ECO-SENSITIVE ARCHITECTURE: BEYOND THE FACADE

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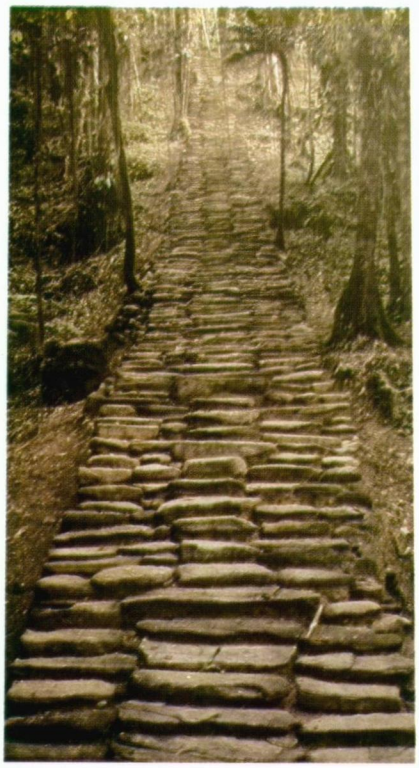


Built Environment in Harmony with Nature.

Eco-sensitive architecture, Green architecture, and Sustainable design are familiar, almost fashionable phrases in the contemporary intellectual discourse. They indicate that in this era of large scale questionable developments involving buildings and globally threatened fragile ecological systems, the possibility of a mutual relationship between these two are constantly being sought after in numerous ways. As in many other industries, building activity is also recently but frequently being viewed from an ecological standpoint.

Simply defined, Eco-sensitive architecture is that which is in its best possible ways, in congruence with its own environment. In other words, in harmony with the surroundings. But when we look at this definition, it seems that there is nothing new in this whole debate. This attitude; to be in congruance with the environment, one may argue, is even more familiar than the more recent ones like the green movement etc. If we look carefully at this phenomena from a historical point of view, then it is easy to realise that the "built" and the "environment" were ever so harmonious in retrospect not only in a local but also in a global context in architecture labelled as primitive, traditional, or vernacular all around the world. Then, architecture were always a part of their environment, using its resources on friendly terms and thus belonging to the place. It is the industrial age and the modern movement which has made it otherwise. In fact. it is the new materials and mass-scale production processes, along with and consumed by drifting and increasing populations which resulted in industrialised technologies and building densities and practices which brought about this change. Ever since the industrial revolution, buildings have grown in number and scale all over the world causing serious distortions in architectural attitudes specifically towards the micro environments and their ecological aspects.

THE REAL QUESTION

Today, an old question is being asked anew. How can architecture relate to ecology? A recent popular philosophical explanation has been to argue that if architecture is in harmony with Nature then it maintains a good relationship with the ecology of its environment. Yet a more pragmatic view would reveal that in more instances than not, especially in mushrooming cities, even any concern for a "green environment" is almost absent. The question arises as to how one talks about eco-architecture let alone consider anything "green" in a city where congestion is in abundance and that space for parkland or wilderness is ever decreasing. Eco-architecture in the city?

Neverthless, it is more so important to examine the meaning of Eco-architecture and understand its meaning at depth even if it is so absent and ignored in the present day urban development.

ECOLOGY AND BUILDINGS

Ecology does not mean just the various organisms and contexts around us, but the totality of the inter-dependant networks of biological relationships encompassing the entirety of the world. If architecture is to go green, it does not mean that merely planting trees around buildings will yield eco-results. Architecture has much more to offer in this respect, that it will need to search beyond the facades of buildings.

A building is not only an eyecatching object in a plot of land, but exists as a dependent of that environment while also adding to that environment. This co-existence and interdependancy should maintain a positive relationship with the environment for it to sustain itself as it needs to be. In short, building activity should conserve the environment including its ecology that it depends and exists on and must contribute positively to its making and its consumption.

