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Naturalism in Architecture Creating a Culture of Resilience

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Abstract

Naturalism is the philosophy that adopted the theory of evolution and the domination of natural properties. The popularity of naturalism was due to the rise of the extensive biological researches and the evolution of natural sciences by the end of the nineteenth century and the beginning of the twentieth. The emergence and the rise of these scientific theories were the contributing factors to the domination of naturalistic trends. It had an ample impact on urban and architectural schemes. Environmental catastrophes and the climate change that followed the second world war that reached its peak in the last two decades of the twentieth century were the major factors in attracting the attention to the importance of preserving nature. Naturalism was inspired by biological theories using a biological metaphor. The philosophy brought to mind techno-scientific images which drew out the concept of genetic architecture. These images tried to synchronize with the natural variables in order to achieve the concept of sustainable development. This paper aims to examine the concept of sustainable architecture by studying the architectural movements that are influenced by nature and biological theories, such as terms, models, projects, and buildings. For a deep understanding of the current discourse, this paper searches for the impact of the philosophy of naturalism on the history of sustainable architecture. The paper focuses on the notion of resilience while picturing the transformation of economic, political, social and physical structures into resilient urban spaces and organizational patterns which have the potential to grow and change—a subject mostly presented in a historical review.

Keywords

Naturalism; Sustainable; Resilience

1. Introduction

"Sustainable architecture," has become an excessively used term in recent decades as a response to environmental catastrophe, and climate change. This notion has a broad applicability but usually used in partial application. The term is always used to point out to recent environmental building solutions, focusing in using new materials which capable to recycle or reuse, and ecolabeling, and with a little concern to social and cultural issues. Sustainable architecture is scarcely discussed as a decisive key driver has a potential to make a greater systemic shift, which would have to foster a radical rethinking of conventional economics, consumption manners, and sustainable life styles. This paper traces the impact of the Naturalism's philosophy on architecture with concentrating on the case of Metabolism architectural movement in Japan which emerged in the 1960s and drew the attention to its revolutionary and visionary urban planning and architectural schemes. Metabolism's prime manifesto, addressed a huge concern to cultural resilience as an expression of national identity. This vision had been seen from a contemporary point of view.

The movement of the Metabolism had influenced with the new political and environmental changes and directly responded to the human and environmental catastrophe after the atomic bombing of Japan in the Second World War. Its architecture came out as a complete and radical transformation of Japan as a political system, social, and physical structures into resilient spatial and organizational patterns capable to change to respond to changing activities. Metabolism is the belief that design and technology should express the vitality of the living organisms. The basis of the ideas adopted by metabolism architects results from the idea that everything in life changes and is altered by rapid technological developments. As a result of the changing human needs, buildings must adapt their spaces to the new activities. This requires them to be able to change and grow as a living organism. Metabolists employed biological metaphors, retrieved technoscientific images, and triggered the conception of a genetic architecture in vernacular forms. They struggled to link between their visionary urbanism, institutional infrastructures, and the individual capability in customizing cells and adaptable temporary order of dwellings, which could expand, shrink or substitute according to the functions need.

Rem Koolhaas and Hans Ulrich Obrist have one of the latest correlations with Metabolism is, Project Japan: Metabolism Talk (2009). It is an extensive synopsis of interviews with the proponents of the movement, in the seventies and eighties of the twentieth century, previously unknown archive material, and photographs documenting the making of the book and revisiting the Metabolism's architecture. The authors tried to explore the movement's revolutionary Agenda, projects schemes, and the reasons behind the success of Metabolism vision and ideas in the 1960s, and its disappearance twenty five years later "in the bonfire of neoliberalism" (Koolhaas, Obrist, Ota, Westcott, & Daniell, 2009).

2. Resilient Urbanism

By the 1980s, as a result of great technological and industrial development, the interest in the natural environment increased. Architecture started seeking for compatibility with the surrounding environment without harming the natural environment and climate. There have also been persistent attempts to develop architecture and accommodate it with the requirements of the times and needs of users. Due to the consciousness of the environmental catastrophe the world is passing by, the concept of environmental resilience has become mainstream .The notion of resilience first emerged in the 1970s related to ecological systems. Recently, it has become one of the major concepts in contemporary urbanism in the context of environmental, economic, and social crisis. It has usually been defined as the capability to response to, and recover from various threats with minimum harm to public safety and health, that is besides focusing on developing the economy of a particular urban area. However, the term of resilience is mostly addressed in environmental and technical contexts and often disregards social and cultural implications (Goldstein, 2011). Resilience gives systems the ability to adapt according to change; thus, it always be capable to rethink assumptions and build new systems (Folke, Carpenter, Walker, Scheffer, Chapin, & Rockström, 2010). When Metabolism was presented to the international design community at the World Design Conference in Tokyo, (WDC) 1960, the term was not in use yet. Metabolists impeded the notion of resilient urbanism in technical, socio-ecological, and cultural terms. A resilient architect's society presents here its systematic spatial reorganization in order to achieve a balance between change and preservation as expressed in the design of different life cycles of infrastructures and individual dwelling unit, and of permanent and changeable parts of the urban system which give the ability to add, subtract or substitute different urban elements according to change in functions or needs.

