The Trombe wall out of equipoise
a missed analysis and communication on the limitations of a sustainable technology

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contents

The contributions by Giovanni Corbellini, Luca Galofaro, and Federica Soletta were published here thanks to the invitation of the curators Luca Di Lorenzo Latini and Giulia Menzietti. The contributions by Marianna Charitonidou, Stavros Kousoulas, Linda Matthews, Piero Medici, Leonardo Zuccaro Marchi, Alessandro Panzeri, Mark Sawyer, and Giulio Testori were selected based on a double blind review of the call *Communicate*.

the *trombe* wall out of equipoise: a missed analysis and communication on the limitations of a sustainable technology

piero medici
leonardo zuccaro marchi

abstract Throughout the 1960s and the 1970s, some European architectural magazines illustrated the *Trombe* Wall: a solar collector designed by engineer Felix *Trombe*, integrated into the southern wall of some housing prototypes by Jacques Michel in France. Magazines such as *Architectural Design*, *Architecture d'Aujourd'hui*, *Technique et Arquitecture*, *Casabella* and *Domus*, illustrated these examples especially during the years before and after the 1973 oil crisis. However, they mainly focussed on the technological aspects of the innovation and on energy performances.
Taking as a reference the concept of Equipoise described by Sigfried Giedion (1948) and re-considered within the sustainability debate by William Braham,[1] the technological interventions of sustainable architectural practices entail three limitations. The first underlines that the interventions could affect the health of the people, the second that sustainability is ultimately a social condition and the third regarded the necessity of regular maintenance and renewal.[2]
This article aims to highlight the absence of debate about the three cautions in the magazines throughout the 1970s and the consequence of this lack on sustainable and energy-efficient architecture of today.

the concept of equipoise and the limitations to sustainable technological practices The methodology of this research consists of the analysis of the period through a survey among the most influential European architectural periodicals published between the second part of the 1960s and the beginning of the 1980s. The biggest amount of case studies and essays related to the *Trombe* Wall and housing where published throughout the decade in: *Architectural Design*,[3] *Architecture d'Aujourd'hui*,[4] *Technique et Arquitecture*,[5] *Casabella*[6] and *Domus*.[7] These magazines had a mutual influence on publishing, reviewing and commenting similar contents and articles. Among the editors of these architectural magazines, Robin Middleton and Monica Pidgeon for *Architectural Design*, Bernard Huet for *Architecture d'Aujourd'hui*, and Tomas Maldonado for *Casabella*, are renowned for their critical approach and their interest in ecological issues.[8]

During the 1970s, several magazines illustrated the *Trombe* Wall as a technical device applied to the south facade, composed by a glass panel installed on top of a thermal mass wall, with openable gaps on its top and bottom. An air cavity is located between the glass panel and the wall, permitting the air to circulate through the openable gaps, due to natural ventilation and stack effect, providing indoor winter heating and summer cooling (figs. 2-3). The *Trombe* Wall and applied on projects such as the detached house in Odeillo by Jacques Michel and the *Maison in Argenteuil* by Marc Vaye and Frederic Nicolas. Surprisingly, the authors of the articles were often the architects themselves who were eager to communicate and popularize the most successful aspects of their projects. In doing so, they mainly focused on the technological innovations failing to critically and objectively communicate some other relevant aspects.

To demonstrate and trace which notions and reflections were missed in the communication of the magazines, it is worthwhile to introduce and reconsider the concept of Equipoise, as first debated by the historian and critic Sigfried Giedion. In *Mechanization takes command* (1948), Giedion

questioned the environmental consequences of mechanization such as its deleterious effects on food, soil and the conditions of everyday life. One of the conclusive notions of his book is an appeal for a condition called 'man in equipoise,' which entails a dynamic equilibrium between 'the artificial surroundings and the organic environment;' between the 'collective and individual spheres;' and between 'feeling and thinking.'[9] It is an idea of non-static, dynamic equilibrium between broader categories of 'inner and outer realities,' which radically influenced the entire Architecture Modern thinking, in particular within the CIAM's debate about the Heart of the City and Habitat in the 1950s,[10] with many references for our contemporary urban condition too.

