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Honoka Nakamachi April 2, 2020

The Cultural Legacy of Metabolism: From Local to Global

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An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
of the requirements of the degree of
Bachelor of Arts with Honors

Art History Department

2020

Abstract

The Cultural Legacy of Metabolism: From Local to Global
By Honoka Nakamachi

The Metabolism movement presents a paradox in modern Japanese architectural history. During the World Design Conference in Tokyo in 1960, the five core Metabolist architects published their individual theory of new Japanese cities in the manifesto, *Metabolism 1960: The Proposals for New Urbanism.* The Metabolists had reservations about the rigid plans of functional cities proposed by International Congresses of Modern Architecture (CIAM) and the universalizing force of International Style that did not seem to take into account the cultural and geographical particularities of different regions. Although each Metabolist had distinct opinions about the visual and spatial features of new urbanism, as a group the Metabolists were interested in buildings and cities that could adapt to rapid social and environmental changes through structural flexibility and renewability, looking to Japan's cultural traditions for theoretical precedent.

Despite Metabolist theories' specificity of site – that is, the local Japanese context – the most prominent Metabolist urban design projects were constructed overseas from the 1970s onwards. This paper examines the paradoxical nature of Metabolism's cultural legacy negotiated in four architectural projects from 1960 to the 2000s, both inside and outside of Japan. Metabolism's legacy, as demonstrated by those four projects, is characterized not by the movement's initial fixation with its Japanese origin, but rather by its theories' adaptability to the rapidly changing global environment.

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The Cultural Legacy of Metabolism: From Local to Global

Introduction

The Metabolism movement presents a paradox in modern Japanese architectural history. From 1960 to the early 1970s, the five core Metabolists – Kiyonori Kikutake, Noboru Kawazoe, Fumihiko Maki, Masato Ohtaka, and Kisho Kurokawa – theorized a new urban order that analogized the city with living organisms. They rejected the Western modernist principles of International Congresses of Modern Architecture (CIAM) that advocated for rigidly-planned functional cities, as well as the universalizing force of International Style that, as Kurokawa noted, "ignor[ed] the climate and the traditional culture of the site … impos[ing] a single style throughout the world."[1] Each Metabolist presented his own distinct theory in their manifesto, *Metabolism 1960: The Proposals for New Urbanism*, but they conjointly argued for structurally flexible buildings and cities that could adapt to rapid social and environmental changes. While Japanese national leaders sought ideological and historical detachment of "new Japan" from the pre-war militaristic society, the Metabolists instead engaged with Japan's cultural traditions to envision the modern city.[2] In other words, Metabolism originated as an architectural movement specific to its Japanese context.

None of the theoretical projects in *Metabolism 1960* was ever constructed in its proposed form or scale in Japan. Instead, the Metabolists carried out most of their urban-scale projects

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[1] Kisho Kurokawa, "Transcending Modernism," in *Intercultural Architecture: The Philosophy of Symbiosis* (London: Academy Editions, 1991), 31.

[2] Today, historians recognize that Japanese history cannot be simply dichotomized into "pre-war" and "post-war." The existence of these terms, however, does point to a loosely-defined period when the ideology of the "post-war" was prominent in the mindsets of the Japanese public. Carol Gluck, "The Past in the Present," in *Postwar Japan as History*, ed. Andrew Gordon (Berkeley, CA; Los Angeles, CA; London, England: University of California Press, 1993), 64–96.

overseas after Japan's economic stagnation in the 1970s. Three architects associated with Metabolism – Kenzo Tange, Fumihiko Maki, and Arata Isozaki – have received the Pritzker Architecture Prize, awarded to those designers whose works are considered internationally relevant. If the Metabolists' global projects hold prominence over their local counterparts today, what is Metabolism's legacy as an architectural movement born of deep cultural introspection?

This paper divides into two sections that address Metabolist projects in the local and the global contexts respectively. The following dual composition of local and global contexts helps organize Metabolism's development from 1960 to the present, both geographically and chronologically. The local section examines Metabolism's sociohistorical origin, theories presented in their manifesto *Metabolism 1960*, and two local projects: Kikutake's Marine City (1959) and Kurokawa's Nakagin Capsule Tower (1972). The global section examines the shift in the Metabolists' architectural activities from the early 1970s and analyzes two global projects: Maki's Republic Polytechnic (2007) and Kurokawa's Zhengdong New District Plan (2004-). The conclusion synthesizes the findings from both sections and returns to the question of Metabolism's cultural legacy in the local context of Japan.

This paper theorizes that Metabolism's legacy is not demonstrated in the movement's initial fixation with the Japanese context, but rather in the theories' adaptability to the rapidly changing global environment. Although Metabolism aspired to materialize a new Japanese architectural language, it left broad and innovative theories that are being revisited by international architects today who struggle with similar social and environmental issues in non-Japanese contexts. Is then a paper that determines Metabolism's theoretical foundations and cultural legacy as strictly "Japanese" intellectually limiting? Metabolism's transition from local to global demonstrate the movement's maturity – or, from a critical perspective, diluting – as the

architects embrace the notion of adaptability in design. Nevertheless, Metabolism shows its greatest potential in architectural practice when the architect modifies previous concepts and develops new forms: in other words, “metabolizing" the original theory.

Scholarly Literature on Metabolism

A significant portion of the literature on Metabolism consists of writings by the Metabolists, all articulate theoreticians who reflected on Metabolism profusely even after the group’s disbandment. The Metabolists’ voices in the books *Metaborizumu to Metaborisutotachi* (Metabolism & Metabolists) (2005) and *Project Japan: Metabolism Talks…* (2011) largely shaped this paper’s research. The Metabolists organized *Metaborizumu to Metaborisutotachi* to commemorate Ohtaka’s eightieth birthday, compiling each Metabolists’ reflections on past projects and visions on the future of architecture. *Project Japan*, edited by architect Rem Koolhaas, assembles Koolhaas’s interviews with the Metabolists in their late stage as architects.

In the postscript of *Metaborizumu to Metaborisutotachi*, Noboru Kawazoe remarks, “Ohtaka wrote his reflections as a sort of will and testament, but I cannot help but think that he has more to say. This is not the end, and moreover, the end is also a beginning. Metabolism is demanding because it is a concept that knows no end.”[3] In contributing to *Project Japan* and publishing *Metaborizumu to Metaborisutotachi,* the Metabolists convey the sentiment that their past movement is not an obsolete artefact, but an extant philosophy in the present world.

The Metabolists’ rather optimistic perspectives are also widely shared in recent scholarship, especially inside but also outside of Japan. In 2011, Mori Art Museum in Tokyo

[3] Masato Ohtaka and Noboru Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)* (Tokyo: Bijutsu Shuppansha, 2005), 243. All translations by author unless noted otherwise.

organized a retrospective exhibition on Metabolism, titled *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan.* This exhibition ultimately framed Metabolists' twenty-first century works as pioneers of urbanization in developing countries, specifically in light of today's globalization. Central to this curatorial stance is architect Hajime Yatsuka, the co-author of *Metaborizumu: Senkyuuhyaku Rokujunendai – Nihon no Kenchiku Avangyarudo* (Metabolism: Avant-garde of Japanese Architecture in the 1960s) (1997). Yatsuka was Kenzo Tange's former student and thus had some personal connections with the Metabolists. Yatsuka's optimism for Metabolism's future, as demonstrated in the exhibition, is consistent with his stance in *Metaborizumu* written several decades earlier. His optimism in the exhibition also could have been intensified by a desire to enliven the public mood in Japan, colored by despair after the Great Tohoku Earthquake (magnitude 9.0-9.1) in the earlier months of 2011. Koolhaas's *Project Japan* was published intentionally in coincidence with Mori Art Museum's exhibition. Koolhaas concludes his foreword to *Project Japan* with the comment, "As [the Metabolists'] memory weakens, vision is the only option," ending the sentence with an affirmation of the Metabolists' forward-looking perspectives.[4] Koolhaas presents Metabolism with ambiguity on the question of its legacy. On one hand, he characterizes Metabolism as an "older movement," but on the other hand, he seems reluctant to dismiss its future prospects, stating that "we should borrow from their ambition in order to form our own dynamic, shifting, and spaces of the future."[5] Considering his prolonged relationship with the Metabolists and Japanese institutions, Koolhaas perhaps felt more at ease in a position of hopefulness than skepticism.

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[4] Rem Koolhaas, *Project Japan: Metabolism Talks...* (Köln: Taschen, 2011), 14.
[5] Koolhaas, *Project Japan*, 21.

The wave of scholarship exploring Metabolism's possible practical applications, especially by the Metabolists, Yatsuka, and essay contributors of Mori Art Museum's catalog, is a recent phenomenon. In his critical account of Metabolism's urbanism and utopianism, *Kenzo Tange and the Metabolist Movement* (2010), scholar Zhongjie Lin comments that Metabolist megastructures were criticized in the mid-1970s for their authoritarian scale and techno-centricity. Lin analyzes that the relatively positive light shone on Metabolism today is a consequence of scholars "[situating] these architectural and urban experiments in their respective historic contexts and view these radical ideas and projects as alternatives to both rigid mainstream modernism and nostalgic postmodernism."[6] In other words, recent scholarship, including Lin's book, posits Metabolism as a movement that responded to the specific problems of its sociohistorical origin.

Understanding Metabolism's origin then seems a prerequisite for assessing Metabolist projects' contemporary relevance as architectural precedents. However, few scholars seem to question the paradox of Metabolism – an architectural movement that initially searched for Japan's modern cultural identity – constructing projects overseas. This paper's intervention, then, is to explore this paradox with a focus on culture as a conceptual component of architectural design. The structure of this paper helps trace Metabolism's development from its theoretical establishment in *Metabolism 1960* and local activities until early 1970s, to its global expansion afterwards.

THE LOCAL

[6] Zhongjie Lin, *Kenzo Tange and the Metabolist Movement* (London and New York: Routledge, 2010), 242.

Before Metabolism

Metabolism is not the first movement to attempt alteration of the traditional cityscape in Japan. In the 1930s, Japanese architects and educators relied on Western models to inspire architectural pedagogy, and also defined "modern" housing as the hybrid of Western and traditional Japanese forms.[7] However, Metabolism differs from these preceding modernist architectural movements in that the protagonists of Metabolism, for the most part, aspired to construct a *local* definition of modernity that was distinct from prevailing Western notions. Metabolist architect Kisho Kurokawa was especially critical of the International Style's supposed task of "creating a universal architectural model that spread to all countries and cultures" while that model is "based on the values and ethos of Western civilization."[8] Metabolism was an introspective movement that carefully examined the history, culture, and current society to invent a new and indigenous language for Japanese modern architecture, instead of modifying essentially European or American building styles to accommodate local building traditions.

Several destructive forces in the first half of the twentieth century propelled the Metabolists' proposals for a new architectural language in Japan. These forces can be largely divided into two types: natural disasters and wartime destruction.[9] In 1923, the Great Kanto

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[7] The first Japanese architecture school was only established in 1871 at the Tokyo Imperial University, reserved for the elite. The program focused on teaching "modern" Western building techniques, which were contrasted with "traditional" Japanese carpentry. Ken Tadashi Oshima, *International Architecture in Interwar Japan: Constructing Kokusai Kenchiku* (Seattle, WA: University of Washington Press, 2009), 12–13.; Oshima, 72–73.

[8] Kurokawa, "Transcending Modernism," 31.

[9] Architectural historian Ken Tadashi Oshima writes, "As a modern transformation of the castle town (*jokamachi*) of Edo, Tokyo afforded little possibility for architects to design more than small portions of the city. Ambitious plans had been proposed before […] but most large-scale projects had been limited to reconstruction after disasters." Oshima, *International Architecture in Interwar Japan*, 176.

Earthquake hit the region that included the most populated areas, such as Tokyo and Yokohama. The 7.9-magnitude quake and its consequential fire damaged 75 percent of the residential fabric in Tokyo, which was densely packed with buildings made of wood or brick.[10] Despite the unfortunate fact that natural disasters happen frequently in Japan, the 1923 earthquake was an occasion that ultimately forced architects to consider the integration of modern building techniques with historic forms on the urban scale.[11] World War II, such as the eradication of Hiroshima and Nagasaki by the nuclear bombings in 1945, also brought about destruction that called for large-scale reconstruction. Air raids also had catastrophic results on Japanese cities. One of the Metabolist protagonists, Kisho Kurokawa, describes how his home in Nagoya (one of largest cities in Japan at the time) fell to ashes:

> Very little was left of the Japanese cities destroyed by the air raids of World War II. Much in cities in the West is built of brick and stone, which remain as heaps of rubble after the buildings themselves have been destroyed. In Japan, on the other hand, building is mostly of wood (today 80 percent of the buildings in Tokyo are wooden) and consequently destruction usually levels Japanese cities to the ground. But even then the buildings and cities persist as vivid images in the minds and imaginations of the people. And it was in this sense that I first came into contact with several major characteristics of Japanese culture, after I had lost my hometown in the war.[12]

Other Metabolists also shared a similar experience, having lived through World War II in Japanese cities as boys or young men. These tragic circumstances bolstered the architects' ambitions and visions for creating more resilient buildings and city structures in their home country.

Metabolism was not alone in its search for Japan's modern cultural identity after World War II. In 1946, cultural anthropologist Ruth Benedict wrote a study on Japanese culture titled

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[10] Oshima, 89.
[11] Oshima, 176.
[12] Kisho Kurokawa, *Metabolism in Architecture* (Boulder, CO: Westview Press, 1977), 23.

The Chrysanthemum and the Sword.[13] *The Chrysanthemum and the Sword* was widely-read in post-war Japan and spurred a literary discussion on the essence of Japanese identity, albeit its problematic essentialist content.[14] Japan's defeat in World War II signified simultaneous deposition of the nation's intelligentsia that greatly influenced nationalistic sentiment during the war. Such deposition fostered an urgent sense of responsibility among the younger generation of Japanese intellects, including governmental leaders and progressive historians, to steer their people away from wartime ideologies, and even from pre-war national image.[15] Historian Shunsuke Tsurumi also described a literal confusion in Japanese lifestyle with the American occupation of Japanese territory from 1945, enforcing cultural and systematic reforms such as remodeling of the school system, provision of American food to the general public, and influx of American movies that displayed gestural equality between male and female.[16] The concurrent intellectual and physical changes in post-war Japan motivated the question: what *is* "Japanness"?

The miraculous economic recovery in the early 1950s not only augmented the narrative of Japan as a renewed nation, but also nurtured hope that Japan might prove its worth as a world leader in production and technology. In 1956, Japan's national income increased from the historical average by 150 percent, and industrial production also doubled from the pre-war era.[17]

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[13] Ruth Benedict, *The Chrysanthemum and the Sword: Patterns of Japanese Culture* (Boston: Houghton Mifflin Company, 1946).
[14] Pauline Kent, "Japanese Perceptions of 'The Chrysanthemum and the Sword,'" *Dialectical Anthropology* 24, no. 2 (1999): 182–85.
[15] Gluck, "The Past in the Present," 64–70. See also the following for a more comprehensive reading on the development of post-war Japanese intellectual history, especially section "II. Contemplating Post-war Philosophy": Kamishima et al., eds., *Sengo Nihon no Seishinshi* (A Psychological History of the Japanese Postwar), Tokyo: Iwanami Shoten, 1988.
[16] Shunsuke Tsurumi, "Occupation: the American Way of Life as an Imposed Model," in *A Cultural History of Postwar Japan* (London and New York: KPI, 1987), 1-12.
[17] "Showa 31-nen Nenji Keizai Houkoku" (Economic Planning Agency, 1956), https://www5.cao.go.jp/keizai3/keizaiwp/wp-je56/wp-je56-0000m1.html. All translations by author unless otherwise noted.

Japan's Economic White Paper of the same year illustrates the societal mood with the bold claim, "Japan is no longer in the post-war period."[18] The upward trends in economic productivity correlated with this period's ambitious zeitgeist and the accelerated growth of the urban population, which the old city fabric could no longer sustain. The construction of the Tokyo Tower – the tallest building in the world at the time – was finished in 1958; in 1959, Tokyo won the bid to host the 1964 Summer Olympics. These events proved to citizens that Japan was back on the international stage and intensified the "anything is possible" mentality in the country.

These immediate conditions of economic miracle, rapid population growth, and positive atmosphere in Japanese cities propelled the establishment of Metabolism. The Metabolists challenged their predecessors in a booklet of essays and architectural images that proposed not only to mitigate the issue of population growth, but also to invent new aesthetics for the future urban life. In this booklet, *Metabolism 1960: The Proposals for New Urbanism,* the protagonists theoretically grounded the movement in the local sphere to claim Japanese modernity in architecture.

The Manifesto: *Metabolism 1960*

> "Metabolism" is the name of the group, in which each member proposes future designs of our coming world through his concrete designs and illustrations. We regard human society as a vital process—a continuous development from atom to nebula. The reason why we use such a biological word, the metabolism, is that, we believe, design and technology should be a denotion of human vitality.
>
> We are not going to accept the metabolism as a natural historical process, but we are trying to encourage the active metabolic development of our society through our proposals.
>
> This volume mainly consists of the designs for our future cities proposed only by architects. From the next issue, however, the people in other fields such as designers, artists, engineers, scientists, and politicians, will participate in it, and already some of them are preparing for the next one.

[18] "Showa 31-nen Nenji Keizai Houkoku."

> In future, more will come to join "Metabolism" and some will go; that means a metabolic process will also take place in its membership.[19]
>
> – from the introduction of *Metabolism 1960*

Metabolism arose from the developments during the 1960 World Design Conference (WoDeCo) in Tokyo, the first international, government-sponsored conference hosted in Japan after World War II. The main supervisors of the conference were the prominent architect Kenzo Tange and his mentee, architectural critic Noboru Kawazoe, who would later become the spokesman of the Metabolism movement. Kawazoe and his team of WoDeCo organizers titled the conference theme, "Our Century: the Total Image – What Designers Can Contribute to the Human Environment of the Coming Age."[20] The conference theme reflected governmental concerns about the issue of Japanese companies plagiarizing foreign designs after the war, and hopes to stimulate the creativity of Japanese designers to formulate more indigenous styles.[21]

Metabolism owes its inception to Kawazoe, who, instead of maintaining a strictly administrative role in the conference, inspired the attending Japanese architects to challenge international participants by proposing future cities. He selected four architects – Kikutake, Maki, Ohtaka, and Kurokawa – to become part of this coalition, and published a compilation of their theoretical models in a booklet titled *Metabolism 1960: The Proposals for New Urbanism*

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[19] Noboru Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism* (Tokyo: Bijutsu Shuppansha, 1960), 5. English translation transcribed verbatim from manifesto unless noted otherwise.

[20] Tange entrusted most of his conference responsibilities to Kawazoe, meaning that Kawazoe's presence was crucial during the preparation of the WoDeCo. Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 14.; Toshino Iguchi, "Reconsideration of the World Design Conference 1960 in Tokyo and the World Industrial Design Conference 1973 in Kyoto," n.d., 2.

[21] The organizations involved were the Ministry of International Trade and Industry (MITI), the Ministry of Foreign Affairs, and the Japan External Trade Organization (JETRO). Iguchi, "Reconsideration of the World Design Conference 1960 in Tokyo and the World Industrial Design Conference 1973 in Kyoto," 2.

(fig. 1). This publication marked the beginning of Metabolism as a movement. As the excerpt above makes clear, the group chose the biological term "metabolism" to postulate the modern city's development as an organic entity, constantly renewing and adapting in order to survive unpredictable future events.