Metabolism left its influences on the Japanese architectural community, beside it had a decisive impact on Western architectural and urban discourse (Folke, Carpenter, Walker, Scheffer, Chapin, & Rockström, 2010). The WDC in Tokyo was the first international event Japan ever held, it presented new urban discourse and turned the WDC into a forum where discus differences between Japanese and Western culture. Metabolists were searching for Japanese cultural identity differ from Western models, however, Metabolism took a new approach.
Dealing with new models, terms, and images that could be applied more generally, and reflected a broader shift, not only in Japanese architecture but also to the contemporary architecture. Metabolists connected traditional

models with a historic, universally applicable, and structuralist spatial conceptions with biological metaphor. All of these underline the strong influence of organic theory and expressed by cutting edge technology. Metabolists created their conceptual movement focusing on nature and organic schemes accomplished an accepted stereotype of Japanese architecture.

3. Envisioning Reorganization

The architectural historian Ryuichi Hamaguchi divides post-war modernism in Japan into two separate decades. After the second world war, all the main cities in Japan were destructed, particularly Hiroshima and Nagasaki. The guiding theories as early rationalism and functionalism were taken up again. Hamaguchi claims that around the middle of the 1950s, an architectural discourse shifted from functionalism to 'aesthetic consciousnesses. In Japan, around 1960 architects started to engage in a broader discourse on cities planning and urbanities. Architects launched numerous Conceptual Proposals for urban redevelopment. Kenzo Tange's Metabolist proposal for Tokyo Bay was one of the first examples of this both theoretical and utopian approach to urbanism in Japan (Hamaguchi, 1966).

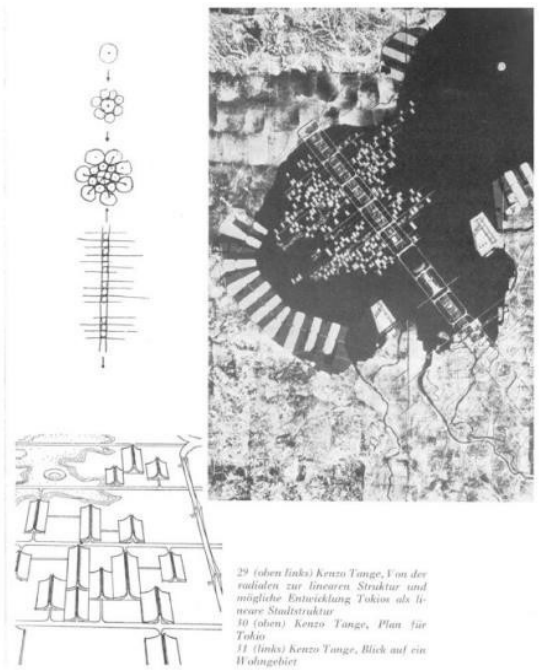

Figure 1. Tokyo Bay (1960) KenzoTange, with Kisho Kurokawa and Arata Isozaki.

By the end of the 1950s Japan was still fighting for achieving the task of housing millions of people left homeless in affected cities. The consciousness of having lost the war, brought with it a deep concern of losing the Japanese national identity with having a disconnection with one's own culture. This is created the desire to retrieve the national heritage of Japan. The Japanese architects tried to unite a new Japanese alliance to participate in creating a utopian city planning.

It was a wonderful chance for the Japanese architects and urban designers to communicate directly with their foreign colleagues during the WDC in Tokyo in 1960. This event plays not only as a catalyst for a generation shift in general especially in the design community in an Asian context, but also as a marker for a growing self-consciousness of a non- western architecture. In similar way, Metabolists defined Japanese culture vis-a-vis a western audience. They used the term "Japanese" as opposite to Western modernism, which they considered it as an essentially uniform condition. The spokesman of the metabolists, Noboru Kawazoe, claimed that in Japanese architecture there are a strong relation between functional and symbolic values. In opposition, he emphasized that West modernism - which for him was purely functionalist.

