers, seas, mountains and forests. Those are the primary experiences of aesthetic. Vivante has pointed out that there is the sensual experience and considered it as purely passive. Nature is created all along, but the aesthetic qualities were the major sources used to create architecture. Nature has lent its name to everything that appears "real" it is the source of emotion, moods and the aura of space and time. Many of the emotions generated are intangible. They are the emotions that were felt by the people in the appreciation of architecture. Those feelings were generated through influence by nature.



Plate - 14
seasonal variations and textures



Plate - 15
Responding to the Patterns.

The changes of the hour, the passage of time as seen through the colors of the elements, the mountains and the sky, the filtering of light through the clouds, the moon on the sunset; all of these intangible and imaginative aesthetics were memorized as the various situations in architecture. These aspects are made as didactic potentials of nature in visual, spatial, and constructive senses. These intangible aspects in nature are really the attributes which are exploited for use in architecture, and those attributes can be identified as volume, scale, proposition, hierarchy and balance.

2.4.1.1 Volume

"...People live in earth, on the land but in the three-dimensional air space, the atmospheric volume, immediately above this land surface. Plans and land use maps may be measured diagrammatically and abstractly, but space for living is measured in cube, in volumes of air space enclosed or organized with tangible physical elements." (Garrette, E.1983:136)



Enhancement of the volume

Plate - 16

Volume is the main attribute influencing architecture. It has a different character in different situations. It changes from situation to situation. It can be tangible or intangible to understand in relation to nature. It is defined in various ways in various places. Width height and the depth were the measurable items of volume generally. But it can be measured only in small spaces or in objection the others immeasurable.



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In nature the volume is determined according to the eye connection. We have an idea or mood when we are in certain places, which are related directly to architecture. Those are mainly influence by nature. The natural quality of a place can provide inspiration for architectural design through its volume, scale and proportions of nature's creation.

Volumes vary in size from the intimate to infinity. In nature volume can be apprehended in varying spaces with the different location. If one is in a bare land, the volume can be measured in infinity. When there is a tree, it determines the tree. If there was a large rock, the volume reduces sequentially in to an intimate space.

"....The experience of being within fine three dimensional spatial volumes is one of the experiences of life." (Garrett, H.1983:136)

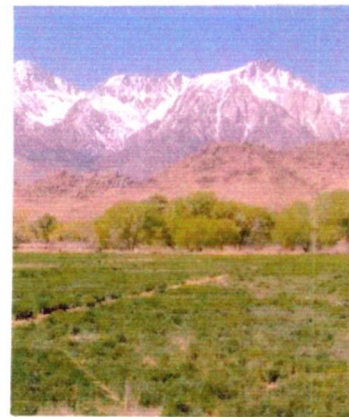


Plate - 17

Nature is the main three dimensional space to understand the volume. It varies according to the different situation of nature. Volume of the forest varies from place to place according the spatial progression of the nature. Experiencing of this kind of various spaces are memorized as spatial progression in architecture.

2.4.1.2 Scale and proportion

All the architectural forms were determined by the scale and proportions. Scale is a dialogue between the human and the objects. Proportion is the physical relationship between the parts of the building. Proportion is of particular significance in the field of architectural composition. Scale of the various suitable parts which govern the dimension of individual parts and their interrelationship were helpful to determine the aesthetically manipulated proportions.



Plate 18

Dialogue between elements

In nature all the attributes were made according to the suitable scale and proportion. A petal of a flower, the stem of the flower, and the leaves of the tree, all are generated according to the proper scale and proper proportions. It cannot be separated, and is a

whole. Some of the trees and the trunk were rated according to the suitable environment and suitable scale and proportion with economy of the particular setting. All these elements have their unity and the compositions with the help of their scale and proportion. So, nature's parts cannot be separated. Components of nature are well operated by nature itself.

The proportion of an item of architecture is extracted from that of human being. The main element of the proportion is the eye level and the height of the human being. This was realized by the golden section and the modular of the Le Corbusier's as explained in the theory of proportion.

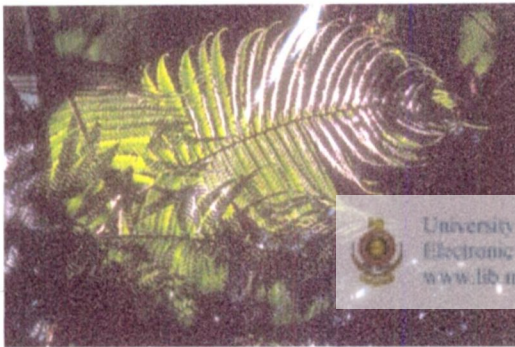
"...First we shall talk of the proportion of the man, because from the human body derive all measures and their dimensions and in it is to found every ratio and proportion by which god reveals the innermost secrets of nature."
(Lawlor, A. 1994:105)

Not only the human figure, but also all other components of nature guide the suitable scale and proportions. All those proportions and scales give intelligible inspiration for architectural creation. The information of has to handle scale and proportion the various situation of the various places were fundamentally guided by the rules of nature.

2.4.1.3 Balance

Balance is another attribute which affects the architectural formation. This has a major role in the architectural field. But the main source of understanding balance is nature. Most of the balancing components were born with the nature. Balance of the flower, balance of the animals, mountains, trees etc. are guided by the natural law of gravity. All these aspects were given the feeling of balance in the mind. Balance can be categorized in two ways.

(a) Symmetrical balance



It is equal and stable. It is like masses balance either side of optical axis or fulcrum.

Plate 19

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(b) Asymmetrical balance



Plate - 20

It is unequal and unlike masses balanced on either side of an optical axis. This equilibrium that is achieved by mind eye, evaluation of form, mass, value, color and association

Balance can be hidden like Henry, V.H. says, it can happen in two opposing elements or structures. There are an apparent attraction and tension developed between them. The symmetrically and balance has a quality of stability.

".....Growing things including humans are often symmetrical, for the seed or cell may be by nature symmetrical, and thus also are the shapes evolved through their development of growth." (Simonsds, J.O.1976:15)

All the above hidden and the apparent symmetrical and asymmetrical balance of the nature directly related to the balance of the building. There are buildings which have symmetrical and asymmetrical balance. It was composed by the different elements of the architecture same as the element of nature.

2.4.1.4 Rhythm

Rhythm is introduced from the very birth of a child. The heart beat is the first feeling of the baby to senses in its mind as rhythm. Has continuation and repetition.

"....The two irregular successive beats of your heart that means life to you, is a rhythm whose pattern changes, with your emotions, your health, your age. In all creative work, be it poetry, music, architecture-rhythm means life." (Paul, J.G.1960:154)

As Miess, V. (1992:32) says repetition in the form of rhythm, as much in music as in architecture, is an extremely simple principle of composition which tends to give a sense of coherence.

Rhythm can be a repetition of the element or object in nature and architecture. But it gives the monotony and the regularity to the object of nature and architecture. It can be in the horizontal and vertical way. In

nature the rhythm of the trees, the parts of the animals can be understood intellectually. The distance of the trees or the parts of animals is memorized in the same way as the rhythm of the columns etc. in architecture.

All natural phenomenon resemble in architecture very much in intelligible way. The spatial variations their densities, depth in repetition and regular pattern also enhance total rhythm of particular place.



Rhythmic pattern of tree trunks
Plate - 21

"....The root of architecture is to understand nature, the rhythm, proportion which can be found in study of a tree is a beginning." (White, S.1993:53)

2.4.1.5 Hierarchy

The principle of hierarchy plays a major role in architecture. It implies a dominance of space or objects. One always uses hierarchy to organize ones day to day life. Hierarchy of space is defined for specific situations according to the decisions of the user or designer.

Hierarchy of a building or of an object in nature can be experienced in three ways. Hierarchy by size, shape and placement. In each one it can be given meaning and significance by being an exception to the norm and normally within an otherwise regular pattern.

Shape is the visually dominant aspect. It may be discernible through change in geometry or regularity. Hierarchy of nature or building can be understood in size and the shape. But the hierarchy of the placement is rather different than above. A form or shape may be strategically placed to call attention to itself as being the important element in composition.



