Denial and Dissolution: Architecture's Battle Against Entropy

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Destined for Demise

"When the baby is born there is no place to put it: it is born, it will in time die, therefore there is no sense in enlarging the world by so many miles and minutes for its accommodation. A temporary scaffolding is set up, an altar of ephemerality – a permanent altar. This altar is the Myth. The object of the Myth is to give happiness: to help the baby pretend that what is ephemeral is permanent. It does not matter if in the course of time he discovers that all is ephemeral: so long as he can go on pretending that it is permanent he is happy."
- Laura Riding, *Anarchism is Not Enough*[1]

There is a beautiful, but brief window of time after birth when we fail to take the world for granted. People, places, and objects swirl in and out of our nascent consciousness as we fumble through a delirious, naïve, and helpless trance. Before the age of two, however, a new spell begins to charm us as we develop an understanding

[1] Laura Riding, "The Myth," in *Anarchism Is Not Enough* (Garden City, N.Y: Doubleday, Doran & Company, Inc., 1928), 9.

that these things we witness can persist beyond our immediate senses. This is *object permanence*,[2] and we carry this foundational insight with us through the rest of our lives, for better or worse.

The concept of object permanence is powerful and persuasive — something so certain that its future does not demand concern. This is a convenient belief to maintain for designers who already attempt to balance so many other considerations, but rejecting the inevitable demise of our architectural creations can invite severe consequences. All matter in our universe is subject to the same phenomena — there is no exception for architecture, but its afterlife is often an afterthought. What kind of architecture might we conjure if practitioners turned away from the more technologically indulgent methods that have perpetuated an illusion of permanence and instead embraced its future dissolution more radically?

An architectural order cannot simply be created. It must also be maintained to prevent it from succumbing to the elements: corroding, flooding, or even becoming infested. This transition from higher to lower order is entropy at work. As defined by the second law of thermodynamics, *entropy* is the dissipation of energy in a closed system, which occurs as a statistical inevitability with the passage of time.[3] The implications of this law are that, at a universal scale, we are sliding toward ever-increasing entropy, however, this trend can be locally disrupted with some effort. This is where architecture (and indeed any creative endeavor which invests energy into ordering things) can turn back the tide of entropy's constant creep.

The second law of thermodynamics tells us that the process of establishing order comes at a cost, however. This is because disorder cannot be truly negated. Rather, it is offset to another portion of space within an open system.[4] This price is plainly seen in new development projects where our human habitats are erected at the expense of the environment. Although we may find a new physical order to be comfortable, convenient, and beautiful, disorder has been externalized in the form of habitat loss and population isolation.[5] One particularly troubling example of this

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[2] J. Gavin Bremner, Alan M. Slater, and Scott P. Johnson, "Perception of Object Persistence: The Origins of Object Permanence in Infancy," *Child Development Perspectives* 9, no. 1 (2015): 7–13, https://doi.org/10.1111/cdep.12098.

[3] Adam Frank, "Life Gives Sight To A Chaotic Universe," *NPR*, September 10, 2013, https://www.npr.org/sections/13.7/2013/09/10/220988227/life-gives-sight-to-a-chaotic-universe.

[4] Robert Shapiro, "A Simpler Origin for Life," *Scientific American*, 2007, https://www.scientificamerican.com/article/a-simpler-origin-for-life.

[5] Fredrick Ojiija et al., "Impacts of Emerging Infrastructure Development on Wildlife Species and Habitats in Tanzania," *Journal of Wildlife and Biodiversity* 8, no. 2 (February 5, 2024): 365–84, https://doi.org/10.5281/zenodo.11106542.

process is the world's largest open pit iron mine located in the Amazon rainforest (fig. 1), where one of the planet's most productive carbon sinks and biologically diverse habitats is being destroyed for the extraction of raw minerals to be transmuted into steel for our architecture and infrastructure. This mine is not alone either. Many other iron mines occur in isolated, ecologically sensitive regions, where extractive activity threatens the health of wildlife.[6] Limestone is another highly demanded ingredient for one of architecture's most ubiquitous materials: concrete. Soil and vegetation disturbance at limestone quarries increases the risk of erosion and runoff, which leads to sedimentation of local water streams.[7] This degrades water quality and results in a disruptive domino effect for organisms lower on the food chain through effects like eutrophication and downstream flooding.[8] Given the complexity and interdependence of living and non-living elements within the natural systems that we encroach on, the full effect of our impacts are often difficult to predict, mitigate, and fully understand.