The Metabolism's manifesto prepared for the conference (Kawazoe, 1960), was contained essays and visionary projects and schemes, but the most visible was the drawings of Kikutake (Wendelken, 2000). The projects presented were theoretical designs and visionary schemes' discussing cities and urbanities dealing with the issue of accommodating a population growing into the millions, drawing the attention to sites that had not been considered before like the ocean or the sky. The publication also included an essay by Noboru Kawazoe, where he point out to the nuclear catastrophe and promotes 'the unity of man and nature and the evolution of human society into a peaceful state of unity, like a single living organism.' He ends his essay with: 'Our constructive age . . . will be the age of high metabolism. Order is born from chaos, and chaos from order. Extinction is the same as creation . . . . We hope to create something which, even in destruction will cause subsequent new creation. This something must be found in the form of the cities we were going to make—cities constantly undergoing the process of metabolism' (Kawazoe, 1960).

The Metabolist manifesto at the WDC presented The concept of megastructure as a unique Japanese contribution to modern architecture, and according to Reyner Banham its marking the maturity of Japanese architecture and its independence of other cultures,' and of "'neo-colonialist" views of what it ought to be,' (Banham, 1976) . The term of 'megastructure' appeared for the first time in a paper by Fumihiko Maki's Collective Form (Maki, 1964). The idea of megastructure is like the natural evolution of the organic idea with respect to growth and development. Different parts of the same organism work in the same mechanism as flowers, leaves, and fruits that grow from one tree.

As a response to actual issues, the Metabolists developed their organic schemes of network cities. One of the major problems was recognized as the lack of comprehensive infrastructure in Japan, which was the main obstacle to urban development and economic growth. Progress of means of transportation increased mobility which was promoted as a matter of individual freedom. The urban design proposals which presented by different members of the Metabolism movement dealt with topological questions (The following). They did not take a traditional way envision infill of streets and new public transportation systems to solve this problem, but they took a radical approach dealing with new forms of total organizations that went beyond the conventional urban planning for the existing city. The mission they decided to go through was set on unifying all urban aspects into one big organism, which held as a containers for various functional units of different life-cycles. These megastructures branched in a hierarchy from large traffic arteries and transportation lanes down to streets on the pedestrian level. They linked all the public and commercial facilities with housing, which was being organized to become self-contained community.

4. Metabolism in Architecture

The urban sociologist Ernest Burgess' created a biological term" Metabolism" in his article 'The Growth of Cities', first published in 1925 in the book" The City Metabolism" which inspired from the anabolic and katabolic processes of a living body. Burgess used the term 'social metabolism' to identify the process of growth and transformation of cities. The most revolutionary concept in Burgess' at this time was the stating the cities' growth as 'normal' and not as the reason for social demise, as in the rhetoric of the Garden City proponents (The foremost). Because a city behaves in its formation and extension like a living organism it grows and changes, and thus endure naturally cycles of disintegration and reintegration.

Beside Metabolism's biological implication, the term was often showed up in the context of Buddhist values, especially by Western writers, focusing on the model of death and rebirth. Günter Nitschke in a special Japan number of AD in 1964, edited an essay claiming that 'Metabolism' can be translated to the Japanese expression "Shinchintaisha", which means renewal or regeneration. Cherie Wendelken has pointed out to the Buddhist concepts of transmogrification and reincarnation (Wendelken, 2000). In this way, we find out that the notion of 'Metabolism' carries both a universal scientific connotation as well as a Japanese spiritual values and beliefs.

Metabolism as a biological metaphor focused on the reorganization of the relationship between society and the

individual adopting the Comprehensive planning which would make people free (Lin, 2010). The disintegration of the city into 'cells' corresponded to the breaking away from conventional family structures especially in the modern western societies and the strengthening of the situation of the individual in Japanese society.

As a native Japanese model for the impermanence of architecture and a boost for Metabolist principles served the national monument of the Ise shrine, reconstructed every 20 years since the 7th century in the Shinto tradition. Another example, the historical model of the 16th century Katsura Detached Palace, which was extended twice over 150 years into an asymmetrical plan, as representing a Japanese tradition of metabolic and ideas of growth (Koolhaas, Obrist, Ota, Westcott, & Daniell, 2009). Metabolism created an organic stand for visualizing the regeneration of Japanese culture after the destructions of fire bombings and two atomic blasts and severe environmental catastrophe. It granted the acceptance of Japan as ground zero - a site of rebirth where culture would be regenerated from an underlying spirit of Japanese traditional values and beliefs and give it a new dimension as a modern nation. For that reason the Metabolists proposed an organic connection between the individual and a fundamental cultural pattern (Wendelken, 2000).

