Godzilla vs. Mechagodzilla: Radical Urban Structures Past and Future

This, one may suspect, was one of the most persistent meanings or motivations for megastructure: that in spite of its extensibility and uncertain outline, its sheer concentration of activities would bring an end to the situation where 'the huge, uncontrolled sprawling chaos that we now call City is choking out civilization...' – Reyner Banham[1]

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As humanity moves forward into a potential future of pervasive climate change, architecture will confront expanding sub-tropic conditions and extremes. Coupled with increases in population numbers, radical proposals for urbanism and urban ecology are re-emerging as a serious arena of speculation in architectural discourse.

Architecture, and its collective plurality we call cities, gives expression and stability to society. In recent times of cultural and climatic upheaval, this stability has been perceived as an indifference to, or even cause of, the problems; allowing architects to respond with new, progressive, and often radical urban theories and strategies. "The aim is the correction of human life and of mutual relationships by means of architecture." [2] In many regards, Mid-20th-century megastructures and more current 21st-century hyper-structure proposals are both eerily similar and yet manifestly different; mechanical / biological avatars for modes of architectural/political/cultural control. By comparatively examining some of the explicit and implicit assumptions and strategies embedded in representative proposals from both then and now, a greater understanding of new versus resurfacing ideas emerges.

THEN - OVERVIEW

In response to the global upheaval caused by The Second World War – political, technological, architectural, and environmental – architects, both established and new, began proposing solutions which questioned the fundamental relationships of the natural and built environments to the future of both the individual and society. The results understood people and the city as a collective, with architecture establishing the infrastructural form of the city. "Today, modern architects know that buildings cannot be conceived as isolated units, that they have to be incorporated into vaster urban schemes... Monuments should constitute the most powerful elements

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Figure 1: Structure Examples; a) Tomorrow's City Hall project, Louis Kahn, 1952. b) Toshiba Pavilion, Kisho Kurokawa, 1970. c) Evolo 2011 Finalist, Nicolas Jomain, Boriana Tchonkova.

in these vast schemes."[3] To succinctly describe these new monuments, Reyner Banham invented the term 'megastructures.'[4]

These new, speculative systems of living were unabashedly modernist in their rejection of tradition and celebration of machinery for living, but added contemporary understandings of biology and ecology. They wandered across a wide range of cultural and engineering feasibility, new visions of pronounced scale and condensed urbanity. Ultimately, much of this design work was branded as too heroic for the idiosyncrasies and excesses of twentieth century existence, as architecture and politics regressed in many quarters to the cultural middle.

NOW - OVERVIEW

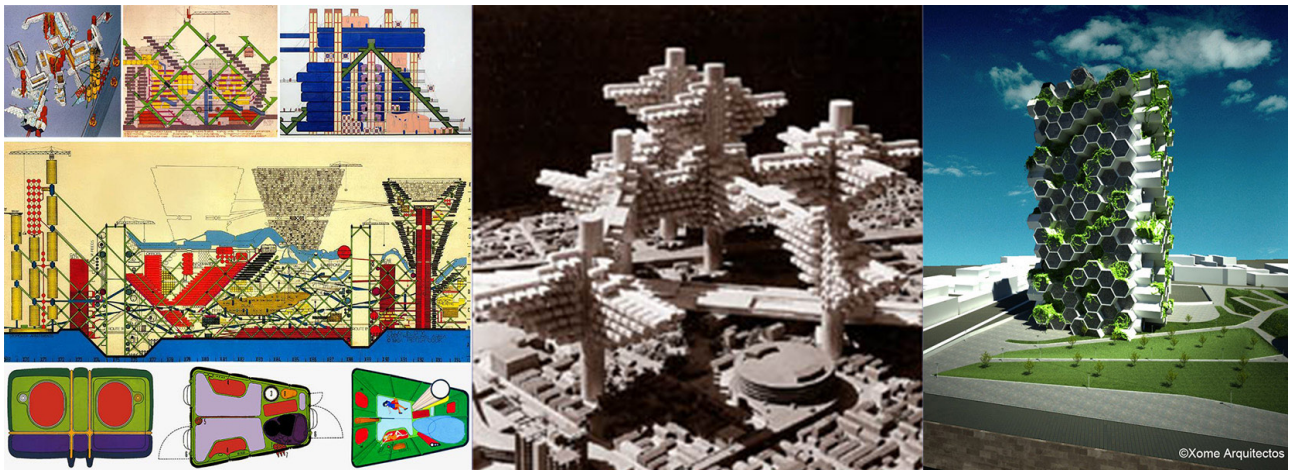
The 21st century has seen the reemergence of ecological concerns, supported by diverse scientific data and analyses. The recognition of the real and potential impact of global climate change has led to the emergence of a progressive audience again willing to listen to fantastic proposals and see visionary projects as more than idle speculation. The rapid pace of design and technological advancement in the last few decades makes projection into the future seem more feasible, more inevitable.[5] Additionally, a more refined and expansive understanding of biological entities and systems has manifest in architecture as a more literal greening of space and infrastructure.

