

ARCHITECTURE IN HARMONY WITH NATURE:

An Examination of Implications of "Physical context" in creation of Form

**LIBRARY
UNIVERSITY OF MORATUWA, SRI LANKA
MORATUWA**

A Dissertation

Submitted to the Department of Architecture of the

University of Moratuwa in partial fulfillment of the

requirements for the degree of

Master of Science

in

Architecture



University of Moratuwa, Sri Lanka
www.lib.mrt.ac.lk

Handwritten notes in the bottom right corner.

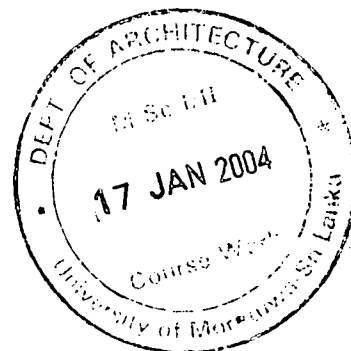
85430



University of Moratuwa

Purnima Jayasekera

January 2004



85430

ACKNOWLEDGEMENT

The attempt to express gratitude and convey sincere thanks in words to so many who helped, assisted, inspired, and guided me in making this dissertation a reality is an arduous task. However I humbly thank all of them from the bottom of my heart for their lavishly extended co-operation.

First and foremost I am duty bound to express my thanks to Archt Vidhura Sri Nammuni, head of the department of Architecture, for guiding me properly from the 5th year, to gather, and enhance the knowledge in compiling this dissertation.

A very special thanks to Archt Prasanna Kulathilake senior lecturer, and course co-ordinator, for his invaluable suggestions and inestimable support given to arrange the facts in a systematic and coherent order from the very inception, and the co-operation extended to prepare the format.

Sincere thanks to,



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

- Archt Arosh Gamage supervisor of my dissertation, for scrutinizing, providing resources from the very initial stages, till the completion. It is with gratitude that I mention her co-operation and assistances was decisive in moulding this dissertation.
- Archt Suthumina Rathnamalala, for the valuable advices given at the initial stage.

Hearty thanks to all my friends who contributed in what ever manner possible. Special tributes are due to - Chanika, Amali, Sonali, Suranga, Sisara, Dauphadi, Dhanika and Samantha for advising guiding discussing encouraging and assisting me throughout.

Last but by no means least, to my parents and my brother for their continuous guidance, encouragement and the blessings extended all the time.

DECLARATION

I declared that, this dissertation represents my own work, where due acknowledgements are made, and that it has not been previously included in thesis, dissertation or report submitted to the University, or to any other institution for a degree, diploma or other qualification.



Signed

A handwritten signature in black ink, appearing to read "J.P.P. Jayasekera", is written over a horizontal dashed line.

J.P.P Jayasekera

TABLE OF CONTENTS

	Page No
ACKNOWLEDGEMENT	I
DECLARATION	II
LIST OF PLATES	VI
LIST OF FIGURES	IX
ABSTRACT	X
INTRODUCTION	
0.1 The study	01
0.2 Importance of the study	03
0.3 Intention of the study	04
0.4 Methodology	05
0.5 Scope and limitations	06
1.0 CHAPTER ONE: "FORM" AS A "PHYSICAL ENTITY" WHICH EXPRESSES REAL MEANING OF "ARCHITECTURE".	
1.1 Architecture - Definition	08
1.2 Architectural expression	09
1.3 "Form" as a expressive media in Architecture	11
1.4 Constituents of architectural form	14
1.4.1 Orientation	14
1.4.2 3-D Composition	15
1.4.3 Plan configuration	16
1.4.4 Hierarchical order of spaces	16

1.5	Generative factors of Architectural form	17
1.5.1	User	18
1.5.2	Activity pattern	19
1.5.3	Purpose/ Function	20
1.5.4	Context	21
1.6	Concluding remark	26

