

Junk Food

Radical approach to sustainability in Grahame Caine's Eco-House

arquitectura radical
Grahame Caine
eco-house
sostenibilidad
comida

radical architecture
Grahame Caine
eco-house
sustainability
food

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El objetivo de este ensayo es ilustrar una forma posible y extrema de entender el ciclo del reciclaje de residuos y la producción de alimentos a través de la experiencia de un arquitecto radical como el miembro de Street Farmers Grahame Caine en su propia Eco-House, ensamblada en Londres en 1972 y desmantelada en 1975. Nos situamos en el marco del material ya existente y la perspectiva de la arquitectura radical junto con una militancia política utópica y anárquica para responder a la cuestión de la sostenibilidad radical en una época en la que este movimiento estaba empezando. El proceso y el significado de este ejemplo temprano sigue siendo interesante no solo por su carácter extremo sino también como una lección de compromiso radical.

La ubicación de la Eco-Casa en el marco y la genealogía de proyectos relacionados con la naturaleza como Archigram, Superstudio o Archizoom también forma parte de este ensayo.

The objective of this essay is to illustrate a possible and extreme way to understand the cycle of waste recycling and food production. This is pursued via the experience of a radical architect such as Street Farmers member Grahame Caine in his own Eco-House, assembled in London in 1972 and dismantled in 1975. Using the framework of the already existing material, and the radical architectural perspective along with an utopian and anarchic political militancy, this essay aims to answer the question of radical sustainability in a time where this concept was starting. The process and significance of this early example is still interesting, not only because of its extremeness, but also as a lesson of radical commitment.

The Eco-House location within the framework and genealogy of nature-related projects such as Archigram, Superstudio or Archizoom's is also part of this essay.

*To us, pollution is a greenhouse full of tomatoes and cucumbers and it's pretty healthy pollution.*¹

The construction of a shelter and to prepare food to eat are part of the group of basic human needs, those that we cannot do without but that accept improvements oscillating between the cultural, the social, the aesthetic, or the political. The result of these updates give rise to architecture and gastronomy respectively.

One of the most fascinating links between gastronomy and architecture, due to its literalness and immediacy, was provided by the radical group Street Farmer with the Eco-House designed and built by Grahame Caine in London in 1972. The house, understood as an active laboratory during the more than two years it was lived in, materialized the anarcho-ecological ideas of a group of architects who trusted in the reformist and emancipatory capacity of an architecture detached from the dominant technophile circles in the Architectural Association at the time.²