The price of our desired order becomes even greater when understanding entropy in tandem with the first law of thermodynamics. Without a perfect conservation of energy, the reality is that the amount of chaos generated is actually greater than the order it yields.[9] In the example of the iron mine, this occurs in the form of all of the embodied energy spent in transporting and processing ore from the site, polluting the atmosphere in addition to the baseline habitat destruction.

This chaos created is not perpetually confined to space external to the construction site, however. Regardless of how impervious we design our walls to be, the chaos sewn by our elaborate, disconnected paradigm of construction haunts us from a distance, promising to trickle back with time. Climate change is a clear manifestation of this. The same greenhouse gases that we emit into the atmosphere as a byproduct of creating and maintaining our civilization are also accelerating the intensity and frequency of extreme weather events.[10] Our planet's climate system has been knocked so far off balance that we now risk creating a feedback effect that accelerates the pace of its collapse, potentially making some impacts irreversible.[11] The

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[6] UK Green Building Council Team, "What Are the Environmental Impacts of Construction Materials?" UKGBC, 2024, https://ukgbc.org/news/introduction-to-embodied-ecological-impacts.
[7] UK Green Building Council Team, "What Are the Environmental Impacts of Construction Materials?"
[8] Victoria Spina, "The Impacts of Sedimentation," *VERTEX* (blog), 2022, https://vertexeng.com/insights/the-impacts-of-sedimentation.
[9] Shapiro, "A Simpler Origin for Life."
[10] Hans-Otto Pörtner et al., eds., *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, 2022.
[11] Pörtner et al., *Climate Change 2022*.

Paris Climate Accords identify a maximum increase of 2 degrees Celsius in average global temperature before 2050 if we are to avoid triggering these impacts, which we are grimly off track from achieving.[12] The building sector, specifically, is the largest contributor to this problem, responsible for 37% of global emissions.[13] If the construction of architecture is directly fueling our more extreme weather events, it is implicated in more than its own demise.

Once the forces of entropy come to reclaim our architectural creations, we are forced to confront the challenge of processing the heaps of spent material. There are three basic options in contemporary demolition waste management: directly re-using, recycling, or landfilling. The first of these options is the most resource-efficient, or, in

Figure 1: Satellite Image of Brazil's Carajas Mines, 2018. Photo in the public domain. Courtesy of NASA.

[12] United Nations Environment Programme, "2022 Global Status Report for Buildings and Construction | UNEP - UN Environment Programme," November 9, 2022, https://www.unep.org/resources/publication/2022-global-status-report-buildings-and-construction.
[13] United Nations Environment Programme and Yale Center for Ecosystems + Architecture, "Building Materials and the Climate: Constructing a New Future," 2023, https://wedocs.unep.org/20.500.11822/43293.

terms of entropy, externalizes the least amount of chaos. Despite being the least resource-intensive, re-using is perhaps the most planning-intensive, requiring designers to carefully specify durable materials for systems that are easily disassembled. Building with mechanical fasteners makes this much more achievable compared to sticky and persistent adhesives.[14] The logistics of disassembly are also key, requiring plans for workers to safely access and remove materials. This may be complicated enough to demand a manual for future owners and workers to consult.[15] Reuse also requires buy-in from future stakeholders, agreeing to constrain the composition of their projects to the raw remains of another.

Recycling offers a higher degree of flexibility in material adoption, but it comes with a higher processing cost, and a portion of material that is theoretically recyclable is often unrecoverable, leaving it to be disposed of in landfills.[16] In the US, about 24% of demolition materials, by weight, are simply landfilled.[17] By far the largest material captured for reuse by weight is concrete, but there are limitations to concrete's recycling potential. The only reliable way to recycle concrete is to pulverize it into aggregate for another concrete mix, but this is only sparing a marginal amount of global warming potential because the highest driver of carbon emissions in concrete production is not aggregate, but the cement used to help bind the aggregate together.[18] Additionally, mixes using recycled concrete aggregate are often only adequate for low-strength applications, demanding a larger amount of cement to compensate.[19]

The reality is, without 100% recycling or reuse efficiencies, most of our modern construction materials are destined for landfills sooner or later. This isn't to say that we shouldn't recycle. In the face of climate collapse and all its implications, we shouldn't spare any solutions, however insufficient, but the building industry's outsized impact presents a profound potential for change. Architects and engineers must investigate

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[14] American Institute of Architects, "Design for Adaptability, Deconstruction, & Reuse | The American Institute of Architects," 2024, https://www.aia.org/resource-center/design-adaptability-deconstruction-reuse.

[15] American Institute of Architects, "Design for Adaptability, Deconstruction, & Reuse."

[16] Milad Ashtiani, Jordan Palmeri, and Kathrina Simonen, "End-of-Life Modeling and Data in North American Whole Building Life Cycle Assessment Tools," *Carbon Leadership Forum* (blog), March 30, 2024, https://carbonleadershipforum.org/eol-modeling-data-wblca.