The booklet *Metabolism 1960* consists of four chapters: "Ocean City" by Kikutake, "Material and Man" by Kawazoe, "Toward Group Form" by Maki and Ohtaka, and "Space City" by Kurokawa. Each chapter except for Kawazoe's presents a theoretical design project, consisting of both text and drawings. Because the original propositions were never built, the drawings embedded with the texts are crucial visual evidence to fully comprehend the architects' visions.

In the first chapter, "Ocean City," Kikutake explored the possibility for a new relationship between the urban population and the surrounding ocean. The Japanese cultural perspective on nature is largely shaped by its geographical situation: a group of small mountainous islands isolated by water from the vast expanse of continental land. Kikutake based "Ocean City" on his theoretical project Marine City, which he had just published in 1959, a year before the WoDeCo (fig. 2). Kikutake's essay is poetic in that he states a longing for a city environment that is in touch with its natural surroundings – which, in the case of Marine City, is the ocean:

> The present poverty of Asian countries is the result of their inefficient agricultural production and reliance on specialized local industry, the rate of agricultural production failing to keep pace with the rapid population growth. […] Fresh air, healthy and mild climate, a view of the expansive nature, the horizon that makes one conscious of the Earth, the blessings of sun from dawn to dusk, a humanistic freedom from ethnicity and national borders, the benefits of a well-ordered communal life. The marine city must emerge as a city that serves the human community.[22]

[22] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 21. Translation by author.

Kikutake's proposition to move out to the ocean is not only an architectural response to the deteriorating urban conditions on land, but also a cultural trope that evokes the integral relationship between the Japanese islands and the ocean. Japanese origin myths tell of how the deities produced the Japanese islands in an area where only a vast body of water existed, making water the direct source from which the Japanese civilization arose. Instead of raising livestock for food, as was the norm for ancient continental societies, the Japanese people traditionally ate marine products and rice, which also requires a large amount of water to cultivate. Furthermore, the "island country mentality," rooted in Japan's geographical isolation from the vast Asian continent, may account for the widespread conviction in Japan that the country's cultural identity is distinct from any other nation's.[23] Cultural and physical ties to the ocean are not exclusive to Japanese civilization, but the ocean certainly plays a large part in the Japanese formation of identity.

The second chapter of *Metabolism 1960* is Kawazoe's "Material and Man." This chapter starts with the sentence, "Everything will come to an end if a nuclear war covers all the earth with a shower of radioactivity" – a clear reference to the eradication caused by the atomic bombings of the prefectures Hiroshima and Nagasaki at the end of World War II in 1945.[24] In "Material and Man," Kawazoe theorized that physical things and the environment will remain long after humans cease to exist on Earth, an idea which he called the "immortality of

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[23] Although the "island country mentality" is often used to describe the uniqueness of Japanese lifestyle, that phrase should not undermine the real influences of Korean, Chinese, and Western culture. Like any other nation involved historically in international trade, modern Japan is a product of the countless interactions with surrounding countries. Scott Schnell and Hiroyuki Hashimoto, "Guest Editors' Introduction: Revitalizing Japanese Folklore," *Asian Folklore Studies* 62, no. 2 (2003): 186.

[24] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 48.

material."[25] The term is somewhat misleading, however. "Immortality of material" could imply durability and stability in the Western notion, but what Kawazoe meant is the exact opposite. The core of his argument is that the macrocosm is made immortal through a constant renewal of its microcosmic components – in other words, metabolism.[26]

Kawazoe's philosophies were central to the theoretical precepts of the Metabolism movement. Kawazoe, who held a strong presence in the Japanese architectural community as a writer and the previous editor of the architectural design magazine *Shinkenchiku* (New Architecture), often exhibited his preoccupations with the origins and qualities of Japanese architecture.[27] Kawazoe firmly believed in the existence of a Japanese cultural essence, even going as far as to claim that "there would be no meaning in proposing a model for new urbanism [at the WoDeCo] if it is isn't conceived through a Japanese or Eastern viewpoint, moreover using logic that is acceptable to the entire world."[28] In other words, Kawazoe consciously aimed to theorize an inherently Japanese concept for an international audience. Kawazoe used the traditional wooden Japanese house as a positive example. A traditional Japanese house has a structure versatile enough that components can be added to or subtracted from depending on the circumstance.[29] He theorized that structural versatility would help accommodate the more recently developed urban issues such as crowding and devastation by natural disasters – both of which were severe concerns in Japanese society at the time – and become the necessary quality

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[25] Kawazoe et al., 48.
[26] Kawazoe was the mastermind who coined the name "Metabolism" for this architectural movement. Koolhaas, *Project Japan*, 235.
[27] Tokyo Bunkazai Kenkyujo, *Nihon Bijutsu Nenkan: 2016 (Yearbook of Japanese Art: 2016)* (Tokyo: Chuo Koron Bijutsu Shuppan, 2018), 544–45.
[28] Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 14.
[29] Ohtaka and Kawazoe, 15.

of future architecture.[30] By discarding the notion of a building as an unmodifiable entity, the world of architecture could be opened up to different possibilities and, critically, processes. Furthermore, Kawazoe's attention to the traditional Japanese house has even greater significance for Metabolism as a culturally-ingrained movement in light of his research interest in the Ise Shrine.

Ise Shrine is a monument of the Shinto Religion, the foundational religion of Japanese civilization. The origin myth introduced in the analysis of Kikutake's "Ocean City" is also in Shinto folklore as described in the eighth-century historical text of *Nihon Shoki* (The Chronicles of Japan) and its many successors.[31] In his book *Ise: Prototype of Japanese Architecture*, co-published with Tange two years after the formation of Metabolism, Kawazoe stressed the importance of the bidecadal rebuilding ceremony of the Ise Shrine deity hall.[32] The Ise Shrine deity hall is believed to house the most important Shinto deity, sun goddess Amaterasu-omikami (the great deity who shines in heaven) (fig. 3).[33] Since the deity hall has historically been constructed from wood, Japanese craftsmen have continually rebuilt the hall structure over 1300 years to make sure that Amaterasu-omikami will have an alternate home before the old structure decays.[34] This tradition continues today despite the emergence of more durable materials such as concrete and brick.[35] To account for this persistence, Kawazoe argued that the act of rebuilding

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[30] Ohtaka and Kawazoe, 15.
[31] Noboru Kawazoe, "Ise Bunkaron (Cultural Theory of Ise)," in *Ise: Prototype of Japanese Architecture*, by Kenzo Tange and Noboru Kawazoe (Osaka: Asahi Shinbun-sha, 1962), 83–85.
[32] See Appendix for Kawazoe's analysis of the Ise Shrine *Shikinen Sengu* (periodical deity hall transfer).
[33] Koolhaas, *Project Japan*, 222.; Günter Nitschke, *From Shinto to Ando: Studies in Architectural Anthropology in Japan* (Great Britain: Academy Editons, 1993), 9.
[34] Junko Edahiro, "Rebuilding Every 20 Years Renders Sanctuaries Eternal: The Sengu Ceremony at Jingu Shrine in Ise," Japan for Sustainability, August 2013, https://www.japanfs.org/en/news/archives/news_id034293.html.
[35] Edahiro.

is culturally significant because it mirrors the lives and deaths of the Shinto deities, whereby a new deity appears simultaneously as another disappears.[36] In other words, the renewal of the shrine is a metaphor for the re-materialization of a godly figure. This is a rather different take on architectural permanence as compared to the durable stone monuments of Western civilizations insofar as that the material impermanence of the Japanese wooden building reinforces its spiritual "immortality" (fig. 4). Since Kawazoe wrote extensively on the origins of Japanese architecture many years before the establishment of the Metabolism movement, he must have contemplated the history of Ise while developing the ideas for *Metabolism 1960.* The core of Metabolist theory – the renewal of components to insure the longevity of the greater whole – is consistent with the logic behind the rebuilding ceremony at Ise. Thus, even though Kawazoe did not provide any specific architectural models in *Metabolism 1960,* he is nonetheless the central theorist of the Metabolist movement.

In the third chapter "Toward Group Form," Maki and Ohtaka co-designed Shinjuku Redevelopment Plan. In the written introduction for this plan, Maki and Ohtaka rejected the hegemonic procedure of designing master plans. Instead, they demonstrated their new theory "group form" in the rather abstract Shinjuku Redevelopment Plan (fig. 5). The group form provides flexibility – a quality lacking in the rigid, top-down formulation of a traditional master plan – by defining the city's identity based on a collection of elements while accepting that changes would take place to those elements over time. For example, "Shopping Town" is a flexible space in which "shop areas, access lanes, and passageways are freely changeable, depending upon needs at a given time," and the architects designate just two overarching requirements for the "Business Town" buildings as having "all the conveniences of a modern

[36] Kawazoe, "Ise Bunkaron (Cultural Theory of Ise)," 83–85.

city and at the same time a variety of vistas from the windows of the buildings."[37] The lack of specificity in such a plan is potentially problematic for developers who might find comfort in adhering to strict logistics, but Maki successfully materialized the group form in his later projects Hillside Terrace (1992) and Republic Polytechnic (2007), the latter examined in the global section of this paper.

Architect Rem Koolhaas describes Maki's design approach as "completely cosmopolitan" compared to the other theories that more obviously engage Japanese tradition, a view that complicates Maki's position in the discussion of Metabolism as a culturally-ingrained movement.[38] Maki, who taught architecture at Washington University in St. Louis, Missouri, and travelled extensively to Mediterranean and Middle Eastern villages for research, did not see himself tethered to Japan to the same degree as the other Metabolists.[39] However, architect Hajime Yatsuka explains that Kawazoe, who organized Metabolism, possessed "a strong will to conceive a Metabolist theory that embraced the anomalies in the group. This stance is different from that of [other architectural] groups like Team X that selected members based on ideology-matching."[40] In this light, Maki's involvement is consistent with the flexibility of the group's

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[37] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 65–66.

[38] To this comment, Maki simply replies that he is Japanese, and that he had just "already been exposed to things outside – more than anyone else in the Metabolist group." Koolhaas, *Project Japan*, 307.

[39] Maki recounts his visits to Mediterranean and Middle Eastern villages as fundamental experiences that contributed to his conception of his collective form theory: "My experience in visiting Mediterranean hill towns and Middle Eastern villages – each a convincing urban unity that had evolved over time without the guidance of an architect's master plan – convinced me that ultimately, in a truly organic form such as a city, the urban order can be maintained only if the autonomy of individual buildings and districts is assured." Fumihiko Maki, *Nurturing Dreams: Collected Essays on Architecture and the City*, ed. Mark Mulligan (Cambridge, MA: The MIT Press, 2008), 41, https://doi.org/10.7551/mitpress/7596.001.0001.

[40] Hajime Yatsuka and Hideki Yoshimatsu, *Metaborizumu: Senkyuuhyaku rokujunendai -- Nihon no Kenchiku Avangyarudo (Metabolism: Avant-garde of Japanese Architecture in the 1960s)* (INAX Shuppan, 1997), 31–32. Translation by author.

membership noted in the *Metabolism 1960* introduction, rather than detrimental to the theory's legitimacy.

Architect Kiwa Matsushita considers an alternative perspective on Maki in her monographic essay. She argues that the group form is "a concept in which Maki has ingeniously mediated between Asian concerns of collective entities woven from various elements and Western beliefs toward establishment of the individual."[41] The essentialist characterization of Japanese culture as collectivist and American as individualist is a stereotype proliferated by Ruth Benedict's *The Chrysanthemum and the Sword.* Since it is highly probable that Maki was aware of the collectivist-individualist binary when he wrote "Toward Group Form," Maki's conception of group form could be interpreted as an implicit engagement with the topic of Japan-ness.

Kurokawa, who was only twenty-six at the time, wrote the final chapter "Space City," in which he introduced four projects: Agricultural City, Mushroom Shape House, Urban Design for New Tokyo, and Wall City. Hajime Yatsuka evaluates these four projects rather harshly, commenting that "compared to Kikutake's pages that demonstrate a high degree of completion and conceptual density, Kurokawa's pages are underdeveloped in a way that could be perceived as a product of youth."[42] Yatsuka might have judged in light of awareness that Kurokawa later, more maturely, theorized and materialized the capsule theory. The most prominent example of this theory is Nakagin Capsule Tower, the second design project studied in this paper.[43]

In Mushroom Shape House, Kurokawa not only referred visually to traditional Japanese space and architecture, but also placed movable components along a central shaft – an idea

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[41] Hajime Yatsuka et al., "Maki Fumihiko: City and Crowd," in *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan* (Tokyo: Mori Art Museum, Shinkenchiku, 2011), 270.
[42] Yatsuka and Yoshimatsu, *Metaborizumu*, 125.
[43] Koolhaas, *Project Japan*, 372–439.

replicated later in the Nakagin Capsule Tower (fig. 6). Kurokawa described the Mushroom Shape House project as:

> A one to three storied structure with a wooden frame aluminum roof. The mushroom shaped house has a ferro-concrete facility shaft (including the staircase) to which living quarters and other facilities are attached. […] The equipment shaft is the center of the mushroom structure as well as the equipment base which provides such architectural equipment as bathrooms, kitchen units, washbasins etc. […] The living space within the roof wall can be changed by rearranging architectural equipment installed along the shaft, allowing for effortless metabolism.[44]

Although the materials used for construction – reinforced concrete and metal – are modern, the form of the Mushroom Shape House resembles the Ise Shrine's deity hall. The interior of the Mushroom Shape House is only accessible by climbing the staircase, which is connected to a horizontal platform called the "space for tea ceremony;" this is similar to how a user would enter the elevated level of the shrine. The cap of the mushroom that encloses the living space also evokes the large overhanging roof of the deity hall, although the latter does not necessarily contain living spaces – for humans, at least. Furthermore, the concept of rearranging the "architectural equipment" suggests an implementation of the spatial flexibility that is prevalent in Japanese architecture. Traditionally, spatial flexibility is achieved by moving sliding screens known as *shoji* to change the dimensions of the individual rooms (fig. 7). Kurokawa also intends for the "living space within the roof wall [to] be changed," and even interprets this transformation as a form of structural and programmatic metabolism.

Equally significant in cultural terms is Kurokawa's spatial positioning of the "space for tea ceremony" on the liminal boundary between interior and exterior, which acts as an *en*-space (transactional space) in traditional Japanese architecture. Günter Nitschke, a specialist in East

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[44] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 74–78. Translation by author.

Asian architecture and urbanism, explains a type of *en*-space called *noki-shita* (under the eaves) (fig. 8):

> One of the most characteristic features of traditional Japanese buildings, both rural and urban, is their huge overhanging roofs which define and/or blur the edge of the buildings and give rise to the *noki-shita*, literally sphere under the eaves, which is the space for climatic, visual and social transactions.[45]

Apart from the mushroom cap, the tea ceremony space does not have an immediate covering above. The program of this space is similar to that of the *noki-shita* in that they both allow the residents to engage in social interactions and enjoy the surrounding scenery in the shadows of the overhang, but are not completely enclosed. Because of this ambiguity between the interior and exterior the *en*-space differs from the Western concept of plazas and agoras, which are both public spaces open to the sky. By using such spatial formulas, Kurokawa draws a connection between traditional Japanese notions of space and his proposed modern urban housing model.

These texts by Kikutake, Kawazoe, Maki and Ohtaka, and Kurokawa in *Metabolism 1960* comprise the theoretical foundations of Metabolism. The next two chapters analyze projects that emerged from these theories in subsequent years. Kikutake's Marine City (1959) and Kurokawa's Nakagin Capsule Tower (1972) demonstrate that implementation of the theories met with mixed results. Kikutake's enthralling vision of an artificial island city of Marine City, and its subsequent renditions, stayed in the realm of unrealized paper architecture. Kurokawa's Nakagin Capsule Tower, perhaps the most visually and conceptually faithful to the theory outlined in *Metabolism 1960*, is so structurally rigid that it lacks practicality. If it is so easy to define each project's limitations, what lasting legacies did they leave behind in Japan?

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[45] Nitschke, *From Shinto to Ando*, 85.

Kikutake's Marine City (1959)

Kiyonori Kikutake experimented with floating architecture prior to his involvement with Metabolism. His preoccupation with structural mobility and versatility resonated with the Metabolist interest to promote architecture that survives aging and destruction through micro renewals. Kawazoe, the theoretical mastermind of Metabolism, retrospectively confessed that he had considered centering the WoDeCo proposals on Kikutake's early projects Tower Shape Community (1959) and Marine City (fig. 9). It is no wonder then that Kikutake's chapter precedes all others in *Metabolism 1960*, acting as the doorway to understanding the movement. Nevertheless, Kikutake was unable to fulfill his complete vision of the Marine City in built form.

Megastructures – a massive multistory structure or a complex of buildings – were gradually being accepted with the 1950 loosening of a national construction law that prevented construction of apartments taller than 20 meters (66 feet).[46] However, verticality was still an uncommon architectural trait in the following decade, since residential spaces in Japan were traditionally developed horizontally. Their unusual height in the Japanese context made Tower Shape Community and Marine City especially radical at the time. Both projects attempted to solve the problem of urban sprawl by stacking 1250 living spaces on top of each other, a condition that would cause inhabitants to "become conscious of the community" through co-habitation in a single tower.[47] Kikutake modified the idea of the Tower Shape Community in

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[46] The term "megastructure" in the discourse involving Metabolism generally refers to an alternative (and perhaps, antithesis) to the low-rise forms that prevailed in Japanese buildings before construction law changes in 1950. Akihiko Osawa, "Tatemono Takasa no Rekishiteki Hensen, Sono Ichi (Historical Transition of Building Heights, Part One)," *Tochi Sogo Kenkyuu*, Kenkyuu Note, 2008, 21–23, http://www.lij.jp/html/jli/jli_2008/2008spring_p015.pdf.

[47] Kikutake writes, "Tokyo, a huge city, is worn out with bad sickness. She has lost the proper control of city, because of her mammoth like scale. On the contrary, she is even trying to conceal her illness and to justify the present situation by depending on the adaptability of inhabitant. The limitation of the horizontal city has far passed over from the ability of function of transportation

Marine City by envisioning a city floating on open waters with submerged towers acting as buoys (fig. 2). He clarified that the prerequisites of the new marine city are "fresh air, healthy and mild climate, a view of the expansive nature, the horizon that makes one conscious of the Earth, the blessings of sun from dawn to dusk, a humanistic freedom from ethnicity and national borders, the benefits of a well-ordered communal life."[48] Kikutake's philosophy reflected a desire to return to Mother Ocean, the original "home" of the Japanese people and their land according the origin myths. This proposition is radical on its own, but Kikutake furthered the idea by considering also the structural feasibility of the floating city through numerous drawings (fig. 10).[49] Although the drawings themselves are poetic rather than pragmatic, they convey Kikutake's desire to innovate structurally, and to see his visions take shape in reality. He is an architect, who wishes ultimately to build.

In *Metabolism 1960*, Kikutake synthesized his work on the Tower Shape Community and Marine City into a new project called Unabara, a floating infrastructure in the Sagami Bay to accommodate a population of five hundred thousand (fig. 11).[50] Unabara – its name literally meaning "the ocean field" – is a two-ringed structure that transfers the central location of human activity from the land mass to the ocean, employing movable structures for both the residential complex and its comprising living units. These movable parts – called *movable house* and *mova-block* respectively – are detachable units with short lifespans, which will continually renew and transform in massing with changes in the resident population (fig. 12).[51] Some of the other key

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and the living standard. The new harmful tissue like cancer is spreading over the city." Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 13.

[48] Kawazoe et al., 21. Translation by author.

[49] Kawazoe et al., 21.

[50] Kawazoe et al., 26.