5. Structural and Symbolic Reorganization

The Sky House which was owned by Kiyonori Kikutake1958 presents as the prototype for the 'cell', staging Metabolist principles. The Sky House consists of one square room, floating above ground on piers containing plumbing compartments attached on two sides of the building representing expandability. It proposed possible expansions extending from the main cell by what Kikutake called 'move-nets', which would be plugged in beneath the floor to provide bathrooms, storage space, and removable children's rooms for an expanding and contracting family. In Otterlo in 1959 Kikutake, presented at the last CIAM meeting his Metabolist project, Ideas for the Reorganization of Tokyo City that was through Kenzo Tange. Due to the lack of space and the high land prices in Tokyo, Kikutake proposed here a group of towers on the edge of Tokyo Bay, carrying exchangeable capsules of domestic units. Kikutake's high- rise projects for a Tower City and a Marine City (literally 'City on the Sea'), previously published in the journal Kokusai Kenchiku (International Architecture), were he presented it once again as parts of a comprehensive project entitled Ocean City at the World Design Conference in 1960, and were included in the publication Metabolism 1960: A Proposal for a New Urbanism. Young Japanese architects, Kisho Kurokawa and Arata Isozaki collaborated on the project with kenzo Tange, among others who were not originally part of the inner Metabolist circle (Watanabe, 1961).

Tange's organized the masses in a linear spine eighteen kilometers across Tokyo Bay, the masses' organization like an element made of layered systems of intersecting infrastructural cycles on different scales, which extended from Tokyo center, forming a 'civic axis'. Tange emphasize on reflecting metabolism thoughts on the nature of urban structures that would allow growth and change. This meant that the organization of the new civic axis was a significant challenge. They would become the most central mobility element contributing in a growing metropolis, where mobility was one of the basic necessities in city growth. Biological metaphor of the growth process of organic bodies now managing the new development concept, inspiring the development strategy from the city core into a spine as a new growth phase from vertebrates, where the spine is essential for the transmission of information through the nervous system from the brain to the spine.

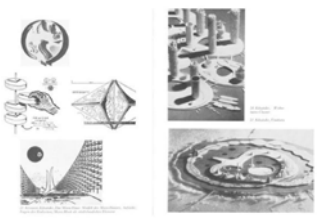

Figure 2. KiyonoriKikutake's ocean and marina projects, (1972).

Tange's plan addressed a units of two square kilometers would stand a high-rise building complex symbolizing entrance and exit, or interchange with a three level of terrific, graded due to speed to facilitate the transportation of up to 2.5 million inhabitant along the city axes plus providing a city with a communication network and underground parking. These axes would be bounded with housing for five million people on man-made islands, each high rise building considered as amegastructure or a little city or community of its own. Tange presenting his three dimensional Megastructure as a superstructure, consisting of terraces on which the inhabitants could erect private houses according to their own tastes while the artificial land stayed in public hand. 'Private space where man lives and works in the air, and common space on the ground level where modern society unfolds freely its own interactions are separated' (Nitschke, 1964). The plan rejected the traditional form of the static master plan and envisioned an 'organic', more dynamic system stretch out across the water of Tokyo Bay. This dynamic was able to absorb programmatic changes and to respond to economic and social needs. Tange developed his schemes to give an expandable urban forms that could grow and change.

6. Megastructure Versus Group Form

Fumihiko Maki in the publication "Investigations in Collective Form" In 1964, published his research on 'group form' with Masato Othaka. This was a new spatial concept differs from the concept megastructure. Maki distinguished in his research three different 'collective forms', the compositional (the modernist space), the megastructure (Tange's Tokyo Bay project, for example), and the group form. The group form differed from the compositional in its way of connecting the separate elements to the totality. Elements can be added and taken away from the cluster without destroying the balance of the whole composition as in a modernist ensemble. This consisted of a fixed number of certain elements according to the master plan principle, where the design process was clearly divided into two phases, first is a functional planning phase followed by the second phase of creating individual buildings. The megastructure, on the other hand, was an open structure without a fixed concept of composition or a specific form, it was denominating the infrastructure, a man-made landscape, upon which all functions and elements of society grew and flourish. From his point of view a 'master system' replaced the master plan. Maki saw the task of the master system in its capability to change to swing into place 'in ever new stages of formal and structural equilibrium,' preserving at the same time 'visual integrity'. Group form was rather based on a 'group program' than on a determined plan, resulting in non-hierarchical collective forms, in contrast to the master plan and the master system. The layout of a group form always stayed dynamic and open-ended. Maki described its cluster-like arrangements with the words 'it is not necessary to limit composition to inorganic, geometrical, structural, or mechanical patterns. Rather group form is an intuitive, visual expression of the energy and sweat of millions of people in our cities, of the breath of live and the poetry of living (The research).' Koolhaas, in his recent publication, has compared group form to a social process instead of a technological proposal, whereby group form 'surrenders to change rather than imposing mastery, and that asserts interdependence among disparate, even unfinished elements, rather than hierarchy and isolation' (Maki, 2005).