[17] Environmental Protection Authority, "Advancing Sustainable Materials Management: 2018 Fact Sheet," December 2020.

[18] Ryan Mills, "Policy Opportunities to Increase Material Circularity in the Buildings Industry," RMI, August 4, 2022, https://rmi.org/opportunities-to-increase-material-circularity-in-the-buildings-industry.

[19] Mills, "Policy Opportunities."

methods for conducting the profession more responsibly, because our attempts to externalize disorder in a game of capitalist hot potato are coming to a head, as we all fundamentally share the greater environmental and social contexts which our projects impact.

We don't have to look far for examples of civilization without the architectural end-of-life dilemmas that we currently face. In the Great Basin of western Nevada and eastern Oregon, Native peoples have lived within an arid landscape of mountains and deserts through austere means and sacred practices for over 11,000 years.[20] The Northern Paiute tribe were particularly successful survivors in this region until they were encountered by western pioneers and silver miners whose encroachment, hostility, and occupation made their traditional lifestyles increasingly difficult to maintain. In 1859, the US government relegated the Northern Paiute people to the Pyramid Lake Reservation, making their nomadic way of life effectively impossible.[21] Before this, their architecture was *deliberately* ephemeral to coincide with their occupation patterns as nomadic people. The Northern Paiute would weave structures from what little substantial plant material could be gathered: grass, tules, cattails, sagebrush, willows and pine boughs.[22] These shelters served primarily as an easy means to protect from the elements – they were never exactly regarded as a "home."[23] The Northern Paiute did produce longer lasting settlements woven mostly of willow branches, bent and lashed against each other into dome shapes (fig. 2), and clad with cattail or tule leaves to break the wind and shed moisture. These structures might last more than five years before having to be rebuilt, but this short life-cycle does not share our familiar concerns for disposal. Thanks to the organic (i.e. low entropy) material palette, these structures could simply break down and return their nutrients to the ecosystem where they fuel future growth. In the event that a death occurs in one of these dwellings, however, the Paiute would perform a special ritual. Instead of disassembling or abandoning the

[20] William Sigler, Steven Vigg, and Mimi Bres, "Life History of the Cui-Ui, *Chasmistes Cujus* Cope, in Pyramid Lake, Nevada: A Review," *Great Basin Naturalist* 45, no. 4 (October 31, 1985), https://scholarsarchive.byu.edu/gbn/vol45/iss4/1.
[21] Kelly Aliano, "Life Story: Sarah Winnemucca," *Women & the American Story* (blog), https://wams.nyhistory.org/expansions-and-inequalities/westward-expansion/sarah-winnemucca/.
[22] Margaret M. Wheat, "Building Houses," in *Survival Arts of the Primitive Paiutes* (Reno: University of Nevada Press, 1967), 103.
[23] Wheat, ""Building Houses," 103.

Figure 3: Jimmy George (left) and Daisy Aster (right) demonstrating traditional Northern Paiute shelter assembly with willow branches, 1967. Courtesy of University of Nevada Press.

Figure 2: *Aerial View Burning Man 2014 During Embrace*, 2014. Photo by Duncan Rawlinson.

structure to allow it to passively degrade, such structures would be burned to help transition a lingering soul to the afterlife and purify the space of its residual presence.[24]

Contemporary Native peoples may not practice architecture like their ancestors, but the Pyramid Lake Paiute tribe is working to continue the legacy of their culture in Nevada. Since 1990, an ancient lake bed within the ancestral territory of the Northern Paiute known as "the playa" has served as the site for the ephemeral metropolis of Black Rock City to ritualistically emerge through the work of upwards of 80,000 Burning Man festival attendees (fig. 3).[25] Thousands of years of seasonal flooding and alkali sediment deposit have transformed this area into one of the largest and flattest places on earth,[26] providing what Koolhaas and Obrist call a "tabula rasa"—or blank slate—for Burning Man participants to spawn all sorts of experimental installations and experiences.[27] Despite its empty appearance, the playa is a site of historic Paiute presence and reverence, and is still considered sacred by them today. To respect this history, the Burning Man organization grants hundreds of free tickets to members of the Pyramid Lake Paiute tribe, and its spiritual leader Dean Barlese is invited each year to personally bless the Temple structure for the festival.[28]

The Temple is redesigned and rebuilt each year by a team of volunteers in the center of the city as its crown jewel, beckoning attendees to reflect, mourn, or simply take refuge from the desert sun. It is a secular monument to whatever meaning people are inspired to instill it with, however it is not intended to be permanent, as most monuments are. As in the death rituals with the shelters of Dean's ancestors, the Temple leaves this world in a controlled blaze, taking with it all the notes and offerings that people have left in its confines throughout the week. This brings a somber catharsis to an otherwise ecstatic and whimsical festival, laying the emotional groundwork for people's impending return to the "default" world, and symbolizing the beginning of another cycle (fig. 4).