Conservation of the ecology of an environment through architecture goes beyond saving trees and waterbodies and creating greenspaces as such. At the lowest level, any building activity has an indirect but a larger effectual impact upon the environment it feeds on. Further, the need for raw materials in a prolong continuous basis may create a somewhat direct impact on the same or distant environments. Scooping out natural resources in a

large scale may even alter the conditions of an eco-system in terms of aspects such as moisture, temperature, or even nutrients which in turn can result in drastic ecological change.

In the Sri Lankan context, we now realise that increased building activities have caused the mass production of bricks, cement, lime, timber, steel, glass etc. Raw materials such as clay, sand, limestone, wood and other minerals are being extracted from the earth endlessly to be used in the manufacturing process.

BUILDING WITH APPROPRIATE MATERIALS

The problem here however, is not the use of raw materials themselves but the extents of wastages involved and the seeming lack of concern for re-use or the re-usability of these materials, as had always happened in the conventional practice. Let us take for example the use and mis-use of Timber, which has generated an interesting debate. Many NGOs, architects, and engineers worldwide have suggested the curtailing of the use of timber in the construction industry so that the rainforests can be saved. Such a curtailing, they claim, will help create an ecologically sustainable architecture. Instead of timber, it is suggested, aluminium, steel or other alternatives may be used. Sound as it may appear to be as an argument, this attitude is based primarily on a misconception of eco-sensitivity and is very very short-sighted. Unfortunately, it has been forgotten that timber, coming from nothing but the trees is easily and rather quickly renewable, and in fact without a major cost involvement in the process. So long as the trees are continuously and selectively planted to meet the demands of the timber, trees can be felled without a guilt for eco-crime. The industry can have a continuous supply, and generate many other sustainable industries without having to impinge upon the rainforests which are the hearts and lungs of the global ecology. The case with materials such as aluminium or steel of course is not the same.

Similarly, it has been calculated that the cement manufacturing process of the world, apart from absorbing a great amount of energy, contributes to more than 8% of Carbondioxide to the global atmosphere. Furthermore, transporation from extract sites to the factories and then to numerous locations locally and across the world costs a lot of energy, extracted from the earth again as oil and emits much hated CFCs which damage the protective Ozone layer above us.

Situations such as these arise largely because our architecture depends on the "international" materials. It seems that we continue to depend upon the "international" materials against the local. Perhaps it may be difficult always to take up this line of approach in the practice of architecture in all spheres such as, in the case of the skyscraper where the structural technology is nothing but international. But the important thing here is to look for the appropriate technology, and not to be carried away by the fantasies of the international technology for its own sake. In most other instances, the local materials may be most appropriate, affordable and in fact become more congruous with the immediate fragile environments.

If conservation of materials, and appropriate use of materials is rudimentary to eco-sensitivity in architecture, the use of locally produced materials through local manufacturing processes will be an essential starting point of such an approach. They will conserve energy and avoid unnecessary wastages. In many instances "alternative materials" to "international materials" will prove to be more eco-friendly and more appropriate in many other ways.

Modern Skycrapers.
Is this the Correct Approach?

More recently, in the United States, where materials vary significantly across the country, a number of architects have resorted to find solutions which are really traditional. They promote more locally available materials and renewable materials, probably with a minimal cost of transportation. A well known example of this approach is of course the works of Hassan Fathy in Egypt who both advocated and built the traditional adobe for not just houses but tall mosques as well.

Building with materials from their own sorroundings.

In Sri Lanka, we do not have to warily look for eco-sensitive materials anew. They are already there. Our ancestors have already shown us enough substance, ranging from good insulative materials to keep off the heat and glare of the tropical sun, to technologies that reassure us with building techniques of locally available "specifications" as well as energy efficient spatial articulation. We simply need to use them perhaps with modification, thereby reducing our constant dependancy on "typical" mass-produced materials to be transported from all four corners of the world.