2.0 CHAPTER TWO: CHARACTERISTICS OF "PHYSICAL CONTEXT" IN CREATION OF ARCHITECTURAL FORM

2.1	Interpretation of physical context	28
2.2	Man-made environment	29
2.2.1	Character or Spirit of man-made environment	30
2.2.1.1	Patterns of locality	30
2.2.1.1.a	Patterns of organization of masses	31
2.2.1.1.b	Patterns of sequence of spatial progression	35
2.2.1.1.c	Patterns of activity	36
2.2.1.1.d	Patterns of Architectural style	38
2.3	Natural environment	39
2.3.1	Character or Spirit of natural environment	40
2.3.1.1	Natural systems	41
2.3.1.1.a	Physical order - Geography	41
2.3.1.1.a.1	Land	42
2.3.1.1.a.2	Water	44
2.3.1.1.a.3	Plants	41
2.3.1.1.b	Cosmic order	46
2.3.1.1.b.1	Ecology	46
2.3.1.1.b.2	Climate of locality	47
2.4	Concluding remark	48

3.0 CHAPTER THREE: HARMONIZING WITH "NATURAL ENVIRONMENT" IN THE CREATION OF "FORM"	
3.1 Harmonization - completing the pattern of the place	50
3.2 Harmonization as a method of responding to the context	51
3.3 Identifying the pattern of the "Natural context"	52
3.3.1 Symbolic patterns of natural context	54
3.3.1.1 Volume	55
3.3.1.2 Scale and proportions	56
3.3.1.3 Balance	57
3.3.1.4 Rhythm	58
3.3.1.5 Repetition	58
3.3.1.6 Hierarchy	59
3.3.2 Visual patterns of natural context	60
3.3.2.1 Topographical conditions	60
3.3.2.1.a Site Geometries	65
3.4 Responding to the pattern of the "Natural context" in creating "Form"	
Case Studies	67
3.4.1 Boulder Gardens - Kalawana	68
3.4.2 Kandalama hotel - Dambulla	75
3.4.3 Subhodhi - Piliyandala	83
3.4.4 Blue waters - Wadduwa	89
CONCLUSION	95
BIBLIOGRAPHY	97

LIST OF PLATES

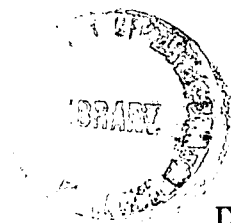
	Page
1. Plate 01 - Pyramid of Giza, Egypt.	11
2. Plate 02 - "Form of built", Sydney Opera House.	13
3. Plate 03 - "Form of none built", Spanish steps.	14
4. Plate 04 - Acropolis, Athens.	15
5. Plate 05 - Composition of form, Villa Savoye, Poissy.	15
6. Plate 06 - St Peters, Rome.	16
7. Plate 07 - A building in a context of water body Sydney Opera House	25
8. Plate 08 - "Sacred rock of Athens", Acropolis hill.	25
9. Plate 09 - Different cohesive patterning systems.	31
10. Plate 10 - Centralize organization.	32
11. Plate 11 - Villa Hernoza, Spain.	33
12. Plate 12 - Clustered organization, Grand axis, Paris	35
13. Plate 13 - Different spatial experiences, Venice.	36
14. Plate 14 - Different spatial experiences, Venice.	36
15. Plate 15 - Water front, Venice.	37
16. Plate 16 - Town Square, Tello.	38
17. Plate 17 - Trees in rural environment.	40
18. Plate 18 - Tree in deserted environment.	40
19. Plate 19 - Rural site.	43
20. Plate 20 - Sloping site.	43
21. Plate 21 - Flat land.	44
22. Plate 22 - water fall in the site of falling waters, before the design	45
23. Plate 23 - Falling waters by frank Lyoid Wright	45
24. Plate 24 - Talisen West by Frank Lyoid Wright	45
25. Plate 25 - Cosmic order changes the character of a place	46
26. Plate 26 - Cosmic order changes the character of a place	46
27. Plate 27 - Housing forms according to the climate.	47
28. Plate 28 - Housing forms according to the climate.	47

