Entropy and structure: Re-thinking the Plaza de Armas *building as Modernist heritage*

Armando Caroca Fernández
Santiago de Chile
armandocaroca@gmail.com

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ABSTRACT
Buildings, as all things, age. They are not static entities, but change, get wrinkled, get stained. In that sense, their behavior resembles that of living organisms but, generally, these changes are seen as a decline, as processes that ought to be avoided. What would happen if we began to think about buildings as dynamic systems affected by entropy, in such a way that the passing of years actually added value to them? The paper illustrates the case of the* Plaza de Armas *building, built in 1954 in the foundational center of Santiago de Chile, a building that turns paradigmatic in two ways: as an example of the introduction of the modernist ideals in the country and as an often cited example of "bad aging". It is then proposed to imagine a possible refurbishment, reformulating traditional ideas of heritage preservation. This new approach will allow to re-insert this structure into the ever-changing fabric of urban centers, so that the building can evolve into useful heritage for the city in which it is located.

PLAZA DE ARMAS *BUILDING*

In 1954, Chilean architects Sergio Larraín[1], Emilio Duhart[2], Jaime Sanfuentes and Associates projected the Plaza de Armas *building, located in the historical centre of Santiago, on the corner of the main square of the city. The project was organized using the "tower and plate" typology, the same used on the Lever House, the office building designed almost simultaneously by Skidmore, Owings & Merrill in New York. The idea behind the building was for it to be used as a model for a complete redevelopment of the town centre by means of the repetition of this same typology: the towers would allow accommodating private programmes – office or dwelling – and the plates would be used as a continuous base for commerce which would be connected to the existing network of centre galleries of the capital.*

Literature dealing with modern architecture in Chile often mentions two things about this work: first, that it is an important building in the history of this movement, as it introduces a completely new typology, and, besides, on a relevant place in the city (Boza, 1990, 1996; Eliash, 1982). And second, that it is a building that has aged very badly, showing today a deteriorated image compared to the original project[3]. In the book Sergio Larraín G. M.: la vanguardia como propósito (Sergio Larraín G. M.: vanguard as a purpose), architect Cristián Boza argues that "the low quality of the closures, together with the climate and the city pollution, immediately gave it a decadent appearance" (Boza, 1990, p. 110). Architect Humberto Eliash adds that "the lightness of nonstructural materials attempt on their conservation over time. The aging of these and very noticeable stains on the concrete, made obvious the visual deterioration of the building" (1982, n.p.).

In front of a hypothetical intervention of the Plaza de Armas *building, the following question immediately comes up: what is the pertinent perspective to approach a work like this, taking into consideration the discourse built around it?*

MODERN HERITAGE

If we consider the Plaza de Armas *building as paradigmatic in national architecture, it is pertinent to use patrimonial architecture and historic preservation´s own approaches. In some of the best known interventions of modern heritage, whether they are restorations (Bauhaus Building in Dessau,* Casa del Fascio*), partial (*Villa Savoye*) or total reconstructions (*Barcelona Pavilion *of Mies van der Rohe), the most often applied criterion is that of erasing the traces of time, trying to recover the original splendour of the works. However, it is not the same with interventions on pre-modern heritage, where the original is usually differentiated from the new (Martínez, 2011). This seems to be explained by certain heroic character with which*

the modern movement began to be seen as from the 60s, a kind of Golden age – and therefore already finished – which we cannot access except through literal reconstructions of its iconic works (Hernández, 2008). In spite of these examples, one of the fundamental dilemmas for the theoretical reflection referred to the preservation of modern heritage continues to be whether to preserve the historic value of its surfaces or eliminate it in favour of a frozen and pristine image (Hernández, 2008).

There is the impression that the character of modern architecture is incompatible with the idea of ruin or deterioration itself, since this always wanted to be linked to the notion of "novelty" (Calduch, 2009). From its beginnings, this architecture experimented with new materials and building techniques; technical exhibition then became an architectural value and, at the same time, the main reason for the subsequent deterioration that many of these buildings suffered: many times products or materials were used over which the architect had no control or, simply whose behaviour in time was unknown. This is added to the fast spread of Le Corbusier´s ideas, synthetized in the "Five points for a new architecture", where he proclaims the separation between structure and closure, which he called "free façade". As a consequence, the closure stopped fulfilling the structural work historically assigned to it, being then built with any material.