Plate - 22

Hierarchy in objects in nature

Nature is the main source inspirational of all facts. Hierarchy of mountains, hierarchy of animal's plants etc. are representatives in nature. It is shown in various ways, texture, color, form, shape etc. the orientation of the element in nature, centrality, geometric opposition also show out the hierarchy of the placement. All the above aspects direct the relationship of nature, and influence the subject of architecture

2.4.1.6 Transformation

Transformation is the principle that an architectural concept, structure or organization can be altered through a series of discrete manipulations and interchange in response to specific context it set of conditions without loss of identity or concept.

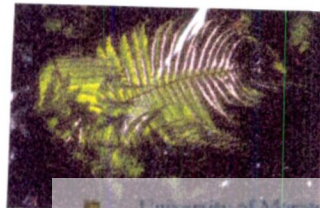
Biologist D.Arcy Thompson said about transformation that it is a process and phenomenon of change of form under altering circumstances. That means he only discussed the two dimensional concept of the transformation. He divided the transformation into two groups, as descriptive and analytical. Architectural relationship of transformation was taken as expressed

through the descriptive side. He has meant the sequential through drawing and its ultimate depiction of architectural form. But when talking about the transformation, it can not be expressed in the form only it has an unrelated form also. It has described the Jorge Silveti's

regard to transformation in architecture as our mental attitudes, the making of our inner beings in time in ourselves and in our intellectual make up. He defined transformation as

"...Those operations performed on the element of a given extent code which apart from the original normal or canonical usage of the code by distorting, regrouping, resembling or in general altering it in such a way that it maintains its references to the original while tending to produce a new meaning."

(Silveti, 1956:48)



Transformation of the whole vs. part, and forced externalities. In nature all the above factors are guided according to the principles. Transformation of natural components trees, animals, and the other elements in nature is being followed as rules by architecture.

Plate - 23

The above statement is an advance one for the transformation idea for architectural form and the spaces. Still there are considerable factors that determined all the above aspects as whole vs. part, and forced externalities. In nature all the above factors are guided according to the principles. Transformation of natural

components trees, animals, and the other elements in nature is being followed as rules by architecture.

2.4.2 Visual characteristics in nature

All the visual aspects comprise always hearing touching and experiencing. In ancient time most of the people responded to nature by imitating the aesthetic appearance of the objects. It is the relevant feeling of that people. Due to various aesthetical reasons they applied their formation and the colors as it is.

In addition to all the above factors, there are different attributes in nature. They have close relationship to architecture. In different places that are naturally created, and composed according to the scale and proportions, balance, symmetry, hierarchy etc. it may be visual but those will help to create architecture in different formations. It guides the basic of architecture. In addition to the forms there are so many structural principles which are

directed towards architecture. All those are not apparent but they have the strength of building up an architectural work. These are not only the visual but also the intelligible understanding of nature.

The roughness of the stone, the softness of the water, the link between the leaves and trunk, the formation of the flowers were shown out as their needs and their manner of operation according to the nature. All those have direct relationship with the architectural space, formation and the creation.

2.4.2.1 Topographical variations



Responding to the topographical variations
Plate - 24

Topographical variation of the nature is a main considerable factor which generates certain significant patterning systems in nature which leads to give identity in architectural creations. Land variations, greenery, water bodies together give rise to particular character to the location with incorporation of the other physical features on that particular natural setting. Topographical variations sometimes determine the plan. The gradient of paths, the flow of utilities, the use of areas, the disposition of buildings and the visual form are all dependant on it. The designer must grasp the land form as a whole and identify its key points.

"...he must sense its scale, the meaning of its slopes, and the relation of its plan shape to its perspective appearance. In most cases, the topography has an underlying order brought about by the flow of surface water. Thus the basic modeling of the ground can be analyzed by locating the ridge and drainage lines." (Lynch, K.1993:39)

2.4.2.2 Geometrical variations

The word 'Geometry' can be interpreted as the organizing discipline of a place or a thing. It is necessary for the arrangement of structures. So that geometrical constructs are as inevitable as they are in nature. In contextual design, geometry of site has a significant role of determining the organizing lines or regulating lines which also termed as the axes. It refers not

simply to geometric regularity, but rather to a condition in which each part of a whole is properly disposed, with reference to other parts and to its purpose. This enables the designer to produce a harmonious arrangement of the built environment with the nature.

For example a town built on a hill with its buildings being located along the contours or perpendicular to them gains a natural specific character to that specific location only. Likewise a town developed a river or water body gains a special quality as well as towns which are located in low-lying areas.



2.5 Concluding remarks

There is **no architecture without the inspirations of the nature**. Nature being as an **architectural determinant** provides the aesthetic quality of the building in an intangible way. Several harmonizing characteristics of nature are reflected in the discussion. The identified main two characteristics are

- 1 Symbolic aspects
- 2 visual aspects

Symbolic referred to as the imaginative and intangible aspects of nature where as visual referred to as hearing, touching and experiencing aspects of nature.

The above characteristics of **nature already harmonizing with its surrounding**. Addition of **built environment becomes a contradiction**. But it reveals that there are **several conditions** that could be blended with nature and reduce contradictions. Therefore a situation created to **harmonizing with natural context** is further more discussed in detail in the next chapter in the form of case studies.





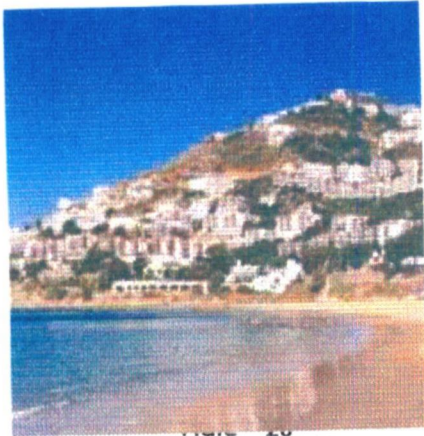
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CHAPTER THREE

Examination of manipulation of built environment in harmony with nature

3.0 CHAPTER THREE – EXAMINATION OF MANIPULATION OF BUILT ENVIRONMENT IN HARMONY WITH NATURE

3.1 Responding to the character of nature in harmony



Natural context as a generator
Plate - 25

exceeded in the developed worlds well beyond those of substantiality. So the architect's duty should be not to exceed those limits.

The desire for architecture to be in harmony with nature is not merely sentimental or nostalgic; it is a practical necessity if it is to be part of the echo system and accord with and be inspired by the same process even though a building is only a temporary and transitory occupier of eco system. But it can do a lot of damage while it is there,

Of course humans and their shelters are part of the nature and have a rightful place there but within limits. To day their limits have long been

From the following examples we can take the spirit which one should recognized when designing in nature. The examples discussing here will be from foreign as well as from the Sri Lankan situations. Though, for studying purpose we have taken the resources of natural environment under four elements, in most of the time when we get a site to respond there will be one or more resources we had to respond to. Because of that some examples will not cater only one element of above category but for one or two (for example some times the given site has water body and green cover or a topographical change and a water body etc.)



Adjustment according to the
topography
Plate - 26

If we consider the land, people have responded different ways or get themselves adjusted according to the various topographical changes. Those principles are important for this study. In the following examples we will be looking at a building done close to greenery, on a sloping site and on a flat

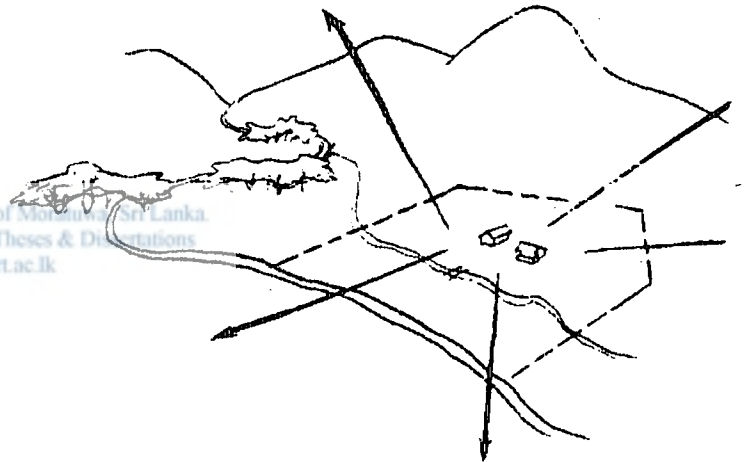
site. At the end of this chapter the study will focus on to some local examples where the buildings were placed harmonious with its own context.