29. Plate 29	-	Housing forms according to the climate.	47
30. Plate 30	-	Variations of volumes in natural contexts.	56
31. Plate 31	-	Variations of volumes in natural contexts.	56
32. Plate 32	-	Rhythms found in natural contexts.	58
33. Plate 33	-	Rhythms found in natural contexts.	58
34. Plate 34	-	Repetitions in natural contexts.	59
35. Plate 35	-	Hierarchy by size, in a composition	59
36. Plate 36	-	Falling Waters by Frank Lyoid Wright	61
37. Plate 37	-	Falling Waters by Frank Lyoid Wright	62
38. Plate 38	-	The Great wall of China.	63
39. Plate 39	-	The Red rocks amphitheatre, Collorado.	63
40. Plate 40	-	Mortuary Temple of Queen Hatsheput, Thebes.	63
41. Plate 41	-	Building in flat dessert, Teliesien West.	64
42. Plate 42	-	Spanish Province of Gastellon.	64
43. Plate 43	-	Built form - Boulder gardens	71
44. Plate 44	-	Built masses with nature, Sri L-Boulder gardens	71
45. Plate 45	-	Restaurant, L-Boulder gardens	71
46. Plate 46	-	Open terraces - Boulder gardens	71
47. Plate 47	-	The entrance - Boulder gardens	72
48. Plate 48	-	water stream soon after the entry - Boulder gardens	72
49. Plate 49	-	Reception - Boulder gardens	73
50. Plate 50	-	Path through the jungle - Boulder gardens	73
51. Plate 51	-	Restaurant, Cave made wide open area	73
		Boulder gardens	
52. Plate 52	-	view of the swimming pool from the entrance	74
		Boulder gardens	
53. Plate 53	-	Irregular pathways from through the Jungle	74
54. Plate 54	-	Built masses - Boulder gardens	74
55. Plate 55	-	Built masses - Boulder gardens	74
56. Plate 56	-	Distant View - Kandalama Hotel	75
57. Plate 57	-	Model - Kandalama Hotel	77
58. Plate 58	-	Building form - Kandalama Hotel	77

59. Plate 59	-	Distant view -	Kandalama Hotel	78
60. Plate 60	-	Composition -	Kandalama Hotel	78
61. Plate 61	-	composition with the context -	Kandalama Hotel	78
62. Plate 62	-	horizontality of building form -	Kandalama Hotel	79
63. Plate 63	-	Balance of the built form within the context		79
64. Plate 64	-	Entrance -	Kandalama Hotel	80
65. Plate 65	-	Entrance lobby -	Kandalama Hotel	80
66. Plate 66	-	The tunnel -	Kandalama Hotel	81
67. Plate 67	-	The climax -	Kandalama Hotel	81
68. Plate 68	-	Spatial arrangement within the context -	Kandalama	82
69. Plate 69	-	Spatial arrangement within the context -	Kandalama	82
70. Plate 70	-	Built form within the site -	Subhodhi	85
71. Plate 71	-	linearity of the built form -	Subhodhi	85
72. Plate 72	-	linear organization in the natural terrain -	Subhodhi	85
73. Plate 73	-	Entrance -	Subhodhi	87
74. Plate 74	-	From the entrance -	Subhodhi	87
75. Plate 75	-	The gloomy tunnel -	Subhodhi	87
76. Plate 76	-	Main space -	Subhodhi	88
77. Plate 77	-	Linking corridors -	Subhodhi	88
78. Plate 78	-	Linking corridors -	Subhodhi	88
79. Plate 80	-	Built form within the context -	Blue Waters	90
80. Plate 81	-	Built form -	Blue Waters	91
81. Plate 82	-	Glimpse of the building -	Blue Waters	92
82. Plate 83	-	Entrance porch -	Blue Waters	92
83. Plate 84	-	The main axis -	Blue Waters	92
84. Plate 89	-	Intermediate climax -	Blue Waters	92
85. Plate 90	-	Main space -	Blue Waters	93
86. Plate 91	-	Main space -	Blue Waters	93
87. Plate 92	-	View from the main space -	Blue Waters	93
88. Plate 93	-	View from the main space -	Blue Waters	93
89. Plate 93	-	Relationship with its physical setting -	Blue Waters	94
90. Plate 98	-	climatic responses -	Blue Waters	94