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[24] Jerry Schaefer, "'Now Dead I Begin to Sing': A Protohistoric Clothes-Burning Ceremonial Feature in the Colorado Desert," *Journal of California and Great Basin Anthropology* 22, no. 2 (July 1, 2000), https://escholarship.org/uc/item/55k3s7j6.

[25] "Burning Man Timeline - 2019," https://burningman.org/timeline.

[26] Kate Galbraith, "Burning Man Rain: All About the Ancient Lake Bed Where the Festival Takes Place," *San Francisco Chronicle*, September 3, 2023, https://www.sfchronicle.com/climate/article/burning-man-playa-rain-18345507.php.

[27] Rem Koolhaas and Hans Ulrich Obrist eds., *Project Japan: Metabolism Talks* (Köln: TASCHEN GmbH, 2011), 56.

[28] Lucy Kang and David Boyer, "Burning Man Special: Black Rock City Is Built on Northern Paiute Land," *KPFA* (blog), September 5, 2020, https://kpfa.org/blog/burning-man-is-built-on-paiute-land.

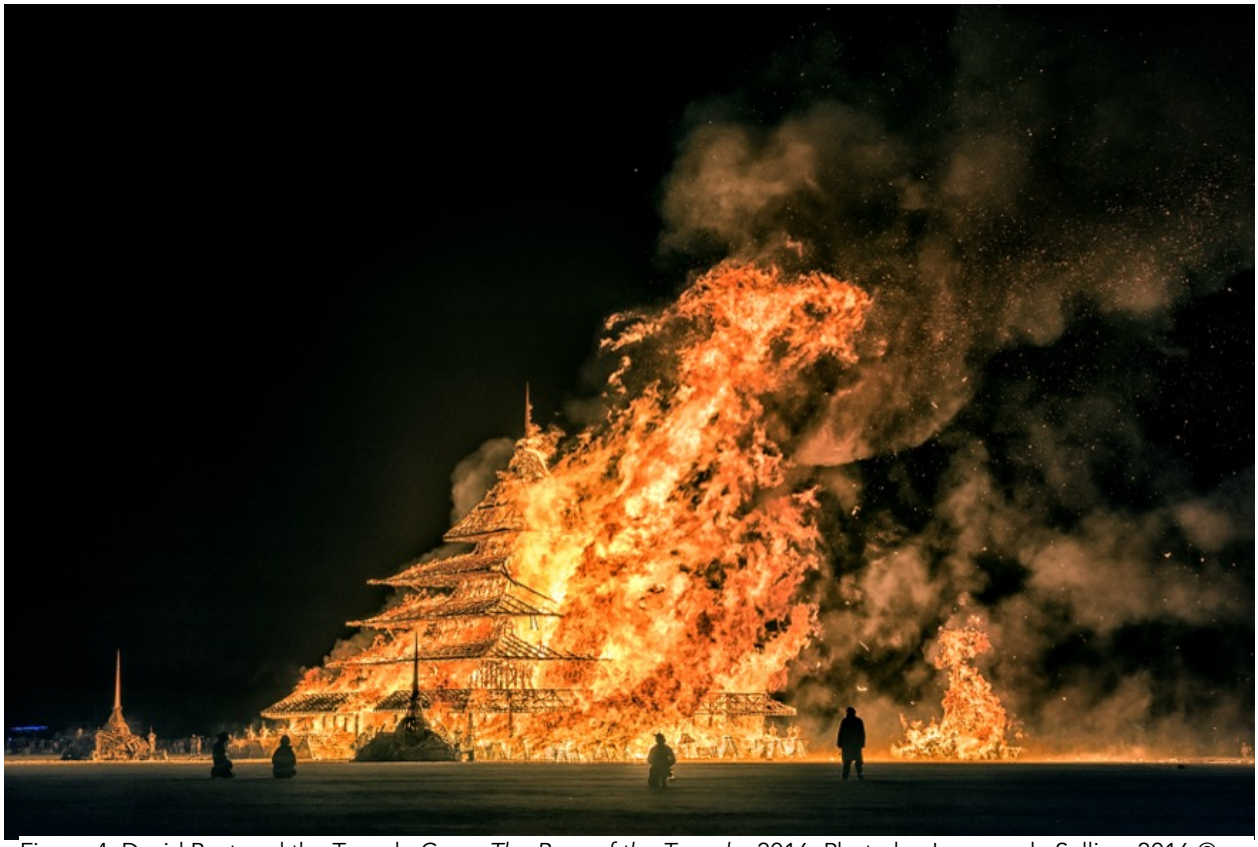

Figure 4: David Best and the Temple Crew, *The Burn of the Temple,* 2016. Photo by Jacques de Selliers 2016 ©.