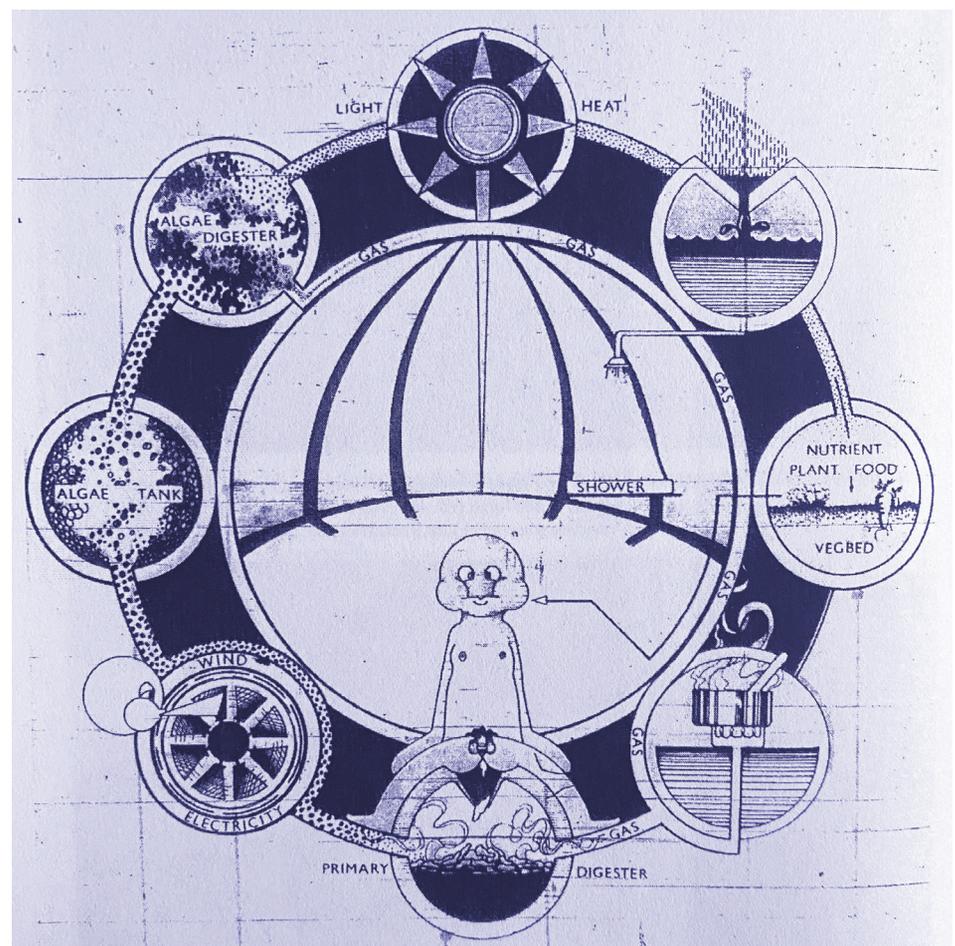
As part of a political and cultural agenda opposed to the aestheticization of technology, its authors (and fundamentally Grahame Caine, its designer and main inhabitant) built a manifesto to which the basic functions of architecture were added inventions such as electro dialysis, closed cycle air evaporation, compressive vacuum distillation, primary digesters, algae digesters, algae tanks, rainwater tanks, hydroponic gardens, solar panels, wind generators and other devices that turned the Eco-House into an authentic and updated *machine à habiter*, a device that transformed human waste into both methane, used for cooking, and other substances that were used in a hydroponic greenhouse that included *bananas and other tropical fruits*.³

possible by the confluence of different factors such as the offer of a plot of land owned by Thames Polytechnic⁴ and the donation of 2,000 pounds by Alvin Boyarsky, the president of the Architectural Association. In addition, Grahame, who was still a student at the time, managed to get the Woolwich district planning supervisor to grant a temporary building permit with a maximum duration of two years to build an "inhabitable housing laboratory"⁵ that would achieve total self-autonomy by transforming household waste into fertilizer for growing vegetables within the house itself.

Construction began, with the help of the Street Farmers, in September 1972, so that the house would be up and running by the following Christmas, as the Eco-House was not just an architectural, technological or political experiment for it had to respond to the family needs of Caine and his partner, Fran Stowell.

The house had a considerable impact on the British press during its almost 3 years of life and became the protagonist of the episode called "Clearings of a concrete jungle" in the BBC show "Open Programs for Television" in June 1973. Other publications that included the Eco-House were "The house that grows" and "A new way of living" in the magazine *London Garden News* along with "Living off the sun in South London" in *The Observer*, "A revolutionary structure" in the magazine *Oz* (Fig. 1). and in issue 20 of the magazine *Mother Earth news* in March 1973.

It is ironic that despite the explicit support of both the local administration and the Architectural Association, the creator of the Eco-House, Grahame Caine, failed his final exam at the AA and never obtained his architectural degree. This is probably due to the fact that in his presentation of the house - which was the topic of his research - he did not provide



The construction was made

Fig. 1 – Magazine Oz.

drawings and conventional representations of the proposed architectural object. Instead, he dedicated himself to showing innumerable technical diagrams and data that he had collected on the performance of the different machines that made the Eco-House work, along with sketches of an alternative political reality detached from the infrastructural control of the state. Even more ironic is that the Architectural Association hired Caine as an instructor there the day after he failed.