Then, it is no coincidence that, as Giedion focuses primarily on man and his communities, William Braham has highlighted the direct connection of Giedion's 'Equipoise' with our current mandates about sustainability. In particular, Braham points that the virtue of Equipoise suggests that the mission of sustainability is more an interrogation of the very condition of technological intervention, than a mere technical matter of safeguarding resources or enforcing measures of health.

Braham concludes that technological interventions of sustainable architectural practices entail three limitations. The first considers that the needs of the cycles of interventions are changeable and this could affect the health of the people. The second underlines that 'sustainability is ultimately a social condition that cannot be applied therapeutically by experts nor even wholly institutionalized.'[11] The third one is the necessity of a regular maintenance and renewal of the sustainable architectural practices. Braham underlines that these observations don't require a renunciation of the premises of ecological services, but they identify the limitations of any technique of sustainability. Therefore, practitioners of the sustainable must remember that their enterprise is a radical rethinking of technological premises.[12]

Throughout the 1970s, these three cautions were rarely highlighted or analysed in the selected case studies. When

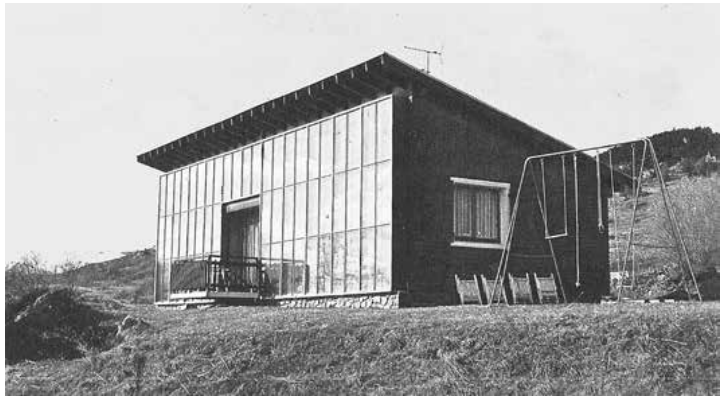
indoor or outdoor spaces and rooms affected by or derived from energy efficient technologies were described, the focus was hardly on aspects such as changes in the user's behaviour, human health, social aspects like commonality, maintenance of the machines and the areas. A better regard of the three would have prevented several analysed case studies from being easily cast apart during the 1980s.

the *un-critical* communication of the *trombe wall* as part of the house At the beginning of the 1970s, *Architecture d'Aujourd'hui* published an entire issue called *Architecture De Soleil*.[13] In that magazine, several buildings related to solar energy were described, including the *Trombe Wall* solar houses in Odeillo, France, designed by architect Jacques Michel. These houses comprised the first *Trombe Wall* detached house built in 1967 (fig. 1). The author of the article who illustrated the *Trombe Wall* and its main technological principles, was the architect Jacques Michel himself of the published project.

The *Trombe Wall* was exhibited and popularized from the unique perspective of its designer, with a positive, sometimes un-critical point of view. Critiques to the *Trombe Wall* became only later more evident in Architectural magazines when editors and critics started to focus on the socio-technological limits of this apparent perfect technological *apparatus*. For instance, Ian Hogan in *Architectural Design*[14] defined the *Trombe Wall* as more suitable for heating in specific climatic areas with cold winters and clear sunny summers, stating that the system was only capable of supplying 70-90% of the heating needed. Mario Scheichenbauer in *Casabella*[15] described the *Trombe* Wall as solar panels, extremely simplified but with poor control of the temperature, and with difficulties to heat a room not directly exposed to the sun or next to the *Trombe* Wall.
As far as Michel's article is concerned, in terms of energy performances the *Trombe* Wall panels installed on one of the vertical walls of the structure are described as more productive