Burning Man is only made possible through permits granted by the Bureau of Land Management (BLM), an agency responsible for ensuring the health of 245 million acres of public land across the United States. One of the ways that the Burning Man organization continues to garner the confidence of the BLM is by enforcing a principle for attendees called "Leave No Trace." This principle mandates that participants remove everything they brought to the playa, and refrain from engaging in acts that would disrupt the site's physical integrity, such as dumping greywater. This drives a lot of creativity in how people survive on the playa, from water evaporation basins to deployable architecture. Tents are a classic example of deployable architecture, designed to be quickly constructed and packed away with minimal impact to the earth. Tents are ubiquitous in Black Rock City, constituting the vast majority of structures, however, one organized camp of attendees, who go by the name "Hotel California," opt for a modular timber approach instead. Their multi-level flagship installation utilizes a clever structural node assembled out of six identical CNC-ed pieces of marine grade

Figure 5: Hiroshima in the aftermath of the atomic bomb, 1945. Photo in the public domain. Courtesy of the US Air Force.

baltic birch plywood.[29] This node allows for the structure to take on a bespoke, modular 3D-gridded form that nimbly adjusts to desired programming requirements and site constraints, such as neighbors or public rights-of-way. Black Rock City retains the same radial planning scheme each year, but internal adjustments to its grid are always made. This is just one of many variables ensuring no two gatherings are alike. Whatever the exact context will be Hotel California's scaffold structure can adapt, and because it is assembled without screws or adhesives, the structure can be easily deconstructed and packed flat into shipping containers for removal, where it will await redeployment once again. Soon enough (and not without some challenges) the surreal partyscape of Black Rock City goes dormant for another year, and Dean Barlese makes a final blessing of the land to clear it of any negative energy left behind.[30]

[29] Hotel California, "GitHub - Hotelcaliforniabm/Duxel: A Nifty Way to Build Modular Multi Story Structures," posted 2019, https://github.com/hotelcaliforniabm/duxel?tab=readme-ov-file.
[30] Kang and Boyer, "Burning Man Special."

The concept of birthing an adaptive metropolis out from a tabula rasa landscape is not novel. While Burning Man draws on the idea of a tabula rasa to facilitate a process of creative renewal in a landscape whose apparent emptiness is the product of environmental factors, another example emerges from landscapes subject to deliberate deletion. Appearing as a sudden, silent white flash,[31] entropy expelled by atomic bombs swept through the cities of Hiroshima and Nagasaki in 1945 at unfathomable speeds, reducing vast swathes of dynamic urban territory to radioactive debris within seconds, and taking upwards of 210,000 human lives.[32] In the wake of the unprecedented attacks, these decimated landscapes became a sort of tabula rasa canvas for the reimagining and rebuilding of Japan, guided by a new architectural movement that rose from the ashes (fig. 5).

Urban Reincarnation

"There are atom bombs, and architecture will perish….Architecture can no longer be like temples, the pyramids, or gothic cathedrals. Architecture is finished, it has been destroyed, and that's why we are proposing Metabolism."
- Hiroshi Hara, recalling a quote by Noboru Kawazoe, *Project Japan: Metabolism Talks*[33]

"Metabolism" was an avant-garde utopian modernist architecture and urban planning movement in post-war Japan that attempted to integrate the humbling lessons of impermanence bestowed by the bombs. The name was proposed by one of its key members, Noboru Kawazoe, after translating *metabolism* from the word *shinchintaisha* (新陳代謝) which he read about in a Japanese copy of Friedrich Engels' *Dialectics of Nature*. In it, Engels writes about the scientific discoveries of the time: "all rigidity was dissolved, all fixity dissipated, all particularity that had been regarded as eternal became transient, the whole of nature shown as moving in eternal flux and cyclical course."[34]

Contemporary science continues to rebuke object permanence and elucidate entropy's role as it probes at one of the most foundational mysteries of our ontology:

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[31] John Hersey, "A Noiseless Flash," in *Hiroshima* (New York: Knopf Doubleday Publishing Group, 1946), 5.
[32] Thomas Gaulkin, "Counting the Dead at Hiroshima and Nagasaki," *Bulletin of the Atomic Scientists* (blog), August 4, 2020, https://thebulletin.org/2020/08/counting-the-dead-at-hiroshima-and-nagasaki.
[33] Koolhaas and Obrist, *Project Japan,* 239.
[34] Friedrich Engels, "Introduction," in *Dialectics of Nature* (International Publishers, 1934), 30.

the origin of life itself. Two of the most distinguished traits of life are the abilities to replicate and metabolize, but there is debate among scientists about which of these processes came first. The replication-first theory — based on RNA — was prominent for some time, but many chemists have flocked to the metabolism-first theory due to complications with replication and the relative simplicity of metabolism.[35] The metabolism-first theory requires a precise stew of biochemical reactions to kickstart a metabolic process, but this low-entropy precision requires a distinct zone for filtration and containment. As outlined in the beginning of the essay, entropy can be spatially offset, however something is needed to keep it at bay. This is where membranes emerge as a solution, a barrier to help maintain physical separation between different zones of low and high entropy, or life and non-life. Today, we see sophisticated double-layered cell membranes made of lipids, but it is fairly conceivable how some inert feature — like small pores of a particular geologic formation — could have initially served the same purpose in the recipe of life.[36] Discoveries of geothermal vents within

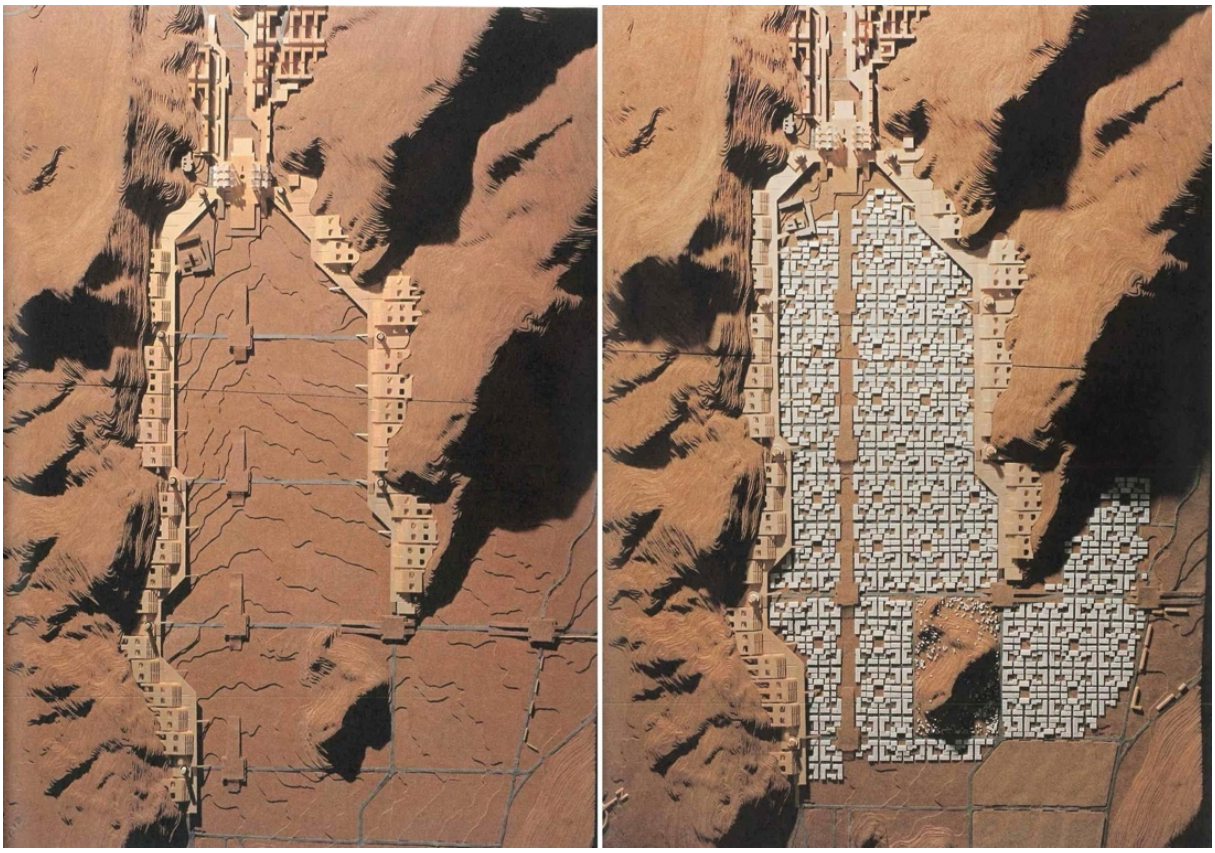

Figure 6: *Master Plan for Pilgrim Accommodation in Muna*, Saudi Arabia, 1974. Before and after tent deployment. Courtesy of Tange Associates.