3.1.1 Built on large lands (A rural site)

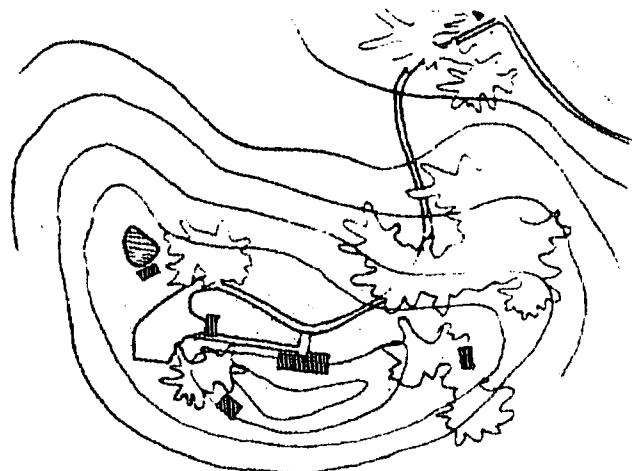
Most of the times the land area is much bigger comparing to the towns. Because of that the plan could be a spreader on much open and free. Though the sites have its own four boundaries in those sites the visual limits may include extensive sweeps of landscape. In these site paddy fields, water bodies, even mountains tops miles away, becomes design factors and elements.

Freedom with open views, of sceneries sky is the essential quality in those. We may logically orient our plan outward to embrace the total sites best features and to commend the best views.

The building in open land has an expansive feel of streams, trees and distant hills all features of nature that can be sensed or seen are part of the extensional site (figure xx)



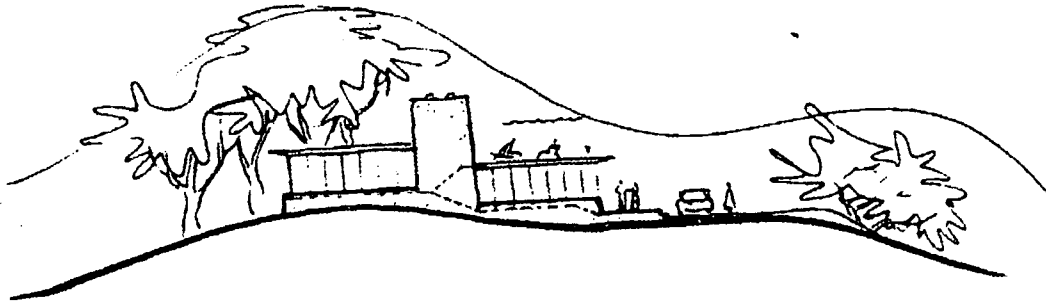
Ample area permits for a spreader plan, each element being related to the most compatible topographic feature. ()



The earth and the ground forms become visual elements. This can be



enhance or submerge or go parallel with it.

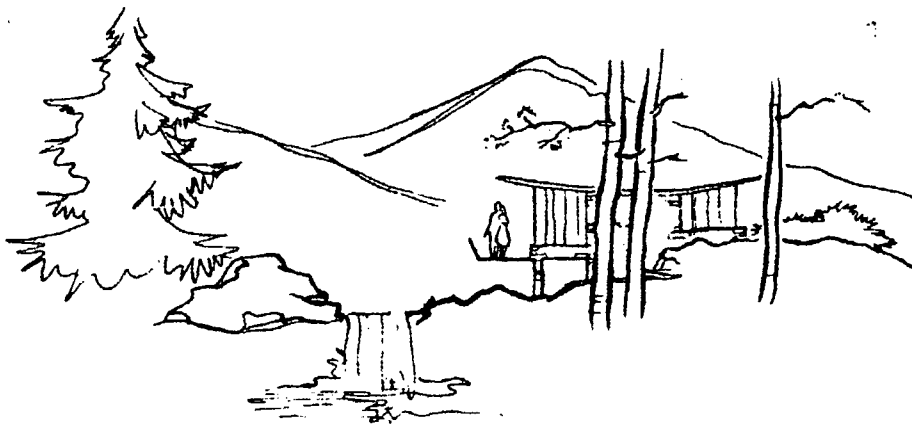


The landscape character of the site becomes important to create a coherent transition between structure and the site.

Here the building was built almost parallel with form of the topography. Major topographical features are taken in it the building or built around it.



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The built elements conceived in sympathy with ground forms borrow power from and return power to the nature.

In this environment the structure placed with minimum disturbance to the nature (the building is on stilts) while trying to embrace the nature in to the building (the roof forms cantilevering balconies in to the environment).

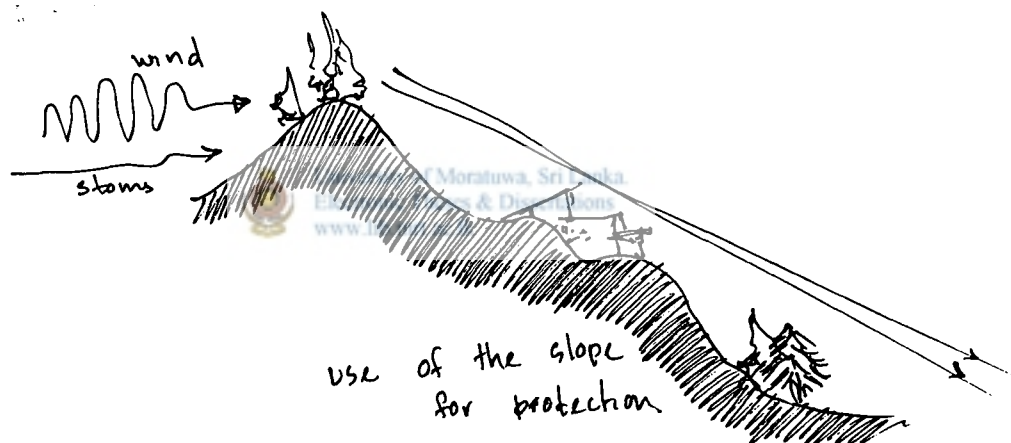


3.1.2 Built on sloping site

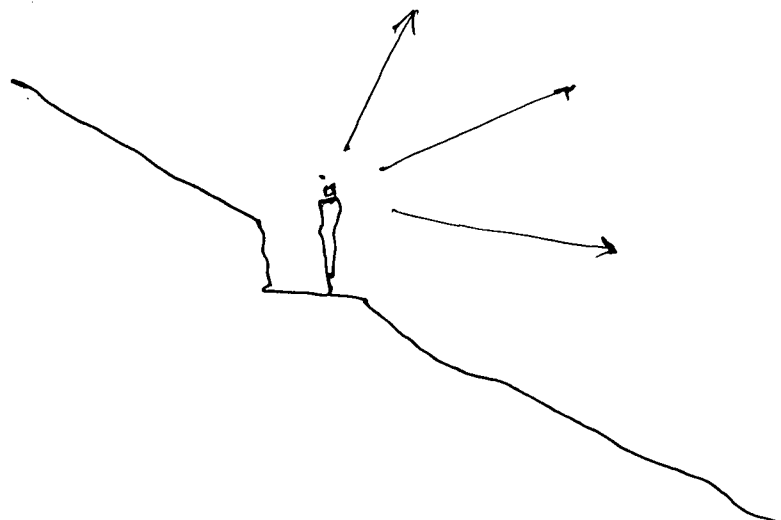
The contours are major designing factor. In these sites one has to consider what's most appropriate whether level place is achieved through terracing by retaining walls or by cantilevering. The pull of gravity is down the slope—the design forms not only must have stability, they must express it to be pleasing the sloping site lends itself a dynamic plan form.

