Metabolism Reconsidered
Its Role in the Architectural Context of the World

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Abstract
This paper analyzes and considers the main features of the Japanese avant-garde movement “Metabolism” that appeared on the scene of the architectural world in the early 60s. The originality of the concepts developed by its members and the innovative design of their projects captured the attention of many critics, in Japan as well as abroad, who often either misunderstood or neglected most of the original theories of the group. Therefore, it seems that furthermore analysis could be necessary to clarify some points of metabolist group’s activity, and to reach a better understanding of the historical context in which Metabolism has originated and developed, as well as of its aims.

Keywords: Japanese architecture; urban planning; metabolism; Kikutake; Kurokawa; Kawazoe

Introduction
More than 40 years have passed since the Metabolist Movement was promoted worldwide. By now the memory of this group of architects, in Japan as well as in the rest of the world, is a bit dimmed, both as the events that saw them are distant in the time, and as many of the early members have moved away, although never rejecting all the principles completely, from the original themes and the theories that were the basis of their proposals in architectural and urban design. Furthermore new generations of brilliant architects have spread in the recent years in Japan, moving the main interest of the architectural world to the current “New Japanese Wave”, contributing to the acceleration of the process of oblivion and separation from those years.

In spite of the natural process of inevitable change that occurs to ideas through the years, some central ideas developed by Metabolism are extremely topical: first of all the matter of how to link the Japanese traditional culture (that is an Asian culture) to the Western models, as well as the necessity to blend modernity with the heritage of the national culture and to create an environment that could promote the harmonization and the cooperation of the different aspects of the contemporary society. And last but not least, how to structure the development of the cities in an age of huge and fast urbanism, driven by a spectacular economic growth, consequence of the massive industrialization accomplished at the turn of the second half of the XX century.

All these themes are still topics of great importance, both for Japan and for the new developing countries, especially for those countries that, for economical and historical reasons can share some linkage with Japan, such as the Far East Asia (China, Korea, Malaysia, etc) that at the moment are moving fast to a similar unprecedented prosperity, and whose situation is similar from many points of view to that of Japan of the 60s.

Historical Background
The analysis of the events that can be traced since the dawn of the Metabolism shows that it coincided with the period of the fastest development of Japanese nation ever, and it spread in the span of a decade, when Japan reached the two targets of the economic recovery after the defeated in the Pacific War, and the official recognition as an effective member of the developed world previously only driven by western countries.

Japan during all the decade of the 60s was the stage of worldwide events that helped in his promotion abroad. The first of these events was also the springing board for the launch of the Metabolist Group and was the World Design Conference held in Tokyo in 1960. Others were the Tokyo’s Olympic Games in 1964, and the last was the Osaka Expo in 1970.

During the 50s Japan was striving hard to rebuild the country and recover the wounds of the war in which the country was defeated. The central government stressed the importance of empowering the economy, thus the enhancement of the industrial system became the priority of national policy and the continuous improvement of the production became a sort of imperative for the entire Japanese population. The 50s were decisive years for the future of modern Japan for many reasons. When Japan regained independence from the US occupation
forces in 1952, it was still a nation shocked by the recent war. Many new factors were presents. Problems like the housing shortage, the delay in rebuilding the factories and the whole economy, the concern about national identity after the defeat were balanced by the new democratic system introduced by the Americans, as well as the new spirit of pride and awareness for the duty of the material and moral reconstruction of the country. In 1953 the war of Korea was the turning point for Japan because it transformed the Japanese archipelago into a virtual barrier against the threat of Communist expansion, as well as into an outpost of democracy and capitalist world in Far East Asia. US government gave the financial and technical assistance for the reconstruction of the industrial frame of Japan. Since then began the amazing Japanese economical development, that thanks to the capitals from overseas and the more and more enhancement in the new technologies and the know-how imported from western countries.

The strategy undertook by the government was full of consequences for the future development of Japanese cities. The priority given to the industrial sector promoted a strong centralization of the factories near the cores of the cities, above all Tokyo. In the capital was the highest concentration of qualified skill labors, markets, and financial and governmental institutions, as well as the main infrastructures. At the end of the 50s the Japanese government enacted a plan to make economies in the main infrastructures. At the end of the 50s the Japanese government enacted a plan to make economies in the areas of Tokaido stronger through direct public investments that led to concentration of people, functions and activities in this region, following a policy continued till the end of the 60s, with a special concern on the efficiency of industrial system rather than the social equality.