and efficient than external heat-capturing devices like the solar collectors, placed, for instance on the roof, as shown on the first sketch of figure 2. This is because the latter require mechanical extraction of the hot air produced.[16] The articles also explained accurately the technical details of the technology and the general functioning. A concrete wall that is the surface to be heated, is set behind the external glass panels of the *Trombe* Wall. It operates as the mass and transmits heat to the interior space of the building. In the northern hemisphere, the external glass panels and the *Trombe* Wall should be placed on the south façade.[17] The south wall absorbs the short-wave solar radiation that penetrates the glass. The thermal mass is heated up and emits radiation of a longer wavelength. This radiation does not penetrate the first sheet of glass encountered.[18] The thermal mass absorbs the radiation and produces heat towards the inside of the house.[19]
Heat can be stored overnight in the thermal mass of the wall without mechanical assistance. The *Trombe* Wall is not restricted to latitudes where direct sunlight is abundant, because the greenhouse principle also operates, for example, on cloudy days with diffused solar radiation. The relatively large surface of the south façade should be adjusted, with specific formulas, in relation to the total enclosed space.[20]
The *Trombe* Wall includes two gaps on its top and base for air circulation. During the winter, the air heated behind the glass panel recirculates inside the building. During the summer, an inlet on the north façade allows fresh air to enter for cross ventilation towards an aperture on the south façade (figs. 3-4).[21]
The gaps at the bottom and top of the collector areas connect the cooler air mass inside the building with the heated air mass in the collector. Thanks to the natural stack effect, cooler air flows in at the bottom, while the heated air flows out of the top.
In the detached house in Odeillo, the *Trombe* Wall was also a structural wall and one of the longest of the house, running adjacent to 4 rooms.

However, some architectural aspects were neither architecturally solved nor described in the magazine. The



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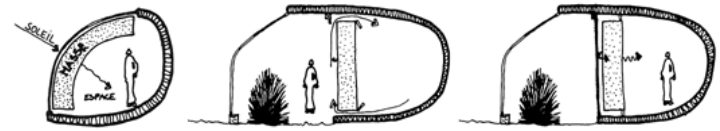

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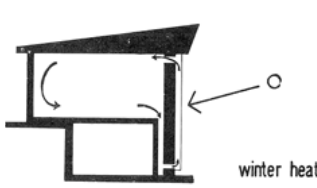

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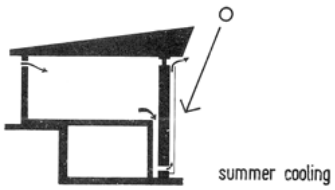

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1 Single solar house in Odeillo. Detached house with *Trombe* Wall, built in 1967 in Odeillo, France, in *Architecture d'Aujourd'hui*, 192 (1977).
2 Hand-drawn diagrams: *Trombe Wall*; *Trombe* Wall where the air cavity, between thermal mass and glass, is extended creating a greenhouse; *Trombe* Wall with embedded greenhouse, with rotating shutter pulled down, in *Architecture d'Aujourd'hui*, 192 (1977).
3 *Trombe Wall*, Winter heating and summer cooling. Section of the detached house with *Trombe Wall*, built in 1967 in Odeillo France, in *Architectural Design*, 45, 1 (1972).
4 *Trombe* Wall, Summer cooling. Section of the detached house with *Trombe* Wall, built in 1967 in Odeillo France, in *Architectural Design*, 45, 1 (1972).