The dynamic quality of slope is its apparent change in grade. Natural grade changes may be accentuated and dramatized through the use of terraces, overlook decks and flying balcony.

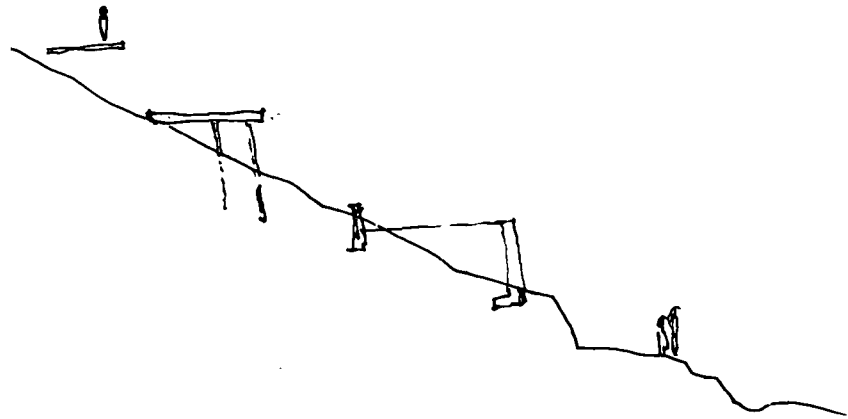
The slope inherently emphasizes the meeting of earth and air. Inherently these sites are rich in views. Though there are lots of credits on the side of the slope, there are some factors one should seriously think of, storm water or wind effects, land slide (probable) ground water and surface water run off etc.



The outward orientation with rich views



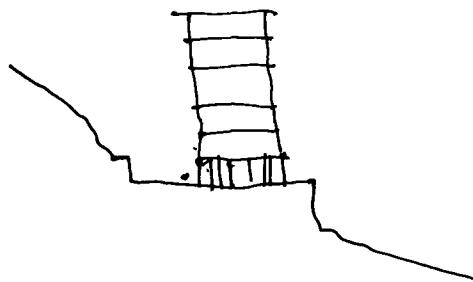
On a sloping site terracing, retaining walls, the supported platform or the cantilever achieve the level plane.



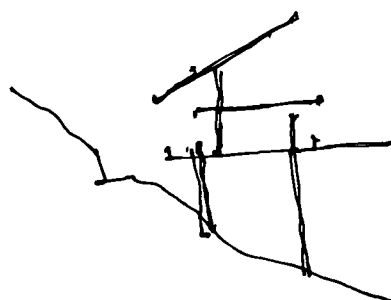
Imposed structure may hug the slope

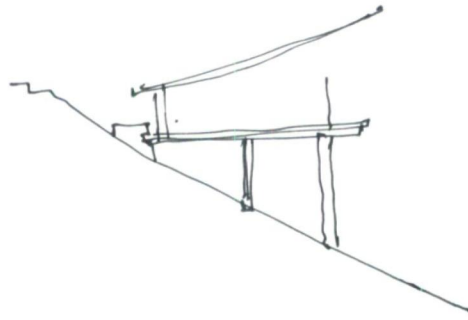


Rest on a platform

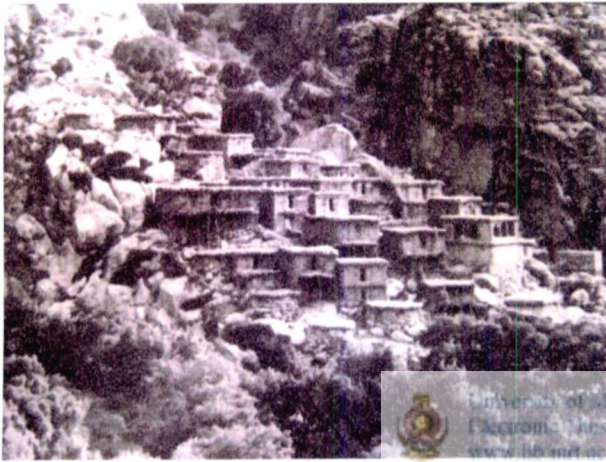


Stand completely free



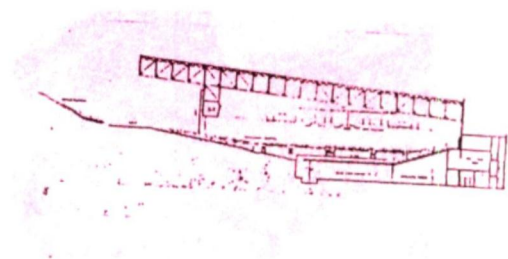
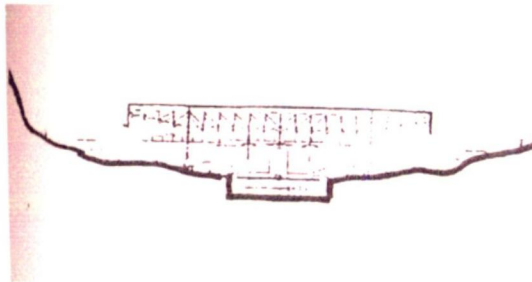


The placing of building on a sloping site (plate -27)



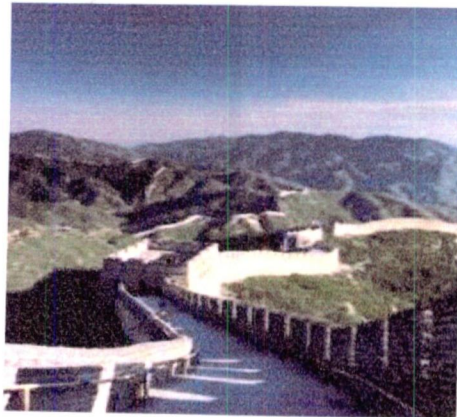
Performing art pavilion Concord, California

The building located in a bowl in the landscape acoustically shield performances from the noise of an adjacent highway and conceals the pavilion from view. The designer has not disturbed the mountains just fill the valley and used the natural topography as a noise and visual barrier.



The fortress walls were a deliberate attempt to extend and reinforce the protective conformation of the mountain ridges.

Plate - 28

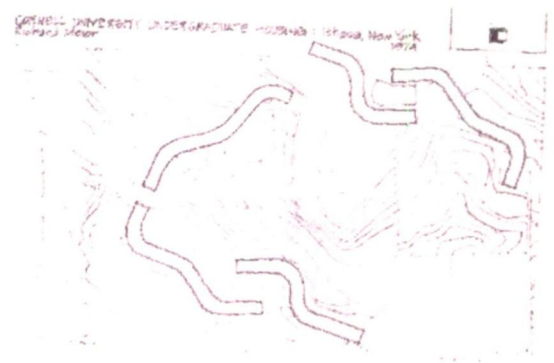


The red rocks amphitheater Denver, Colorado; harmony with existing nature
People used to climb to top of the red rock. It was a very hard journey. To ease situation people built flight of steps that made amphitheater down the hill automatically.

Plate - 29



Order without reason - monotonous



Ribbon pattern in free alignment, to flow with the topography. Harmony is pleasantly evident
The above two figures show how one can go against the nature or live with it.

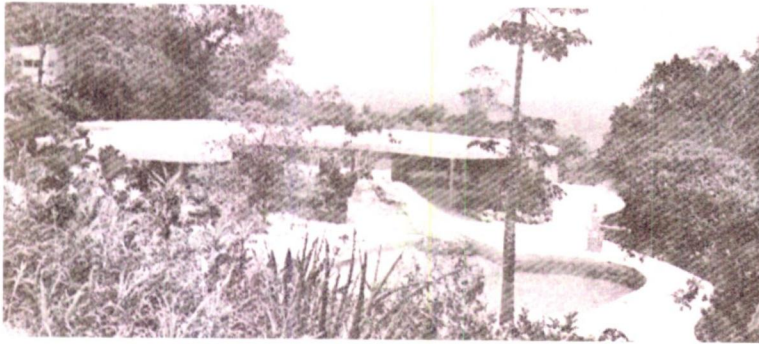


Plate - 30

The building placed o contours merges with the forest while facing the sea

3.1.3 Built on flat land

A level site offers a minimum of plan restrictions. A flat site is essentially a broad base plane. All elements set upon this plane are of strong visual importance, as there's a relation one to the other.