It is interesting to point out that the Eco-House left no one indifferent, and that its disregard for the basic principles of composition, space or form - "form was anathema"⁶ - aroused both the rejection and angry criticism of the architectural community (and the complains of the neighbours, for whom it was a "eyesore"⁷), but at the same time it gained the admiration and illusion of an emerging sector of the population that was looking for alternative and sustainable ways of inhabiting the planet.

Although probably the main interest of the house had to do with its biological, organic and self-sufficient character, the Eco-House distanced itself from its pretended counterparts. In other words, in the face of the fascination and technological optimism of contemporary architects such as Cedric Price or Archigram (satirized in number 3 of the magazine ARse, in which the Street Farmers participated (Fig. 2), who considered nature as the necessary (although irrelevant) background to what they wanted was the transfer of military technologies to the civilian sphere. Even in projects with a romantic natural aspect this occurred (Fig. 3), which are actually camouflaged forms of a figurative use of nature: "Since it is difficult to recognize these outlets from nature's own products, they are equipped with a homing signal that locates



Fig. 2 - Issue 3 of the magazine ARse.

each one within a radius of one mile (...) The whole of London or New York Will be available in the world's leafy hollows, deserts and flowered meadows.⁸

A complete look at Radical Architecture is not the main goal of this essay, and yet it is interesting to look at least three projects that addressed the very core of nature as the main element to understand such an "artificial" discipline as architecture. New perspectives, such as the Architecture-tree branch as made up of plugs

and drains... or of architects with a technophile appearance but clearly distanced from the redemptive spirit of modernity⁹ such as Superstudio or Archizoom. In these the bucolic and pastoral reverie (Fig. 4). refers to archaeology or the ecstatic contemplation of nature as background, as an "exterior"(Fig. 5). but where the scientific reality, the pragmatism necessary to achieve the real viability of these projects, is not studied in detail (because it does not matter, it's just an image). The source of energy in all of them is not

