

# EDIBLE, or the Architecture of Metabolism

πλανητικά συστήματα τροφής  
συμμαχίες ανθρώπινων και μη- ανθρώπινων ειδών  
Υποπροϊόντα και περιττώματα  
ανακύκλωση  
μεταβολισμός δομημένου περιβάλλοντος  
πεπτικά συστήματα  
**planetary food systems**  
**interspecies alliances**  
**excremental processes**  
**recycling**  
**metabolism**  
**digestive systems**

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Πώς μπορούμε να ορίσουμε την αρχιτεκτονική του μεταβολισμού; Αυτή η ομιλία ερευνά πώς η αρχιτεκτονική κατασκευάζει, διανέμει και μετασχηματίζει μορφές εξουσίας μέσω της ανακύκλωσης υλικών, της κατασκευής συμμαχιών ανάμεσα σε διαφορετικά είδη -ανθρώπινα ή μη-, και της βιοπολιτικής που σχετίζεται με τη διαχείριση περιττωμάτων. Νέα δομικά υλικά θα παρουσιαστούν μέσα από την χαρτογράφηση και τον επανασχεδιασμό συνασπισμών στο δομημένο περιβάλλον, ως προϊόν πολλών δυνάμεων, που μεταφράζονται στις εντάσεις μεταξύ προϊόντων και υποπροϊόντων, παραγωγής και κατανάλωσης και, τέλος, δημιουργίας και αποσύνθεσης.

**How can architecture produce food, and be eaten away? How can we define the architecture of metabolism? This paper seeks to reveal how architecture constructs, distributes, and leverages power via material upcycling, interspecies alliances, biopolitics and excremental processes. It maps and redraws the affinities of the built environment as a product of many forces, translated in the tensions between products and by-products, production, and consumption and, finally, creation and decomposition.**



Fig. 1 - Tallinn Architecture Biennale 2022 graphic identity by stuudiostudio.

When we consider something edible, we understand its capacity to be eaten, consumed, or ingested, independently of taste. If our contemporary relationship to the built environment registered these processes, what could our cities and constructed environments become?

During the COVID-19 pandemic, the question of where our food comes from became eminently important. The fragility of our production processes and the mobility networks that transport commodities and food, new forms of localization and the design of circular economies.

In the 2022 Tallinn Architecture Biennale --EDIBLE, or, the Architecture of Metabolism—we approached food both literally and metaphorically. On the one hand, we explored food via architectural strategies of local production and self-sufficiency —like urban agriculture and renewable energy (Fig. 1). On the other, we analysed the by-products of urban life—namely livestock, agriculture, and forest residues—as resources, and in ways that

limit material loss and explore alternative pathways. The material and existential entanglements between architecture and food surface at different scales: from the gut of our bodies to the ecology of territories and the technology of building systems. They bring together the farm, the city, environmental inequality, and the stomach.

Currently, the global food system—from the overgrowth of chickens to the entirety of the agri-food industry—is the world's second largest emitter of greenhouse gases. As the need for food continues to grow in response to an increasing global population, the alienation between people and their sources of provisions also grows. We continue to produce and consume our edibles by growing carbon dependency, often unaware of the links between the sourcing, production and distribution of food, and the ways in which we consume it. In many ways, we are estranged from the journey of the edible arriving to our table. Returning to poultry for a moment, if we consider that the

volume and weight of chicken breeds between 1957 to 2005 grew about 4 times larger, it becomes evident that our food systems are deeply mired by continuously unfettered growth. This rapid enlargement of chickens, for instance, has had a significant impact on their health and well-being, including in some cases the inability to move or support their own weight. We not only raise and alter chickens to be turned into a food source as quickly and efficiently as possible, but also have developed food systems that require the physical alteration of living beings to support the insatiable logistical machine of industrialized agriculture.

The overuse of fertilizers, the excessive reliance upon antibiotics in animals, the destruction of natural habitats through processes like deforestation, and the loss of biodiversity are only some of the many practices that massively “infect” human and non-human species on our planet in order to support our unsustainable food systems.



Fig. 2 - "The Metabolic Home" curated by Lydia Kallipoliti and Areti Markopoulou and designed by kse studio (Sofia Krimizi & Kyriakos Kyriakou). Tallinn Architecture Biennale 2022. Photograph by Petros Pattakos.

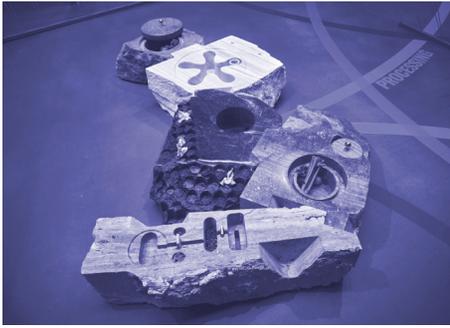


Fig. 3 - "Post-Industrial Zymological Kitchen" by Andrés Jaque (Office for Political Innovation) with M-Marble Project. Tallinn Architecture Biennale 2022. Photograph by Tõnu Tunnel.