[35] Koolhaas and Obrist, *Project Japan*, 239.
[36] Shapiro, "A Simpler Origin for Life."

the ocean have led further credibility to this theory, as they contain the exact combination of biochemical and geologic conditions that scientists had previously speculated must exist to produce life in a metabolism-first scenario.[37]

As the name suggests, the Metabolist movement of post-war Japan took overt inspiration from this elemental inception of biology, imbuing architecture with the concepts of growth, adaptation, decay, and renewal to birth a new "living" architecture. This was done in part through their promotion of the module — a cellular unit that could be aggregated to compose larger, organic forms that adapt to their context over time. The Metabolists referred to this method of recursive, adaptive design as "group form."[38] Thanks in part to the flexibility of the module, the Metabolists produced a diversity of projects in both form and scale.

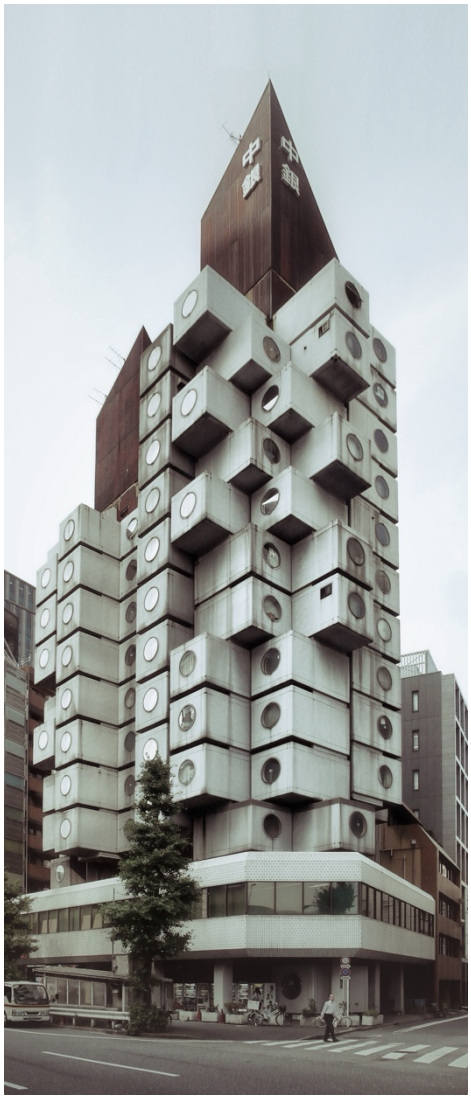

Figure 7: Kisho Kurokawa, *Capsule Tower*, Tokyo, Japan, 1972. Photo by Carlo Fumarola.

Toward the larger end of the spectrum were masterplans, like Kenzo Tange and Kenji Ekuan's 1974 design for a pilgrim city near Mecca (fig. 6). This project was commissioned by King Faisal of Saudi Arabia to accommodate two million pilgrims during the yearly four-day celebration of Hajj. Due to the sacredness of the Mina valley in which it was to be located, the tent city was designed to bloom into form only during the Hajj, after which it would retract into more permanent, consolidated structures at the foot of the perimeter hills, preserving the integrity of the sacred grounds as with the playa after Burning Man. Despite the desire to implement the project, King Faisal was assassinated the following year, and the project was shelved.[39] Many Metabolist

[37] Sean Carroll, "All of the Universe's Disorder, Explained in 6 Minutes," *Big Think* (blog), 2024, https://bigthink.com/the-well/sean-carroll-on-entropy-complexity-origins-of-life.
[38] Koolhaas and Obrist, *Project Japan*, 302.
[39] Koolhaas and Obrist, *Project Japan*, 612.

projects remain unbuilt, but Kenzo Tange lamented the cancellation of this one more than any other.[40]

Perhaps the most influential built project by the Metabolists was Kisho Kurokawa's 1972 *Capsule Tower* in Tokyo (fig. 7). The building is anchored by two structural/utility/circulation cores, which 144 nearly identical 8'x13' prefabricated modules are plugged into and secured with only four bolts each. Kurokawa asserts in his *Capsule Declaration*: "the capsule stands for the emancipation of a building in relation to the ground, and heralds the era of moving architecture."[41] Indeed, the capsules were designed to be moved, or rather removed and replaced with new, updated capsules at the end of their life cycle, similar to the process of cellular regeneration in organisms. Kurakawa insists that the project was supposed to live for 200 years if they were replaced about every 25.[42] This never happened after the process was determined to be prohibitively expensive, however, and entropy was allowed to reclaim its space. The capsules' steel shells began to corrode, requiring the structure to be wrapped in safety netting to prevent debris from collapsing to the street, and many capsules were abandoned.[43]

To the dismay of many architects, *Capsule Tower* was finally dismantled in late 2022, each of its modules carefully plucked from their stem like an over-ripe fruit. Most were not in salvageable condition, but 23 modules are being refurbished and given a new life for dispersion to architectural exhibits around the world, pollinating the planet with the ideas of Metabolism.[44] Although not the exact cycle intended by Kurokawa, *Capsule Tower* is nonetheless being critically metabolized by future generations of architects.

