

A STUDY OF PARALLELISM BETWEEN BIOLOGY AND ARCHITECTURE



UNIVERSITY OF MORATUWA
LIBRARY

The Dissertation presented to the
Faculty of Architecture of

University of Moratuwa, Sri Lanka,
for the Final Examination in

M.Sc. (Architecture)

B. A. H. Ariyaratne

Department of Architecture,

University of Moratuwa,

Sri Lanka,

April, 2002.

78"02"
72.011 (548-8)

University of Moratuwa



78158

78158

78158

ACKNOWLEDGMENTS

Let me informed here my faithful gratitude to each and everyone mentioned below for their help to make this dissertation a success.

To Archt. Vidura Sri Nammuni, Senior Lecturer, Dept.of Architecture Who Showed me correct path to my intellectual searching eye about vast subject areas, with his comments and criticisms which helped to built up my assurance.

To Ravin Gunarathne, Lecturer, Dept. of Architecture, for giving me most suitable vision when I was braking down my confidence, criticized me and helped me with valuable comments.

To Prof. Sarath Kotagama, Dept of Zoology, University of Colombo and Prof. Upali S. Amarasinghe, Dept of Zoology, University of Kalaniya, for gave me necessary guidelines about subjects' matters.



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

To Architect Mahinda Witanarachi helped me to develop my enthusiastic for reading relevant books and hard work and also reading and correcting the script.

To Anuradha for helping me to take most of the photographs.


To my dear friendly cliques Danachandra, Dasuntha, and my loving Pathmakumari for their help, encouragement given, sharing most of the hard work and help during the word-processing and printing the document.

To my dear parents for their valuable comments, encouragement to develop my self-confidence and living with me in lifetime failure and success.

Finally to rhythmic attributions of nature, which are stimulated and inspired me in writing this.



CONTENT

Acknowledgements	I
Abstract	V
Introduction	01
Chapter One	
Biology, man and origin of man made things	
1.1 Biology and nature	07
1.2 Animal and human behavior	08
1.3 Man and multicellular organism	10
1.4 Living harmony with nature	10
1.5 Primitive society and culture	11
1.6 Primitive art	12
	
Chapter Two	
The nature, art and architecture	
2.1 Art	
2.1.1 Definition of art	16
2.1.1.1 The definition	16
2.1.1.2 Sense of beauty	17
2.1.1.3 Art and aesthetics	17
2.1.1.4 The elements of art	18
(a) Line	18
(b) Tone	19
(c) Colour	19
(d) Form	19

2.1.1.5	Form and expression	20
2.1.2	Art and science	20
2.1.3	Art and humanism	21
2.1.4	Art and religion	22
2.2	Art and nature	23
2.2.1	The Golden proportion	25
2.3	Architecture as art	25

Chapter Three

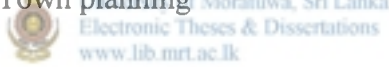
Parallels between Biology and Architecture

3.1	Natural forms and built forms	28
3.2	Principles of Nature as applied in architecture	29
3.2.1	Rhythm	29
3.2.2	Symmetry and Balance	30
3.2.3	Proportions	31
3.2.4	Part to the Whole	31
3.3	Concept of organic architecture	32
3.4	Primitive hut concept	33
3.5	Village settlements	35
3.5	Natural environment and built environment	36
3.6	The image of the spiritual space	38



Chapter Four

Applications of Biological analogy in architecture

4.1	Compositional analogy	41
4.1.1	Structural Elements	41
4.2	Functional Analogy	43
4.3	Analogy of architectural designs.	44
Case study of famous architectural works and architects		
4.3.1	Architect Frank Lloyd Wright	44
4.3.2	Architect Santiago Calatrava	47
4.3.3	Architect Glenn Murcutt	48
4.3.4	Architect Geoffery Bawa	50
4.4	Application in Town planning	53
		
Conclusion		56
Bibliography		59

ABSTRACT

The 'origin of living' in Earth was given birth to supreme creature of human being. Since that he interconnected with nature and survived through the millions of years. He captured the several rhythmic attributions of nature and he felt about the warmth of the land and freshness of the air, and he talked about the beauty of the flora and fauna and sparkle of the blue water. All these moral forces surrounded by man and governed by nature. He consequently helped him and dominated nature, being a part of it and observing "nature's" phenomenon of creation.

Nature was given path to intellectual and physical revolution of man and he mutually connected with innumerable talented procedure. So "Architecture" became one of the visible creative result of these innumerable talents.

These inspirations man interpreted as an analogy with different visual terms of nature and scientific in terms of studying nature's processes and applying it in his designs.

Even in today most of architects illustrate about diversity of architecture according to biological concepts. Architecture and biology have unexplainable connection between with each other. Biology and architecture are vast subject areas, which have their own language of interpretations. So this is the time to study, examine, search about architectural and biological interconnections according to our intellectual vision.