magazines didn't regard the three cautions derived from the concept of Equipoise, related to health, the social condition and maintenance. Nor was the aesthetics of the architecture was deeply analysed. Reflections about aesthetics are mostly missing, such as, how the extended dark glassed façade would fit in the natural context and with the local traditional architecture. Aesthetically, from the outside the full dark façade could be considered as an architectural statement about the importance of saving energy, as well as a very strong and visible technological device.[22] In relation to the three cautions derived from the concept of Equipoise, it is relevant to highlight that the southern façade is a full dark *Trombe* Wall with the entrance door as the only opening. This affects the health of the inhabitants because of the lack of natural light and view to the outside, the social condition of the internal rooms, and the maintenance of the installation needing the manually open able air gaps for natural ventilations. The south façade is completely blind, with no landscape view or access of natural light. Bathroom, kitchen, and entrance spaces are located in the north side (fig. 5) probably because services and internal circulation need less heating, even if the magazines never inform about the location of these areas.

During a visit to the house in 2017, it was easy to discover that the air gap on the north side was closed and approximately 20 years ago electric heating had been installed. The internal natural light from the south is not abundant, and the view from the inside towards the natural landscape outside is missing. From the living room the open valley is visible only through the door window of the balcony, located in a corner of the room. Apparently, the goal of generating an efficient thermal comfort was more important than the visual comfort of admiring the open natural landscape from inside the house. These considerations show that the architectural design potentials of the *Trombe* Wall were still not sufficiently explored. The above-mentioned architects and critics, analysed the *Trombe* Wall extensively, however they focused mainly on the technological aspects and on the technical properties

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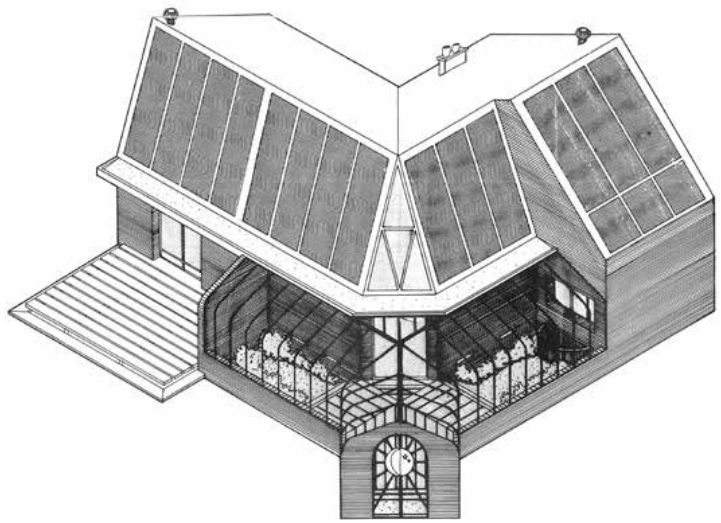

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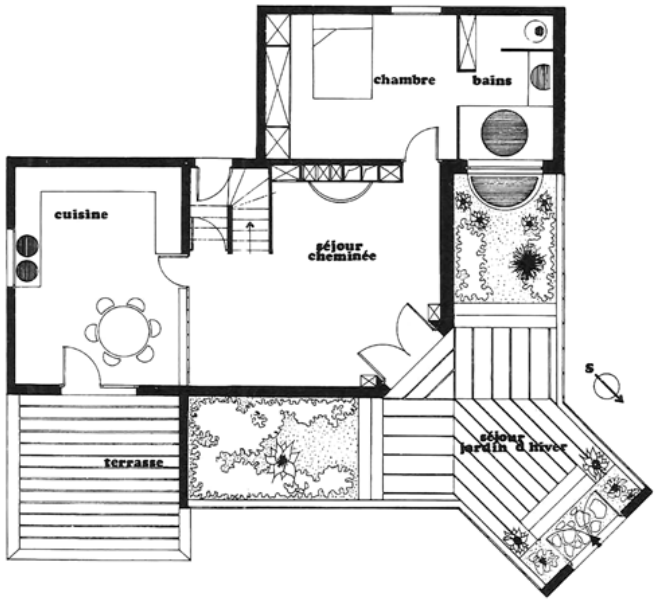
5 Single solar house in Odeillo. Plan, orientation and program. <https://jjureidini.wordpress.com/2011/01/18/trombe-wall-case-studies/, 2011>.
6 *Maison particulière*, Argenteuil, Val d'Oise. Axonometry. Main entrance and greenhouse on the south, in *Architecture d'Aujourd'hui*, 192 (1977).