Accepting a Fleeting Architecture

"Incubated cities are destined to self-destruct
Ruins are the style of our future cities
Future cities are themselves ruins
Our contemporary cities, for this reason,
are destined to live only a fleeting moment
Give up their energy and return to inert material

[40] Koolhaas and Obrist, *Project Japan*, 502.
[41] Koolhaas and Obrist, *Project Japan*, 338.
[42] Tim Hornyak, "In Tokyo, Rescuing the Residential Spaceship That Fell to Earth," *The New York Times*, January 15, 2024, https://www.nytimes.com/2024/01/15/realestate/tokyo-japan-nakagin-tower.html.
[43] Hornyak, "In Tokyo."
[44] Hornyak, "In Tokyo."

All of our proposals and efforts will be buried
And once again the incubation mechanism is reconstituted
That will be the future."
- Arata Isozaki, "Incubation Process," *Project Japan: Metabolism Talks*[45]

It is easy to admire the material and technological feats that have delivered us with the potential for such ordered, resilient, and functional habitats. However, our increased technical mastery has perhaps also enabled a dissolute, cavalier, and myopic prescription of architecture without broader concerns for the disorder that it externalizes to time and space. It has become convenient to forget that our creation's demise has not been indefinitely delayed, but with the concept of object permanence being undermined by entropy, architects must ask themselves: how can we responsibly embrace ephemerality and prevent our practice from grossly generating further disorder to the planet?

The answer lies in the fact that Earth is not a closed system. Our planet receives a constant stream of external energy in the form of low entropy radiation from the sun.[46] This energy becomes progressively converted into higher-entropy forms as it disperses through the planet's systems, creating temperature gradients, promoting phase changes, and fueling metabolism up the food chain. This high-entropy energy is ultimately radiated from the planet back out into space, leaving behind an observable increase in organization while the overall energy balance remains roughly the same.[47] The building industry must tap more directly into this flow of low-entropy energy bestowed by our star, break its dependence on depleting resources, and relinquish stubborn standards that use long-term materials in pursuit of short-term incentives in a dissolute, technology-fueled frenzy. Rather, we can embrace the ephemeral nature of lower entropy materials and, not just allow, but plan for, our designs to be metabolized into future urban forms. This new (or perhaps old) form of order may not necessarily present as austere as the Paiutes, as flashy as the Burners, or as formal as the Metabolists, but each of these examples embrace ephemerality in a way that is more aligned with the entropy guiding our planet's evolution into more complex yet stable states. Our attachment to architecture has impeded this trajectory, and we must now let it go.

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[45] Koolhaas and Obrist, *Project Japan*, 38.

[46] Mark Buchanan, "The Thermodynamics of Earth," *Nature Physics* 13, no. 2 (February 2017): 106–106, https://doi.org/10.1038/nphys4031.

[47] Buchanan, "The Thermodynamics of Earth." This is decreasingly true as greenhouse gases accumulate and create a net positive balance of energy harbored on Earth.

This practice of non-attachment serves as the very basis for the Buddhist theory of liberation. In his quest for enlightenment, the last Buddha — Siddattha Gotama — was said to have penetrated to a level of awareness so subtle that he could observe the fundamental structure of the physical universe — a composition of extremely tiny particles arising and passing, in and out of existence, trillions of times every second.[48] This phenomenon of universal ephemerality is referred to in Buddhism as "Anicca." If everything is ultimately fleeting in an endless scheme of cosmic recursion, how can we reasonably form attachments to things without inviting suffering once they are gone? Architecture's fate may be sealed as an ephemeral blip, but humanity's destiny still hangs in the balance. If for nothing but our own sake, can we find the will to claw ourselves out from the pit of our current construction paradigm? Can we atone for the gross chaos sewn in its wake? Can we stop suffering?

[48] S. N. Goenka and William Hart, "Day Three Discourse," in *Discourse Summaries*, 1st ed. (Onalaska: Pariyatti Publishing, 2000), 28–29.

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