Fig. 4 - "Everything's on the Table" by Hayley Eber and Mae-Ling Lokko. Tallinn Architecture Biennale 2022. Photograph by Petros Pattakos.



Fig. 5 - "From Brick to Soil". Tallinn Architecture Biennale 2022. Photograph by Tõnu Tunnel.

Envisioning an architecture that produces resources, digests its waste, and decomposes, could radically intervene, and recompose the extractive, consumptive, and contaminating logic and processes of the built environment. Within the context of interconnected global crises today, namely that of climate emergency, public health, and social inequity, the idea of a world where resources are recirculated is vital for planetary habitability.

Crucially, such an idea needs to be posed as a creative, multidimensional design problem that reflects the aesthetic and cultural qualities of spaces as productive environments in their full life-cycles: from the moment of extraction to the moment of demolition. How can architecture produce food and be eaten away?

It is with this in mind that EDIBLE urges architects, planners, and environmental designers to re-imagine planetary food systems along with architecture's expressive capacity to metabolize, digest, and generate resources.

How can we redefine traditional practices upon which the global food systems have been operating for the last decades and urge new forms of localization and production? How can we explore alternative pathways between production and consumption? How might we foster circular processes and economies through design?

The production of food organizes and establishes territorial sovereignty and political struggles, which are largely hidden behind power regimes that maintain aesthetic and lifestyle desires while changing the earth. The appearance of edibles, as well as the ways in which they are ingested and then wasted, are entangled with political protocols that manufacture and empower desires. These very political protocols also define the modes of reproduction and prefigure the modes of discourse through which food is envisioned, sourced, and distributed. Through this lens, we use food as the tool for imagining scenarios for alternative futures.

## THE ARCHITECTURE OF METABOLISM

As the authors of *Black Almanac*—and participants in TAB 2022—wrote, "we incorporate the world, not only by acknowledging and recording its geochemical and socio-political manifestation, but also by eating it." By eating, we ingest the planet, and the planet in turn becomes the repository of our excretions. This reciprocal and primeval relationship of interdependency can be sensed via architecture, itself a medium wherein resource consumption and decomposition, as well body sheltering and micro/macro-climate change, is registered.

During the pandemic, we have all become witnesses to the fact that the human body is the most

powerful instrument of biopolitics. When there is an immediate and abrupt change in the reality and canons of physical encounters, and in the ways that bodies relate and form spatial protocols, our understanding of larger questions—planetary habitability, climate justice and environmental ethics—become painfully present. Food uncertainty and the impact of the pandemic on industrial food production have foregrounded the urgency for a united reflection on the fragility of our production and distribution processes, the significance of the geolocation and mediums of such processes, our hubris in the pursuit of ceaseless growth and endless mobility, and finally, our accountability for how we occupy our planet.

Like a filter, architecture receives the evolution of territorial networks and geopolitical power struggles, and transfers it to the body. Historically, the body's physiology has gradually been removed from the processes wherein ecological concerns are translated into sustainability criteria. Buildings have been primarily conceptualized as systems equipped with devices, performing or operating in particular ways in order to achieve certain standards. As such, the literal and corporeal ramifications of occupation, maintenance, and care have been marginalized. While ecological systems of the postwar period portrayed the inhabitant as an indispensable part of building ecology,

currently this image is dismissed. Environmental concerns register in a framework that promotes conservationist ethics all the way down to lists for cautionary daily practices in face of scarcity.

Against this constellation, the metaphor of metabolism—which manifests most prominently in TAB 2022's main program entitled "The Metabolic Home"—presents the archetypal program of the house, conceived, however, as a living experiment and stage set where humans and other species, and their physiology of ingestion and excretion, become combustion devices and integral components of habitation (Fig. 2). The Metabolic Home is a digestive system that receives human output and waste in its multiple forms and converts it to various

usable forms. This portrayal of the home urges viewers to look at debris, the waste of our own production processes, and the milieu of interrelated social problems that are linked to the production and transportation of waste, in a visceral way; via the raw ecologies of our bodies and the understanding that these problems are not simply statistical, abstract, and disembodied. They cannot merely be relayed only to the management of resources, but that they're landed on bodies and on the food we eat, the water we drink, and the air we breathe.

The idea of the house as a regenerative system prompted William Stumpf's "Metabolic House" in 1989, a project by the Minnesotan designer who investigated furniture design and

ergonomics to explore energy efficiency and the local looping of water and bio-waste. In his own words, "Our houses should have a digestive system just like we do." For Stumpf, this principle was not rooted in biomimicry or physiology, but rather in exploring alternative patterns for energy re-use and consumption. This quest may forge new paths to habitation, both as a process of restoration of organic materials and recirculation of resources and remains relevant to contemporary concerns for decarbonization and non-extractive approaches to architecture.