[51] Kikutake proposes the durability of the movable houses to be 25 years and the mova-blocks to be 100 years. Kawazoe et al., 30–33.; Kawazoe et al., 34.

components of Unabara are the control towers, which act as the "energy centers" and lighthouses for the entire island city; the administration block where the policy-making takes place; and the exhaust pipes that transport human and industrial waste from Unabara to the mainland. The bodies of water within the rings are used for marine production and transportation, and a layer of protective barrier surrounds the outer ring to "[absorb] solar energy as well as the energy of the sea waves."[52] This model for living is consistent with Japanese food culture that relies heavily on marine products, and is environmentally sustainable if energy is successfully generated from the sun and sea waves. A great advantage of Unabara over the current city, claimed Kikutake, is its detachment from land and the unpredictable effects of major earthquakes, a more common and dire problem than the lesser ocean-borne dangers of tsunamis and typhoons.[53] If successfully materialized, it could easily become one of the most innovative and sustainable architectural solutions of modern times.

Kikutake's vision partly made its way into reality in Aquapolis (1975), designed sixteen years after the first publication of Marine City (fig. 13). Aquapolis, constructed as a pavilion for the Ocean Expo in Okinawa, was a floating and self-moving structure that housed functions such as "a banquet hall, offices, infirmary, communication room, post office, residences for 40 staff members, computer room, and exhibition spaces" that was intended to be used long after the Expo ended.[54] Aquapolis was not a successful project, however, for two main reasons. First, Aquapolis was temporary, as it was dismembered in 2003. National organizations were hesitant to take part in expensive conservation of the project, especially since it was difficult to gauge its

[52] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 13.
[53] The notion that typhoons and tsunamis are less damaging than earthquakes is thought to be less true today, especially in the light of the destruction caused by tsunami after the Great Tohoku Earthquake of 2011 and more recent major flooding on occasions of heavy rainfall.
[54] Koolhaas, *Project Japan*, 153.

potential as a commercial facility.[55] Second, Aquapolis was built on a much smaller scale than that proposed for Unabara. The oil crisis of 1973 severely affected the Japanese economy, so the post-war economic ambition that gave birth to Metabolism could not sustain its drive.[56]

Changes in the Japanese national economy after 1973 impeded Kikutake's attempts to materialize his theories. However, an on-going contemporary project by the Japanese general contracting firm Shimizu Corporation could potentially bring Kikutake's dreams into reality in the near future. The project GREEN FLOAT (2010-), which strives to be fully operational by 2030, modifies Kikutake's ideas to contemporary expectations and uses the technological resources of the well-established general contractor (fig. 14).[57] GREEN FLOAT is an artificial island city designed to float above the equator, a strategy to avoid typhoons. Each island contains a thousand-meter-tall tower with a total surface area of ten square kilometers (roughly 3.9 square miles), to host residential, commercial, and green space. Developers will attempt to replicate the natural ecosystem in the green land outside of the tower, with the adjacent land mass reserved for townhouses. If the space is used efficiently, GREEN FLOAT can accommodate 50,000 people – the same number as Kikutake's Unabara. Furthermore, Shimizu Corporation advances

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[55] "Okinawa Times Shasetsu 2000.10.24," September 27, 2007, Okinawa Times, https://web.archive.org/web/20070927213859/http://www.okinawatimes.co.jp/edi/20001024.html.

[56] Marius Ioan Mihut and Decean Liviu Daniel, "First Oil Shock Impact on the Japanese Economy," *Procedia Economics and Finance* 3 (2012): 1042–48, https://doi.org/10.1016/S2212-5671(12)00271-7.

[57] Shimizu Corporation partly sponsored a retrospective exhibition at Mori Art Museum in 2011, titled *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan*; in turn, the museum provided a lounge space that featured the firm's research on the *GREEN FLOAT*. This active exchange confirms that the connection between Kikutake's *Marine City* and GREEN FLOAT consists of more than visual similarities. Mori Art Museum, "About the Exhibition," Metabolism: The City of the Future - Dream and Visions of Reconstruction in Pastwar and Present-Day Japan, accessed November 9, 2019, https://www.mori.art.museum/english/contents/metabolism/about/.

Kikutake's visions by utilizing technologies that were unforeseen at the time of *Metabolism 1960*. For example, instead of producing energy with solar panels, GREEN FLOAT will gain 80% of its energy from space-based solar power with the collaboration of JAXA (Japan Aerospace Exploration Agency) and 20% by converting thermal energy from the ocean.[58] With adequate funding and advanced technologies, Kikutake's seemingly remote visions are moving towards the future.

To be clear, GREEN FLOAT is not a Metabolist project, but rather an example of a separate, developing movement that integrates globalization with an ecological approach to architecture. Although inspired by Kikutake's Marine City, GREEN FLOAT lacks two qualities that tethered the former project to the Japanese architectural movement. First, GREEN FLOAT does not employ Kikutake's design of *movable house* and *mova-blocks.* These short-lived, detachable housing units and their accompanying skeletal structure ensured that the housing in Unabara would change in massing with the growth or decline of populations. Instead, much of the residential spaces on GREEN FLOAT are located on the midair platform within the central tower, rented out to individual tenants by square meters.[59] Once the tenants fill the space, it will become increasingly difficult to accommodate growing populations. Structural flexibility is key to Metabolism, but GREEN FLOAT jettisons Kikutake's radical theory for a more conventional approach to housing. Second, GREEN FLOAT is not a local project but a global one. Geographically, GREEN FLOAT is planned for operation directly above the equator. Although

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[58] "Interview - Henshuucho Ga Kiku! Shimizu Kensetsu Kankyo-Gijutsu Solution Honbu Honbushusa Takeuchi Masaki, Youjou Ni Ukabu Mirai-Toshi 'GREEN FLOAT': 2030 Nen Kadou Ni Mukete Shimizu Kensetsu No Chousen (Interview with the Chief Editor! Shimizu Corporation Head of Department of Environmental Technology Solution, Takeuchi Masaki, The Future City Floating in the Ocean 'GREEN FLOAT': Challenge for Full Operation by 2030)," *Business i. ENECO*, February 2014, 10–12.

[59] "Interview with the Chief Editor," 11.

the longitudinal position is not yet specified, this contemporary project can hardly be considered an extension of land from the Japanese islands. Rather, GREEN FLOAT project leader Masaki Takeuchi embraces the notion of the artificial island becoming an architectural breakthrough for international communities requiring a refuge from the wrath of nature – namely, rising sea levels, earthquakes, and tsunamis.[60] The introspective, identity-searching tone of Kikutake's Marine City as described in the manifesto has disappeared with its evolution into GREEN FLOAT. For these reasons, the legacy of Marine City is potentially impactful for new urbanism, but incompatible with the original Metabolist spirit.

Kurokawa's Nakagin Capsule Tower (1972)

The most well-known local work of architecture by Kurokawa during his Metabolist phase is the Nakagin Capsule Tower, completed in 1972, shortly before the disbandment of the group. Nakagin Capsule Tower is located in Ginza, one of the central business districts in Tokyo (fig. 15). It is composed of two central reinforced concrete shafts that hold elevators, staircases, and utilities, and a total of 144 capsules attached to those shafts.[61] Its skeletal structure is thus related to the earlier Mushroom Shape House. Kurokawa takes the concept of structural flexibility one step further in the Nakagin Capsule Tower by introducing individual capsules for the living spaces (fig. 16). While the shafts were designed with a lifespan of at least sixty years, the capsules were designed to be detached and renewed in twenty-five to thirty-five years, as the tenant population changed.[62] Similar to Kikutake's conception of *movable houses* and *mova-*

[60] "Interview with the Chief Editor," 12–13.
[61] Zhongjie Lin, "Nakagin Capsule Tower Revisiting the Future of the Recent Past," *Journal of Architectural Education* 65, no. 1 (October 2011): 18.
[62] Lin, 18.

blocks in his Marine City, Kurokawa attempted to practice the Metabolist theory with these – theoretically – detachable capsules.

From the time of *Metabolism 1960*, Kurokawa was interested in the movement of people in and out of cities, especially between the agricultural village and the industrial city.[63] When Kurokawa designed Nakagin Capsule Tower, he replaced this rural/urban dichotomy with an interest in diversified lifestyles and the promise of constant movement in the information society.[64] In the original brochure distributed to potential tenants, titled *Business Capsule,* Kurokawa stressed the importance of compartmentalized spaces where businesspeople can "rest and regain their own sense of self, establish their foothold in the influx of information, and – for lovers of urbanity – create a life station within the city."[65] This need for a compact, individualized space drove Kurokawa's prefabricated capsule housing concept.

Kurokawa argued that the prefabrication of his capsules was rather different from the Western model of standardization, as exemplified by the Ford Model T in the early twentieth century, because his capsules have the ability to "react sensitively to the changes in people's lifestyles" through "interchangeability of parts."[66] More specifically, capsules are furnished to accommodate the varied needs of the inhabitants. In Nakagin Capsule Tower, there are four types of rooms – standard for office, standard for sleep, deluxe, and super deluxe – with differing

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[63] In the texts of "Agricultural City" and "Wall City," Kurokawa describes the changing lifestyle of rural and urban areas in Japan, both moving towards further urbanization. Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 74, 84.

[64] The premise of Kurokawa's argument is that many elite businesspeople commuted thirty to forty minutes one way and returned home around midnight on average. Tokyo needed architecture that accommodated these new day-night cycles. "Business Capsule: Nakagin Capsule Mansion, Ginza" (Nakagin Mansion Corporation, n.d.), 3.

[65] "Business Capsule," 2.

[66] Kurokawa, *Metabolism in Architecture*, 83.

equipment (fig. 17).[67] Thus, Kurokawa devised an architectural system that purportedly responded to the changing lives of businesspeople in Tokyo and was compatible with the Metabolist theory of organic renewal.

Unfortunately, the Nakagin Capsule Tower was unable to faithfully embody the Metabolist vision of renewal. While the architect planned for the capsules to be detached individually, in reality, the capsules were installed bottom-up and one cannot be removed without affecting the capsules above it.[68] Logistically, removal of the capsule would result in displacement of the residents in the capsules above, risk of damage to interior personal property, and high cost of construction to address the aforementioned issues. As such, no capsule renewal has taken place since the time of the tower's initial construction. Today, Nakagin Capsule Tower faces the threat of demolition because of problems such as inability to repair the decaying architecture of the capsules, concerns about the impact of asbestos on the residents' health, and the cost inefficiency of the residential building located in an expensive business district.[69] In his conservation tour of Nakagin Capsule Tower*,* active since June 2017, a capsule owner and preservationist Tatsuyuki Maeda advocates for the building's historical importance as the emblem of Metabolism as well as its unique architectural form.[70] Many of the current residents elected to move in as part of the conservation effort, for reasons ranging from aesthetic preferences to media coverage.[71] In fact, the futuristic look of the capsules continues to attract

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[67] "Business Capsule," 14.
[68] Lin, "Nakagin Capsule Tower Revisiting the Future of the Recent Past," 19.
[69] Lin, 13.
[70] "Fudanwa Nakani Hairenai 'Nakagin Capsule Tower' Guide Tour (Tour of a private residence 'Nakagin Capsule Tower')," Tokyo Betsushiten Guide, June 10, 2017, http://www.another-tokyo.com/archives/50552196.html.
[71] Tatsuyuki Maeda, "Capsule Observation Tour" (Tour, Nakagin Capsule Tower, Ginza, Tokyo, August 17, 2019).

the media and the art scene, a notable example being the 2013 film *The Wolverine* featuring the capsule as a love hotel. Maeda even attested to the regular presence of ruins photographers showing interest in the building for the decaying, dystopian look of the capsules in the worst conditions.[72] The legacy of Nakagin Capsule Tower as a Metabolist building is complicated by the fact that it continues to exist as a semi-functional building while resisting the intended structural changes.

A direct architectural legacy of the Nakagin Capsule Tower in Japan, however, is that it acted as the prototype for the prolific capsule hotels. The capsule hotel, first designed by Kurokawa in 1979 for a business district in Osaka, is a type of hotel with shared amenities and rows of individual pods just large enough to accommodate one sleeping person (fig. 18).[73] Unlike the capsules of Nakagin Capsule Tower, the pods of capsule hotels are built within the building structures and are not designed for "metabolic" replacements. In addition, the capsule hotel is most valued for its relatively cheap rate (3,000 to 4,000 yen a night, approximately 30 dollars) and its efficient use of space in a dense city environment, unlike the expensive-to-maintain Nakagin Capsule Tower. The capsule hotel is neither architecturally nor conceptually "metabolic," except that its inhabitants change frequently. Despite these fundamental differences, Nakagin Capsule Tower is necessarily the precursor to a now indispensable architectural type in Japanese cities, making it a historically significant building.

On one hand, it is possible to interpret Nakagin Capsule Tower as currently undergoing a metabolic process at the hands of its residents and enthusiasts in academia and corporations, who have transformed the value of Kurokawa's work from a functional residential space into an

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[72] Maeda.
[73] New Japan Co., Ltd., "Capsule Inn Osaka," New Japan Umeda, accessed December 22, 2019, http://www.umedasauna-newjapan.jp/.

architectural artifact. The transformation in people's perception is a form of societal change; in this sense, Nakagin Capsule Tower has adapted to become useful for the current generation. On the other hand, the characterization of Nakagin Capsule Tower as an architectural relic ironically undermines its conceptual value as a Metabolist building. Zhongjie Lin, a scholar of contemporary urbanism, comments on the fast-paced cycle of construction and deconstruction in the contemporary Japanese city:

> Although one can argue that conflicts between urban development and architectural conversation are a commonplace characteristic of the contemporary metropolis, the Japanese context has accentuated the contradiction between the growth of cities and the impulse to preserve historical fabric and landmarks. The notoriously high cost of land in Japanese cities has directly impacted these demolition decisions. On a more fundamental level, however, intense conflict between redevelopment and conservation is emblematic of an enduring cultural attitude toward urban change and regeneration in Japan, an issue with even more relevance after the incredible disruption of the March 2011 earthquake.[74]

Lin's analysis points to the current condition of Japanese urbanity that is marked by an acceptance of destruction and renewal, also elaborately discussed by Kawazoe in *Metabolism 1960.* The impact of economic efficiency on demolition decisions makes Nakagin Capsule Tower a direct candidate for replacement by a building that might better suit the residential needs and technologies of today. The fact that there is an active conversation on the preservation of Nakagin Capsule Tower indicates resistance to dismantling. In other words, Nakagin Capsule Tower is resisting the metabolic process that should have occurred for a historically-insignificant building. Therefore, the legacy of Kurokawa's Nakagin Capsule Tower as a Metabolist building is best described as archival: it marks a past, rather than making way for the future.

THE GLOBAL

[74] Lin, "Nakagin Capsule Tower Revisiting the Future of the Recent Past," 15.

Metabolism Globalized

For the entire decade after their establishment at the WoDeCo, Kikutake, Kurokawa, and the other Metabolists were largely unsuccessful at materializing their paper projects in Japan at the massive urban scale that they had originally proposed in *Metabolism 1960.* Moreover, the five individuals did not work together as a group, but rather continued to develop their own visions of Metabolist architecture. For example, Kikutake and Maki refined their Marine City and group form theories, separately in their own practices. Much of the group's fame in the 1960s relied on the Japanese mass media's wide coverage of the Metabolists' megastructural visions, which served as popular entertainment for the Japanese household with access to a television.[75] In her analysis of Japan after World War II, historian Carol Gluck assesses the longevity of Japan's *sengo* (post-war), the nomenclature used to denote contemporaneity until the late 1980s, to be reflective of the public sentiment that "the present – democracy, peace, prosperity, and all – owed its origins and authenticity to *sengo*."[76] Gluck claims that Japan struggled to weave a national history that reconciled accountability for wartime atrocities with celebration of Japan as a renewed modern nation.[77] The term *sengo* conveniently reinforced the idea of the country's historical break in 1945, as well as its associated ideologies of democracy, peace, and prosperity, in public memory. Anticipation of large-scale national events such as the Tokyo Olympics in 1964, and the Osaka Exposition in 1970, also kept the flame of post-war

[75] In fact, Kurokawa and Tange (preceding architect and the mentor of some of the Metabolists) were featured numerous times in popular magazines such as *Shukan Asahi,* as well as the national television channel NHK. Koolhaas, *Project Japan*, 444–73.
[76] Gluck, "The Past in the Present," 93.
[77] Gluck, 94–95.

ambition burning, which may explain why the public discourse was rather uncritical of the seemingly fantastical megastructural "dreams" discussed by the architects.[78]

However, economic and societal changes in Japan in the early 1970s drove the Metabolists to seek alternate career paths. First, the Japanese economy fell into a deep recession with the first oil shock in 1973. The sudden decline of the national economy resulted in employment downsizing by fifty percent, and the investment rate in construction of public works continued to fall until 1975.[79] The obsolescence and consequent demolition of Kikutake's *Aquapolis* in 2003, three decades after its construction, suggests that experimenting with megastructures in Japan from the 1970s onwards became less economically or politically viable than in the previous decades. For the most part, the Metabolists worked independently even during the 1960s, due to differing visions of the Metabolist city; the fall of the national economy just simply accelerated the group's dissolution. Second, the Osaka Exposition of 1970 helped heighten international awareness of the Metabolists' works, making it possible for them to find work outside of Japan. Kikutake, Maki, Ohtaka, and Kurokawa displayed their individual works at the Expo, unanimously working with the idea of capsules plugged into megastructural skeletons.[80] Maki and Kurokawa started to gain individual recognition in international competitions after the Expo, and the Metabolist group disintegrated by mid-1970s.

Since Metabolism was an architectural revolution intended to invent Japanese architectural modernity, the movement's global re-contextualization prompts a question of its cultural legacy in Japan. If the Metabolists conceived their projects to create a language specifically for the Japanese context, can their underlying design concepts be applied to global

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[78] Koolhaas, *Project Japan*, 514–30.
[79] Mihut and Daniel, "First Oil Shock Impact on the Japanese Economy," 1043–44.
[80] Koolhaas, *Project Japan*, 518–29.

projects without adjustment? At what point did Metabolism's cultural foundation in Japan become irrelevant to its theories' global implementations, and what lessons do their transition from local to global convey for the development of future cities?

The latter half of this paper explore two projects by Metabolists in the global realm: Maki's Republic Polytechnic (2007) in Singapore and Kurokawa's Zhengdong New District Plan (2004-) in China. Republic Polytechnic and Zhengdong New District Plan are the largest projects in which the Metabolist architects were able to materialize their Metabolist theories on the urban scale, and notably, they are *not* in Japan.

Maki's Republic Polytechnic in Singapore (2007)

After publishing "Towards Group Form" in *Metabolism 1960* with Ohtaka, Maki continued to explore the relationship between the individual building and its surrounding environment. Four years after the publication of *Metabolism 1960,* Maki published a more extensive account on his urban design theory called *Investigations in Collective Form*. Maki explained collective form as a group of "buildings that have reasons to be together," which emerge in most cases as a result of perpetual organic growth rather than instantaneous urban planning.[81] He identified three types of collective forms – compositional form, megaform, and group form – that underlie the relationship between a building and its surrounding urban environment (fig. 19). Each of these collective forms can be distinguished by the number of dimensions considered in the form's conception. Compositional form describes a group of individual buildings arranged on a two-dimensional plane. When using this approach, the architect designs each structure separately, largely focusing on the planar rather than the spatial

[81] Maki, *Nurturing Dreams*, 45.

relationship when examining the city as a whole. Compositional form is represented by master-planned complexes like the Rockefeller Center, Chandigarh, or Brasilia, and describes the most historically common urban design approach.[82] Megaform consists of a large skeletal frame that contains semi-permanent structures of all functions needed in the city. Since the spatial relationship between each structure is essential to the functionality of the megaform, this approach is conceived in three dimensions. Megaform is a relatively new approach not only because constructing a city within a large skeletal frame requires advanced technology, but also because traditionally, cities have been designed through the two-dimensional mode of drawing. Group form considers a fourth dimension that cannot be mapped onto static representation: time. In the context of *Metabolism 1960,* group form is "a pursuit of a total image" that encapsulates all the architectural elements in the city, although the individual elements shift with time.[83] Each building exists as a constituent of the city's identity at a single moment, but the city's identity will continue to evolve as those individual buildings undergo change – in effect, the city sustains its vigor through metabolism. Although it may seem from these descriptions that the group form is superior to the other two, Maki argues that the three forms are not mutually exclusive in quality, and that the modern city consists of a combination of compositional form, megaform, and group form.