LIST OF FIGURES

		Page
1. Fig 01	- Housing development, Pavia, Italy.	33
2. Fig 02	- Varieties of clustered organizations.	34
3. Fig 03	- Topographical map of falling waters site .	60
4. Fig 04	- Ground floor Plan, Falling Waters.	61
5. Fig 05	- Lay out, Cornell University undergraduate housing, Italy, New York.	62
6. Fig 06	- Dominant linear longitudinal axis, Church at Assisi	65
7. Fig 07	- Organization of form accordance with levels	66
8. Fig 08	- Plan - Boulder Gardens, Kalawana	69
9. Fig 09	- Rough Section - Boulder Gardens, Kalawana	70
10. Fig 10	- Lay out plan Kandalama Hotel	76
11. Fig 11	- Plan - Kandalama Hotel	77
12. Fig 12	- Section - Kandalama Hotel	79
13. Fig 13	- Orientation of the building - Subhodhi	84
14. Fig 14	- Rough section- Subhodhi	84
15. Fig 15	- Section - Subhodhi	86
16. Fig 16	- Conceptual diagram - Blue Waters	89
17. Fig 17	- Plan - Blue Waters	90
18. Fig 18	- Section - Blue Waters	91



ABSTRACT

"Architecture"

- **"Many things in one". (Balance harmony of visible, invisible, tangible, intangible things)**
Antoniades, (1980:18)
- **"It should satisfy mans natural needs, Environment adjusting capabilities and his spiritual needs"**
Antoniades, (1980:31)
- **"it is to serve humanity"**
Antoniades, (1992:15)

Accordingly, Architecture should be a meaning full creation by the people, for the people. It is some thing more than a mere visual object. But today it is misinterpreted and produces mere "buildings" which can not term as "Architecture".

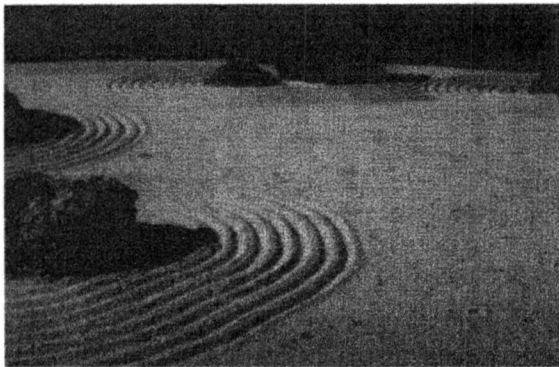
So, "Architecture", embodied a meaning and should be a purpose full creation. This meaning or the inherent idea of an architectural product communicated to the beholder through the "Architectural Form" which is the main expressive media of architecture.

"Architectural form" , by the way of its **orientation, plan configuration, composing** and through the **spatial arrangement** should be related to the what **function** it performs, to the **activities** taken place in it, to the **type of people (user)** who are going to use in it, as well as to the **context** which it is in (**Generators**).

Considering the theme "**Architecture In Harmony with nature**", (nature - Swabhawa or reality), if anything to term as "Architecture" it necessarily should harmonize with nature. According to Nammuni, V, there are two primary natures to harmonize, with **its** own and that of the place. (Own nature means true to the function it performs, to the type of user and to the activity pattern) The aim of this dissertation is to discuss about the "Architecture" which is harmonize with the "**nature of the place**", with its context (**physical setting**).



University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk



*Architecture is unfortunately, at present, a drop
in the ocean of reality, but,*

*"Architecture can wait thousand of years, because
its presence of this world is indestructible."*

Louis Kahn

Introduction

1.0 The study

Architecture is an important achievement of man. It is a discipline; comprehensive discipline and state of mind which makes human existence meaningful. Architecture come in to being as a harmonious integration of "tangible" and "intangible" the known and quantifiable, the unknown and inexplicable things together, at the same time, as a whole, in a useful, appealing and mind elevating way. As Antoniades (1980:18) states, Architecture is **many things in one**. Some things tangible, others intangible. Some things visible, others invisible. Where all things, tangible and intangible, visible and invisible, are in balanced harmony among themselves and with the rest of the world, constituting a **useful and mind elevating whole**, then this whole is "Architecture".