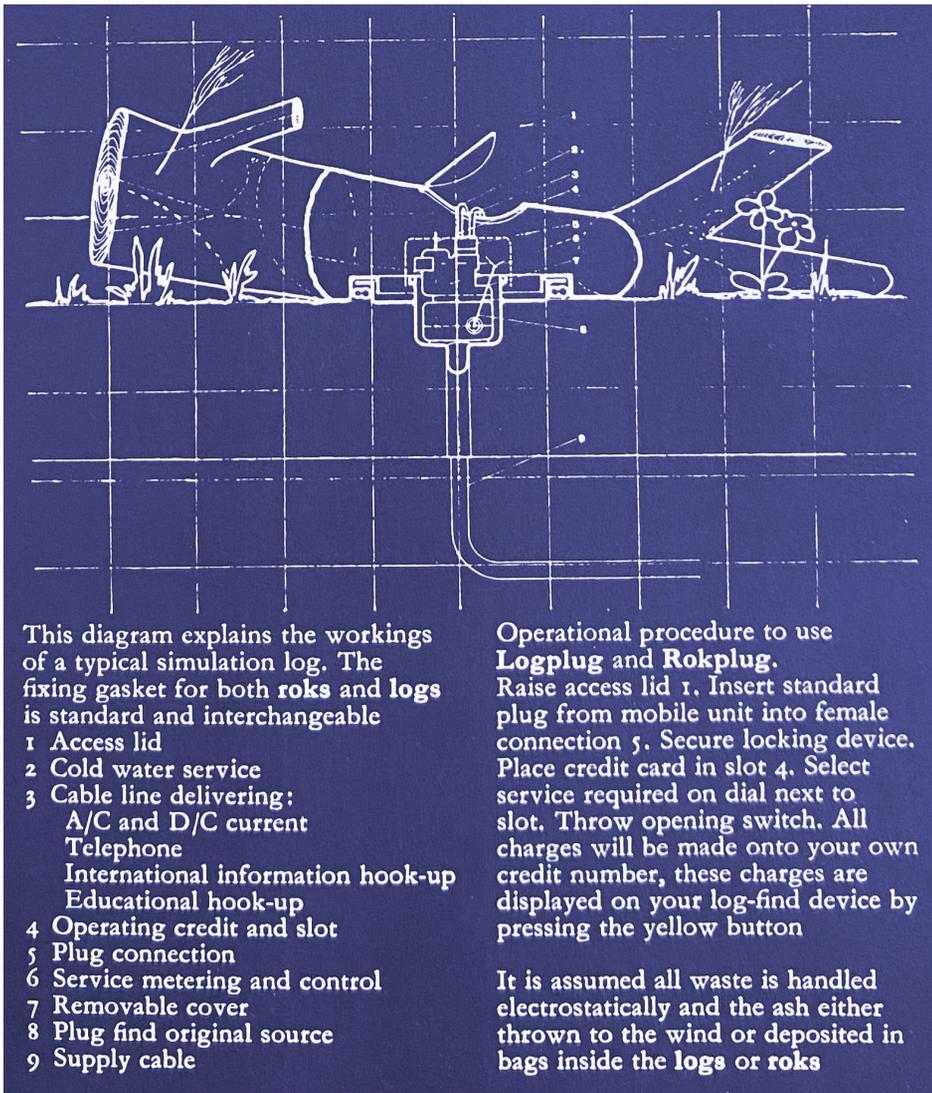


Fig. 3 - Logplug by Archigram.



Fig. 4 - Supersuperficie by Superstudio.

questioned, the 'system' will provide.¹⁰

The main problem for mobile living support systems is, of course, the energy source. Until an effective system is devised short-term energy will be taken from batteries of gas cylinders.¹¹

Despite the graphic parallelism and a certain "naturalistic" or anti-architectural intention of some projects such as LAWuN by Archigram (Fig. 6), that shaped a "robot-serviced landscape"¹², the Eco-House is something else, a practical exercise to illustrate the necessary change in mentality that the Street Farmers promoted, the creation of "new age" of towns immersed in, and working with, nature.

The techno-ecological resonance can also be found in Banham's Environmental Bubble with the difference that it, in contrast to Caine's operativeness and militancy, it stands as the anti-architectural prototype that serves as a pretext to reflect on the idea that "A Home Is Not a House"¹³ where humans, the environment and technology dialogue with new postulations. Pure conceptual architecture.

And coming back to this essay's main topic, it's important to note that the Eco-House was not metaphorical technology but the anarchist and counter-cultural version of autonomous ways of living¹⁴ that included the entire catalog of ecological gadgets such as algae digesters, algae filtration systems, solar panels, wind generators or composting toilets¹⁵. Contemporary with the communes in the southwestern United States of America and the squatting movements in Great Britain, these shared Caine's political vision of ecology and consumption by disassociating or unplugging from state supply networks as part of an emancipatory manifesto. This was a pioneering movement in the creation and development of

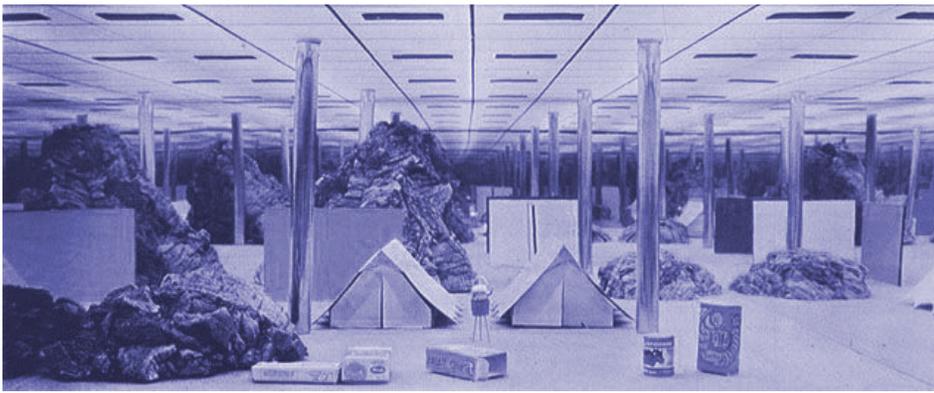


Fig. 5 – No Stop City by Archizoom.