Furthermore, the emphasis on the economic matters caused an underestimate of the problems related to housing. The poor investments in this field and the governmental guidelines in the matter of housing standards (that prescribed the dimensions of the house as small as possible) were aimed to reduce in little time the problem of shortage of houses, promoting quantity over quality. So the result was the creation in the cities of Japan of a huge fragmented urban fabric, fulfilled with tiny and uncomfortable shelters, far away from western housing standards.

The logical consequence of this strategy was the beginning of an impressive emigration phenomenon that pushed people and activities into the main cities along the Pacific belt, from Kanto Plain, to Osaka, all the way to Fukuoka, in the what was called in the early 60s “Tokaido Megalopolis”.

During the years of economic boom the urban growth accelerated so quickly that in the 1970 an amount of 72% of the total population lived in the cities. Just 20 years earlier the amount of urban population was about the 37%, witnessing the sharp shift of Japan from a rural society to an urban society compressed in a little span of time.

The works by Metabolist were mainly promoted as radical solution to the problem of crowded cities and as polemical alternative to all the previous city planning methodologies that were devised by the Modern Movement. But the origin of those futuristic projects lay more specifically in the efforts of contrasting the chaotic urban sprawl of Tokyo.

In 1958 the president of the Japan Housing Corporation, Kuro Kano, proposed the filling in of the North side of Tokyo Bay, aiming to recover land to be used as new grounds for the extension of the city. This proposal was rejected by most of the architects, although it was the starting point for the development of projects that presented new dimensional scale and radical solutions both in structural engineering and architectural appeal. Among the others that proposed their ideas were Masato Otaka, Noraki Kurokawa and Kiyonori Kikutake. The latter proposed the drawings and models of his famous project for a “Marine city” and a “Tower Shape city”, both presented at CIAM meeting (together with projects of his house called “sky house”) in Otterlo the following year.

From that on, the driving idea was the recovery of Tokyo conceived by means of all sorts of the most advanced technology and engineering solutions, seen as the only way to overcome the inextricable chaos and the troubles of the real city.

Since then onwards, all the subsequent urban projects concerning Tokyo (such as the plan for “Neo-Tokyo”, 1959, and the famous Plan for Tokyo Bay by Tange and URTEC, 1960) were all conceived by using massive megastructures and artificial land.

Metabolism and its Manifesto

The Metabolism movement was both an architectural theory aimed to resolve the problems of overpopulation of the crowded cities of Japan during a time of impressive economical growth, as well as a critical theory of the society analyzed from an architectural point of view.

It tried to create a linkage between the Japanese culture and the contemporary architecture through the assimilation and the subsequent transformation of Western values in order to produce models suitable for the Japan’s cultural tradition.

The main members of the movement were architects Kiyonori Kikutake, Noriaki “Kisho” Kurokawa, Masato Otaka, Fumihiko Maki, the critic Noboru Kawazoe, the industrial designer Kenji Ekuan and the graphic designer Awa zu Kiyoshi. The architects of the original group presented their manifesto at World Design Conference in 1960 as a collection of independent papers in which they proposed ideas and concepts regarding their own vision of the city of the future.

It was the critic Kawazoe that promoted the usage of the word “Metabolism” as key word to present the ideas and the theories of the group; this word refers to biological world and generally to metamorphosis and
transformation. It stresses the basic idea of an endless change that occurs inside organism and in its nearby environment. The Japanese architects that joined under this name promoted a flexible architecture and dynamic cities that could develop and grow through the elimination of their exhausted parts and the regeneration of new components in accordance with the necessity of the socio-economical environment.

The city is conceived as a metaphor of the human body, and is seen as a structure that is composed by elements (cells) that are born, grow and then die, whereas the entire body continues living and developing.

Linking their theories with the Japanese cultural tradition of impermanence derived from Buddhism thought, metabolist architects believed the architecture shouldn’t be static, but capable to undergo “metabolic” changes, and instead of thinking of fixed forms and functions, they developed structures and projects composed of mobile and flexible elements.

As stated by the same Kawazoe referring to the form of the city of the future: “What will be the final form? There is no fixed form in the ever-developing world. 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 are going to make- city constantly undergoing the process of metabolism”.