The number of Maki's international projects increased dramatically from the early 1990s. This increase might be partly attributed to his reception of the 1993 Pritzker Architecture Prize, the highest recognition bestowed to a living designer and often regarded as an equivalent to the

[82] Koolhaas, *Project Japan*, 304.
[83] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 59.

Nobel Prize in architecture.[84] Maki was the second Japanese architect to achieve this rare feat, only after his mentor Kenzo Tange received the prize in 1987.[85]

Although the Pritzker certainly helped Maki to establish his global relevance, he had actually gained traction outside of Japan much earlier in the 1970s. One of the earliest international projects inspired by Maki's group form theory was People's Park Complex (1973) in Singapore, designed by a local architect William Lim (fig. 20).[86] Singapore had recently gained independence from British rule, in 1965. To create architecture "that celebrated the spirit of the time as the island emerged from almost a century and a half of colonial rule," Singaporean architects not only turned to the works of modernist architects such as Le Corbusier, Walter Gropius, and Mies van der Rohe, but also to the contemporary theories of the Metabolists for inspiration.[87] Upon visiting People's Park Complex during its construction, Maki noted the building's adherence to his collective form theory by exclaiming, "But we theorized and you people are getting it built!"[88] In effect, Lim's People's Park Complex represents an early example of Metabolist principles being utilized by an architect outside of the original Metabolist group and its movement, both culturally and geographically.

People's Park Complex replaced the one-storied, overcrowded market in the center of Chinatown with a multi-storied building on a large horizontal plaza. The multi-storied building contained two interlocking atriums containing many small shops, kiosks, and a plaza for public

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[84] "Fumihiko Maki | The Pritzker Architecture Prize," accessed January 13, 2020, https://www.pritzkerprize.com/laureates/1993.
[85] "Fumihiko Maki | The Pritzker Architecture Prize."
[86] Robert Powell, "1942-1991: The Birth of a Nation: An Independent Architecture," in *Singapore Architecture: A Short History* (Singapore: Periplus, 2004), 89.
[87] Powell, 80. The fact that Kurokawa also held a presence in Singapore as an architect also confirms Metabolism's international reach. Powell, 80–82.
[88] Powell, "1942-1991: The Birth of a Nation: An Independent Architecture," 89.

events.[89] This multi-functioned atrium design contrasted with the conventional, single-use zoning of shopping centers in Southeast Asia at the time.[90] Architectural historian Eunice Seng described the atrium as such:

> The "city room" [(the atrium)], with a sunken plaza for flash sales and bazaar events, was an arrangement of scales of spaces, levels and movement. Accessible from each of the four sides of the complex, it was designed to invite people in and to accommodate them in a variety of ways and speeds. This continuous public space is connected to throughout the entire People's Park site via the paved plaza to the Park Road redevelopment project and Majestic Theatre.[91]

The atrium, designed to "invite people in and to accommodate them in a variety of ways and speeds," reflected Maki's theory of group form and its preoccupation with how people will act as catalysts of change in the social space over time. Although People's Park Complex was a single entity, its nature as a public place where diverse populations can interact in different ways gave the building an urban quality.

Maki designed a building in Singapore several decades later that contains a structure conceptually similar to Lim's atrium. In 2002, Maki won the design competition for the campus of Republic Polytechnic*,* the fifth polytechnic institute constructed in Singapore (fig. 21).[92] Though conceived with an underlying master plan on a rather small scale (the campus covers only 0.2 square kilometers or roughly 0.08 square miles), Maki considers Republic Polytechnic to be a successful materialization of the collective form and an extension of the Shinjuku

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[89] Eunice Seng, "People's Park Complex: The State, the Developer, the Architect, and the Conditioned Public, c.1967 to the Present," *Southeast Asia's Modern Architecture: Questions of Translation, Epistemology and Power*, 247, accessed January 16, 2020, https://www.academia.edu/38159546/Peoples_Park_Complex_The_State_the_Developer_the_Architect_and_the_Conditioned_Public_c.1967_to_the_Present.
[90] Powell, "1942-1991: The Birth of a Nation: An Independent Architecture," 89.
[91] Seng, "People's Park Complex," 255.
[92] Chye Kiang Heng, "Republic Polytechnic Campus - An Architecture Tour de Force," *Shinkenchiku (New Architecture)* 83, no. 6 (May 2008): 96.

Redevelopment Plan he conceived almost half a century before.[93] Like the plan for Shinjuku, Republic Polytechnic is composed of multiple individual buildings embedded within an overarching elliptic platform that is connected to several administrative buildings by bridges; thus, the basic structure of the campus is a megaform (fig. 22). The eleven embedded buildings called learning "Pods" each contain varying departmental functions and are organized above and around two layers of elliptical platforms, in a clear formal composition. The ellipse on top is a grassy platform called the "Lawn," which provides quick access to the Pods and administrative buildings. The ellipse on bottom, called the "Agora," is a glass-veiled expanse that houses many programs, including a library, informal reading spaces, lecture rooms, specialized labs, auditoriums, cafeterias, landscaped courtyards, gardens and pool.[94]

The Agora in Republic Polytechnic is conceptually akin to the atrium in Lim's People's Park Complex, and demonstrates the idea of group form (fig. 23). Architect Chye Kiang Heng, who sat on the jury panel for the design competition for Republic Polytechnic, describes Maki's Agora as "an urban maze with large and intimate spaces suited for a multitude of activities."[95] Many of the Republic Polytechnic's core public facilities are gathered in the Agora, including the library and the cafeterias. To accommodate users who prefer more private conditions for activities like quiet study, Maki designed structurally-flexible rooms called "study clusters" within the eleven Pods connected to Agora. The Agora also contains lecture rooms of different sizes, including exhibition halls with mobile partitions so that two halls can be combined into one if necessary. Maki's recognition of diversity in user activities mirrors Lim's design of People's Park Complex atrium, which was "designed to invite people in and to accommodate

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[93] Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 157.
[94] Heng, "Republic Polytechnic Campus - An Architecture Tour de Force," 99.
[95] Heng, 99.

them in a variety of ways and speeds" as Seng mentions. In turn, the atrium's eclectic composition that accommodated "an arrangement of scales of spaces, levels and movement" echoes Maki's philosophy, that each vendor's individuality should be respected for the sake of promoting the entire complex's well-being. Lim's and Maki's projects share an interest in programmatic flexibility, an important aspect of group form. Both architects considered how human activities can shape a user's spatial experience, regarding the element of time as part of the architecture.

As is true for most design competitions, a project's success can be largely attributed to the architect's integration of the client's visions into the work's visual and spatial qualities. Maki took into consideration that Republic Polytechnic was the first project within the jurisdiction of Singapore's Ministry of Education to implement a teaching method called Problem-Based Learning. Heng described this method:

> The Republic's vision to provide "a holistic education in an integrated IT-enriched learning environment where lifelong learning and all-round maximal development of students is encouraged and nurtured" implied a rather different kind of educational facility. Instead of providing a structure designed for instruction, the key focus of the polytechnic is to create a learning environment in which "subject knowledge is learned while using and developing process skills in the context of applications." This approach termed Problem-Based Learning (PBL) encourages students to solve problems set by specialist by working in groups under the supervision of facilitators. In PBL, not only is the pedagogical approach different, its ideal environment encourages students to take the learning outside of the classrooms and elevate the experience of the learner "beyond a potentate teacher-student connection."[96]

Maki's objective as a candidate architect for Republic Polytechnic was to address this prerequisite of Problem-Based Learning with clarity in the proposed architectural structure. This implied ample learning space outside of a conventional classroom structure, which Maki demonstrated in the library design. The library, located in the center of the Agora, contains a

[96] Heng, 96.

large area dedicated to collaborative learning (fig. 24). This triple-height space holds numerous rows of round tables, which attest to the kind of group work encouraged at the polytechnic institution. The staircases and learning spaces on the above tier are clearly visible from the triple-height space, also visually connoting continuous movement among the different parts of the Agora that facilitate education beyond the classroom.

Neither Lim's People's Park Complex nor Maki's Republic Polytechnic engage directly with Japanese culture apart from its Metabolist concept. However, the way Lim engages with culture is analogous to the approach that Metabolists took when conceiving their manifesto in 1960. Although the Metabolists did not explicitly define "culture" in *Metabolism 1960,* it seems that they understood the term to represent the beliefs, customs, and behaviors of a particular ethnic population. Similarly, Lim tackles the topic of ethnic identity in his design of People's Park Complex. The area surrounding People's Park Complex had been allocated to Chinese immigrants by the British since Singapore's establishment in 1819.[97] Lim recognized this history as well as the current demographics of the neighborhood, and tried to preserve elements of the local Chinatown culture in his new shopping complex. For example, the sunken plaza in the atrium of the People's Park Complex reflected the busy marketplace by holding flash sales and bazaars from time to time.

Culture in terms of ethnic identity and history is rather irrelevant to Maki's Republic Polytechnic, understandably since it is a higher-education institution that consciously promotes diversity. Maki's design is governed instead by Republic Polytechnic's institutional vision: Problem-Based Learning *is* Republic Polytechnic's culture. This change in attitude towards culture does not preclude Maki's awareness of Republic Polytechnic's local context, however.

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[97] Seng, "People's Park Complex," 236–37.

Sitting on two regional parks open to the public, the polytechnic today invites the larger community of northern Singapore to use their facilities, such as The Republic Cultural Centre located on the periphery of the ellipses.[98] Maki also tries to alleviate the heat from Singapore's tropic climate by making the architecture of Republic Polytechnic porous. The openings in the structure allow natural ventilation and spaces with high contrast of light and shade.[99] Republic Polytechnic's architectural responsiveness to the site helps the institution integrate into the local Singaporean context, stepping further away from the original focus of Metabolism as a movement designed for Japan. Despite the change in geographical context, Lim and Maki both manage to materialize group form in their mini-urban projects.

Kurokawa's Zhengdong New District Plan in China (2004 –)

Like Maki, Kurokawa began to receive more international commissions in the 1980s, after Metabolism's dissolution in the previous decade. Zhengdong New District Plan is a project that demonstrates Kurokawa's distancing from Metabolism's local contextualization, as well as the architect's own evolution as a theoretician (fig. 25). Later in the 1960s, Kurokawa developed the notion of "symbiosis" as a continuation of the biological analogy in architecture from Metabolism. He defines symbiosis as "a relationship where two or more parties in opposition, contradiction, or rigorous competition nevertheless find each other indispensable."[100] He notes the importance of accepting and celebrating heterogeneity in the contemporary world:

> [T]oday we live in the society of *homo movens,* who has learned the value of movement, exchange and discovery. Our world transcends differences in ideology, culture and levels of economic and technological development. A society of symbiosis is a pluralistic world where each person can display his own individuality, where many different cultural

[98] Heng, "Republic Polytechnic Campus - An Architecture Tour de Force," 97.
[99] Heng, 102.
[100] Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 216.

> spheres exist together. In this situation, the expression of a unique national character, a people's identity, becomes extremely important. […] Our goal is a world in which the many different cultures recognise one another's values, compete with each other, and while opposing each other in their unique identities also live in symbiosis.[101]

Kurokawa's discussion of symbiosis retains the poetic language of *Metabolism 1960*, yet the architect is also surprisingly compelling in his description of a world system that values diversity – a keyword in today's progressive global community.

Kurokawa's Zhengdong New District Plan for the city of Zhengzhou in Henan Province, China, is a project that was designed with Metabolism and symbiosis in mind. In the late 1970s, Zhengzhou's status as an urban center was overshadowed by coastal cities like Shanghai that rose to prominence with increased investments by foreign capital.[102] The commissioning of Zhengdong New District Plan was the municipal government's strategy to recode the city's identity as the economic and cultural center of inland China through an urban design renewal. Covering an area of 150 square kilometers (roughly 58 square miles), Zhengdong New District consists of two circular rings that are connected by a system of looping longitudinal roads and interior canals (fig. 26).[103] Multiple layers of roads encircle the southern and northern rings, which contain the central business district (CBD) and the CBD sub-district respectively. The multi-layered loop structure of the road not only helps combat traffic congestion, but also embodies the notion of constant circulation (fig. 27). In tandem with Kurokawa's observation

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[101] Kurokawa, "Transcending Modernism," 41.

[102] "After the open-door policy was adopted in 1978, the cities on the east coast and the west developed rapidly with foreign investment, but cities in Central China were relatively marginalized." Charlie Q. L. Xue, Lesley L. Sun, and Luther Tsai, "The Architectural Legacies of Kisho Kurokawa in China," *The Journal of Architecture* 16, no. 3 (June 1, 2011): 424–25, https://doi.org/10.1080/13602365.2011.591605.

[103] Hajime Yatsuka, Makoto Kikuchi, and Yoshinori Yamana, *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan* (Tokyo: Mori Art Museum, Shinkenchiku, 2011), 222.

that the contemporary world is "the society of *homo movens,* who has learned the value of movement, exchange and discovery," it seems only fitting that a robust circulatory system is in place in Zhengdong. The roads also create a new system of class division within the city, as noted by a travelling writer Wade Shepard in his book *Ghost Cities of China*:

> New city building is a very class-conscious affair in China, and places like Zhengdong have set the groundwork for parallel migrations. The 'haves' will escape the congestions of the archaic and crowded historic cities and move to the new districts, whereupon the urban working class and rural migrants will flood into the old city and take their place. So a situation has been created where different social classes live in very different urban environments within the same cities. The incredible disparity between China's rich and its poor is magnified by the new city movement.[104]

Although Kurokawa likely did not envision exacerbated class disparity as a positive component of his architectural legacy, Shepard's account describes a form of Metabolism and symbiosis manifesting in the city of Zhengzhou. From the perspective of the old city fabric, the formulation of the Zhengdong New District Plan is a force of social change that lowers its population density and provides homes to new residents, including "rural migrants" of diverse origins – a metabolic process. Examining the old and new city fabric together, the dwelling of different social classes in close proximity represents a symbiotic relationship. Furthermore, Kurokawa's emphasis on the circulatory system in Zhengdong New District Plan corresponds to his conception of new urban model called "Ring City." In the design concept for this project, Kurokawa described Ring City as "a cell cluster without center, in other words, it is a city of no center."[105] Ring City challenges the traditionally-Western model radial cities that concentrate the most important infrastructure in the center. Kurokawa observed that the radial plan in many American cities

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[104] Wade Shepard, "Of New Cities and Ghost Cities," in *Ghost Cities of China: The Story of Cities without People in the World's Most Populated Country* (London: Zed Books, 2015), 51, http://ebookcentral.proquest.com/lib/emory/detail.action?docID=2011540.

[105] "Works and Projects: The Zhengdong New Town Zhengzhou City, China," Kisho Kurokawa: Architect & Associates, accessed January 5, 2020, http://www.kisho.co.jp/page/255.html.

resulted in the "degeneration of city centers into slums."[106] To avoid such a fate in planning for Zhengdong, Kurokawa employed the Ring City structure that shifts the city's focal point from a static central location to the roads. The roads can bring in new elements from outside, catalyzing the city's metabolism.

Four key planning features of Zhengdong, as described in the district's official website, elucidate the design aspects that the municipal government officials found most appealing in Kurokawa's plan. These four features are: progressive architectural concepts, such as symbiosis and Metabolism; adoption of a group development model; ecological protection; and visual expression of the local culture.[107] In describing the first feature, the government appropriates Kurokawa's original language of symbiosis, Metabolism, and Ring City. This adoption might be reflective of the government's desire to advertise Zhengdong as a Kurokawa project. Zhengdong New District Plan is one of the first urban design projects in China that was conceptualized by a foreign architect and executed by the municipal government, which underscores the significance of Kurokawa's involvement.[108] Kurokawa had secured his reputation in China in the previous decade, when he designed and built Chinese-Japanese Youth Exchange Centre (1991) in Beijing. The youth exchange center was a part of the political effort to repair Japan's relationship with China after World War II, and Kurokawa was one of the leading Japanese architects at the

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[106] Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 239.
[107] Zhengdong New Area Administrative Committee, "Guī Huà Tè Sè (Planning Features)," Zhengdong New District, accessed January 1, 2020, http://www.zhengdong.gov.cn/sitesources/zhengdong/page_pc/qq/ghts/list1.html.
[108] The authors claim that "[s]everal other town plans designed by foreign architects were built in China in the twenty-first century – for example, around six suburban towns in Shanghai – but the Zhengdong new district was a couple of years earlier than in the Shanghai examples." Xue, Sun, and Tsai, "The Architectural Legacies of Kisho Kurokawa in China," 441.

time.[109] Kurokawa's high reputation as an architect, and the message of international harmony implicated in the employment of a Japanese designer, might have had equal significance to the Chinese officials planning for Zhengdong's new future. The second feature, adoption of a group development model, denotes the district's underlying biological concepts of symbiosis and Metabolism. Zhengdong is divided into several areas by function, such as business, residence, education, scientific research, and industry. The group development model implies that a symbiotic relationship exists between those areas – as signified by the robust circulation system encasing the district – causing growth in one area to affect the others positively. Although the legitimacy of this model requires assessment after the district's infrastructures have been fully developed, the inclusion of this second feature in the website description points to Zhengdong's respect for Kurokawa's theory.

The third feature, ecological protection, is arguably the most instrumental for Zhengdong New District to embody the notion of symbiosis. Kurokawa theorized the necessity of symbiosis not only between humans living in different cultural spheres, but also between humans and other organisms. He stressed the responsibility of humans to maintain Earth's biodiversity and asserted that "humans are allowed to exist on this plant only within boundaries that can maintain the delicate life cycles of the ecosystem."[110] Kurokawa reflected this philosophy in Zhengdong New District Plan by constructing wildlife corridors around the artificial lake and the canals, to facilitate animal movement throughout the city.[111] He had already alluded to the ecological

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[109] Kurokawa's experience in the designing of bicultural institutes (Japanese-German Centre of Berlin in 1988) might have been one of the factors in his employment as the chief architect of the new youth exchange center. Xue, Sun, and Tsai, 418.
[110] Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 223.
[111] Yatsuka, Kikuchi, and Yamana, *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan*, 222.; Kurokawa had already affirmed the importance of the wildlife corridor in "Metabolism and the Philosophy of Symbiosis," which

significance of wildlife corridors in "Metabolism and the Philosophy of Symbiosis," an essay that predates the conception of Zhengdong New District Plan by seven years. In this essay, Kurokawa noted that many global leaders ratified the Convention on Biological Diversity at the 1992 Earth Summit, thereby affirming the important role of wildlife corridors in promoting biodiversity.[112] By mentioning this event, Kurokawa implied that his philosophy of symbiosis echoed the current global concerns of the harmful effects of industrialization and urbanization on the natural environment. In turn, the feature of ecological protection in Zhengdong New District Plan in the form of wildlife corridors is significant to the municipal government officials as evidence of their sense of responsibility towards the environment – a prerequisite of a contemporary global city.