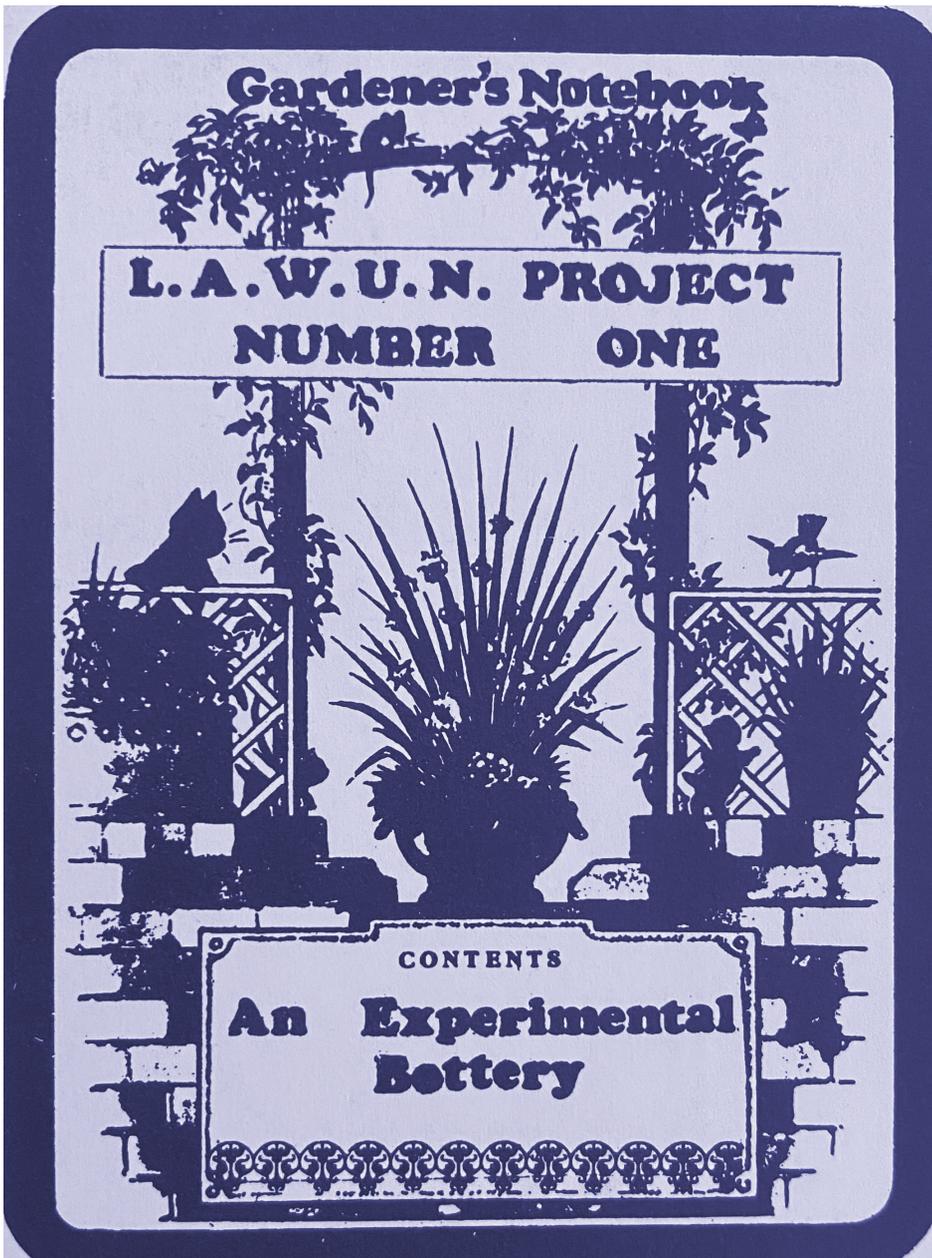


Fig. 6 – LAWuN by Archigram.

concepts such as ecology, self-sufficiency or the creation of life support architecture.