The Metabolist city aimed at overcoming the fixity and the mechanical structure of the Modernist city, whose principles were in a state of crisis since the last CIAM meeting in Otterloo held in 1959. Again Kawazoe refers as: “...the linkage between architecture and city is related to the issue of the interaction between order and disorder. The disorder of the social activities is the basis for the vitality of the modern cities. The philosophy of Metabolism must, concerning this reality, balance the disorder and the order of the city”.

Botond Bognar, a well known scholar of modern Japanese architecture, stressed that the ideology of Metabolism movement was founded on two major elements: the former was the concept of the society considered as living and mutable entity, with an inherent aptitude for change. The latter was the awareness of the members of the group to be able to lead the process of transformation of the whole society by means of the technology and their architectural and urban design.

High technological devices became a key feature common to most of the projects by Metabolists. Thanks to the innovative mix of futuristic technology and appealing forms that fulfilled their drawings, two projects presented at the World Conference of Tokyo were invited to participate at the exhibition of “Visionary architecture” held at MoMA in New York in 1961. Those projects were “Marine city” by Kikutake and “Agricultural City” by Kurokawa.

These two architects were the most influential of the original group. Especially Kurokawa, who during those years was member of Tange team for the project of Tokyo Bay and actively engaged as reporter for the magazine “International Architecture” (Kokusai Kentiku), was author of many publications about the theory and the ideology of Metabolism in the subsequent years.

His urban planning methodology bases on the idea of creating a “patchwork-like” city, by adding side by side new blocks on the ground in a somewhat random way, and creating thus the whole urban fabric letting the city herself leads her process of growth and development. This idea is well explained in his works of the early 60s, as the projects for “Floating City-Kasugimaura” in 1961 and the linear city “Metamorphosis” in 1965. In these projects the city develops thanks to the continuous growth of her parts along the main transportation channels, rejecting the tradition of the concentric urban model, and stressing the importance of the communication routes in the modern city.

Furthermore, Kurokawa doesn’t hesitate to deny the Rationalist hierarchical order in favor of a completely free relation among the urban elements, creating a new type of urban space, unknown in European tradition, recalling the concept of “en” space, or intermediate space, which, according to Kurokawa, links directly to the tradition of ancient Japanese cities.

In a somewhat similar direction Kikutake moves in the explanation of his theories of urban planning; starting with his interest and studies of new artificial environment in the sea, like shown in the projects for “Marina city” and “Ocean City” elaborated during the years 1958-1961, he later developed the urban methodology of “Channel Development System”, based on the concept that the city can develop as a system of functional connectors (links) among cores (key points) which can grow and change. Thus the whole system is like a huge and interconnected web, both planned as well as capable of spontaneous change.
Whereas Kikutake and Kurokawa gave great importance in the usage of the new technology as an indispensable tool to manage the modern city, Otaka and Maki gave more consideration in the relationship between the buildings and the surrounding urban environment, as explained in their research on the collective forms and the development of the “Golgi’s structure”, a urban method that shows: “how the interior space of a building can be conceived as a direct order of preconceived exterior spaces”ix.

The new metabolists ideas relied on the use of a different approach in searching the solution of urban problems. Rejecting the methodology spread by the Modernists, based on the commands of Athens’s Chart and the tool of master plan and zoning, the insight by Metabolism was an the attempt to control and plan the city through the industrial design methodology instead of the architectural principles.

This concept was well suited for resolving urban problems, as it permitted to consider the urban elements as goods produced by industrial factories, willing to change and modify quickly and directly when needed. The well-known idea of metabolic cycles of the metabolist architecture finds its explanation in the vision of the world of technology and the concept of assembly of line of the industrial production. By the way, it can be said that during the 60s the entire Japan looked like a huge industrial factory, where the economy growth was the main concern.

The dynamism of modern society and the tasks of reconstruction and production pushed the imagination into the realm of (new) mechanic world. As the historian William Curtis noted: “...There was much in the Metabolist position that recalled the (Italian) Futurist’s suggestion that the modern city be made into a dynamic machine of moving and variable parts”ix.