There's no focal point on a flat site. The most visually insistent element placed on this site will dominate the scene.



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The flat site's character is created by the elements introduced. Bold forms, strong colors and often-exotic materials may be used here with out apparent violation of the native landscape. A method of construction that attempts to restore rather than drain the planet of resources.

Plate - 31

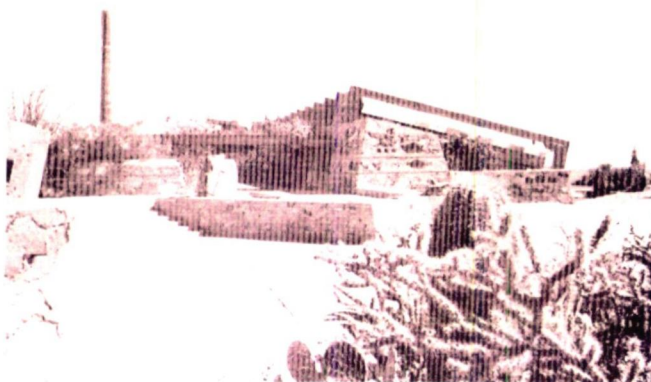
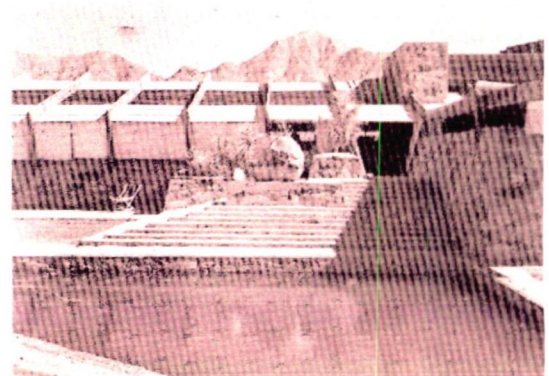


Plate - 32



3.2 Built Form as a responsive mode in harmonizing with nature

The Earlier part of this study discussed the way of responding to different natural context when creating built environments, submerging with the nature in a coherent manner. But at the end, it gives a clue on 'which aspect in built environment is going respond harmony with nature. Therefore it is essential to identify the constituents of built environment, which can be used to harmonizing with nature.

Different kinds of built environments can be responded harmony with its context in many ways such as by its color, texture, building materials, building orientation etc. under different concepts. Such architectural work communicates with its beholder through comprehensive manipulation of architectural language.

All art forms posses a language of its own to facilitate the communication. Hence it is the communication through architecture termed as architectural language. Architecture manifests in the form of an integral system of forms and spaces. The specific structure of these brought out one's emotions into a higher pitch. Like other arts these emotions are evoked by a message or a meaning depicted in the built form.

Jurgen(1985:23) describes architectural form as the outward body within which the space is embedded. And also its direct reciprocal relationship between form and space, space cannot be experienced without form, and conversely, space creates distance need to perceive the form and space together give rise to expression.

3.2.1 Attributes of built form

Considering the built form, it has major components to determine the basic form of the masterpiece. These are enhanced and helped to determine the built form regarding to the situation. If not there will not be any satisfaction to encourage the form within the relevant condition.

3.2.1.1 Plan configuration

Plan form is described as an arrangement of spaces. So the arrangements of the plan form enhance the internal spaces, function of the building and its response to the site factors corresponding by this. So it captures the sense of three dimensional qualities. It could be used to express some of the essentials or the architect's intended message.

This is a two dimensional quality. Volume is not considered in plan configuration. But this is based on capturing the volume of the building. This two dimensional quality cannot be seen from its users. It can be felt through the emotional quality of the space.

3.2.1.2 Orientation of the building

It is the true relationship between site forces and the building forces. Orientation is important issue in creating built environment, because it causes various visual effects on observer by conveying the message. This leads to identify the architectural form within the totality of location.

3.2.1.3 3D composition

Three dimensional form is the qualitative definiteness of internal and external space and at the same time it is the most important expressive component which is capable of communicating the architect's intended message. The three dimensional composition can also be defined as the extension of material entities and the correlation of each of them with the surrounding material entities. The qualitative attributes of the external space been modulated by the volume of the building. These volume or masses create the three dimensional form.

3.2.1.4 Hierarchical order of spatial arrangement

The built form is created by the collection of spaces. Those spaces which are used to enhance the built form are not in same size and qualities. There is a categorization according to the needs of the dweller. Therefore according to the architectural needs a space should be enhanced and encourages as a main space, while other spaces will help to keep that function. So that quality enhances as hierarchical order of space.



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CASE STUDIES

3.3 Manipulating the built form in harmonizing with nature - Case studies

The manipulation of the built-form in harmonizing with nature is considered and selected in three different case studies for the examination.

The selected case studies are as follows

- Kandalama Hotel at Dambulla
- Blue waters hotel at Wadduwa
- Polonthalwa estate bungalow at Nikarawetiya

Kandalama Hotel - Dambulla

This has a surrounding of rocky forest and still Lake Environment. The manipulation of the built form in harmonizing with nature is considered on the above fact.

Blue waters Hotel – Wadduwa

This has a surrounding of costal strip with coconut plantation and the costal railway line. The manipulation of the built-form in harmonizing with nature is considered on the above fact.



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Polonthalawa estate Bungalow – Nikarawetiya

This has a surrounding of rock bolder in a coconut plantation. The manipulation of built-form in harmonizing with nature is considered on the above fact.

The above stated case studied re further discussed in detail.



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A
KANDALMA HOTEL

3.3.1 Kandalama Hotel – Dambulla



Plate 33

Kandalama hotel at Dambulla is a five star hotel which was implemented by the Aitken Spence. Geoffery Bawa was the architect behind this magical creation. The hotel is located by the side of Kandalama tank in Dambulla, which bares a historical value to Sri Lanka. Due to the fact that the Architect is very much aware of the physical context, and his knowledge of empirical connections along with his tremendous capability in articulation the hotel as a whole it looks very successful piece of Architecture.

According to the conceptual idea it becomes necessary to design hotels that offer its customers something 'special'. It has been identified that the most significant feature, at this particular moment that could make the hotel 'special' in its context. In Kandalama hotel the architect has shown how to be responsive to the



surrounding environment and thereby to generate architecture that is meaningful and sensitive.

(a) Nature and its character



Plate -

Kandalama, the place where the natural beauty of the landscape and the peace and harmonizing of the surrounding

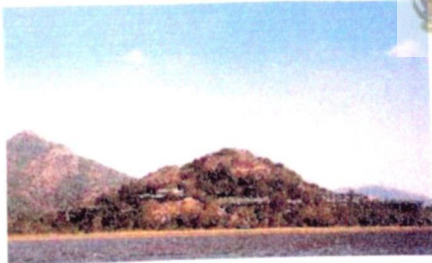
Among the prevailing few hotels sited in the interior of island, Kandalama hotel is a realization of an environmental sensitive area. In precise, it is in the nourishing area of the 3rd century Kandalama tank in Dambulla. The site is sloping; is occupied on a middle position of a side of a forestry hill. Further the site is having an extra benefit of the scenery of the Kandalama tank,



distant view of Sigoriya rock as well as the sacred Dambulla rock.

Uniqueness at Kandalama which had made it 'special' is created due to two main factors; the rock and the water. The rough, rugged rock in delicate balance with smooth still sheet of water, have generated the 'character' that is unique to Kandalama.

Creation of the building totally follows the rhythm of the rocky mountain. The outer appearance of the rock and its solidity, the sheet of water in the other side enhances the solidity of the rock. The designer has totally identified that and he concerned that idea into building, and he uses those components of nature to determine a suitable architecture for that place. Geffory Bawa said the hotel was conceived as a belvedere on a series of magic views as an enjoyment in itself.



