

Experiencing Nature in the World of Architecture!

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Abstract— Architects and designers often admire nature for creativeness; they speak of nature as roots. The study is focused on the equivalences among nature and architecture. It has been noted that the main perception of nature influenced forms is chiefly aesthetic while little concern is given to the significance of inspiring from nature in the structural performance. Nature can impart us about methods, materials, processes, structures, competence and aesthetics. Nature has also been always a base of inspiration for the human begin in characteristics of their life. Nature has devotes its numerous gifts and resources substantially to human beings to be able to grow their developments all over the world. It provides us with an amazing assortment of way out for multifaceted difficulties that we face nowadays –learning from nature in this way is “bio-mimicry”. Bio-mimicry is a skill that studies nature’s models and then imitates these forms, process, structures, and approaches to solve human complications. Bio-mimicry practices an ecological standard to judge sustainability of our advances. Bio-mimicry is a new way of looking and appreciating nature. For any environmental building design, must to consider structural competence, water efficiency, zero-waste systems, and energy supply.

The final structure will display integrated ecological and architectural design components in order to attain building that creates complete harmony between the building, the users, and the environment. This study concludes the significance of making a comprehensive amalgamation amid the building exterior, interior and the neighboring nature by using an indistinct natural concept from the surrounding environment.

Keywords— Nature, Bio-mimicry, Bio-mimetics, Computation-Aid

I. INTRODUCTION

Is Nature appealing? We find an immeasurable variety of shapes, colors and species in it. The only autocratic for living in harmony with nature is mutual respect.

Nature is an ardent element within the surrounding environment and is an important facet to deal with everyday affecting everything around human. Human always converses with nature; since starting to construct shelters and using them, nature has been used as a significant and basic part in the plans and designs. By the time passing development of technology gives more opportunity for humans to have more variety in design of their shelters .These improvements can be seen easily by looking back to history of architecture.

One of the evolving idea and discipline in architecture is Bionic Architecture. It is more in adjusting with nature and environs; uses more nature inspired curved forms. It is on

differing of straight lines used in traditional and conventional architectural designs.

The collective points of all bionic systems are followings:

- Nature as chief inspiring element
- Human being as main designing part and also main consumer of created spaces
- Human being as chief element in finding unknowns
- Human being as a living element with different physical and mental needs
- Technology as a key element in design, not as main goal.

Despite the amount of scientific knowledge mankind has gathered, nature still embraces great mysteries that we may never be able to unravel. Nature is inspirational but it is also a fragment of our world which we can study more acutely – extracting creative solutions that we can apply today.

Tomasz and Rafal in their Structural design inspired by nature say

“Complicated design problems needs novel solution to solve and as most of the solution already done in nature”

II. HISTORIC EVOLUTION

Ever since the beginning of human existence we have brawled to regulate, use, govern and gain independence from nature. The brawl began ten thousand years back with the Agricultural Revolution, when we liberated ourselves from hunting and gathering and learnt to stock food to last longer. Scientific Revolution enlarged the momentum of the practice but it was not up to Industrial Revolution, when machine substituted man, that humans felt ready to dominate the world. We were finally able to generate internal ease in any climate, travel long distances in a little period of time, produce food sovereign of natural conditions. The result of it, from architectural standpoint, is that an office building in New York looks just like an office building in Moscow or Singapore. By isolating ourselves from our instant surroundings and thus from respective cultures, we rely that we have extended our independence from nature.

In spite of the technology, modern gadgets and machines that have certainly made our lives easier, at least in the short span, we are yet inseparably destined to the laws of nature.

At a present world population of 7 billion and rising, with current untenable habits, scientists have determined that we have used nearly all of our ecological supplies. Man must return home, back to the forest. Formerly the modern science started inspecting the formations of nature it was evident that all that we so proudly rely, we've created with our extraordinary ingenious, has already been made in nature, only in a much more stylish, smarter way, with no damage to the planet. The concept of sustainability, green or eco-friendly has become a catchphrase in nearly every scientific field in the past few years. Even though bio-mimicry shares the same good aim with green design of stabilizing the planet, it goals to go one step further and form not only a more sustainable but even reformative 'living building', resources and machines that not only do not destruct the nature but subsists in perfect synergy with it.

III. DESIGN APPROACH

The style states imitating natural forms processes and ecosystems to generate more sustainable and improved human technologies and design, moreover that nature may be measured as model, measure and mentor.

Bio-Mimicry for architecture can be linked to the credence and actions occurring within nature that resolve architectural complications. On the other hand, studying different species to attain and conclude their operative and protective measures within their own environments so that it can be applied to materials and systems that assist passive ecological design.

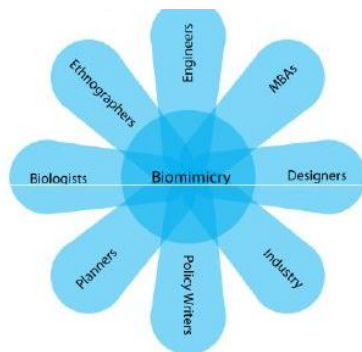


Fig1: Creating the Conversation between nature and human science.