RECYCLING THE MATERIALS

Recycling materials is yet another sphere of activity, which has now become recognised as a significant way of diminishing the consumption of resources. It reduces the vast quantity of energy consumed in unnecessary productions, and transport. While recycling has become popular in the West recently, recycling as a practice had been a way of life in the Sri Lankan Society. Recycling in the building industry however, is a recent practice around the world. In Sri Lanka, we already see a good measure of used building materials, such as bricks, kabook, stone, doors and windows, timber members of columns etc being sold and bought.

If recycling can be promoted and developed without involvement of the factory process, then, the industry in future can be made more eco-sensitive and useful. Lessons may be drawn from the many developing countries such as Mexico, Morocco, India, Egypt and other African countries where materials are brought to re-use at the local level. However, architectural research is needed for this purpose, which can devise ways of recycling materials such as clay, mudbricks, and timber etc. These no doubt will minimise the extraction and wastage of meagre natural resources from the Earth. For example, in places like Colombo, Kandy and Galle, we observe frequent demolition of old buildings in order to make space for bigger buildings. More often than not, the materials end up in the garbage dumps or landfills adding yet another problem into the environmental equation. This situation can easily be changed only if attention is focussed to the architectural and constructional potential of reuse.

An attractive 'Old' element now popularly used in modern Architecture.

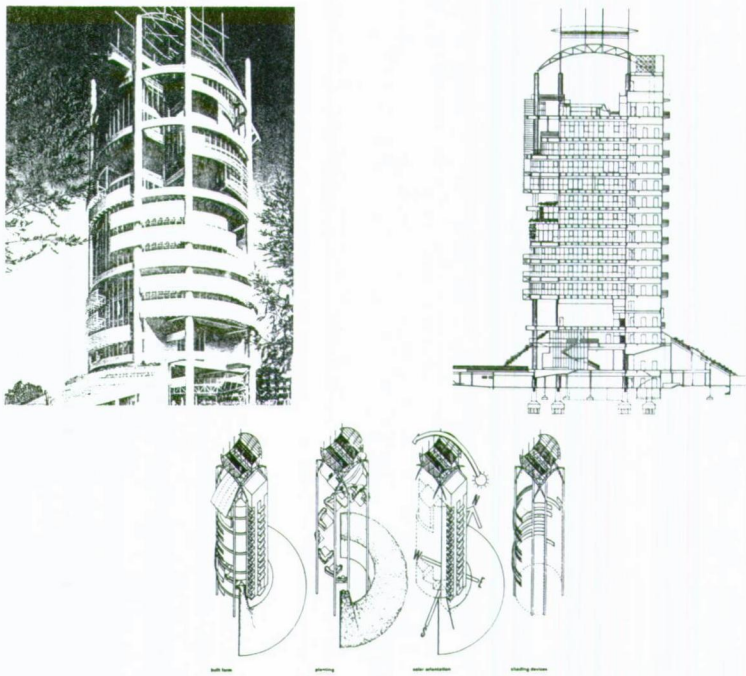
RIGHT MATERIALS FOR RIGHT USE

In temperate climate, the use of new inventions such as plastic-based building components can serve the purpose of environmental conservation. Even though regarded as an artificial material insensitive to environment in general, plastic stays intact in such climatic conditions and insulate the interiors of buildings just as required. More importantly, it can be easily recycled without any wastage. Materials such as glass reinforced plastic (GRP) could be used within a range from mobile houses to large sport arenas.

KEEPING THE INSIDE COMFORTABLE

Another aspect that is becoming increasingly insensitive to the environment is the issue of keeping the inside of buildings comfortable at the right temperatures and the right quality of air. Energy consumption to heat or cool buildings have increased so much that in the last couple of decades, the building industry has become the major energy consumer in the world.

Attempts are being made to use solar components for heat gain in colder climates and to heat water, to run the domestic electric appliances etc., without having to depend on the outside energy-consuming processes to tap the energy sources.



"Tropical Tower" in Malaysia by Dr. Ken Yeang.

But a more pertinent question to ask is why tropical buildings need to have mechanical devices to cool and ventilate interiors at all? Archt. Ken Yeang in Malaysia demonstrates skillfully that correctly orientated, appropriately deviced, and sensitively articulated spaces can create optimum comfort levels inside a building without relying on mechanical air-conditioning.