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Bawa had identified these patterns of the later site, he conclude it 'surprise-drama and mystery and suspense'. In addition, he identified the patterns and the rhythms of the site and the surrounding nature. Bawa has identified the long ridge behind the tank that ended in an outcrop, which had a cave like cliff face. He also has been impressed by the view of the Sigiriya rock across the tank. Witnessing all these, Bawa has almost formed the hotel in his mind.

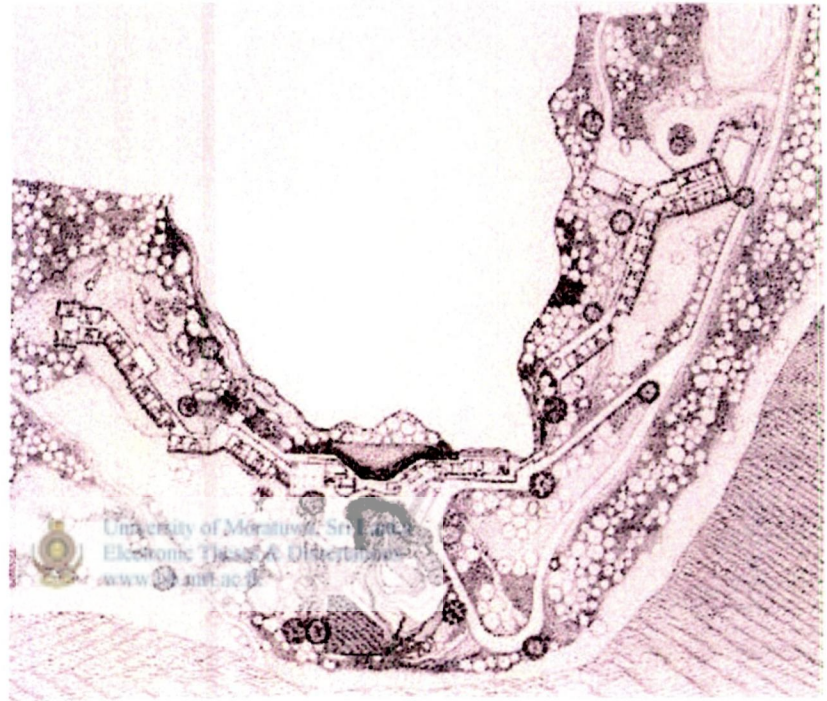
(b) Plan configuration



Plate - 00

When considering the building setting out of the Kandalama hotel, it is done on a linear development along the slope of a hill, which is the catchment area of the Kandalama tank. The shape of the hill has highly affected to the setting out of the building.

This specific nature has enabled the building to achieve a flexible movement, following particular rhythms and patterns inherent to place, making itself well blended with the context. It is obvious that this particular plan form of the building is purposely achieved, not only to facilitate its functions but also to strengthen the main theme: "a place for one to experience Kandalama."



The architect has harmonized the hotel by lying out the hotel in to two wings in a 'snake form' with the geometry of the bedrock. Its language dramatizes the glory of the nature by allowing the vegetation of the thick jungle to overcome it. In the macro scale the building is hidden and it will emphasize the dominance of the nature.

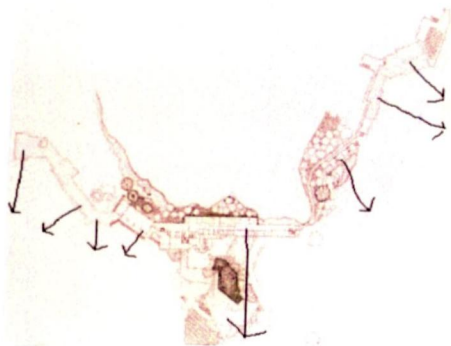


Plate –

The layout increases the visuals of nature to perceive to the perceiver in different angles



(c) Orientation of the building

The building was orientated to give a maximum view towards the lake. The architect has achieved that by arranging the spaces like a set of ribbons running with the existing contours

In achieving this concept Archt. Geoffery Bawa has tried to make the building a part of that context so that one could experience the real essence of Kandalama through the building itself as well as through the views it provides towards the outside environment.



Plate - 00

The hotel was done as a part of this hard rock boulder. He has considered the surrounding forest, the rock and the opposite, still water body. Even the distant ring of mountains Moratuwa, Sri Lanka. Orientation of the building obtained the potential of providing a better view of the surrounded area to its customers and thus has contributed in achieving its ideal concept. Excessive use of glass and open areas has contributed in this attempt and blending of external and internal environments. Therefore it makes the building a part of the same context.

The overriding influence to restrict the hotel to an existing clearing from the previous use as a 'chena' by the surrounding villagers has been affected. This minimized the land area of human intervention resulted Kandalama hotel in multi-story form. Hence the straight- line geometry of the structure brought it into sharper focus together with the huge brief.

(d) 3D composition

Composition of the building is well suitable to the site condition. The designer identified the rhythm of the mountain and he wanted to continue that without destroying it.

Plate -

There are two hills with gap of in-between. He wanted to fill these by the building and continue it as a rhythm of the mountain.

He operated the building well suitable to that condition and to the other objects in the nature they operate without unbalancing the nature. This building also acts without destroying the character of the nature.

The overall unity of the form has been achieved by composing mainly the rectangles, which are oriented to different angles in order to tally with the character of the place, linking them through common spaces of mostly the corridors and lobbies rhythmically.

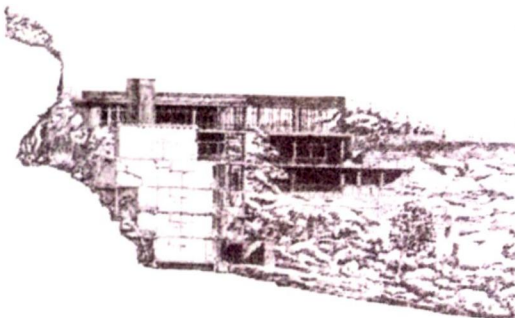


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The complete structure of the hotel is made of a highly geometrical form. Entrance lobby is triangle. In the same way most of the other spaces are rectangles.

Plate -

The building is tied to the context by incorporating physical features of the natural environment into the built environment. This has made the building unique to that place while making it well blended with the natural environment. Colors and textures used in exterior walls, reduced solidity through excessive use of glass and open areas, ideal balance created between horizontally and vertically repeating the rhythmic movements of trees and planes, flexible, stretched nature adapted in locating the building, all together has made the building "well blend" with its surrounded environment.



The use of colors in this building harmonizes with the environment. The roof top is constructed and painted to be seen as a natural garden. Bushes and grass have been planted on top of the roof to make it compatible with environment.



Plate -

For the growth of the design the architect captured the essence of the trees, lake, the mountain etc. His consideration was on the rhythm of the trees and the rocky mountain. He captured balance and the unity of the situation by exposing verticality by columns. It expresses the vertical rhythm of the tree and it follows the rhythm of the mountain. The rhythm of the mountain is followed by divides in to two wings. It grows as two components according to the rhythm of the hill.



Plate -

The rectangular or square have made crept into a grid to reduce the effect of a vertical box. Further all the boxes are not in same height. Thereby it creates terraces and uses them as roof garden with the wild flora which hanging from the roof attempts to hide the building in the forest.

The sale and proportion of cubes with linear elements of the composition reduces the huge scale in plan form and seems to be tally with the spirit of place. (On contrary restaurant failed to capture the essence due to it's dominate scale of the cube.) This has been quite offset in the vertical scale and proportion due to the presence of verticality domination in the forest.

(e) Hierarchical order of spatial arrangement

The hotel Kandalama is exceptional in the designer's articulation of spatial qualities as it provides the beholder the ultimate spatial experience giving a complete feeling on surrounding, which is true to the culture, the nature, thus creating a building in perfect harmony within the cultural and the natural context.



Plate -

The man-made ramp provides the oblique approach acknowledging the natural surrounding essence and bringing a visitor to a higher level and to the middle of the form.