Furthermore in both cases, one of the main aims of those avant-garde movements was the promotion of an independent “national” language in architecture completely split from the influence of current streams. Many of the projects by Metabolists presented high rinse mega-structures support clusters of prefabricated apartment capsules which were modified and replaced according to their life cycles and the social demand and fashion. During all the 50s many experts in the prefabrication of industrial components for housing were invited to Japan by Japanese Government and independent professional associations to join seminars and conferences. Among others the architects Konrad Wachsmann, Luis Khan and Buckminster Fuller were invited. Their activity was stimulating for the subsequent development of the big housing companies in the field of the industrial production of architectural components.

The theory of capsules elaborated by Kurokawa during the 60s was the final result of his studies in the field of containers production started at the beginning of the decade. Those researches were extremely interesting both for the government and the big housing companies that often hired professional architects to enhance the quality, the performance and the aesthetics of their products.
The issue of the aesthetics was of the most importance for the architects of Metabolism. In spite the orientation towards the biological metaphors of their drawings and the models of their projects, the necessary corollary for their ideas was the adoption of new materials as reinforced concrete, which became a typical mark that denoted the Japanese brutalism of the 50s, and the steel frame, to whom the capsules, conceived as metallic boxes made of welded steel, exactly as the ship containers, were supposed to be placed. The results, at least in the few works completed, are rather far from the supposed flexibility and changeability announced in the early manifesto.

Surely any clue of formal reference to the traditional architecture is vanished.

But, on the contrary, the weight of the ancient national architecture was still effective.

In their meeting in preparations for the World Design Conference, and in all the writings published later, all the original members recalled the influence and the inspiration suggested from the analysis of the ancient shrine of Ise and the imperial villa of Katsura.

The concepts of endless reconstruction, take from the former, and cyclical change, suggested from the latter, poured out both into the theory and the general metabolist methodology. Other elements of modern architecture, as the concept of standard, the use of module and the industrial prefabrication, suddenly appeared to them as “modern” tools that belonged to the national Japanese architecture for centuries.

Japan, which so far was striven to reach the same level of West in most of the field of Culture, Technology, Science, a run started 100 years before, suddenly found itself in the field of architecture, for the first time, as “master” for the western countries. Pride and Aesthetic eventually became the main features that were recalled from the national cultural heritage.

International criticism

The World Design Conference in Tokyo, whose main theme was the “Visual Communication” and joined together graphic design and environmental design experts, was an occasion for the public presentation of the Manifesto of Metabolism, published at their authors’ expenses, and the final stage of a series of two years long informal meetings held by the members of the group since 1958.

From the very beginning, the projects by the metabolist architects caught the attention of the western audience and the success of their futuristic and highly technological visions was, as stated before, so strong that some of these projects were invited (first Japanese ever) at the international exhibition at MoMA in New York.

The international recognition of Metabolism Group as the most important avant-garde movement in Japan dated from the first moment of its appearance, and since then Japan entered officially in the main stream of current architecture.

The sophisticated design methodology and intriguing name “Metabolism” played an important role in the promotion of the ideas expressed in the manifesto, filled with biological metaphors. So did also “...the simple theoretical program and the very attractive monumental forms of their huge visions” as stated by the critic Reynar Banham. However his opinion about the Metabolists, as well as all the architects that represented the heterogeneous movement of Mega-structuralists during the 60s, looks like quite superficial. Especially if considered that in his fundamental work about the rise and fall of Megastructures, referring to the Japanese metabolism, he presented Kenzo Tange, since the 60s the most famous and influential Japanese architect, as the main star of the whole group, when in reality he never joined the Metabolist movement, although many ideas where shared by both, as other critics have rightly noted.

Anyway, it can be said that a part of the notoriety gained by Metabolists ideas and his acceptance in Japan and worldwide, at least at the beginning, was alleged to the “supervision” of that great architect of the previous generation, who supported actively the group; in return the Metabolists helped him in renewing his font of inspiration in the field of architecture and urban planning, bringing more “…needed vitality and enhanced imagery.”

During the 50s the interest for the Japanese architecture and art was high, and fruitful contacts between architects and designers were frequent. Walter Gropius, who visited Japan in 1954, as a guest of Tange, invited all the young architects to “…forget Rome and come to Japan!” The issue of national identity, due to the traumatic changes occurred in Japan during the previous years (the war, the economic recovery), became the most fundamental for Japanese people during those years. The necessity to protect the traditional values of the past from the threats of the fast transformations of modernization (after surviving the destruction of the war) stimulated and spread a new interest for the traditional
artistic heritage. Metabolist ideas tried to combine and balance the need for the modernity with the aesthetic values of the past of Japan. Although many other critics have found many analogies with other avant-garde groups, such as the British Archigram, most of the proposal by Metabolism cannot be clearly envisioned without a direct survey of the reality of Japanese society and history of those years.