The fourth aspect, the expression of local culture, is conveyed by both city planning and architecture in the new district. The plan of Zhengdong New District demonstrates that the two circles connected by the road and canal conjointly form the shape of a *ruyi* (ceremonial scepter).[113] *Ruyi* is widely-accepted in China as a symbol of good fortune and longevity. There is little room for doubt as to why the Zhengdong officials chose to highlight this symbol as one of the district's most distinguishing features; the *ruyi* shape ties the foreign architect's design to the Chinese culture, not only conveying a sense of locality to its citizens, but also demonstrating national pride to foreign visitors and architectural scholars that view the city plan. The individual works of architecture in Zhengdong, though designed by architects other than Kurokawa, also pay tribute to the local history and culture. Henan Art Centre (2008), located on the waterfront of

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precedes the conception of Zhengdong New District Plan by seven years. Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 221.

[112] Ohtaka and Kawazoe, *Metaborizumu to Metaborisutotachi (Metabolism & Metabolists)*, 221.

[113] Yatsuka, Kikuchi, and Yamana, *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan*, 222.

CBD, is one of them (fig. 28). Its architect Carlos Ott describes the five egg-like forms of Henan Art Centre to have been "inspired by abstract interpretations of ancient musical instruments," most likely referring to the *xun* (vessel flute) as judged from the instrument's round shape and curved finger hole arrangement.[114] Zhengdong's Ring City plan and Henan Art Centre both derive their forms from objects of significance in Chinese ancient traditions. To reiterate Kurokawa's definition of symbiosis introduced in the beginning of this chapter, a symbiotic society is one where "the expression of a unique national character, a people's identity, becomes extremely important." The implication of a "unique" national character, in its literal sense, is deeply problematic when considering the ethnic diversity of the city's residents –an inherent limitation of Metabolism and its assumptions about culture. However, the adoption of *ruyi* and *xun* shapes in the city fabric denote the history of the place rather than the ethnicity of its inhabitants, since both objects are indigenous to China, and more specifically to Henan Province. This focus on the geographic location draws an unexpected thematic parallel between Zhengdong New District Plan and Metabolist projects in Japan. Both are concerned with expressions of locality, and Kurokawa managed to find themes and symbols that satisfied each site's needs.

As evaluated from the description of the four planning features, Zhengdong New District Plan articulates Kurokawa's philosophy of symbiosis more immediately than it does the concept of Metabolism. The philosophy of symbiosis is especially central to the third and fourth features of ecological protection and expression of local cultural characteristics; thus, it might seem as if symbiosis replaced Metabolism as the primary theoretical underpinning for Zhengdong's design.

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[114] "Henan Art Centre," *Petroff* (blog), accessed January 2, 2020, http://ffortep.com/projects/recreational/henan-art-centre/.

However, the conceptual relationship between Metabolism and symbiosis is neither mutually exclusive nor sequential. Symbiosis describes a macrocosmic phenomenon within a limited time frame. Metabolism describes a process of change from one state to another. In other words, symbiosis can happen at any given point of the metabolic process of a city, and it is possible for an architectural project to embody Metabolism and symbiosis simultaneously. A significant difference between the two concepts – and the reason for symbiosis's relative conspicuousness in urban design and architecture – is that Metabolism can only truly manifest itself in retrospective observation; time is an intrinsic component of Metabolism. Zhengdong New District Plan is still being constructed, and therefore has not had the opportunity to demonstrate its metabolic potential.[115] The looping roads around the district's Ring City plan is currently the only infrastructure that can embody Metabolism. Even though Kurokawa's concern for a city's metabolic process seems rather modest in the design of Zhengdong compared to that of Nakagin Capsule Tower, the full effects of Metabolism in the new global city have yet to be seen.

Conclusion: Metabolist Legacy in the New Age

Metabolism left a very faint mark on the Japanese urban fabric in terms of architectural expression. None of the Metabolists were able to replicate their projects faithful to the forms proposed in *Metabolism 1960*. The center of human activity is still built on land and not out in the sea, and residential spaces do not consist of removable capsules. The many other projects

[115] Architect Arata Isozaki has been overseeing the design and construction of Zhengdong New District Plan after Kurokawa's death in 2007. In continuing this project, Isozaki decided to "follow and carry-on Kurokawa's ideas, utilizing the waterfront in the norther center to create a location for festivals in the city, and introducing a new transit system with an energy-saving design." Yatsuka, Kikuchi, and Yamana, *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan*, 222.

theorized in *Metabolism 1960,* but not included in the scope of this paper, also remained in the realm of paper architecture. Even Shimizu Corporation's GREEN FLOAT and Kurokawa's Nakagin Capsule Tower – contemporary local projects that are most evocative of Metabolist theory in appearance and concept – lost the essential Metabolist feature of structural flexibility and constant renewal in the process of materializing theory into reality. The Metabolist to invent a vernacular modern architectural language, which reflected the zeitgeist of late 1950s and early 1960s "post-war" Japan, became somewhat obsolete in the 1970s. Japan's economic downturn from the 1973 First Oil Shock, as well as the increased opportunity for the Metabolists to become global architects, accelerated Metabolism's disbandment.

Despite such limitations and apparent disintegration of the movement, the theories and works by the Metabolists keep resurfacing in the local and global context, with more emphasis on the latter in the contemporary world. Kurokawa completed over fifty projects across twenty countries before his death in 2007.[116] A retrospective of Kurokawa's work was first held in Paris in 1998, which then traveled to cities all over the world including London, Chicago, Berlin, and Amsterdam. His publication *Intercultural Architecture: The Philosophy of Symbiosis* exists in Japanese, English, and German translations, also demonstrating the extent of the international popularity of the architect's works and theories. Although not as prolific as Kurokawa, Maki has also built over twenty works overseas since the 1960s.[117] Maki won the Pritzker Architecture Prize in 1993, as one of his juror claims, for the "unique understanding of both eastern and western cultures evident in his designs" and as "one of the leaders of this new wave [of inventive

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[116] Yatsuka, Kikuchi, and Yamana, 211; "Kurokawa Kisho Ryakureki (Kisho Kurokawa Profile)," Kisho Kurokawa: Architect & Associates, accessed February 1, 2020, http://www.kisho.co.jp/page/11.html.

[117] "Projects," Maki and Associates: Architecture and Planning, accessed February 3, 2020, http://www.maki-and-associates.co.jp/projects/index.html.

young architects that emerged in the 1940s] that would rebuild Japan."[118] The international reception of Maki's works as a fusion of the east and west, as well as Koolhaas's characterization of Maki as "cosmopolitan," perhaps elucidates a trend of contemporary architecture that appreciates a well-conceived balance between cultural specificity and global applicability.

Kikutake, Ohtaka, and Kawazoe do not possess the same level of international acclaim as Kurokawa and Maki. However, their contributions to Metabolism are nevertheless significant. Kikutake's theory of Marine City, the first project study in this paper, has undergone revision over several decades and will most likely be culminated in Shimizu Corporation's GREEN FLOAT. GREEN FLOAT's expected full operation in 2030 might fuel a bigger wave of artificial island-building – a stimulating (and potentially dangerous) prospect for future architects.[119] Ohtaka was a purveyor of the group form alongside Maki; without his insights, the chapter "Towards Group Form" in *Metabolism 1960* would have been less developed. Kawazoe, a well-established architectural critic who wrote profusely but only in Japanese, lacked the means – and perhaps also the incentive, because he was not a practitioner – to spread his words to the international community. His genius and resourcefulness, however, are what brought the Metabolists together in the first place. Kawazoe, who was interested in the analysis of traditional Japanese architectural in search for its cultural essence, gathered young Japanese architects at the WoDeCo to put forth a proposal on new Japanese architecture and cities. His predisposition to

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[118] Quoting the comments by Maki's jurors on the Pritzker Architecture Prize webpage. "Fumihiko Maki | The Pritzker Architecture Prize."

[119] The author – who is not at all an expert on ecology – wonders if the construction of numerous artificial islands will have any negative impact on the surrounding marine environment, hence the descriptor "potentially dangerous." This environmental aspect should not be ignored if designers consider embarking on similar projects in the future.

the topic of Japanese culture formed the core of the Metabolist theory, around which the four other architects' proposals revolved. Although the majority of the primary resources are in Japanese, there are more recent publications in English by Kurokawa, architect Michael Franklin Ross, and architects Rem Koolhaas and Hans Ulrich Obrist that examine Metabolism as a collective entity.[120] These works in English also contribute to the spread of Metabolist theory to the next generation of local and global audiences alike.

Why are the traces of Metabolism present in a world situation that is seemingly so different in political, economic, and cultural dynamics from that of Japan in the 1960s? The analysis of the projects led to four points regarding Metabolism's legacy in the local and global contexts. These points are: refinements to the theoretical content contributing to Metabolism's longevity, open-endedness of the Metabolist theories enticing new generation of scholars and practitioners, adaptability as a critical architectural theme in the globalizing world, and relevance of Kawazoe's philosophy in all aspects of Metabolist legacy.

First, the theoretical content of Metabolism changed over time, adapting to circumstantial constraints when the Metabolists progressed from proposing paper architecture in *Metabolism 1960* to constructing actual buildings in the material world. The architectural drawings displayed throughout *Metabolism 1960* are more diagrammatic than technical; the accompanying texts are also more pictorial than practical, because they lack explanation of technical elements that need to be considered if these projects were to be manifested in physical space. There is no way of telling whether this lack of technicalities was a result of the Metabolists' hasty compilation during the short preparation time for the WoDeCo, or a general disinterest in determining the

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[120] Kurokawa, *Metabolism in Architecture*; Michael Franklin Ross, *Beyond Metabolism: The New Japanese Architecture*. (New York, NY: Architectural Record Books, 1978); Koolhaas, *Project Japan*.

fine design details at the proposal stage. However, the roughness of the manifesto does reveal that the Metabolists – at least four of them professionally-trained architects – were well-aware of the unrefined state of their projects. When the time came for construction in real life, the Metabolists made revisions as necessary and even updated the original theory to accompany their new findings. The modifications themselves embody the concept of adaptability, which legitimize the underlying logic of Metabolism rather than undermine it.

Second, Metabolism's open-ended theories and limited material legacy contribute to the intellectual drive – among architects, scholars, and clients alike – to fulfill the past movement's potential. Kurokawa and Maki's global prestige demonstrate that Metabolism qualifies as being worthy of revisiting, many decades after the group's disintegration. The certain appeal that Metabolism has for the contemporary global audience might not have existed if the forms and theories had been rigidly constructed and inapplicable to circumstances other than that of Japanese cities in 1960.

Third, the content of *Metabolism 1960* revolves around the theme of adaptability in a rapidly changing world. Architects and city planners today must consider economic globalization, population growth, climate change, and many other factors that might affect their projects in the long term.[121] Adaptability inevitably becomes a design objective when building in such volatile environments.

Fourth, the previous three points on Metabolism's adaptable, open-ended, and abstract character all return to Kawazoe's cultural theory of impermanence. The last few sentences of

[121] Lin described the Asian urban environment in 2011 as such: "Economic globalization has accelerated the pace of urban change in Asian megacities, and repeated destruction and construction has become part of the everyday urban landscape." Lin, "Nakagin Capsule Tower Revisiting the Future of the Recent Past," 29.

"Material and Man" encapsulate Metabolism's cultural legacy, which germinated in the local context but demonstrated greater promise when it blossomed in the global context:

> 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 a subsequent new creation. This "something" must be found in the form of the cities we are going to make – cities constantly undergoing the process of metabolism.[122]

Kawazoe, an architectural critic, had little to do with the built Metabolist works, but his incredible foresight determined the fate of the Metabolism movement: he understood that nothing withstands the erosive quality of time, even buildings made of the most durable materials.

The two local projects analyzed in this paper, Kikutake's Marine City and Kurokawa's Nakagin Capsule Tower, demonstrate the difficulty of translating paper projects directly into real buildings and cities. Paper projects, conceived in relation to the manifesto, do not necessarily consider physical laws, economic costs, or technological feasibility. What really matters in a paper project is the expression of an innovative idea, as was the case in *Metabolism 1960*. Kikutake's "Ocean City" and Kurokawa's "Space City" both explored megastructural projects that were technologically and economically unattainable, but at any rate intellectually stimulating and sufficient as provisional designs for the future city. Kikutake's description and images of the Unabara model in *Metabolism 1960* seem overly techno-utopian, even six decades after the manifesto's publication. The technology required to build a massive floating infrastructure that can hold five hundred thousand people is only finally starting to become practicable, as demonstrated by Shimizu Corporation's GREEN FLOAT. Even with GREEN FLOAT, there are potential risks such as funding loss, since there is no certainty that this immensely expensive

[122] Kawazoe et al., *Metabolism 1960: The Proposals for New Urbanism*, 49.

project will succeed architecturally or economically, since no project of its scale has ever been constructed. Kikutake completely ignored the issues of technology and finance in designing Unabara, meaning that the only way for this highly ambitious project to have been conceivable at all was on paper. Kikutake was never able to materialize Unabara in its original scale, and was only partially successful in creating a free-floating infrastructure when he built Aquapolis fifteen years later after his conception of Unabara. Kikutake had to modify his Marine City theory drastically when he constructed Aquapolis, shrinking its facilities to house just forty residents and abridging the construction of *mova-blocks* and *movable houses* completely. While these modifications were necessary for Aquapolis's materialization, the excision of *mova-blocks* and *movable houses* meant that the project no longer expressed the concept of metabolic processes in the city. The idea behind these structurally-flexible housing complexes was to accommodate substantial ups and downs in the population, ensuring that the Marine City would grow and diminish organically. Marine City cannot exist in the Metabolist manifesto without the *mova-blocks* and *movable houses*. GREEN FLOAT, though explicitly inspired by Kikutake's Marine City, also replaced the *mova-blocks* and *movable houses* with high-rise towers designed with durability in mind rather than structural flexibility. In retrospect, Kikutake was too specific in the forms and functions he envisioned for Unabara when there was no actual backing for its material success. This specificity makes it possible for contemporary readers to discern the paper project's limitations very clearly, whereas a more abstract proposal could have left future audiences with a fluid notion of what a Marine City should look like.

Nakagin Capsule Tower only has partial roots in *Metabolism 1960,* since Kurokawa's projects for that publication included the Mushroom Shape House with rooms of reconfigurable dimensions around a central circulatory shaft. Kurokawa introduced each project in "Space City"

with a high degree of visual clarity, similar to Kikutake's description of Unabara. However, the proposal of multiple projects with varying forms enabled Kurokawa to demonstrate his eclectic thinking in *Metabolism 1960*, a benefit that Kikutake's focused study did not have. Thus, Kurokawa's abandonment of his manifesto proposals for his pursuit of the Capsule Theory seems reasonable, and even smart considering that he was able to attain theoretical maturity in the latter. His early willingness to shift ideas might also account for Kurokawa's own adaptability as an architect. Using his acute perception of the current conditions of the world, he was later able to transition from building locally to globally, from an architectural scale to an urban scale. However, those fluid qualities did not apply to his materialization of Nakagin Capsule Tower. Nakagin Capsule Tower embodies the notion of the city's metabolic process in its form and concept, which is the reason for the building's architectural prominence today. Yet, Kurokawa was unable to endow Nakagin Capsule Tower with the very functions that would help the building come alive as a true Metabolist building: the effortless exchange of capsules. Kurokawa and his team of engineers did not fully consider the logistics of capsule renewals, though it is strangely unclear why, since the entire point of connecting the capsules to the shaft with only four high-tension bolts was to ensure that a metabolic process would take place. Although Nakagin Capsule Tower has its limitations as a Metabolist building, it did serve as a prototype for the widely-used capsule hotels. Capsule hotels, like the high-rise towers in GREEN FLOAT, generally do not have replaceable units. The erasure of replaceable units from both Kikutake and Kurokawa's materialized (or more prolific) forms indicate that Japanese society did not develop a penchant for capsule living as a standard way of living. One probable reason for this is actually demonstrated in the Nakagin Capsule Tower's residents' resistance towards the building's demolition. For these residents, Nakagin Capsule Tower has more significance

than just being a place to live; the building itself preserves a memory of Japan's only modern architectural movement by a now well-established architect. Kikutake and Kurokawa, who were both so keen to "encourage active metabolic development of [their] society through [their] proposals," as stated in the introduction of *Metabolism 1960,* perhaps failed to notice that their end users might resist the erosion of time as much as possible before change is physically necessary. The erasure of *mova-blocks*, *movable houses*, and renewal capsules from subsequent projects was a lesson for the Metabolists, that metabolic elements should not be ingrained so literally in individual works of architecture.

The two global projects constructed more recently, Republic Polytechnic and Zhengdong New District Plan, synthesize the concept of Metabolism more successfully than the two local projects on two levels. Most obviously, the global projects are much larger in scale and better fit the criteria of "city" suggested in the *Metabolism 1960* subtitle, *The Proposals for New Urbanism.* Even the individual works of architecture proposed in the manifesto were conceived with a larger urban fabric in mind, as was the case with Kurokawa's Mushroom Shape House made for his Agricultural City.[123] Metabolism's goal – at least from the perspective of *Metabolism 1960* – is realized to a fuller extent when the built project takes on a city function rather than that of an individual building.

Maki and Kurokawa also articulate the visual qualities of a metabolic process on a more abstract level in Republic Polytechnic and Zhengdong New District Plan than in the two local projects. As noted previously, components such as *mova-blocks*, *movable houses*, and renewal capsules did not become prevalent architectural features in the decades that followed *Metabolism 1960*. Although it has not been explicitly mentioned, it seems that Maki and Kurokawa both

[123] Kawazoe et al., 74–75.

realized that such features on individual works of architecture do not function in the intended ways, and that they do not necessarily benefit the daily lives of the end users. Since Maki and Kurokawa still found Metabolism to be compelling as an underlying philosophy for Republic Polytechnic and Zhengdong New District Plan, as elaborated in their respective chapters, the architects had to find more nuanced ways to ingrain the metabolic process into those projects. Maki and Kurokawa, surprisingly, took a similar approach to this design problem: they both interpreted human movement to be the catalyst of metabolic process, and created projects that emphasized those movements. In Republic Polytechnic, Maki created the Agora with attention to the diverse forms of interactions that students would have within the campus. Republic Polytechnic is an institution that encourages group learning outside of the classroom environment, adhering to the Problem-Based Learning approach. Maki responded to this institutional ethos by designing the Agora to be a large, multi-leveled space that accommodates various functions such as a library, cafeteria, and lecture spaces but also is rather loosely defined in terms of its overall function. Because of this functional fluidity, Republic Polytechnic allows for its users to shape the spatial experience in whatever way they deem desirable – a form of metabolic process. Kurokawa tried to catalyze a continuous flow of people throughout the expanse of Zhengdong New District Plan by introducing his concept of Ring City, manifested in the multi-layered looping roads encircling the district. The looping roads not only allow expansive degree of circulation of residents throughout the different areas, but also invite people from outside of the city to visit. In Zhengdong, the different areas of the district pertain to different functions, and these functions are organized in a ring form around the looped roads. A condensed city center does not exist and all areas are exposed to transportation, unlike a radial plan. The circulatory movement is further emphasized, promoting the metabolism of people and

development in all areas of the district. Both Maki's Agora in Republic Polytechnic and Kurokawa's looped roads in Zhengdong New District Plan embody the notion of Metabolism by considering human movement as the central component of change in society and environment, and architecture and urban form as facilitators of those movements. By focusing on people as central features of the Metabolist environment, Maki and Kurokawa evaded the technical difficulties that inevitably arose in projects like Marine City and Nakagin Capsule Tower.