Hence the inflection of bedrooms towards the both side from the entrance lobby has spread respecting the natural setting and the contours of the hill. The two wings have been punctuated by the squares which has a void in the middle. There by it brings the spirit of forest into the man-made environment or becoming a place where the two environments are unified. One wing is ending with a viewing deck sandwiched by the bedrooms and the other is by a central atrium space where one end is open to the forest.

The organic nature of the shape and the progression of the entrance lobby trough a living rock to the main lobby contrast from the other refined sharp spaces and the progression within them, as it is the main progression of the entire complex. There, the articulation of one wall plan is of white smooth concrete surface and the other wall plane is of natural rough brownish rock surface. These altogether make feel of the inside of the forest particularly a situation that has came forth of a rock on the journey of endless walk in the wood. Although these spaces have a strong spatial link to each built spaces (not been split into several) doesn't harm to the essence as the nature itself has contributed in the configuration of spaces.



Plate -

The progression to the other spaces has been by mostly through corridors. They have a strong overhead plane where the wall plane is minimized to columns hence allowing the exterior to penetrate into the space, which makes a live walk just as walking in the forest. Further the devoid of details of the built spaces accentuate the landscape.



Plate -

Most of the public areas and bedrooms are arranged as to have an ideal views. The building being a narrow strip thus provides user with views of the natural environment at any place of the building.

Every public space is open to the nature and every effect had been taken to bring the nature and man closer. But when the private spaces like bathrooms are considered they are connected to the nature by frame view.



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HOTEL BLUEWATERS

3.3.2 Blue waters – Wadduwa

Hotel Bluewaters is located in a coastal site (western coast) at Wadduwa, Panadura. The designer Archt. Geoffery Bawa was designed this hotel specially foreigners who comes to experience the Sri Lankan sea cost and tropical climate of hot and sunny conditions. It was specially designed in the concept of 'hotel that experiences the western sea cost and climate.

This was constructed in 1998 with 96 rooms, the hotel blue waters is located on the southwestern coast in the township of Wadduwa. A lesser significant site compared to the other sites of similar hotels by the architect, the site itself is located off the southern highway, in the midst of the immense expanses of coconut tree land along the beach front.

(a) Nature and its character



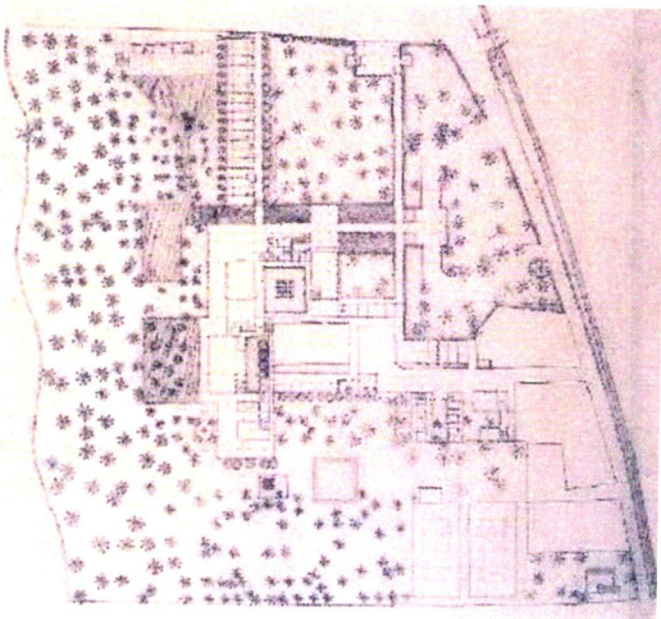
This particular hotel lies in a context in-between a beautiful stretch of beach and the coastal railway line. The site is comparatively a flat land. The entire context consists of a large spread of a coconut plantation. The vertical rhythm of the coconut trees in front of the sea adds a particular character to the location.

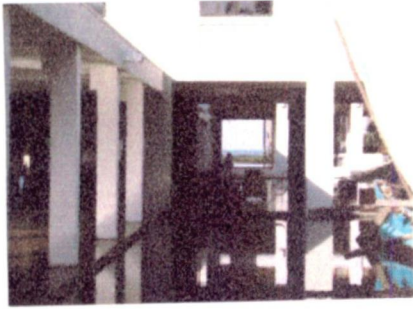
(b) Plan configuration



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The plan form has been spreader over the land to capture the optimum visual link with the sea front. The plan for lies with responding to the site geometries.



(c) Orientation of the building

When considering the orientation of building entrance has given a rather big statement and the parapet wall has isolated the entrance from the rest of the hotel. When you are at the door step to the entrance you will feel the long axis, which give you the view of the sea at far end.

When you slightly off-word from the axis soon after the entrance to the hotel you can see the colonnaded axis which you carry towards the sea. The reflecting pool has given the environment of water prior to the sea.

At the end of the axis one gain a cross axis carry towards the dining area. End of the entrance axis there is the resting area, which almost every time occupied with people.

(d) 3D composition

Composition of the building is well suitable to the site conditions. The designer identified the rhythm of horizontality of the ground and the verticality of the coconut plantation. The form occupies much void than solidity harmonizing with the natural characteristic of the site.

There are various designed components added to the building to feel the qualities of it. The most striking feature from all is that the afternoon sunrays come in to the building and creates patches of lighting strips along the corridors. At the same time it was designed to allow the monsoon rain dashes through pergola to corridors to feel the monsoon rain. But at the moment the hotel authorities has controlled this part since it was troublesome part in maintenance aspect.



(e) Hierarchical order of spatial arrangement

The pathway progression begins by taking a turn towards the seaside from the Colombo Galle highway, along a narrow insignificant sandy road; the approach to the hotel. Approaching a rail track, with movement along the track one's gaze is captured by a fortress in the midst of coconut palms growing in neat rows, setting the first glimpse of the built entity with its huge inviting entrance porch.



The spatial hierarchy is established primarily through the gradation (or progression) of spatial experiences. Thus, primarily deriving a 'main space' as a climax, as a mental pause is created rather than a place of activity.



The cool white pillars lining the corridors, while in resection of the tall coconut palm gardens growing within the entry, the undulating shiny floors as a continuity of the glittery shallow ponds lining the corridors further adding to this main theme.



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PLONTHALAWA HOUSE

3.3.3 Polonthalawa estate bungalow – Nikarawetiya

Polonthalawa bungalow, which is situated on an estate which was owned by A. Baur and company Ltd, in the past, had been built as the quarters of the estate superintendent who was in charge of the estate. The Bungalow is situated about 15 miles away from the Nikarawetiya town and the area is very rough and has no infrastructure facilities.

The Architect of this Bungalow Ulric Plesner of Denmark nationality and Geoffrey Bawa of Sri Lanka have been successful in doing it in a very constructive manner using the natural resources on an area where fairly large rock boulders are in abundance.

Ulric Plesner is a Citizen of Denmark a Western country and inherits culture full of western thoughts and concepts. Geoffrey Bawa is an Architect who lives in Sri Lanka and he is a person who has a good relationship with the western thoughts, but also who has a good knowledge of the eastern way of thinking and eastern culture. The Polonthalawa bungalow which was born of the collaboration of these two architects is another fine example of the combination of Eastern and Western concepts and how it blends with natural context.

(a) Nature and its character



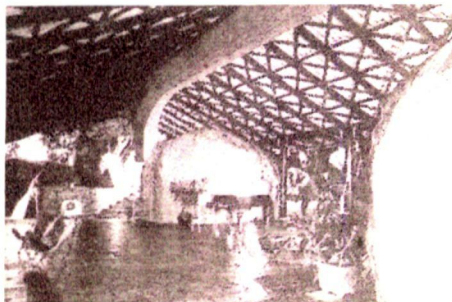
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While building this bungalow, which is found in a large coconut estate situated in a rural area, the geographical factors of the area had been used very valuably. The way this house was built with the minimum possible harm to the nature.



The architects were strongly influenced by the character of the natural terrain, the vegetation, the potential for developing vistas out into the landscape in order to blend the design with the nature.