rather than on the architecture of the building and the living of the inhabitants.
The three limitations of technological interventions derived from the concept of Equipoise were not regarded. In the case of the detached house in Odeillo, the periodicals of the time never considered the luminosity and the spaciousness of the interior, the view from the inside, the natural light coming in. In their analysis, they did not go into the behaviour of the inhabitants and to what extent their lives be affected by the *Trombe* Wall. The most heated rooms were those closer to the *Trombe* Wall, which could have an influence on their use during different hours and seasons. Finally, not much was said about the different behaviour of the inhabitants in such a house compared to a standard one.

evolution of the trombe wall *Architecture d'Aujourd'hui*[23] described a case study characterised by further experimentation about the *Trombe* Wall and architecture on the ground floor, while the solar collectors are integrated with the façade on the first floor. On the ground floor, the air cavity between the glass and the dark thermal mass wall of the *Trombe* Wall is extended and transformed into a usable green space. It is the *Maison à Argenteuil*, in Val d'Oise (fig. 6) by architects Marc Vaye and Frédéric Nicolas, also authors of the article and the book *La Face cachée du soleil*,[24] which puts forward an ecological approach in architecture. In the house, the space between the glass and the thermal mass wall is used as a greenhouse (figs. 1, 7). The solar technical operation of the envelope on the ground floor, on the southwest and southeast, is similar to the *Trombe* Wall. It is a space where the air still separates glazing from masonry and air circulation is still provided via gaps on the top and bottom of the thermal mass wall (fig. 8).[25]

The greenhouse space is also integrated with the main entrance of the house. In this case, part of the *Trombe* Wall technology is transformed into an architectural space. The expanded greenhouse becomes a space defined in the article as temporarily habitable. A second innovation listed is the



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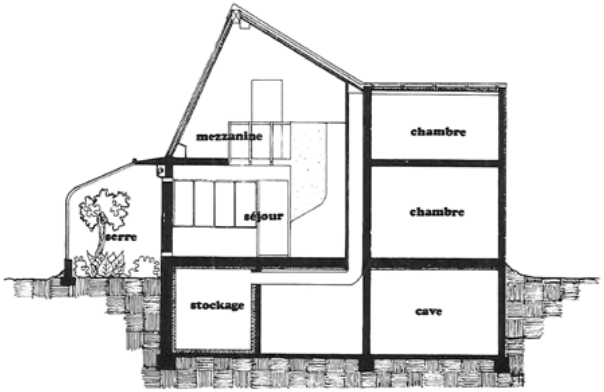

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7 *Maison particulière*, Argenteuil, Val d'Oise. Plan and program, in *Architecture d'Aujourd'hui*, 192 (1977). Archive of Marc Vaye and Frédéric Nicolas, consulted in 2017.
8 *Maison particulière*, Argenteuil, Val d'Oise. Section and program, in *Architecture d'Aujourd'hui*, 192 (1977). Archive of Marc Vaye and Frédéric Nicolas, consulted in 2017.