But, what is perhaps most remarkable about Caine's project (apart from its pioneering status, even before the 1973 oil

crisis happened) is that it was built and tested for a sufficient period of time. Its greatest contribution to discourse was going beyond diagrams, drawings and specifications to arrive at a tangible and edible domestic

reality that was working as an ecological system closed-in on itself and that reformulated both the idea of "house" and its design processes as well as the physiology and psychology of living. Specifically, making human physiology (food intake and human waste associated with it) complete the organism "house". Without an inhabitant - in this case the architect himself - there is no domestic space, because the recycling of those organic substances in a complex processing of products and by-products closed a cycle of design of the interior environment, which contrasted with ideas such as composition, aesthetics, context or proportion, all rejected in favor of organic flow diagrams and their optimal circulation. From the chemical diagram to the domestic space (Fig. 7).

Certainly the Eco-House, as a pioneering version of self-sufficient and ecological living, underwent multiple adjustments in its 'undesigned' organic growth, hence both Caine and his family had to experiment, analyze, monitor and change their eating habits (each meal was analysed regarding the future performance of the organic waste produced), the consumption of water or energy. Caine himself ended up knowing how to feed the house with the right nutrients or how much water to water the vegetables in the greenhouse,¹⁶ how to control the chemical processes to generate electricity in a diagram executed daily where the excretory function was vital for the maintenance of the system, all this in a cycle so exhausting that Caine himself barely left the house¹⁷. Naturally, when the waste was not Caine's, the house noticed it in a cycle of biological interdependence or house-inhabitant symbiosis.

Caine himself explained how the act of defecation was essential to nourish the house, even going so far as to introduce



Fig. 7 – Eco-House.

detailed protocols to retain the feces and thus not damage the aquatic sub-ecosystems, to allow natural decomposition in the reconstitution of food and energy: “the reality is that twice a week you’ve got to get elbow-deep in shit.”¹⁸

This process of conscientious self-analysis of one’s own physiology reached the extreme of calculating calories, as the architect/inhabitant himself explains:

“Numbers were very important. I did all the homework. I knew how many calories and how much energy was being used up by the human body. I broke down my daily activities into components, which was an important part of running the Eco-House. I monitored daily what I ate. I have to say that the human body fascinates me. How much energy can it derive from one boiled egg? How long does it keep you, as an animal, going? It is really amazing”¹⁹

In the complete process of the house, the chemosynthesis of the digesters was essential and Caine himself was the one who carefully calibrated each of them to achieve the desired functions, even using the phase change of the materials, such as wax solar panels, where wax melted when the window was opened and hardened when it was closed again.

More energy was emitted in this phase change process than with conventional thermal conditioning devices.

Or also an invisible wall membrane that purified water, developed by General Atomics of San Diego.

The Eco-House also pioneered the analysis and incorporation of contemporary research on the use of solar energy (such as the General Report on the Use of Solar Energy, which cites that that between 20% and 30% of global energy consumption was dedicated to heating) with

solar panels that stored heat and filtered rainwater with a series of tanks and digesters that transformed human and vegetable waste into both methane gas for cooking and nutrients for farming, as well as a fish pond that closed the cycle as a sink for the heat produced, something like an extra reservoir of water and a source of protein.