A. Nature as Model

Bio-mimicry and its use of nature as a model, attains inspiration from biology to resolve human and architectural complications. As the science of biology develops and discovers new species and the way in which they correlate with their environments, so does the mode in which architecture become familiar and attains new approaches towards structure, tectonics and enactment within a building.

City Hall in London has some prescribed inspiration from the nature. It's a Norman Foster design, who considers that the world can be transformed by varying the design of the places in which we reside. This building is planned to signify and instigate the forward gesture of the democratic process in London. It is an utmost non-polluting building, built of sustainable materials.



Fig 2: City Hall done by Norman Foster in London

B. Nature as Measure

Bio-mimicry and nature as a measure for architectural proposal can be associated with the cohort of form and function that lies concealed, personified within nature. The concept of development and natural selection has had 3.8 billion years of headway, providing a massive range of creatures from which scientists and architects can draw. Through the study of the structural, organizational and performance properties of these creatures an architectural language is engendered and conveyed through form, spatial, functional, structural and stylistic properties.

The plant is the idyllic metaphor for the edifice of a building. The plant's roots offer a foundation and steadiness; the stems are the edifice that resist forces; and the leaves are designed for energy consumption and shielding. Self-organization, classified arrangements and the understanding of material systems are leading elements in the analysis of the core structures of natural organisms.

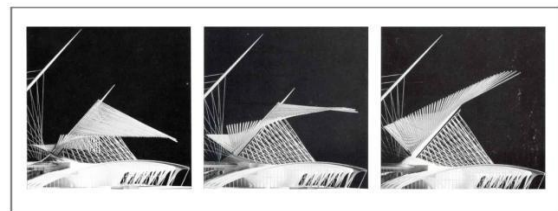


Fig3: Indicates the kinetic movement of the Milwaukee Art Museum.

Architect Santiago Calatrava is attracted in the beauty based on physical metaphors, animal skeletons and human gesticulations. These natural references enhance scale, shape and dynamism of the designs. Calatrava's logic of dynamic measure was consequent from the morals of nature; he studied the complication of animal bones and the manner they link in order to express a lively active condition. The Milwaukee Art Museum in Milwaukee was aimed to rise with the metaphor of a bird taking off for flight. This was attained through the kinetics of the roof construction, a sequence of steel fins that perform as a screen that opens and closes as an openhearted gesture to visitors. The fins pivot from a switch mast that can incline to 47 degrees, generating a complicated patterning of building components. The kinetic movement of the building varies the geometry and atmosphere of the edifice as a whole, a mixture of a composite relationship of light, space, material, form and structure.

C. Nature as mentor

Bio-mimicry and nature as a mentor for architectural proposal can be related with existence and adaptability of organisms within their surroundings. Bio-mimicry as a mentor has endorsed architecture to examine the dynamic exchange amid an organism and its environs, in order to create new models of architecture through biochemical procedures and functionality. Architects pursued to examine the intricacies between form and structure, and the interior operating systems of organisms and their environs, not as separate components but as a solo entity.

The study of the conversion of energy has provoked the technical world. Nanotechnologies and smart materials have been found to imitate the adaptive properties of nature. These smart resources stand by the laws of nature and experience conversions of energy from one form to another. Electro-restrictive materials convert electrical energy into elastic or mechanical energy; a physical alteration in shape or form.

Tree-scraper Tower of Tomorrow designed by William McDonough is a skyscraper that has been planned by the inspiration from the development and variation of a tree. A rounded, sleek building, tumbling the impact of the wind, it uses negligible construction materials, while creating extreme use of the hemmed in space. All of the water in the building is reused in a way similar to that of in what way a tree would re-use water plus nutrients. Wastewater from sinks runs into the building's three gardens and the water from the gardens is successively re-used in the chamber pot.



Fig4: Intelligent building done by William McDonough

It utilizes solar electricity, and is made totally of biodegradable materials. McDonough's proposal emphasizes on the prospects of today, for a future framework,

assimilating green and arboreal-inspired systems in a super-efficient, a forward-thinking architectural wunderkind. The form of the structure is aerodynamic; tumbling the influence of the wind, while its coiled form decreases the expanse of materials desired for construction, increases structural constancy and make the most of enclosed space. Flora prospers, with a green roof and three-story atrium gardens prearranged on the western side of the building. A collective heat-and-power plant would also be mounted, to be operated by natural gas, which could be the source of power that the solar panels cannot.

IV. CONCLUSION

Human, nature and architecture are triangle three points that are not contradictory, but conglomerate and complete each other; and by means of experiences, nature sciences and techniques and generating a sociable bond amid human and nature by architecture aid could generate a hint that has nature inside it.

There has at all times being a dispute that whether the nature would be established as situation for architecture too or it would be a part beside it. For that reason nature has been a fragment of architecture from the time that human in a straight line used it by alive in the caves and by means of building substantial according to the nature of its surrounding up to the time after industrialization which the viewpoint has been altered by the new materials, tools and technologies and inspiration of nature took place in architecture. The study has proposed to show new methodologies to have new age of architecture, by taking inspiration from nature in different perspectives

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