abandoned linearity of the southern façade, as it was in the detached solar house in Odeillo.
The two main façades are in fact oriented to the southeast and the southwest. The angle formed by the façades is underlined by the extension of the 'greenhouse' towards the south. The architects describe the building as one of the first experiments where the volumetric rigidity of the solar house is broken.[26] In this example, the *Trombe* Wall evolved becoming a usable space also hosting some vegetation. Vaye and Nicolas built the 130 m^2 area house including the greenhouse, for Vaye's parents. It materialises the ecological concept defined by the architects in their book *La Face cachée du soleil*.[27] In effect in their article *Pour une approach bio-climatique de l'architecture*[28] they described their bio-climatic architectural approach. Interestingly, rather than only describing the project with its technological devices, the architects felt the necessity to propose a more multi-layered method of design and thinking a sustainable architecture. They stated that their bioclimatic approach requires the knowledge by the architects about topics such as the ecologic niche, the microclimates, the notion of comfort, the collective dimension of climatic control, the relation between the inhabitants, the daily and the seasonal climatic cycles. They also added that the use of the greenhouse is possible only during some specific hours depending on the month. They discussed some aesthetical considerations about the opposition between black body and transparency, opacity and luminosity. This alternation of materials in the façade, they stated, represents a transition space between the mineral and the vegetal, the interior and the exterior, the intimate and the public. They finally highlighted that their architecture will lose its plain linearity facing south as in the case of the *Maison à Argenteuil*. In this article, the architects defined some general principles of their approach, but they didn't regard all of them when they illustrated the *Maison a Argenteuil* in the same magazine.

The house has the disadvantage that the ground floor doesn't get much solar light. The architects weakly justify the choice

of the blind wall behind the greenhouse, not only for energy efficiency reasons but also to preserve the privacy of the inhabitants. In this sense, the article describes the greenhouse by introducing the design concept of relative transparency (i.e. due also to the vegetation and to the different opacity of the glass panels) whose variations are accomplished in the double rhythm of day and night, summer and winter. However, the innovative space of the usable greenhouse with the *Trombe* Wall, paradoxically makes the living room dark.
Even in this case the three limitations of technological intervention pointed out in the concept of Equipoise are not satisfactorily regarded and communicated. The incorrect use of the greenhouse, the manually manoeuvred air gaps and shutter might affect the health of the inhabitants. The blindness of the living room walls might affect the use and the social condition of the spaces. The maintenance and the renewal of the shutter, the air gaps and the greenhouse might change the daily behaviour of the inhabitants.

The architects described different uses of the greenhouse according to the variation of the seasons and added some remarks about aesthetics related to the alternation of transparent and opaque surfaces. However not much is communicated for instance, about the living room having no view to the outside. The natural light does only enter the living room from the triangular opening on the first floor, through the double height space. A rotating shutter (figs. 1, 9) applied on the *Trombe* Wall is also barely mentioned. It is a crucial point because it affects the behaviour of the inhabitants. It is manually manoeuvred, protecting the thermal mass of the *Trombe* Wall overnight, in order to avoid the release of warm air to the outside. It can be seen as a paradox that the technology, transformed and integrated within the architecture of the house, needs a manually manoeuvred protection in order to be more efficient. The architects and the magazines did not extensively describe and investigate these problems and considerations.[29] A deep critical analysis was still missing, highlighting again the lack

of a broad communication and divulgation of the complexity of the living condition with these new and experimental technological devices.
In 2017, a visit to the house has shown that the energy efficient system does not work. For a couple of decades, the present inhabitants have been keeping the *Trombe* Wall rotating shutters and the internal gaps always closed, compromising its function during both hot and cold seasons. Moreover, in order to diminish the warmth during summer, they changed the upper glasses on top of the entrance with opaque panels and added some shutters on top of the greenhouse upper glasses. Neither in this case, the amount of natural light coming in is abundant but what most misses is once again the view to the outside garden, visible from the living room through the entrance glass door only (fig. 10).
The architects, who were in touch with the inhabitants, maintained in an interview that the wall never reaches very high temperatures, meaning that, it is always comfortable to stay close to it on the living room side. They also avowed that the manual operation of the shutters could affect the optimum efficiency of the *Trombe* Wall. The shutters were realised to improve performances and if left open the entire night, the wall loses only a minimal part of its efficiency. On the other hand, if they are left closed during a sunny day, a huge amount of solar energy is not captured.[30]
The greenhouse embedded in the *Trombe* Wall might become a design chance with several potentials. Especially if such issues, belonging to the limitations of Giedion and Braham, are solved: the inhabitants' behaviour, natural light access, the internal program depending on the different temperature in the rooms and view from the inside.
With a solution for these issues, the technical and spatial device of the *Trombe* Wall, might have become an even more powerful design tool instead of a constraint, even during the 1970s.