Contemporary architecture relates and also diverts from such a eschatological device with built examples as the ‘Rambla Climate-House’ by Andrés Jaque / Office for Political Innovation + Miguel Mesa del Castillo in Molina de Segura (Spain, 2021) which uses gray water from the house and takes advantage of sensors that measure humidity and environmental conductivity to complement and optimize the site’s micro climate in order to repair a fragment of the existing dying rambla in a sort of climate activism as opposed to the anarch activism of its predecessor.

CONCLUSIONS

In conclusion, the relation between architecture and food starts off with the bold decision to build a house where cultivating and eating the food produced becomes the most important ingredient of it. As we've seen, the Eco-House was a living organism that pioneered current concepts such as ecology and self-consumption that reformulated the question: what is a house? It incorporated and performed many new functions compared with the traditional one of sheltering. Unconventional answers were many; such as manufacturing a productive inhabiting machine that took organic waste and natural resources (the sun, rainwater, wind, feces) and transformed them into gas, food, heat, clean water, hot water and electricity. A strange and liberating artifact, with an anarchist ideology and politically alternative to the dominant capitalism.

The invasion of dynamics and processes (both physiological and related to the environment) - anything but usual in the domestic space that the Eco-House requires - represents, perhaps, the main interest of this project both in its spatial component (the number, size and position of the devices mentioned) as well as in its social resonance (the material use we make of this type of proposal and the emotional involvement in the way of life it proposes); the construction of the house as a socially revolutionary and radical act. Architecture that is not designed but grows, architects-gardeners-scientists-cooks who resist the destruction of the environment and imagine realistic alternatives in a move opposed to contemporary utopias. As time goes by, the Eco-House remains a critical reference to any designer that wishes to understand the real meaning of sustainability, its inner commitment to resist compromises.

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NOTES

¹Grahame Caine in Street Farm. P141.

²School where the members of Street Farmer, originally Peter Crump and Bruce Haggart, later joined by Caine, were studying.

³Grahame Caine. Eco-House. Mother Earth news 20. March 1973. P62.

⁴As part of Grahame Caine's final year project.

⁵Lydia Kallipoliti. From Shit to Food. Buildings & Landscapes: Journal of the Vernacular Architecture Forum. Vol. 19, No. 1 (Spring 2012), pp. 87-106. P87.

⁶Interview with Peter Crump in Colomina,

Beatriz and Buckley, Craig. Clip, Stamp, Fold. Barcelona. 2010. Actar Publishers. P253.

⁷Lydia Kallipoliti. From Shit to Food. Buildings & Landscapes: Journal of the Vernacular Architecture Forum. Vol. 19, No. 1 (Spring 2012), pp. 87-106Archigram. Princeton Architectural Press. New York.1999. P110.

⁸Archigram. Princeton Architectural Press. New York.1999. P110.

⁹Luengo Angulo, Miguel. La Arquitectura Radical. Cinco puntos para una redescrición teórica. Buenos Aires. 2021. Editorial Diseño.

¹⁰The Project Agronica by Archizoom's leader, Andrea Branzi, further expands this research as the year 2008 proposal for the Grand Paris along with Stefano Boeri.

¹¹Archigram. Princeton Architectural Press. New York.1999. P110.

¹²Archigram. Princeton Architectural Press. New York.1999. P114.

¹³François Dallegret. Reyner Banham, "A Home Is Not a House," Art in America, Vol. 2, 1965: 70-79.

¹⁴Like the space capsules developed by NASA, but in the ideological reverse.

¹⁵Stephen E. Hunt. The revolutionary urbanism of Street Farm. Bristol. Ed. Tangent Books. 2014. P141.

¹⁶Lydia Kallipoliti. From Shit to Food. Buildings & Landscapes: Journal of the Vernacular Architecture Forum. Vol. 19, No. 1 (Spring 2012), pp. 87-106.

¹⁷When he had to, he called one of his best AA students to fill in for him.

¹⁸Boyle and Harper, Radical Technology, p171.

¹⁹Lydia Kallipoliti interview with Caine. 2008.