Robin Boyd pointed out as the main reason that promoted the architecture of mega-structure by Metabolist group was the deep distrust in the policy of government and local administrations in facing the chaos of the cities, and the growing awareness in the possibilities given by the new technologies. This obsession for the technology became a specific feature of Japanese culture because, according to Boyd, technology itself was the main reason for the impressive changes in Japan since the Meiji epoch. The influence of metabolism during the 60s was strong and spread from Japan overseas. In some case the influence was direct, as in the case of the French architect Paul Maymont, who studied in Kyoto in 1959 and had occasion to contact the members of the group, and exported in France many ideas of their original theories. In most cases the influence was through magazines and writings (mostly by Kurokawa) that spread concepts, ideas and drawings of Metabolism during all the 60s and the early 70s, when the movement had already declined.

Conclusions

The merit of Metabolism lays especially in the efforts to revolutionize and change the contemporary society and the concept of modern architecture in Japan. It was the first time that such a large change was promoted by and independent group and not by the government. Their designs were a protest against the situations of the Japanese city, and they tried to use the power of technology to overcome the troubles and the limits of the bureaucracy. The Italian critic Manfredo Tafuri remarked as the development in Japan of an “academia of utopia” during the 60s was the logical consequence of the powerlessness of the Japanese architects, so that their only escape was the creation of artificial worlds. It can be said that this observation was with cognition of the exclusive reality present in Japan. The real value of the Metabolism was, surely, at least, in its tentative to give a new identity to Japanese architecture in the years during the recovery from the shock of the last war, and to act against the forces that generated the urban sprawls in the Japanese urban environment, declaring through their projects their willingness in finding a solution at the evil of the modern metropolis, overwhelmed more and more by commercial architecture with a poor design.

Furthermore Metabolism had the merit to move the attention of the worldwide criticism to Japan, being what Robin Boyd remarked as “Japan’s declaration of independence in architecture”, in spite of the fact that the season of genuine creativeness of the group lasted just a span of a decade.

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2) Karan P.P., Kristin Stapleton , The *Japanese City*, The University Press of Kentucky, Lexington , USA, 1997, p.22

3) Noboru Kawazoe, Kiyonori Kikutake, Noriaki “Kisho” Kurokawa, Masato Otaka, Fumihiko Maki, *Metabolism 1960. The Proposal for new Urbanism*, Bijutsu Syuppon Sha, April 1960

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5) Botond Bognar, *Contemporary Japanese Architecture, Its Developmenmt and Challenge*, Van Nostrand Reinhold Co., NY,1985 p.123

6) Kisho Kurokawa, *Metabolism in Architecture*, Westview Press, Boulder, Colo, 1977, p.65

7) Media space or “En” space is a type of space, half private and half public, that was common in the blocks of the ancient Japanese cities. For this topic refer to: Kisho Kurokawa, *Metabolism in Architecture*, pp. 171-187

8) Kiyonori Kikutake, *Maritime (Marine) City*, Material List for Floating City Project 1971 at Hawaii University; chapter on “Methodology of Urban design”, pp.8-16

9) Quoted in: Michel.F. Ross, *Beyond Metabolism. The New Japanese Architecture*, McGraw-Hill, NY, USA, 1978, p.32

10) William J. Curtis, *Modern Architecture since 1900*, Phaidon London, UK, 2002, p.510

11) Kathryn B. Heiesinger, F. Fisher, *Japanese Design. A Survey since 1900*, Philadelphia Museum of art, Harry Abrams Inc., NY, 1995, p.18

12) The name “Metabolism” refers to the biological phenomenon of the cellular metabolism, as the result (summa) of chemical changes that convert the nutritional elements in energy and the chemical complexes in cellular material

13) Reynard Banham, *Le tentazioni dell’architettura megastrutturale*, (Italian Edition of: *Megastructures. Urban future of the recent past*, Edizioni Laterza, 1980, p.49

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