Maki and Kurokawa continued to innovate their theories as they accumulated more observations on the current urban environment. As time passes, society changes, and ideas surrounding the built environment also must adapt and evolve. Maki did not make many amendments to his group form theory that he advocated with Ohtaka in *Metabolism 1960.* He did, however, consider other general forms as variations in city-building types. His close observations of urban environments in Europe, Middle East, and Asia during the two years prior to WoDeCo – and the subsequent four years that led to his publication of *Investigation of Collective Forms* – allowed Maki to consider that group form might be better paired with other types of collective forms (compositional form and megaform) depending on the place. Republic Polytechnic contains features of all three collective forms, shifting along the parameters of interior function, shape of the overall structure, and relationship between the different elements. While it might seem that Republic Polytechnic could have been built without such ruminations on forms, the theories are nonetheless helpful. Republic Polytechnic can be viewed as a small-scale prototype for more extensive city building; thus, Maki and other designers in the future can estimate the effects that the combination of collective forms can have on building users by observing the conditions of the polytechnic institute. Kurokawa cultivated a series of architectural philosophies after *Metabolism 1960* that all related architecture to biological

processes. Metabolism was the starting point, but he soon began to consider other accompanying concepts like symbiosis. As explained in the chapter on Zhengdong New District Plan, the idea of Metabolism and symbiosis are interrelated rather than mutually exclusive. Like Maki's synthesis of the collective forms, Kurokawa conceptualized symbiosis through a careful observation of his surrounding world. These architects refined their architectural theories through continual observations, which also contributed to their more mature understanding of how to build architecture and cities that serve the location and their users.

The enlarged scale from the local to global projects denote the importance of economics and politics in creating the right situation for city-making. Massive projects like Marine City and Zhengdong New District Plan cannot be achieved without a substantial amount of support by the government or private institutions that are willing to take the financial risk. Economic constraints were partly the reason why Kikutake's renditions of Marine City were limited, and Aquapolis was demolished few years after its construction. It is also why Zhengdong New District Plan, funded by the municipal government, could be built on the proposed scale. The 1973 oil shock made the Japanese economy fall into a deep recession, which in turn diminished the country's budget and will to invest in Metabolist megastructures. Singapore, in contrast, began to invite foreign architects in the national quest for a new architectural language around the same time. The political changes in Singapore, namely the nation's independence from British rule, drove the new nation to be relatively open to searching for a new architectural language. From these observations, it seems that Metabolism in the local Japanese context necessitated Japan's post-war ambition and economic miracles for its inception. In other words, Metabolism was designed to reflect the very specific urban conditions of 1960 Japan.

Why, then, was Metabolism accepted in the global realm? The above analyses of Republic Polytechnic and Zhengdong New District Plan elucidate that throughout the years, Metabolism broke its limits of serving one distinct culture and developed a legacy that extends further to the sphere of the human universal. The specific forms proposed in *Metabolism 1960* could only have been conceived with respect to Japanese cultural traditions, but the types of urban issues that the Metabolists addressed are quite similar to those shared by past and contemporary architects, both inside and outside of Japan. For example, two themes shared by the four projects of Marine City, Nakagin Capsule Tower, Republic Polytechnic, and Zhengdong New District Plan are the appropriate visual expression of underlying design motives, such as national identity or contemporary lifestyles, and the resilience of the urban fabric under the waves of societal and environmental changes. In their later global projects, Maki and Kurokawa also demonstrated a more mature understanding of what it means to build a city that can relate to the past, present, and potential situation of a specific location. Maki adapted his collective form theory to construct a polytechnic institute campus as an urban microcosm. Kurokawa advanced his architecture-as-biological-processes philosophies by theorizing symbiosis in addition to Metabolism.[124] These later modifications helped strengthen the Metabolist aspects of Maki and Kurokawa's works rather than overshadow them.

The universality of Metabolism has a different meaning from that of the International Style, the latter which Kurokawa criticized.[125] The proponents of the International Style had clearly defined their architecture's visual and material qualities, namely boxes made of steel,

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[124] Kurokawa's Zhengdong New District Plan exemplifies construction for the past, present, and future of the location: the plan embodies traditional motifs to tether the district to the local culture (*ruyi* shape), while simultaneously incorporating progressive building concepts (Ring City, symbiosis, etc.) and addressing relatively new environmental concerns (wildlife corridors).
[125] See footnote 1 and 4.

glass, and concrete. Universality of the International Style means the exportation of those same qualities: while small modifications might be made to accommodate different sites, they will still adhere to a singular architectural "style." In contrast, the Metabolists did not devise such clear answers. The variations in the Metabolist architects' formal and intellectual descriptions of the city in *Metabolism 1960* illuminate the fact that "Metabolist architecture" cannot be reduced into a single, neat definition. A rather vague criteria of Metabolism is an acknowledgement that the material world will inevitably change with time, and that the most resilient built environment anticipates that such changes will occur. Although the architects proposed their own distinct projects in *Metabolism 1960,* the rudimentary quality of the theory and drawings added ambiguity to the definition of "Metabolist architecture" rather than establishing its forms. The disagreement between the visual qualities of Marine City, Nakagin Capsule Tower, Republic Polytechnic, and Zhengdong New District Plan is evidence of such ambiguity. As such, the universality of Metabolism resides in its sole fixed postulate: the recognition of change in the built environment. The visual and material qualities can only be determined subsequently by the architect observing the site of construction.

There are questions that deserve further investigation: can any project be Metabolist as long as it exhibits recognition of societal and environmental impermanence? At what point will Metabolism cease to be Metabolism – or, are the aforementioned projects already in the stage where it can no longer be classified as Metabolist? This paper finds the mutability of the original theories at the base of Metabolism's current pertinence, and one criticism towards this argument is that Metabolism seems to lose its substance over time. Research for this paper has revealed that the notability of Metabolism's name today has in part been advanced by the Metabolists themselves. As demonstrated in the Metabolists' publication of *Metaborizumu to*

Metaborisutotachi over four decades after their group's establishment, the Metabolists have been consciously involved in the historicization of their movement in the twenty-first century. The personal and professional interests of the Metabolists and their successors consequently complicate the evaluation of Metabolism's true legacy.

While this research began by looking for the cultural legacy of Metabolism in the local context of Japan, it ended up considering Metabolism's influence on – and potential for – cities around the globe. Metabolism survived the transition into the global context precisely because it eluded clear-cut definitions from the very beginning, in the 1960 manifesto. The rather loose binds of the proposals in *Metabolism 1960,* as well as the founding architects' willingness to explore outside the bounds of those proposals, allowed for Metabolism to be modified into different forms with the passing of time. The changes in environment since the 1960s made it such that Metabolism can only extend its legacy in the realm of the human universal in theory first – specifically, recognizing the inevitability of the changing built environment – and then conform to the local architectural needs when a construction site is determined. Site-specificity is still important to the actual design process when Metabolism is materialized, but the theories' Japanese origin is no longer essential in determining whether Metabolism should or should not be exported to foreign environments. Thus, Metabolism's initial groundedness in the Japanese culture should not shackle the highly-adaptive, perpetually-relevant theories to its origin in the Japanese past. Considering the cultural legacy of Metabolism in Japan today, it suffices to say that Japan's geographic susceptibility to natural disasters, as well as the possibility of other unforeseen drastic changes in society, calls for a reconsideration of the ways in which Metabolism theories might improve Japanese cities' resilience in the face of such changes. But

then again, a similar recommendation can be made for most other locations in light of climate change and inevitable sea rise.

Metabolism's relevance in the broader world ironically returns the discussion of the movement's legacy to Kawazoe's chapter. Kawazoe's ruminations on impermanence and eternity of the built environment had a profound connection to Japanese culture, most notably the rebuilding tradition of the Ise Shrine. Without Kawazoe's intellectual genius and patience in cohering the other four Metabolists' differing theories into one manifesto, the entire turn of events following *Metabolism 1960* would not have occurred. Metabolism owes its inception to Kawazoe and his deep comprehension of Japanese culture. Then again, Metabolism no longer belongs just to the realm of Shinto deities today. The legacy of Metabolism is an organic process, shaving off the withering elements of the past and replacing them with new 'capsules' of forms and ideas to remain relevant in the face of the globalizing contemporary world. Metabolism's current legacy is its familiarization with change – but we can only predict what shape that legacy will take tomorrow. The question, "What is Metabolism?" inevitably becomes more difficult to answer with each step into the future. This is how Metabolism constructs eternity.

Appendix

Noboru Kawazoe, "Ise Bunkaron (Cultural Theory of Ise)," in *Ise: Prototype of Japanese Architecture*, by Kenzo Tange, Yoshio Watanabe, and Noboru Kawazoe (Osaka: Asahi Shinbun-sha, 1962), 67–93.

Excerpt from pp. 83-85
Translated by Honoka Nakamachi

Note: *Ise: Prototype of Japanese Architecture* is a compilation of Kawazoe and Tange's research on the architectural and cultural significance of the Ise Shrine, dated from the mid-first century. Kawazoe had already started his research on Ise Shrine's cyclical renewal in 1959, a year before the publication of *Metabolism 1960*. The English version of *Ise: Prototype of Japanese Architecture*, published by MIT Press in 1965, did not directly translate the portion of the original Japanese text that is instrumental to my paper. For this reason, I decided to provide my own translations from the original. While the parenthetical phrases represent the phonetic reading of difficult Japanese characters in the original text, the ones included in my translation define the preceding, transliterated Japanese vocabulary in italics.

The renewal of the Ise Shrine in *Shikinen Sengu* (periodical deity hall transfer) does not entail destruction of the old deity hall before construction of the new one. Instead, the new hall is built on an alternate site while the old hall still stands. The old hall is only demolished after the *goshintai* (sacred deity body) is transferred to the new hall.[126] As a result, for a short amount of time, the old and new deity halls both stand on the interior of the holy fence. Although there is a difference whether the building is *tsuma-iri* or *hira-iri* (different orientation of roofs), as a whole, the composition of these two deity halls is similar to that of *Daijoukyu* (Imperial Palace).

Daijoukyu is where the most important rituals of *Daijoue* (Imperial ascension feast) takes place. *Daijoukyu* contains two homogenous sanctuaries of *Yuki-den* and *Suki-den,* which are parallel to each other and surrounded by multiple layers of enclosure and accessory buildings, compositionally similar to Ise Shrine deity halls. I previously wrote that the two deity halls of old

[126] The *go-shintai* is an object that is believed to house the deity's spirit. In Ise Shrine, the *go-shintai* takes form of a mirror.

and new only stand in proximity for a short while; the same can be said about *Daijoukyu.* *Daijoukyu* is constructed five days before the ascension ceremony, and deconstructed immediately after the ritual ends. However, *Daijoukyu* is only a temporary structure and therefore constructed of *kuroki* (black wood; log with the bark remaining), while the Ise Shrine deity hall is considered semi-permanent and built of *shiraki* (white wood; plain, unfinished timber).

The similar composition between Ise Shrine deity hall and *Daijoukyu* seems to indicate a deeper significance of *Shikinen Sengu* that goes beyond the explanation that bare wooden posts and thatched roofs decay after two decades. The architectural style would have been technically modified over time if the shrine's materiality was of real concern. Although the exact start date of *Shikinen Sengu* is under debate, most theories agree that the ritual was established under Tenmu and Jito (late seventh-century emperor and empress). Advanced Chinese construction techniques had already been imported and applied profusely to Japanese Buddhist temples by the time of Tenmu and Jito's rule; thus, the same techniques would have been applied to Ise if necessary. In fact, most other Shinto shrines were structurally improved with those construction techniques. I believe that there was no need to make such modifications at Ise because *Shikinen Sengu* had existed since much earlier.

It is generally believed that the *Shikinen Sengu* was established to preserve the historical architecture of Ise, but what if it was the opposite? *Shikinen Sengu* is considered the largest and most important festival in Ise. Between a family's livelihood or its physical house, the former is more valuable without doubt. Following the same logic, the Shinto religion must place more value on the festival than the shrine architecture. To take this argument to the extreme, religious architecture is merely stage equipment for the ritual. Therefore, what was being preserved in

Shikinen Sengu was the deity hall's festival tradition more so than its architectural tradition. The existence of such a large-scale project, namely the periodical rebuilding the deity hall, demonstrates in turn the existence of an old tradition that necessitated this festival. Formalization of the ritual under Tenmu and Jito also underscores the fact that these emperors recognized the significance of *Shikinen Sengu* to the Imperial Court. *Shikinen Sengu*, in other words, was an event of utmost prestige.

What is the meaning behind *Shikinen Sengu*'s extravagant ritual, then? I will attempt to deduce an answer by analyzing the aforementioned example of *Daijoue.*

The festival of *Daijoue* takes place for two days. The new emperor will have dinner in *Yuki-den* on the first day, and breakfast in *Suki-den* on the second day. Both sanctuaries contain bedding called *shitone* (mattress) and *fusuma* (quilt), which are considered to be the equivalent of *Madoko-oufusuma* that appears in *Nihon Shoki* (The Chronicles of Japan).[127] The chronicles state that Ninigi-no-mikoto (deity; grandson of Amaterasu-omikami) descended from the heavens to the earthly realm of Takachiho, wrapped in the *Madoko-oufusuma*. This narrative of great descent is essentially a story that describes how Amaterasu-omikami's heir arrives on earth to become the ruler of Japan, and is a mythological expression of the Imperial ascension. Incidentally, the act of laying on or curling in *shitone*, as in the Imperial ascension ritual, is seen in many other regions throughout the Old World from Africa to Japan. In these contexts, *shitone* symbolizes the placenta, and to be swaddled in *shitone* signifies the emperor's rebirth as a newborn. Thus, life and death are dramatically revealed to be secret components of the emperor's ascension.

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[127] *Nihon Shoki* is the second oldest and most complete text recording the mythological history of Japan. In *Nihon Shoki,* the grandson of the great deity Amaterasu-omikami descends to earth, curled in bedding referred to as *Madoko-oufusuma,* to become the ruler of Japan.

…

Daijoukyu contains two sanctuaries, *Yuki-den* and *Suki-den*. The hidden ritual of having dinner in one building and breakfast in the other would have denoted death in the former and revival in the latter. In the Imperial ascension ceremony, the emperor revives with a completely new character.

Ise Shrine's *Shikinen Sengu* must have the exact same purpose as *Daijoue.* The equivalent of *Niinamesai* (harvest festival in every Shinto shrine) in Ise is the *Kannnamesai* (Ise harvest festival preceding *Niinamesai* by a month).[128] *Kannamesai,* which occurred on September 17th in ancient times and on October 17th nowadays, is considered the most important annual ritual in Ise.[129] The bidecadal deity transfer always occurred on the day of *Kannamesai*, so today, *Kannamesai* does not take place on the year of the deity transfer. To be more exact, *Shikinen Sengu* was most likely the greater *Kannamesai*, just as *Daijousai* was the greater *Niinamesai.*[130] From this reasoning, I speculate that the deity transfer used to happen annually at the time of *Kannamesai.* The existence of *Kanmisosai* (garment-offering festival) corroborates this speculation. *Kanmisosai* currently occurs annually on the fourteenth of May and October, but on the fourteenth of April and September in ancient times. The autumn

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[128] The new emperor's first *Niiname-sai* is called *Daijou-sai.* To explain the etymology, the characters used for *Daijou-sai* (大嘗祭) can be deconstructed into two individual terms: *oonie* (大嘗; sacred Imperial meal) and *matsuri* (祭; festival). The three phrases of *Daijoukyu, Daijoue,* and *Daijousai* used in Kawazoe's text refer to the palace, feast, and festival concerning the Imperial ascension, respectively.

[129] *Kannamesai* is a festival that offers the first autumn crops harvested that year to the great deity *Amaterasu-omikami.* The offering is a demonstration of gratitude for nature's bounty, especially rice cultivation.

[130] The many Japanese phrases in italics can be confusing here. In essence, Kawazoe draws an analogy between the Imperial ascension ceremony at the *Daijoukyu* and the periodical deity hall transfer at Ise Shrine by emphasizing that both sites have established annual festivals that are occasionally replaced by another festival of greater importance, related to the renewal of a dynasty (emperor or deity).

Kanmisosai takes place the day before *Kannamesai*, and involves a ritual that offers garments to the Inner Shrine and *Aramatsurinomiya* (alternative deity hall of Amaterasu-omikami).[131] The garment offering signifies a transition into seasonally-appropriate clothing, which implies the deity's renewal. In the ancient times, the deity transfer from the old hall in the old sanctuary to the new hall in the new sanctuary most likely occurred every year.[132]

The deity is said to have dinner in the old hall the day before the transfer festival of *Shikinen Sengu*, and breakfast in the new hall after the transfer. This is similar to the meal ritual in *Daijousai.* From these facts, I conjecture that the annual deity transfer was lengthened to a bidecadal interval not only because frequent construction of extravagant deity halls was a demanding task, but also because there is greater significance to *Shikinen Sengu* as an infrequent event that parallels *Daijousai.* Just as *Daijousai* implies Imperial dynasty change, which goes beyond the significance of the annual *Niinamesai, Shikinen Sengu* may possibly imply generational change in the lineage of deities.

Original text:

式年遷宮による伊勢神宮の建て替えは、古いものをこわし、そこに新しいものを建てるのではなく、敷地が二つ分あって、古い社殿がいまだ健全なうちに、新しい社殿を建て、古い社殿から新しい社殿に、御神体を移動した後に古い方をこわす。したがってわずかな一時期の間であるけれども、新旧二つの社殿が、ともに玉垣にかこまれて建つこ

[131] Although Kawazoe previously mentions that *Kannamesai* occurs on October 17th, to be more precise, the rituals begin on the 15th and end on the 17th.

[132] Kawazoe does not explain his logic of how the garment offering festival relates to the deity transfer. My hypothesis is that Kawazoe interprets *Kanmisosai* as the deity's preparation for the subsequent *Kannamesai*. In other words, the deity refreshes in new clothes – and possibly a new home –before encountering the great feast.