COMPARISON

Points of comparison for this paper are rooted in the architectural constants of client, tectonics, and site, as framed by communalist and environmental outlooks. While the scope of the paper provides only for a generalized overview, selected examples are representative of prevailing trends and/or sentiments within the context of the point discussed.

Structure

An easy starting point for a comparison among these types of urban models is their structural nature. While the boxy Modernism of the early 20th century was rooted in the rectangular steel grid, the later megastructures required a system which could span larger distances effectively and grow organically in multiple directions. The triangulated space-frame fit the need. While still made from repetitive industrial elements, its airy spatial nature allowed it to generate forms of much greater variety than the grid. Kahn's proposal for a future Philadelphia city hall (Figure 1a) is an early example, undulating into the sky while actually utilizing less material. By the time of the Osaka Expo of 1970, triangulated systems were the primary method of



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support, and had evolved into a dizzying array of densities and formal units. One of special note is the Toshiba Pavilion (Figure 1b), exemplifying how the distributive nature of the system allows the structure to touch the ground lightly at only a few points, a feature common in megastructures to minimize environmental impact. Additionally, triangulated structure is more common in nature than rectangular ones, providing a visual emulation of the natural world they were trying to connect society to.

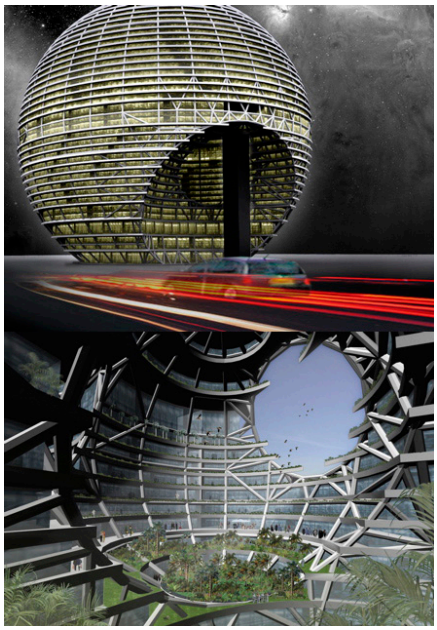
Modern hyperstructures have taken the principles of natural structure and triangulation further. Diagrid systems, using variable triangulation, now commonly structure curvaceous forms and surfaces of all scales. Further, voronoi systems derived from the mathematics of natural point growth are becoming ubiquitous in modern ecological futurism (Figure 1c).

Modules and Identity

Given the focus on nature as a model for form and growth, the use of pods and cellular metaphors were commonplace. This developed two divergent attitudes of modularity related to the individual's freedom of mobility. The first attitude, more common in Western proposals, saw architecture as an industrial reification of infrastructure, as "the place in which the elementary assemblage of single cells assumes physical form."[6] Thus open-network industrial space-frames would provide power, water, etc. to pods wherever the inhabitant chose to connect, allowing for constant change and mobility under control of the individual. La Ville Spatiale by Yona Friedman was a series of structures ranging through and across existing cities, which citizens could occupy wherever they chose. Archigram's Plug-In City (Figure 2a), was explicitly placeless, devoted to "continual circulation, its functions scrambled, its boundaries blurred," using a collective strategy to undercut contemporary tribalism. [7] While the Metabolists of Japan also utilized modular pod elements connected to infrastructure, these elements were seen as two aspects of a unified whole, naturally bound together as leaves and trees. Their proposals, such as Tree City by Arata Isozaki (Figure 2b), tended to be more overt simulations of natural form, especially plants. Pod movement or relocation was constrained by the nature of the collective form.[8]

Modern hyperstructures can be seen as weaving these historic strands together. Recognizing the primacy of western democracy, they allow for, often strive for, a visual variability expressing individual identity, but root

Figure 2: Module Examples; a) Plug-In City, Archigram, 1964. b) Tree City, Arata Isozaki, 1960-62. c) London Farm Tower, Xome Arquitectos, 2011.