discussion and conclusions The *Trombe* Wall in Odeillo, can be considered an attempt to integrate architecture and solar technology along with the entire design process. The *Maison à*

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9 *Maison particulière*, Internal view of the greenhouse. Detail of the (white) rotating shutter closed in front of the thermal mass wall. Photo by Piero Medici, October 2017.
10 *Maison particulière*, Internal view of the living room where the natural light and the view towards the outside are provided by the entrance door and the window on the first floor. Photo by Piero Medici, October 2017.

Argenteuil defines an evolution of the *Trombe* Wall to a usable, liveable space, functioning also as entrance and space to grow plants. In the *Maison à Argenteuil* the *Trombe* Wall functions as a technical device for its thermal properties and as a spatial device because of the extended usable air cavity. The air cavity is transformed into a liveable space being both a technical and a spatial device. Consequently, the *Trombe* Wall is to be regarded as a design tool. This is because the technical device itself, which also creates new spaces, can become an element capable of driving the architectural design.

In the selected case studies throughout the 1970s, the three cautions related to technological interventions derived from the 'Man in Equipoise,' were rarely highlighted, analysed and divulgated by the magazines. Indeed, Architectural magazines during the 1970s didn't debate so frequently about the liveability of the interiors or architectural aesthetics of the selected case studies, instead they often focussed in detail on the technological solution. Topics about the behaviour of the inhabitants, social activities in different rooms of the solar houses, maintenance and longevity of the technical installations, weren't frequently debated. Architectural elements such as aesthetics, spaciousness, luminosity, relations between spaces and the social life of the inhabitants were not so central in their descriptions.
This somehow highlights the limit or the inability of the architect of the *Trombe* Wall to consider the complexity of its socio-spatial consequences on the every-day life of the inhabitants. More generally, it shows the struggle to explain the social effect of technological devices into the domestic-social domain.
The incomplete analysis by magazines and architects without a critical filter, and the fact that the three limitations of technological interventions derived from the concept of Equipoise were not clearly identified and solved, probably didn't help to spread its implementation within the culture of standard architecture even further. If side effects and problems had been better stated, divulgated, analysed and known, the

Trombe Wall might have become a stronger design tool. The development of the *Trombe* Wall during the 1970s to become embedded in the architecture of the house, its reception, description and communication by the magazines, can be informative for the contemporary debate on the sustainable and energy-efficient architecture of today and on the role of the architect as a pioneer of technological experimentation and as a divulgator.

notes

[1] William Braham, 'Correalism and Equipoise: Observations on the Sustainable,' *Departmental Papers (Architecture)*, 3(01) (1999), pp. 57-63.

[2] Ibid.

[3] *Architectural Design*, 45, 1 (1970).

[4] *Architecture d'Aujourd'hui*, 167 (*Architecture de soleil*) (1973).

[5] *Techniques et Architecture*, 525 (*Les 4 Éléments*) (Juin-Juillet 1979).

[6] *Casabella*, 370 (October 1972).

[7] *Domus*, 568 (1978).

[8] Steve Parnell, 'Ethics VS Aesthetics Architectural Design 1965-1972,' *Field: a free journal of architecture, Ecology*, 4, 1 (1/2011), pp. 49-64; Bernard Huet, 'Robert Le Ricolais ou la nature des choses,' *Architecture d'Aujourd'hui*, 192 (*Quelle architecture solaire?*) (1977), p. V; Tomás Maldonado, 'Energia e ambiente costruito,' *Casabella*, 425 (1977), p. 9.