とになる。この光景は、その建物が妻入りか平入りかの差異はあるが、全体として大嘗宮（だいじょうきゅう）のそれと、かなり類似してる。

天皇の即位の大典である大嘗会（だいじょうえ）が行われる大嘗宮は、ともに垣をめぐらされた悠紀殿（ゆきでん）と主基殿（すきでん）と、ほとんど同一の二つの木造の宮殿が並立され、いくえにも垣をめぐらし、種種の付属建物を多数擁していることは、伊勢神宮と同じである。いま伊勢神宮が二つ並び立つ時期は、わずかな期間と書いたが、そのことでは大嘗宮とても同じである。大嘗宮は祭典の 5 日前から建て始められ、儀式の終了後、直ちに撤去される。ただし、この場合は臨時の建造物であるから黒木すなわち皮つきの木材で造られ、長期建造物である伊勢神宮社殿が白木（または素木）造であるのと異なっている。

ともかくこのように類似したものが見られるということは、式年遷宮という制度が、ただ単に掘っ立ての柱や、茅葺（かやぶき）の屋根で 20 年以上もたないから、という理由の他に、もっと深い理由のあることを考えさせられる。もし、それだけの理由であるならば、建築様式に種々の工夫がされてもよいはずであった。式年遷宮の定められた年代については諸々の説があるが、大体において、天武・持統朝と考えてよいようである。この時代は、中国から高度な建築技術が導入されており、すでに都では仏寺が艶を競ってたてられているのだから、十分にそれができるはずであった。他の多くの神社はたいていそうである。私は、伊勢ではその必要を感じなかったのだと考えたい。それは、昔から式年遷宮の制度が存在していたと思うからである。

一般に、建築様式の古制を守るために式年遷宮が行われるようになったと考えられているが、これは逆ではなかろうか。式年遷宮は伊勢神宮における最大の、かつもっとも

重要な祭典とされている。家族の生活と住宅建築とどちらが大切かといえば、誰だって生活の方が大切だと考えるように、宗教において大切なのは祭典の方にあるのであって、建築にあるのではないと私は思う。極論すれば、宗教建築は儀式のための舞台装置のようなものだといってよいだろう。したがって、社殿が古制を守ったよりも、より以上に祭典の古制が守られていたであろう。社殿の式年造営というまったく大規模な行事は、それを必要とするような重要な祭が古くから伊勢に存在していたことを意味するのであり、天武・持統朝に、この制度が定められたというのは、この祭典が朝廷の重要な儀式の一つに加えられていたということに他ならないであろう。ということは、この祭典は、それほどまでに大切なものだったのである。

では、この盛儀の内容は、どのようなことを意味しているのであろうか。先の大嘗会からこの問題を推論していくことにしたい。

大嘗会の祭典は2日にわたり、天皇は前日の夕食を悠紀殿で、翌日の朝食を主基殿でとられるならわしになっている。そして両殿には、褥・衾（しとね・ふすま）といわれる寝具がしつらえてあるが、これが《日本書紀》に見える真床追衾（まどこおうふすま）であろうとは、昔からいわれている。すなわちニニギノミコト（瓊瓊杵尊）が真床追衾にくるまって高千穂に天降ると記されているが、この天孫降臨の神話とは、日本の王となるために天孫が下ったということであるから、即位式の神話的表現であるわけである。ところで、このように即位の儀礼に、しとねに乗ったり、くるまるという形式は、アフリカから日本に到る旧大陸の広い地域に広まっており、このしとねは胞衣の象徴であり、それにくるまることは王が嬰児として生まれかわったことを意味するものであり、ここに生と死が秘儀として劇的に表現されたものであるといわれる。

…

大嘗宮に、悠紀・主基の二殿が存在し、一方で夕食を、他方で朝食を神と共にとられるという秘儀は、一方で死を、一方で生を意味するものであったろう。即位の式において天皇は、まったく新しい人格をもってよみがえられるのである。

伊勢神宮の式年遷宮も、これとまったく同じ趣旨のものでなければならない。新嘗祭にあたる伊勢の祭典は神嘗祭で、古くは９月１７日、現在は 10 月１７日に行われ、もっとも重要な祭儀とされている。20 年毎の遷宮はその日に行われたから、遷宮祭の行われる年に神嘗祭は行われない。というよりは大嘗祭が大新嘗祭であったように、式年遷宮の大祭は、大神嘗祭であったと考えるべきであろう。したがって古くは毎年の神嘗祭ごとに遷宮が行われたと考える。このことを推測させるものとして神御衣祭（かんみそさい）がある。これは現在、毎年５月と 10 月の 14 日に行われているが、古くは 4 月と９月に行われていた。秋の神御衣祭は神嘗祭の前日にあたっており、内宮、荒祭宮に衣を奉り、衣替えする儀式であり、それによって神を更新するものと考えられる。おそらく、古い時代には古殿地の社殿から新殿地に建てられた新しい社殿へと、年ごとに遷宮が行われたものであったろう。

遷宮祭の前日の夕餉は古殿で行われ、朝餉は新殿で、祭神が摂られることになっており、これも大嘗祭の儀式と一致する。このようなことから、毎年挙行された遷宮際が 20 年毎に行われるようになった理由は、社殿が立派なものとなり、毎年改築するのでは大変であるということもあったろうが、それよりも、年ごとの新嘗祭に対しての大嘗

祭が、天皇の即位式として世代の交替を意味しているように、神々も世代によって交替されるとされたのではなかったろうか。

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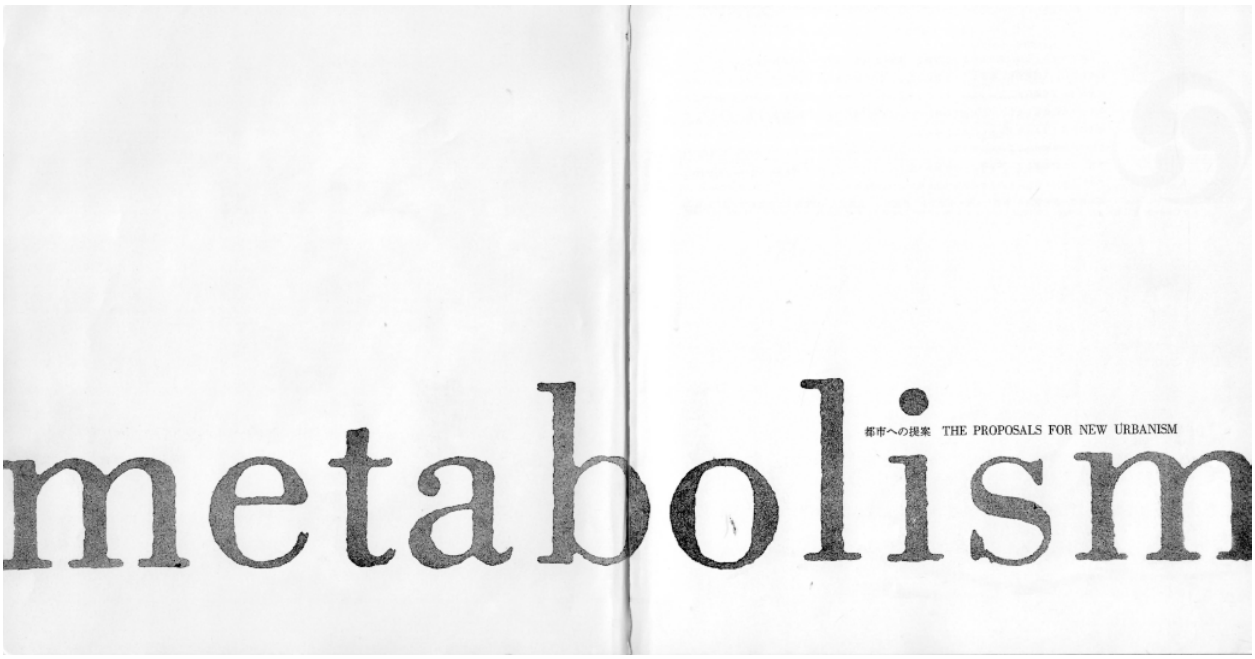

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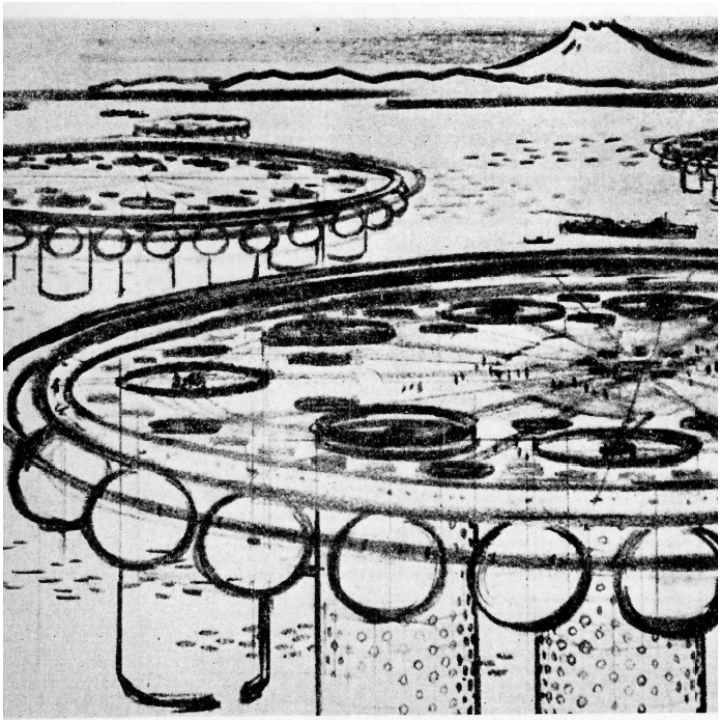

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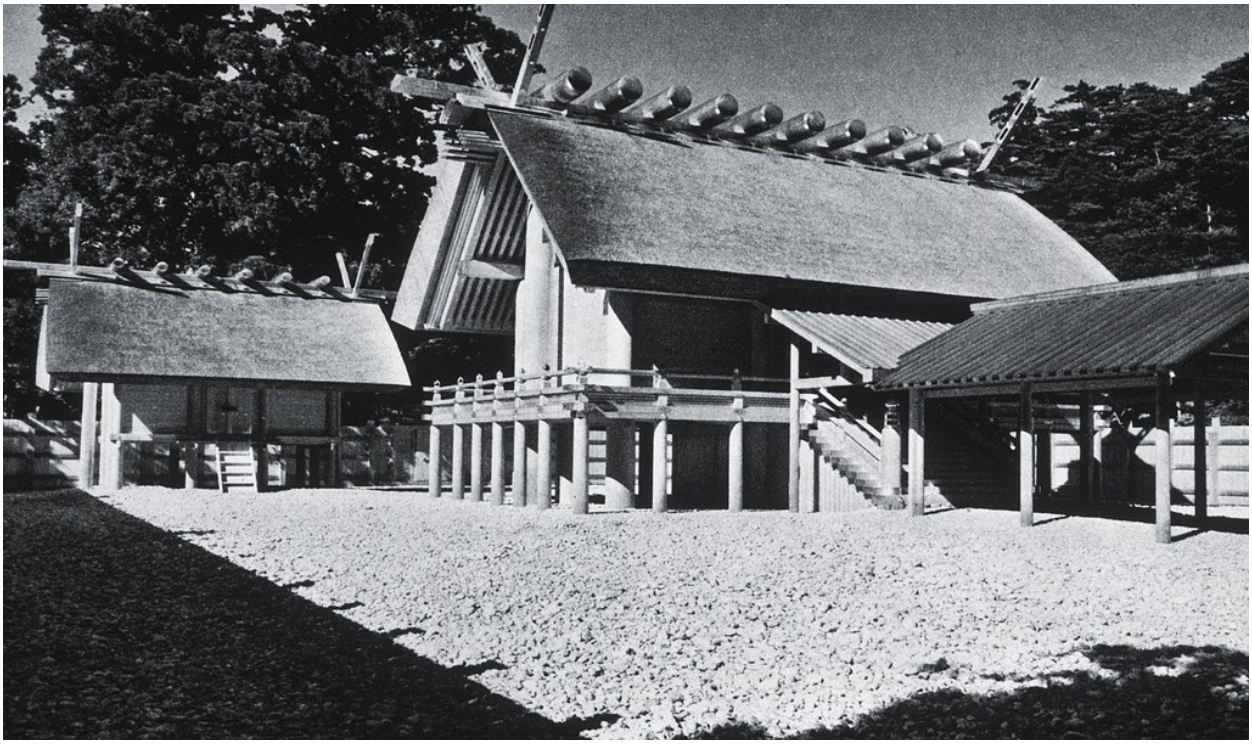

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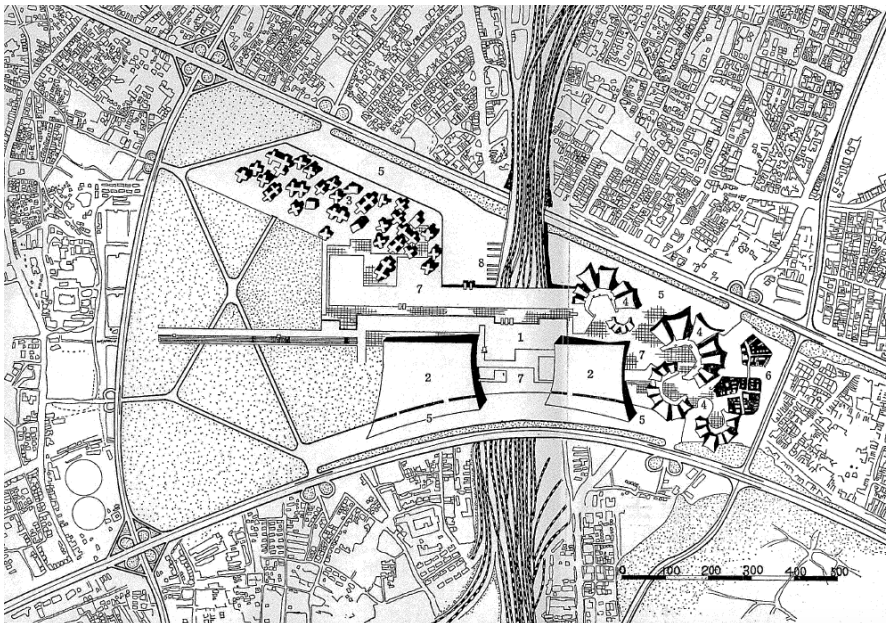

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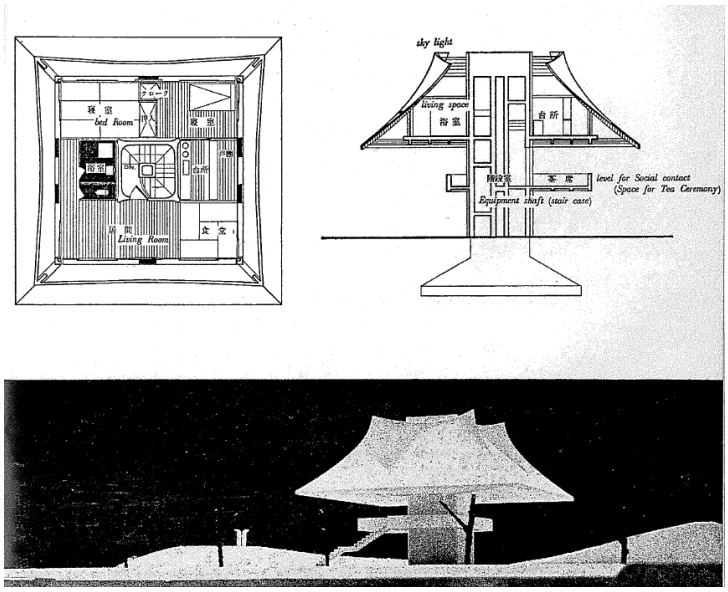

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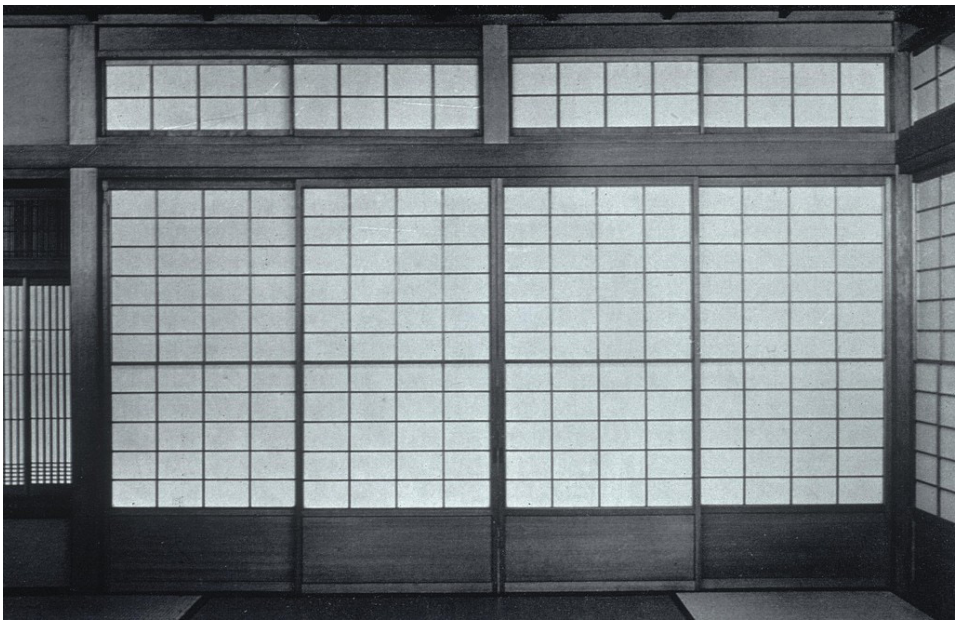

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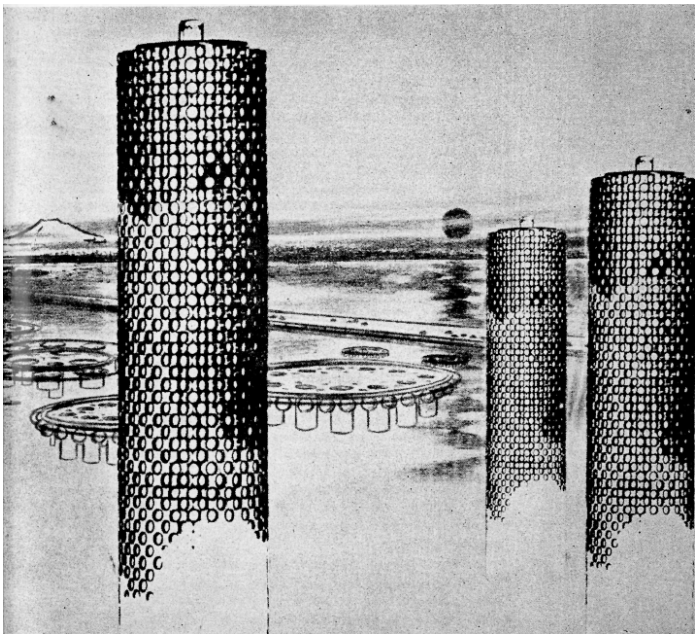
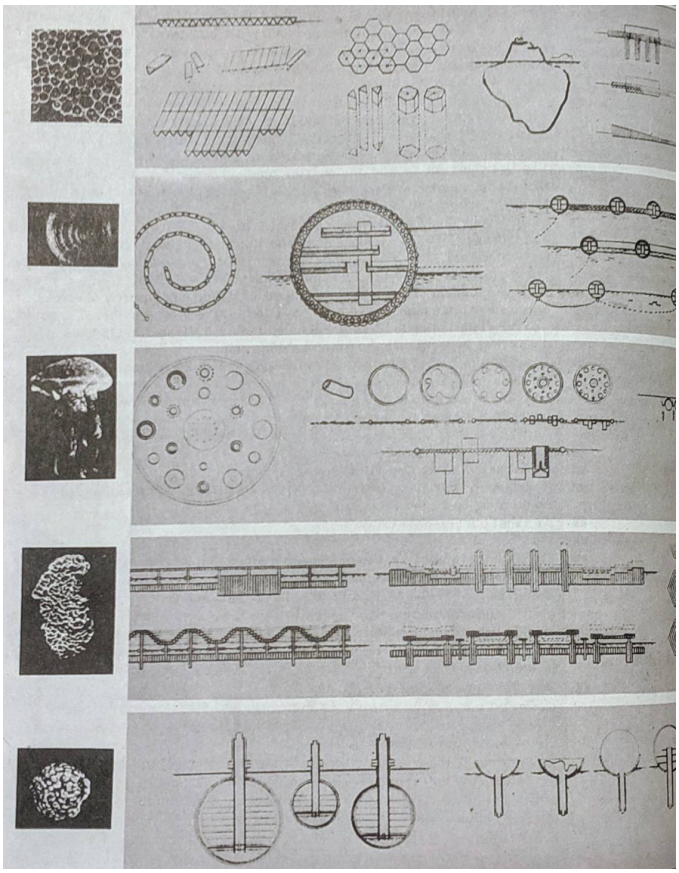