Architecture as "**useful**" integration of "**many things**", is achieved not only by means of visible and tangible physical dimensions as volume, solids and voids also through the intangible dimensions as light and time experience, the proportion of edifice and their relationship to the human being, but only through the harmonious combination of these elements in mind elevating way, giving integrity, wholeness, and harmony to the work.

Such a harmonious product undoubtedly become meaningful and resultant "Architectural creation" should express its inherent meaning. Through the "Architectural Form", the Tangible and visible physical entity which encompasses intangible architectural space and invisible human emotions, communicates its expression to the perceiver. This expression which embedded in "Architectural Form" should convey the real meaning of the product.

"Architectural Form" is a resultant output of certain generating forces, as User, activity pattern, function and the context. "Form" which generated through the above forces become harmonious product and it reflect the real nature about it self. That is by being true to **what function it performs, what circumstances it is built in, and what context it is in**, etc. Nammuni,V (1994)

The purpose of Architecture is **reflecting the real meaning or the truth** about **"itself"** and respecting to the **"every aspect"** which surrounds. "Every aspect" which surrounds means its context or the specific setting where the Architectural form generated. That is considering **"NATURE"**, of the place or the nature of the specific setting where the "form" generated. **"NATURE"** means the **"SWABHAWA"**, or reality (qualities of anything which make it what it is). So it is evitable that every architectural creation necessarily be a reflection of reality of "its nature" (Function, activity pattern, user) and nature of the place (context).



This study is directed only to consider the "nature" of the place. That is considering the specific setting, the identical environment or the context, which earlier identified as one of the generative factor of Architectural form. Context Comprises of both Physical and non-physical context constitute things those are untouchable but yet named as the elements of context. It contains all the qualities which exist in a place, such as imageability etc. though it is very difficult to distinguish physical and non-physical context in practical point of view this study is only aimed to consider the physical context.

Considering the physical setting importance, given to identify the factors which enhance the overall essence of the place or the spirit of particular place. When introducing new form in to particular setting, it should maintain its overall essence, uniqueness or spirit. So it becomes essential to identify contributing factors of spirit of place or generating factors of certain pattern of a place or its uniqueness.



3.0 Importance of the study


Today it is observable that word "Architecture" termed to the buildings which not truly responds the nature of the place (Physical context). Another trend is the result of misunderstanding of the concept, "harmonization with nature", as producing buildings which are mere imitations of the outward visual aspect of nature of the place.

The consideration should give to the fact that harmonizes with "what of the nature". It should not be the outward visual aspect of nature; it is responding or completing the pattern of the existential reality, true essence, rhythm or spirit of particular place.

The existing specific setting or identical environment where any new building is to be placed is one of the major factors that should be essentially considered, and responded. Responding to the correct order of the existing identical environment is more important in the creation of "architectural form". When the things are misplaced from correct order of physical setting, those can easily recognize as the buildings which are in disharmony with existing context, and such products leads to destroy the mans deep rooted need of sense of belongingness or sense of familiarity to that identical environment(physical context).

In the study the specific setting or the context which identified as the "nature" of the place may be twofold as natural settings which god gives to the world and man-made settings created by man. In responding to any physical setting it is necessary to understand, the essence, principles and laws of the surroundings in a meaningful way and transferring it in to the **Architectural form**. That is harmonizing with the essential pattern, which gives unique character to the particular nature.

In harmonizing with is by no means, to look alike, to be twin, to blend with or to disappear in it. What ever the creation should be with the character, the essence or with the spirit of that place. Then harmonizing is to bring up a complete pattern in to the vicinity, true to its values. The idea behind harmonizing is to see that, what ever would be created, and built, it would not be contradicting with its placing, with its own elements, whether it is with composition, proportion, rhythmic progression etc.