[9] Braham, 'Correalism and Equipoise: Observations on the Sustainable.'

[10] Leonardo Zuccaro Marchi, *The Heart of the City: Legacy and Complexity of a Modern Design Idea* (London and New York: Routledge, 2018).

[11] Braham, 'Correalism and Equipoise: Observations on the Sustainable.'

[12] Ibid.

[13] *Architecture d'Aujourd'hui*, 167 (*Architecture de soleil*) (1973).

[14] Ian Hogan, 'Solar Building in the Pyrenees,' *Architectural Design*, (January 1975), pp. 13-17.

[15] Mario Scheichenbauer, 'Impianti e pannelli solari,' *Casabella*, 425 (May 1977), pp. 22-34.

[16] Jacques Michel, 'Chauffage par rayonnement solaire,' *Architecture d'Aujourd'hui*, 167 (1973), pp. 88-93.

[17] Ibid.

[18] Hogan, 'Solar Building in the Pyrenees.'

[19] Ibid.; Colin Moorcraft, 'Solar Energy in Housing,' *Architectural Design*, (October 1973), pp. 634-643, 652-653.

[20] Michel, 'Chauffage par rayonnement solaire.'

[21] Ibid.

[22] Piero Medici, 'The Trombe Wall during the 1970s: Technological Device or Architectural Space? Critical Inquiry on the Trombe Wall in Europe and the Role of Architectural Magazines,' *SPOOL*, 5, 1 (01/2018), pp. 45-60.

[23] Frédéric Nicolas and Marc Vaye, 'Pour une approche bio-climatique de l'Architecture,' *Architecture d'Aujourd'hui*, 192 (*Quelle architecture solaire?*) (1977), pp. 28-30.

[24] Frédéric Nicolas, Jean-Pierre Traisnel and Marc Vaye, *La Face Cachée Du Soleil : Énergie Solaire et Architecture* (Paris: Bricolo Lezardeur, Librairie Paralleles, 1974).

[25] Frédéric Nicolas and Marc Vaye, Archive of Marc Vaye and Frédéric Nicolas (1977).

[26] Nicolas and Vaye, 'Pour une approche bio-climatique de l'Architecture.'

[27] Nicolas, Traisnel and Vaye, *La Face Cachée Du Soleil : Énergie Solaire et Architecture*.

[28] Nicolas and Vaye, Archive of Marc Vaye and Frédéric Nicolas.

[29] Piero Medici, 'The Trombe Wall during the 1970s: Technological Device or Architectural Space? Critical Inquiry on the Trombe Wall in Europe and the Role of Architectural Magazines.'

[30] Piero Medici, Interview with Marc Vaye and Frédéric Nicolas, 2017.

foam city 2.0: djamel klouche, interpreter of peter sloterdijk's spatial thinking as a theoretical framework for the hybrid metropolis

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abstract: In this paper, we will highlight the use that architects can make of philosophical systems as a project subject. In particular, we will show it through the example of the theoretical proposals of the Franco-Algerian architect Djamel Klouche for the International Consultation of Grand Paris (CIGP) which will be compared with the system of thought of the German philosopher Peter Sloterdijk, controversial figure of the European intellectual world. We have chosen the title *Foam city 2.0* in order to underline the link between Klouche's proposal and Sloterdijk's theory of *Spheres* (*Foam city* is one of the chapter of his book *Foams, Spheres III*). Djamel Klouche only sporadically uses direct quotations from the philosopher's texts, but, analysing the discourses and concepts he highlights in the CIGP study books, we can understand that this new thought about space becomes for the architect an essential reference for the constitution of a *métropole hybride* (hybrid metropolis). Drawing on the concepts underlying the architect's proposal, we will show how these correspond to the philosophical concepts developed by Sloterdijk in his monumental work on spherology. To what extent can the architect manage

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