In the exhibition, with different thematic spaces, we addressed three scales: the micro-scale of materials –from brick to soil-, the macro-scale of large-scale



Fig. 6 - "The Future Food Deal" a curatorial initiative for an open library by the Head Curators. Tallinn Architecture Biennale 2022. Photograph by Tõnu Tunnel.



Fig. 7 - "Edible Puffed Rice Organic Facade Finish" by Terreform One (Mitchell Joachim & Vivian Kuan). Tallinn Architecture Biennale 2022. Photograph by Petros Pattakos.

territories – food and geopolitics– and the meso-scale of habitation –the metabolic home.

"The Metabolic Home" redefined the concept of habitation and urged visitors to participate in a curated experiment (Fig. 8, 9). Each of the seven installations exhibited how metabolic processes related to food are linked to everyday domestic spaces and activities. Producing food was presented in a vertical robotic garden; processing in an interspecies kitchen; ingesting in a rewilded dining room; digesting in a lounge with an edible outer envelope; hydrating in a toilet that endlessly recirculates and filters water; breaking nutrients in a vertical terrace for harvesting; upcycling in a garage made of carbon negative voxels. Each domestic space was part of a larger domestic ecosystem and interacted with the other house parts in a feedback chain of

resource exchanges.

In the section "From Bricks to Soil", the aim was to magnify the significance of the origin, process, use and destination of built matter (Fig. 5). With a focus on the micro-scale of materials, this section was a laboratory of experimental solutions for building prototypes and parts that are edible, upcycled, productive or compostable. Blurring the limits between natural and artificial, the projects presented are the outcome of "programming", hacking or adapting natural growth and harvesting processes with the goal to generate buildings and landscapes that produce food, become nutrients and food and enhance biodiversity.

Finally, in the section, "Food and Geopolitics," the scope was to engage with large-scale territories, planetary phenomena and bottom-up territorial actions via maps, drawings, films and

visualizations of mass migration and food sourcing in challenging environmental conditions and zones of conflict. From local ground up material banks, to cultural practices rooted in the land and food (in)justice driven by ecological transformation, Food and Geopolitics highlighted the interdependencies of food systems, culture, political economy, and geography.

## BEYOND METABOLISM

But moving beyond an understanding of metabolism as a collection of inhabitable machines—a reading which carries the heavy burden of modernism—we explore metabolism as patterns of energy and material generation and distribution within a 'multiverse' (or a 'pluriverse' as Arturo Escobar calls it). This reality does not tolerate the separation of humans and non-humans; rather, it urges the assessment

of a shifting web of life and death as well as alternative forms of matter, including non-human agents. In sync with the texts of Anna Tsing, Rosi Braidotti and Timothy Morton, among others, the framework of EDIBLE opens the notion of non-human agents to include not only biological, but also technological and cultural others, while it aims to explore the potential of all natural and technological expressions to mitigate the contaminating and extracting nature of our desires and protocols related to the production of the built environment.

So far, the role of building technology to insulate spaces from environmental flows has been suggestive of a moral discipline that protects buildings against disease, transferring an ideological framework of ethics to the micro-realm of materials. Nevertheless, in a new reality of interrelated crisis—namely that of public health, climate change, and environmental inequity—a new role may be cast for the notion of environment. Instead of the inactive, static, and historicized context within which an architectural object is placed, the environment—and the resources related to it—can quite literally become the object of design itself, introducing new principles of planetary co-habitation, circling of resources, and building performance.

How can we, therefore, design the architecture of metabolism?

How can architecture redefine resources, produce food, and be eaten away?

EDIBLE aims to reveal how architecture constructs, distributes, and leverages power via material upcycling, interspecies alliances, biopolitics and excremental processes. It maps and redraws the affinities of the built environment as a product of many forces, translated in the tensions between products

and by-products, production and consumption and, finally, creation and decomposition.

Operating with an abundance mindset— rather than from a place of “scarcity”—TAB 2022 expands the definition of “resources” and the places for “mining” them, while providing actionable areas for designers and decision makers within a regenerative world that, in its turn, continuously recirculates the “food” required to sustain itself.

## 2022 TALLINN ARCHITECTURE BIENNALE CREDITS

Head Curators: Lydia Kallipoliti & Areti Markopoulou

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Exhibition Design by kse studio [Sofia Krimizi & Kyriakos Kyriakou]



Fig. 8 - Metabolic Home performance during the opening day of the Tallinn Architecture Biennale on September 7, 2022. Directed by Maria Ader. Photograph by Evert Palmets.



Fig. 9 - Metabolic Home performance during the opening day of the Tallinn Architecture Biennale on September 7, 2022. Directed by Maria Ader. Photograph by Evert Palmets.