Banham claims that, the concept of megastructure is often derived from existing 'accidental structures,' Architecture and urbanism at the beginning of the 1960s, promising 'to resolve the conflicts between design and spontaneity, the large and the small, the permanent and the transient (Koolhaas, Obrist, Ota, Westcott, & Daniell, 2009). In Banham, it presents the culmination and the end of the modern movement, which continues to announce in the modern era its capability to control 'the design of the whole human environment,' while now admitting the importance of the individual desires for self-expression, a contradiction that the megastructures were finally unable to resolve. Spontaneous processes of self-building could happen but 'within a framework created by professional architects' and still 'reflecting the monumental and aesthetic values of professional architecture' (Koolhaas, Obrist, Ota, Westcott, & Daniell, 2009).

7. The Image and the Reproduction of Metabolism

Metabolism has generated a radical visionary approach dealing with architecture. We can discuss the different aspects of the Metabolist image: first the early visionary proposals and schemes, second the projects that was actually executed. Kyonori Kikutake's theoretical projects differ quite heavily in language and scale from his executed projects. His visionary proposal for an experimental houses aiming to dwell hundred thousands of inhabitants are represented in a sketchy way, often in charcoal with a dreamy style and always containing some domestic-romantic implications, such as using the reflection of the rising sun on the surface of the ocean or Fuji Mountain as a background. Kikutake's early built architecture has a traditional forms and styles, although he was using contemporary materials and advanced construction methods. Most of his buildings are of a moderate scale and well integrated into their surroundings.

In 1960-62 Arata Isozaki presents his project. 'Future City', using in ironic way images can be found in the photomontage he called it 'Incubation process'. In this drawing from Isozaki's City in the Air, for Tokyo's Shinjuku district, Isozaki introduced his proposal for a new kind of housing featuring a dwelling units plugged to a huge cylindrical cores are built in a specific empty lots. Isozaki situates a megastructure which built above the existing city within a field of classical ruins. The image pictures the city as the place capable to contain many life cycles and could allow to various cultures to live and thrive, overlap, and decline. Isozaki claims that future cities would be built over the ruins, the city has its role in recurring cycle of life growth and death. In this synchronization of the already declined (Western classical architecture) with the visionary (Japanese Metabolist architecture), we still could not imagine if it was a revolution or it was a paradigm shift.

8. Conclusions

Naturalism has influenced architecture and urban design in many ways. The large impact of naturalism shows in Metabolism. Metabolists develop their organic schemes to respond to changing activities. Metabolism is the belief that design and technology should express the vitality of living organisms. The basis of the ideas adopted by metabolists architects results from the idea that everything in life changes and is altered by rapid technological developments. As a result of changing human needs, building must adapt their spaces to the new activities. This requires them to be able to change and grow as a living organism.

The movement of the Metabolism regenerated a new relation with Japanese traditional culture and a gave their architecture a new identity differs from Western architecture trends. The Metabolist schemes earned a large appreciation of visionary projects on huge scales, especially in the west.

One of the major objectives of the Metabolists to find a new approach capable to solve the new urban problems that came out with the rapid growth of megacities. They focused on of land scarcity, housing shortage, and unplanned sprawl. They also addressed fundamental social considerations, philosophical metaphor, political reflections on the structure and architecture features, and national identity and culture.

Metabolists created a radically different conception of the city, conceived that the strict separation of public and private realms, making one part of the megacity an infrastructure at large and disintegrated the other part into a micro landscape of cells. It shows that a population are moving freely associate and dissociate according to personal needs. This society was not related to place; it integrated through the availability of the megastructure and group form, metaphoric images such as cycle and tree, and the idea of an underlying cultural heritage.

The Metabolist visions of a resilience reveals various contemporary urban problems. The current discourse now is discussing how to design sustainable cities which have similar challenges such as, land scarcity, housing shortage, insufficiency of infrastructures, and a lack of transportation means. Sustainable architecture have not led to the emergence of more resilient cities. Koolhaas and Obricht, point out to the retreat of the state's organizations and the prominence of the private market in driving development. They show the network of relations behind the movement. They demonstrate the movement of Metabolism's proponents and their ability to collaborate and build alliances to represent a wide range of other disciplines in order to fulfill their concept of a resilient culture which

left its impact on urban planning and design theories.

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