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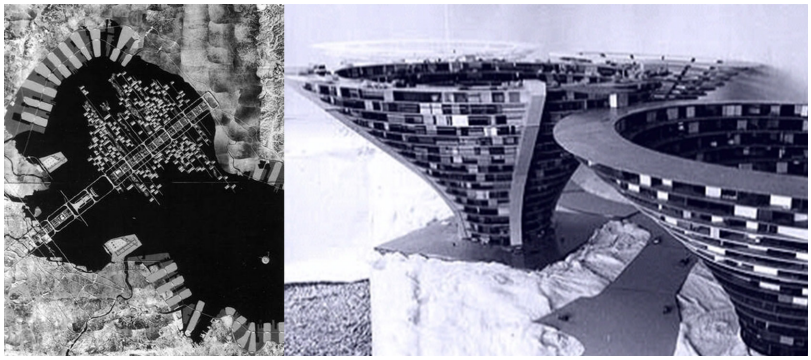

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Figure 3: Site examples; a)Tokyo master plan proposal, Kenzo Tange, 1960. b) Intrapolis, Walter Jonas, 1960.

Figure 4: RAK Convention Center project, OMA / Rem Koolhaas, 2009

Figure 5: Hydrogenase Algae Farm, Vincent Callebaut, 2012

this within a hypernatural organic formalism. Cellular indeterminacy reinforces the naturalist vision, utilizing a process biomimicry instead of an abstracted aesthetic biomimicry (Figure 2c).

Site and Resources

Why propose such radical change for cities? Because it is the traditional city itself that is seen as a parasite on the landscape. In the 20th century, cities grew to cover more land, trying to keep pace with an expanding population. This made the city dependent on imported resources while simultaneously locking away land that could provide those resources, and removing nature from the urban mindset.

In contrast, megastructures reject the capitalist understanding of ownership of both building and land, in favor of an integrated, symbiotic relationship to nature and its resources. By centralizing people and services into a consolidated structure, more efficient transportation, use, and reuse of

those resources becomes possible. The megastructures favored touching the ground lightly if at all, and often utilized sites that were difficult to use for growing or experiencing nature. Desert, mountain, ocean, and space became opportunities for establishing different relationships of urban man to nature, as well as expanding the living niches for the population. This can be expressly seen in Kenzo Tange's proposal for Tokyo bay, where a new city infrastructure is constituted in the middle of the bay (Figure 3a). Walter Jonas's Intrapolis proposal (Figure 3b), rises from the ground like a funnel cloud, preserving and shading the land below it, as well as creating a new, tiered landscape along its stepped inner face.

Modern revolutionary urbanisms maintain and expand upon the logic of consolidation, and actively attempt to expand nature into once barren sites. OMA's RAK Center for the United Arab Emirates (Figure 4), creates a protected oasis in the desert, shielding the plants from the harsh climate. In the face of tropic and sub-tropic expansion, new proposals accept and plan for cities existing in a wetter, warmer future. While earlier megastructures situated themselves as objects in nature, these newer hyperstructures often strive for nature within themselves, where it can be protected along with the human inhabitants. This immediacy of planting also allows them to be utilized as a living component of the urban infrastructure, cleaning air and generating power.

Perhaps no project better illustrates the transformation from mechanical analog to biological reality than the Hydrogenase proposal (Figure 5). Seen as biomechanical airships which process carbon dioxide and grow algae for fuel, they float across the globe, docking when necessary to exchange people and fuel. While still machines, they intake and emulate natural biology in a way that blurs the line of animate and inanimate.[9]

CONCLUSION

These comparisons begin to establish some critical lenses of evaluation for new notions of urban density, based upon their potential architectural, cultural, and environmental prerequisites, utilities, and implications. While "it is the fate of many utopian ideas that they are considered to be too far advanced and that their link to reality – ever present – is eclipsed by the apparently unattainable character of their mental image,"[10] one can hope that the pressing weight of global climate, energy, and population problems will spare them this fate.

A recurrent theme in this paper is an earlier industrial simulation of biology, set in contrast to an emergent biomimetic and biological reality. New hyperstructures – and their explicit environmental infrastructure utilizing plant biology symbiotically instead of as abstract metaphor – not only keep architecture involved in emerging scientific knowledge, but point towards how architecture can work with climate change while slowing or reversing its effects. Godzilla as biological city can replace the mechanical approximation of MechaGodzilla.

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