Plate -



The most extraordinary characteristics that can be seen regarding the Polonthalawa Bungalow is the use of the rock boulders, which were there in the site. It can be seen that the rock boulders have been used for both structural and aesthetic value.

When the concept of this work is considered the architects have not tried to give any thing deep to the observer. But it is seen that their aim was to show the special features of the natural elements.

The architect has skillfully crafted a residence that gently embraced the undulating landscape. The most outstanding qualities about the house is the way architect deals with giant natural rock boulders on the site, and the manner in which he incorporate them into the design.

(b) Plan configuration

In Polonthalawa the plan form has emerged naturally without plans or any drawings. The house was largely design on site and its organic configuration of plan has respectfully inserted the building in to the site to exploit the natural rock boulders.

The language is handled very effectively in harmonizing the nature that anybody would hesitate to believe that this wonderful creation was done 'without drawings. "The house was sketched out roughly on piece of paper and then set out on the ground with sticks and strings."





The setting out of the building is done according to the topography of the site. This is something other than the setting out of a usual living house. Here the setting out is strongly influenced by the things like site formers. As there are a lot of rock boulders in this site the setting out of the building is decided according to the situation of those rock boulders. The layout of the building had been arranged in such a way that certain boulders have been used as structural elements while others have been used as aesthetic elements.

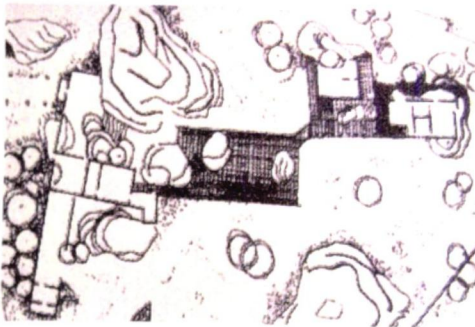


Plate -

When considering the plan form of this building, it consists of two rectangles. A corner of one rectangle is connected to a corner of the other by a small linear path. This is the connection of highly geometrical forms.

(c) Orientation of the building



Always care was taken to orient the house to the wind direction and give flexible character to the building to responded to the climatic condition.

When looking at the residence, one has a feeling that the natural setting, trees and giant rocks are more important than the building.



The frame view through the rock boulders of the entrance lobby overlooks the living from a slightly higher level. A narrow shimmering pool flushed with the rock surface has an instinct to move visitors into the main living space, which is the main focus of the house that opens on both two sides.

Building of courtyards inside the house and making spaces to get frame views to the environment.

(d) 3D composition

When considering the composition of the building, it is seen that the composition is quite different from that of an ordinary house. This is because of the effect of site forces on the site. Another feature seen here is the location of private spaces in the rear side of the house.



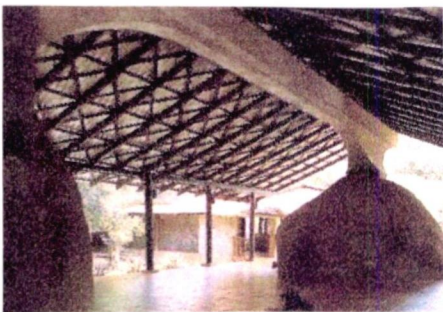
When the three dimensional form is considered this is a bungalow which consists of simple gable roofs. The colors used here to make the form live are usually the ones that mix with the environment. It is the way of connecting this building with the natural environment.



The use of bare rubble walls and rock surfaces create a rustic appearance to the residence, while bearing of withstand the harshness of the climate.

The double pitched roof covers most of the areas of the building which is located on the boulders. The roof is out of

Simple of construction with cross patterned rafters underneath.

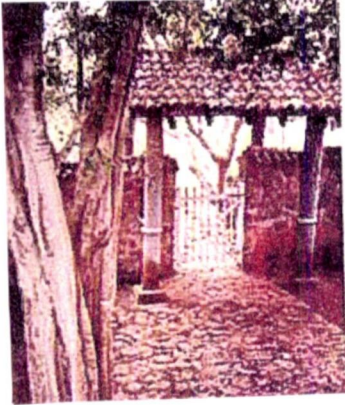


The principle of 'inevitable harmony with the landscape' has been skillfully achieved in to the design in such a way, that the natural elements are so much part of the sensitive design. In fact certain areas of the house are defined by using large rock surfaces.

A natural way is emphasized here to the people closer to the nature. By this it is shown to them that man is another element of nature while building this bungalow the use of natural resources to the maximum possibility and enhancing the way it suits to the nature as the time passes on have shown that priority had been given to the nature over the man.

(e) Hierarchical order of spatial arrangement

The entrance to the house is provided through a paved narrow winding pathway that ends up with stone steps at the front lobby. As an intermediate space, it defines by using large rock boulders. The entrance of this building had been made in such a way that a person who looks at it could understand that this is a private place.



One who enters through this structure can see two fairly large rock boulders on either side. Passing those rock boulders one has to enter the house proper. This reminds the entering to a hermitage in ancient Sri Lanka. This path leads to a small sitting area of the bungalow. Passing this place there will be a row of stairs, which is built again in between two rock boulders. Through this row of stairs one enters to the sitting room which is the major space of the house. It is a fairly a large space. This is open to the natural environment as there are no walls around. From this sitting room there is an angle path, which leads to the private space of the house. All the private spaces are situated at the rear side of the house. The roof of the house had been given a prominent place. It is a simple gable roof and a portion of its rested on rock posts while other portion is rested on the floor with simple posts.



The dining space merges with the living that linked with the inner private rooms through an intermediate loggia like space. The master bed room has been skillfully designed that it rests over a giant rock boulder, which is accessed from a narrow stair ensuring the adequate privacy and security. The living room which is the major space of the house open to the nature in every side and leaving things like rock boulders inside the living room the architects have tried to be close to the nature.



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CONCLUSION

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The word "harmony" is derived from a collection of unity and balance. The harmonizing process is significant to its surrounding context. Whatever it is natural or man made. The harmonization of nature becomes a media of meditation to its perceiver with the essence of the 'aesthetic beauty of nature. A correct meaning and its clarity is essential when building up a proper communication to express with nature.

Good architecture reacts like a symbolic statement; it makes dialogues between user and expression. It further motivates him to experience and understand the meaning of building. In architecture such stimulus, expressions could be evoked by different forces termed as the generators of architecture.

In natural environments; it does not mean to create buildings like trees or animals or mountains but take the rhythm, patterns, forms, in environment and use accordingly. Most of the time it's essential to understand the basics of the creation of nature in a spiritual manner. It is important to respond to the physical context with a careful observation. This is successfully helps to harmonize a building with natural environment.

Not only in Sri Lanka but through out the world, the designers were fascinated with the materials and merely transplanting the building with those materials which are perfectly suited to the different climatic conditions and contexts. This use of materials and new ways of looking at things (influences) comes through books and electronic media. But the experiencing eye knows what is right is and what's wrong out of the context. That's why Frank Lloyd Wright said to his students, stop reading books and do nothing but study nature and sketch.

When designing new buildings, attention must be paid to the existing overriding aspects of the physical context in two ways

1. consideration of each aspect individually
2. consideration of all the aspects as a whole


But in reality this is never achieved to an appropriate extent.

Most of the architects in the world are often fighting with nature in the process of designing buildings. They responded to nature in several ways. But all those theories and movements were not able to capture the essence of nature. Most of them interpret nature's beauty but not in its essence. When designing one should take the clue from nature and try to center its spirit. It should clarify what is the nature's truth, the essence which is related to architecture.

Therefore the composition of nature and architecture can't be separated from each other. This emphasize that the physical context becomes a generator of architecture.



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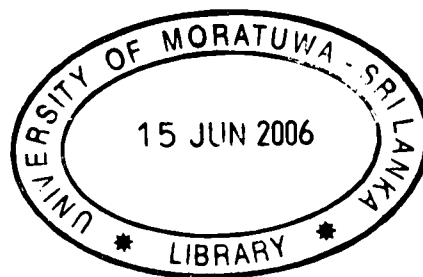
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