9. Tower Shape Community (1959)

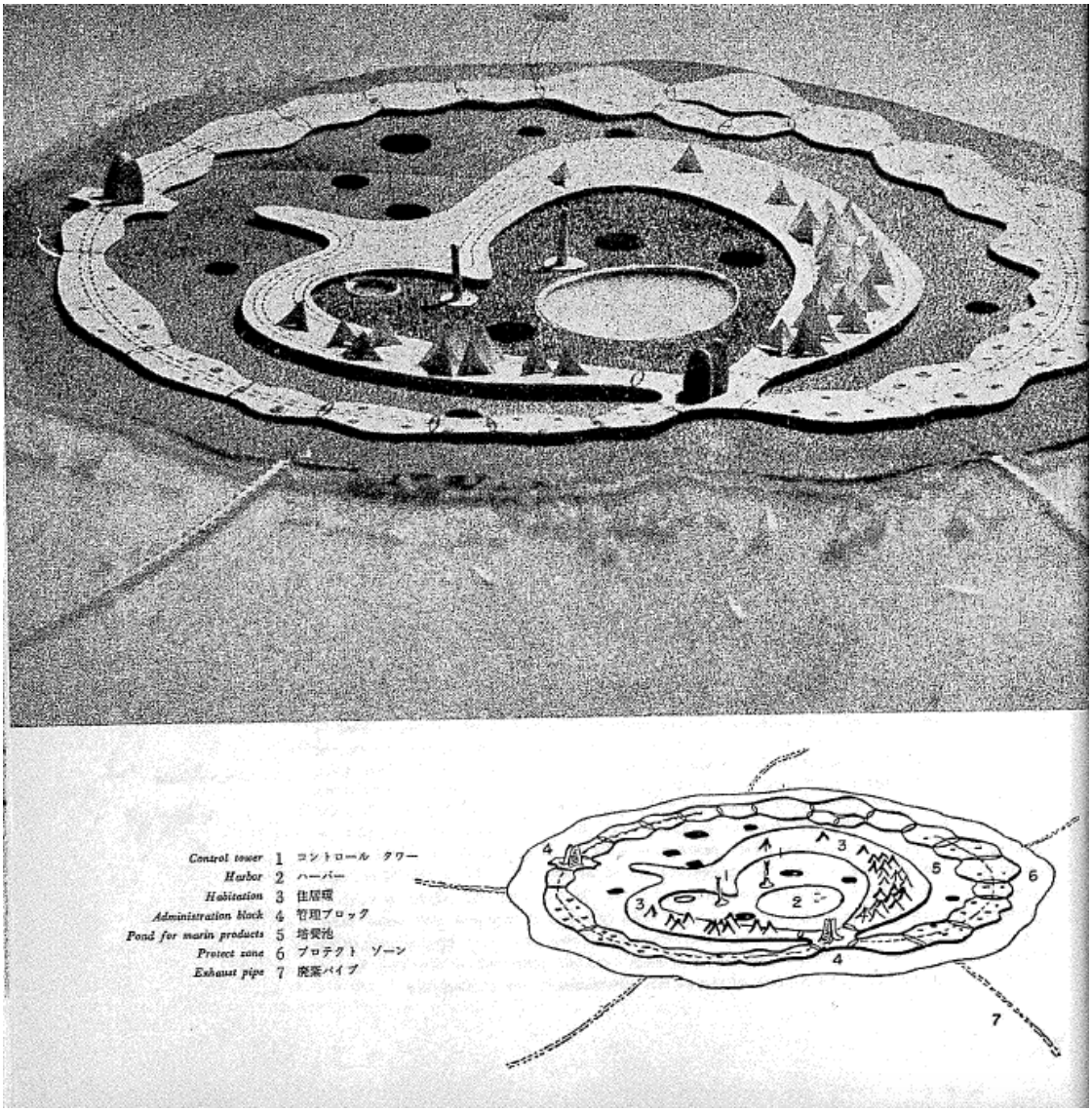
Kiyonori Kikutake, Sketch of Tower Shape Community (1959), 1960, in Kawazoe et. al., *Metabolism 1960: The Proposals for New Urbanism* (Tokyo: Bijutsu Shuppansha, 1960), 11.



10. Kikutake's sketches of floating cities

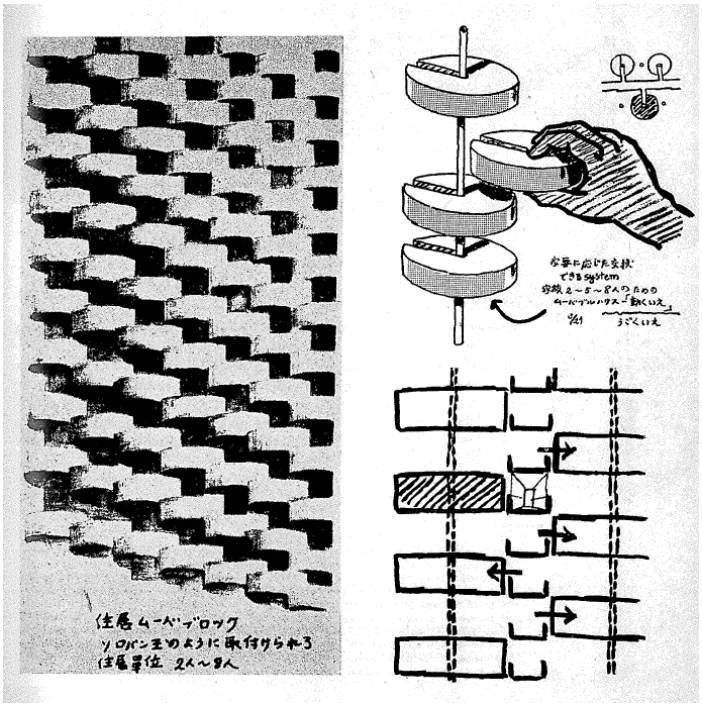
The top three sketches analogizes the floating city with organisms, such as water lilies, algae, and jellyfish. The fourth sketch represents piloti-like hexagonal tubes for protection against waves. The bottom sketch imagines the city being surrounded by a gigantic buoy, shaped together like a bulb.

Kiyonori Kikutake, Sketches for water-based architecture, 1959, in Koolhaas, *Project Japan: Metabolism Talks...* (Köln: Taschen, 2011), 137.



11. Unabara (1960), a Marine City model

Kiyonori Kikutake, Photograph of model and plan of Unabara (1960), 1960, in Kawazoe et. al., *Metabolism 1960: The Proposals for New Urbanism* (Tokyo: Bijutsu Shuppansha, 1960), 24.

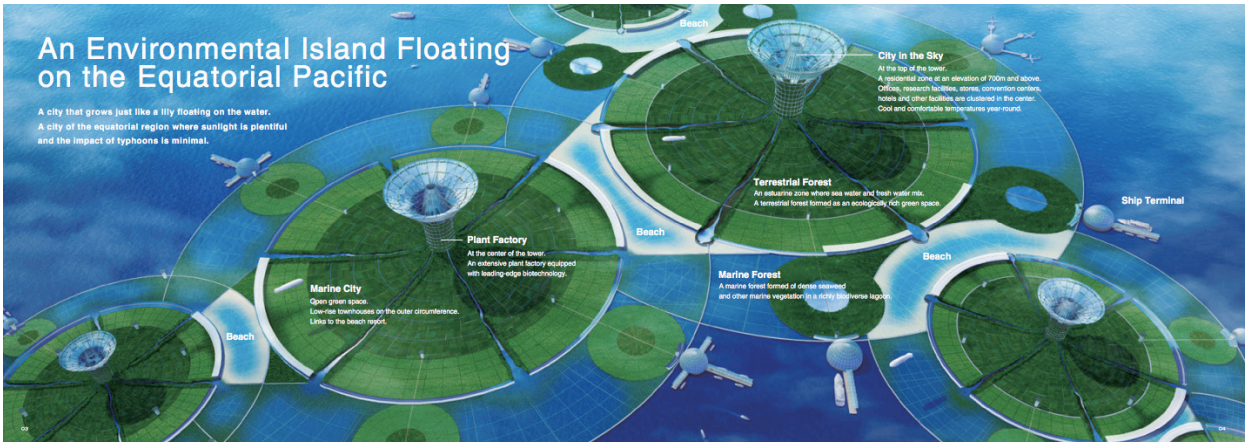


12. *Movable house* and *mova block*

Kiyonori Kikutake, Photocopy image and conceptual sketch of *movable house* and *mova-block*, 1960, in Kawazoe et. al., *Metabolism 1960: The Proposals for New Urbanism* (Tokyo: Bijutsu Shuppansha, 1960), 31.

13. Aquapolis (1975)

Photograph of Aquapolis, in Koolhaas, *Project Japan: Metabolism Talks...* (Köln: Taschen, 2011), 153.



14. GREEN FLOAT (2010-)

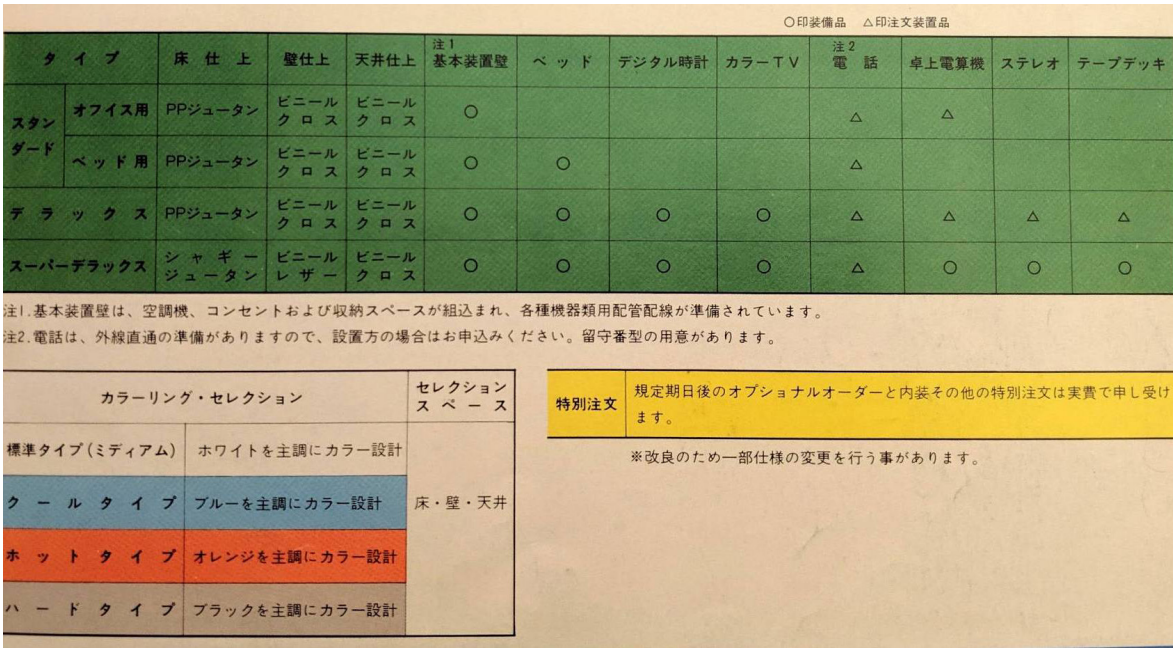
Shimizu Corporation, GREEN FLOAL (2010-), n.d., online project pamphlet, "The Environmental Island, GREEN FLOAT" accessed November 20, 2019, https://www.shimz.co.jp/topics/dream/content03/.

15. Nakagin Capsule Tower (1972)

Honoka Nakamachi, August 17, 2019, photograph.

16. Interior of a capsule attached to Nakagin Capsule Tower

Honoka Nakamachi, August 17, 2019, photograph.



○印装備品　△印注文装置品

タイプ		床仕上	壁仕上	天井仕上	注1 基本装置壁	ベッド	デジタル時計	カラーTV	注2 電話	卓上電算機	ステレオ	テープデッキ
スタンダード	オフイス用	PPジュータン	ビニールクロス	ビニールクロス	○				△	△		
	ベッド用	PPジュータン	ビニールクロス	ビニールクロス	○	○			△			
デラックス		PPジュータン	ビニールクロス	ビニールクロス	○	○	○	○	△	△	△	△
スーパーデラックス		シャギージュータン	ビニールレザー	ビニールクロス	○	○	○	○	△	○	○	○

注1.基本装置壁は、空調機、コンセントおよび収納スペースが組込まれ、各種機器類用配管配線が準備されています。
注2.電話は、外線直通の準備がありますので、設置方の場合はお申込みください。留守番型の用意があります。

カラーリング・セレクション		セレクションスペース
標準タイプ(ミディアム)	ホワイトを主調にカラー設計	床・壁・天井
クールタイプ	ブルーを主調にカラー設計	
ホットタイプ	オレンジを主調にカラー設計	
ハードタイプ	ブラックを主調にカラー設計	

特別注文	規定期日後のオプショナルオーダーと内装その他の特別注文は実費で申し受けます。

※改良のため一部仕様の変更を行う事があります。

○ Provided　△ Provided upon request

Room Type		Floor	Wall	Ceiling	*1 Basic Wall Equipment	Bed	Digital Clock	Color TV	*2 Phone	Tabletop Calculator	Stereo	Cassette Deck
Stan-dard	Office	Polypropylene Carpet	Vinyl	Vinyl	○				△	△		
	Stay	Polypropylene Carpet	Vinyl	Vinyl	○	○			△			
Deluxe		Polypropylene Carpet	Vinyl	Vinyl	○	○	○	○	△	△	△	△
Super deluxe		Shaggy Carpet	Vinyl leather	Vinyl	○	○	○	○	△	○	○	○

*1 Basic wall equipment include air conditioning, power outlets, and storage. Power lines for each equipment are also constructed into the wall.
*2 Direct outward dialing is available. Please request service if necessary. We also provide a voicemail system.

Color selection		Selection areas
Standard type (Medium)	Color scheme based on white	Floor Wall Ceiling
Cool type	Color scheme based on blue	
Hot type	Color scheme based on orange	
Hard type	Color scheme based on black	

Special furnishing order	Any optional furnishing requests and other special orders submitted after the deadline will be processed at the actual expenses incurred.

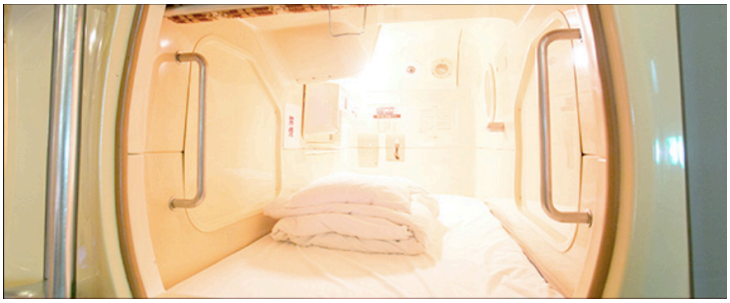
* Please note that designs may be modified for improvement.

17. Facility options in Nakagin Capsule Tower

Nakagin Mansion Corporation, *Business Capsule* (n.d.), 14. Translation by Honoka Nakamachi.

18. Interior of a sleep capsule in Capsule Inn Osaka

Capsule Inn Osaka website accessed December 22, 2019, http://www.ume-dasauna-newjapan.jp/capsule/.



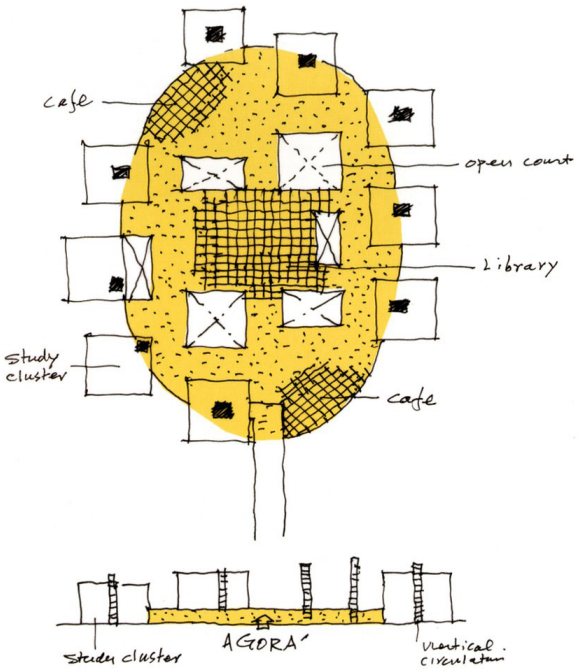
Compositional form Megaform Group form

19. Collective Form (from left: compositional form, megaform, group form)

Fumihiko Maki, Diagram of collective form, in Maki, *Nurturing Dreams: Collected Essays on Architecture and the City* (Cambridge, MA.: The MIT Press, 2008), 46. Label on image by Honoka Nakamachi.

20. Republic Polytechnic (2007)

Fumihiko Maki, Aerial view of Republic Polytechnic (2007), n.d., Artstor Digital Library accessed December 22, 2019, https://library-artstor-org.proxy.library.emory.edu/asset/AWSS35953_35953_29400979.



21. Conceptual sketch of Republic Polytechnic, including plan and section

Fumihiko Maki, Conceptual sketch of Republic Polytechnic (2007), n.d., Artstor Digital Library accessed February 2, 2020, https://library-artstor-org.proxy.library.emory.edu/asset/AWSS35953_35953_29408481.

22. People's Park Complex (1973)

Photograph of People's Park Complex, n.d., in Powell, *Singapore Architecture: A Short History* (Singapore: Periplus, 2004), 89.

23. Exterior of Learning Pod and Agora

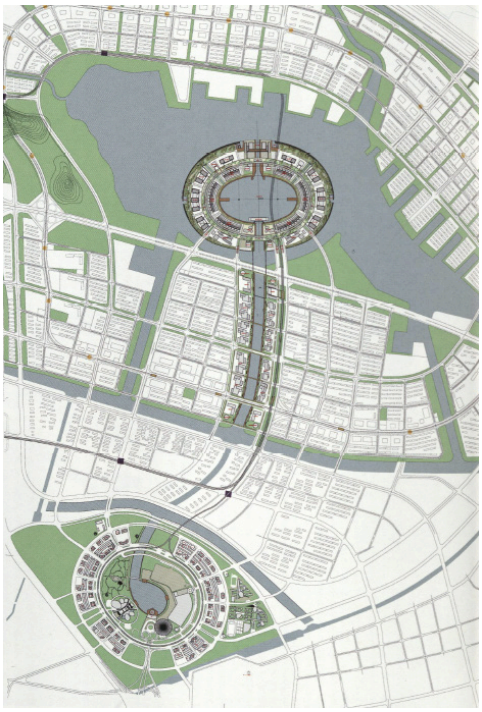
Maki and Associates, n.d., ”Maki and Associates” accessed December 22, 2019, http://www.maki-and-associates.co.jp/details/index_pic.html?p-cd=86.

24. Interior of Republic Polytechnic library

Maki and Associates, n.d., ”Maki and Associates” accessed December 22, 2019, http://www.maki-and-associates.co.jp/details/index_pic.html?pcd=86.

25. Zhengdong New District Plan (2004-)

Yatsuka et. al., *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan* (Tokyo: Mori Art Museum, 2011), 223.



26. Master Plan of Zhengdong New District

Yatsuka et. al., *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan* (Tokyo: Mori Art Museum, 2011), 222.

27. Aerial view of looping roads in Zhengdong New District

Yatsuka et. al., *Metabolism, the City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan* (Tokyo: Mori Art Museum, 2011), 223.

28. Henan Art Centre (2008)

Zai Yi Ke Shu, *Zhengzhou,* September 4, 2011, Wikimedia Commons accessed February 2, 2020, https://en.wikipedia.org/wiki/File:%E6%B2%B3%E5%8D%97%E8%89%BA%E6%9C%AF%E4%B8%AD%E5%BF%83.png