Harmonizing with nature means a being a part of it. Be a part of its values and patterns. That is to complete a pattern with form of the place, with its rhythm, its spirit. In the creation of architecture, should select possible ways of assembling elements while creating forms to communicate the appropriate expression to the human mind, with its inherent nature. Harmony with the nature is, in composition with its own elements and also with the spirit, the rhythm, the essence of that place.  Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Finally it is justified that architectural form means to visualize the understanding of nature's expressing about the existential reality while facilitating to experience environment meaningfully.

4.0 Intention of the study

The intention of this study is to identify the essential patterns and qualities of unique physical settings, which give its unique character and examine the way of capturing its essence, rhythm and spirit in to the architectural form which reflects the reality of nature of the place (physical context). In this regard attempt is made to concretize the idea of that all Architecture should be in harmony with its nature, and further it is extended to examine the qualities and relationship of those created forms with their physical settings, which make architecture more meaningful, by uplifting or enhancing the totality.

In achieving that it is necessary to understand, or rather should have sensitivity to the particular physical setting and should be knowledgeable to capture the essence rhythm and spirit of it, in to the created form. That is by responding to the tangibles as well as to the intangibles of that physical setting. The spirit of certain space gathered by means of studying the entire property surrounding it and brings the surrounding closer to the man.

5.0 Methodology

The study is carried out to examine particular face of architecture, in harmony with "nature" of the place (Physical setting), adopting a case study approach as a methodology for study. To establish the particular concept, architecture and its purpose will be defined in a broader context, Architecture introduced as silent art that communicate and expressed a message through its own language, "**architectural form**" identified as main visual and physical attribute which complete, translate, and heightens, the particular essence, rhythm or spirit of unique physical contexts, in to the tangible and experiancable condition.

In facilitating above relationship, physical context described as everything that surrounds us, which influences our lives and characters, and establishes the validity of harmonizing with physical context in Architecture. In this regard identified factors contribute to the spirit or uniqueness of particular physical contexts while dividing it in to basic two categories as man-made environments and natural environments.

In natural environments certain contributory patterns were identified which leads to uniqueness or to the **spirit of that place** as **physical order** which includes geographical patterns with land, water and plants, and as the **cosmic order** with ecology and climate of locality.

In the final stage of study through the selected case studies from unique natural sites, examine the way of architectural form complete the true pattern, spirit or rhythm of the Particular natural environments. Selection of case study is done from different geographical situations with different visual patterns, and further discussed the symbolic patterns of natural settings as **volume scale and proportions balance rhythm hierarchy** which enriches particular setting and way of capturing it in to the architectural form.

6.0 Scope and Limitations

As interpreted, every architectural creation should express real meaning about itself and it should complete the true pattern of its location. So any creation which is to be termed as "Architecture" it should necessarily harmonize with its nature. This Nature is two folds, the **nature of itself**, and **nature of the place (context)**. The term "nature" is identified as "Swabhawa" or reality. That is being true to its definition.

Harmonizing with its own "nature" is reflecting reality about itself that is being true to what function it performs, what are the activities that going to house in it, and type of people who are going to use the building. Also those are some of the generative factors of Architectural form, and this part will not discussed in this study, and it is directed only to examine the way of harmonizing with its context.

"Nature" of the place identified as a context or an identical environment which is one of the generators of architectural form. Here consideration only given to the physical context and non-physical part of the context will not discussed in detail.

The chosen identical environments or physical contexts basically divided in to two parts, as natural environments where the western world described as God has given and man-made environments which constructed by human being. To produce a harmonious built form, it is necessary to identify overall essence, spirit or pattern of particular physical setting.

In this study though identified the factors which contribute to the spirit or essence of the physical setting both in natural and man-made environments detail study of examining the way of identifying and responding to those patterns is discussed only about the natural environments.

Responding to the identified patterns is discussed according to the constituents of Architectural form, as how created form complete the existing pattern in the way of orienting building, in composing in plan configuration and in hierarchical setting of spaces.

To sum-up the study certain local examples were selected as case studies from unique natural sites with selected different visual patterns which considers as successfully identified and responding to the patterns of their unique natural settings