It is not unknown to most architects that with a scientific understanding of the behaviour of a building, non-mechanical methods of energy efficient

spaces can be set up. The results of a research conducted at the University of Moratuwa on thermal comfort levels in different types of Sri Lankan Dwellings revealed that the major heat gain is not from the hot air around us but from the direct radiation from the roof. It also proved that uncomfortable humidity levels could surprisingly be minimized by good ventilation at different body levels on the walls. The most remarkable result was that it justified a traditional house with porous mud walls and a steep, side-opened thatch roof to be the most thermally comfortable dwelling.

The most significant threat to ecology or eco-systems in every corner of the world is the extensive destruction of natural habitats in the course of development. Population growth is ever increasing, and all mechanisms employed to accommodate the increasing populations result in the eventual destruction of the natural environment. Most people involved, and the architects in particular do not seem to bear any responsibility in the equation of the balance between the man-made and the natural.

THE ARCHITECTS' CONTRIBUTION

Nevertheless, the architects have a central role to play in balancing this between the man-made and the natural environments. The starting point would be recognising and understanding the impact of the buildings at micro and macro levels of the environment, and then responding to them. Specially in threatened environments, designing spatial distribution patterns to allow "breathing" architecture and avoiding congestion, the architects can begin to participate positively in the efforts to save the environment. The architects have a greater control in the use of materials, in the re-use of materials, and in the right use of building processes, and concepts that can and will make a change. Archt. Frank Lloyd Wright at the other end of the World and our own Geoffery Bawa have shown how to be so responsive, to the fragile ecologies and thereby to generate architecture that is both meaningful and sensitive.

There is now recognition among the most ordinary people that architects also can and do contribute to the environment and its conservation. Earth buildings have suddenly emerged from the status of "old" and "poor" to "eco-friendly" and "exciting" futuristic options. For example in New Mexico, USA, actor Dennis Weaver has built his own house entirely with old tyres and rammed earth. While these may appear to be "Bizzar" examples of such reawakening, they indicate to us the enormous possibilities that exist in the re-use of materials, and eco-sensitive architecture.

Geoffrey Bawa's Colombo Residence.

The options for architects are many. From design options to building potentials, architects encounter choices to be made. The architects can and should in such instances make those choices on the basis of eco-sensitivity, and long term contribution to the conservation of the environment. Recent developments in the field of architecture indicate the ways to build pleasant and livable built-environments, based on eco-friendly approaches.

Architects have to blend their buildings with not only the immediate surroundings with superficial green facades, but with the whole system in which they are built. Architecture must create working "eco-spaces" both inside and outside. Architects have much to contribute to the ecology of the immediate environment as well as the whole.

References:

1. The Amicus' Journal - A Publication of the Natural Resources Defence Council, New York, June 1993.

2. Agarwal, Anil "Mud Mud" An Earthscan Publication. London. 1981

3. AR Journal February 1993

4. Report for a NARESA funded research project on "Assessment of Thermal Comfort in Dwelling Houses in Sri Lanka" by Prof. Lakshman Alwis, MPR Emmanuel, Nisha Perera Fernando and SG Wijesuriya. University of Moratuwa 1990

Photo References

1. Geoffery Bawa (Revised ed) Brian Bruce Taylor Thames and Hudson Ltd., 1995

2. Earth Construction - A Comparative Guide Hugo Houben Hubert Guillaud. Intermediate Technology Publication, 1994

3. Mihintale - Cradle of Sinhala Buddhist Civilisation J. B. Dissanayake, Lake House Investments Ltd., 1987

4. The Illustrated Book of Architects and Architecture. Tiger Books International, London, 1990

5. Mysterious Places, George McNeil, Tiger Books International, London, 1995

"A building should be designed so as to minimise the use of new resources and at the end of its useful life, to form the resources for other Architecture"

Brenda and Robert Vale, 1991