Anyway, it may be possible to think of a modernity compatible with the idea of weathering, so as to avoid its ruin as well as its transformation into blocked, iconic works, always new (Calduch, 2009). Some authors propose the possibility of intervening respecting the material authenticity of the original, its transformations and deterioration or, in other words, making evident the fact that modern work is already an object with a history (Hernández, 2008).

WEATHERING

In the book On Weathering, *authors Moshen Mostafavi[4] and David Leatherbarrow[5] (1993) discuss these ideas in the realm of architectural theory. The concept "weathering" summarises in one word two realities which are deeply connected: on the one hand, it describes all those effects or traces produced by time – chronological and climatic – on what has been built and, on the other, it refers to all the building elements and resources that cause those effects, making them evident as well as reducing them. The authors argue that the difference between good and bad weathering is merely a cultural issue and, therefore, it is necessarily the object of constant updating. This can be shown by the difference between a building that has produced patina – generally seen positively –, and one that is simply stained or deteriorated; the limit dividing both concepts is diffuse.*

But the authors propose something else: the weathering of architectural works cannot only be foreseen, it can also be considered as a potential field project, so that this weathering results in favour of the architectural work, enriching it and giving it greater meaning. It is, thus, a "plus", an added value to the work, that makes it different from the traditional consideration of ageing as a "minus", like a pathology or loss of meaning, or the romantic view that is satisfied by the merely aesthetical contemplation of the ruins (Mostafavi & Leatherbarrow, 1993).

It seems useful, at this point, to introduce the concept of "entropy", which is defined as the measure or the degree of disorder of a system. In this case, we can think that a building is a system that constantly performs changes of energy and matter on its surroundings, thus suffering modifications in time (Césarman, 1997). Weathering can then be considered as a type of entropy, influenced not only by climatic and atmospheric factors, but also by the modifications performed by the users themselves, considered as another force or vector that must be taken into the equation. This approach would assess and measure the changes experienced by architectural works more precisely, and at the same time less prejudicially.

STRUCTURE AND HERITAGE

French architects Frédéric Druot, Anne Lacaton and Jean-Phillippe Vassal, authors of the book Plus: Large-scale housing developments: An exceptional case, *introduce an original approach to face works that imply the intervention of buildings. With the traditional tools of the architectural project, they try a different way from the one proposed traditionally by patrimonial architecture, even by the one that specifically deals with modern architecture. They propose that buildings constructed during the European post-war, anonymous, deteriorated and always risking demolition, might be re-evaluated and also considered heritage. "Never demolish, never take away or replace, but add, transform and always use" (Druot, Lacaton, & Vassal, 2007, p. 22) is the theme used as a premise*

for a series of projects to intervene large housing developments of the 60s and the 70s in France. Beneath these projects lies the idea that the modern movement is still rather unfinished and, therefore, susceptible to be continued and, besides, it is always more valuable to work from something pre-existing than from tabula rasa *(Druot, Lacaton, & Vassal, 2007). Architects argue that the central question that must be asked about modern buildings is regarding their present usage, something which is largely conditioned by the adapting capacity of their structure; it is this value of usage and recycling that gives these buildings their quality of heritage, a proposal that separates them from the traditional ways of rehabilitation and reconstruction and tends towards the concept of "transformation" (Druot, Lacaton, & Vassal, 2007).*

PLAZA DE ARMAS *BUILDING (ONCE AGAIN)*

Sixty years after its construction, the Plaza de Armas *building is a good case to study how time can affect a particular work. Based on what has been said so far, this building can be considered heritage in at least two aspects that have not been mentioned within the literature dealing with modern architecture in Chile: on the one hand, its structure allows incorporating changes and improving the standard of living of its residents, thus becoming heritage in the sense of usage and recycling value of Druot, Lacaton and Vassal. On the other, weathering on the surface and produced by its users as well as by climatic factors, can be seen as a source of knowledge, if we manage to study it in a systematic and exhaustive way, to make it project matter later.*

TOWER

On the façades of the tower, time has produced at least three variations. The first one, related to the "hatch pattern" of the building: the original lines that are drawn and organise the surfaces have become discontinued, cut by new and varied rythms and patterns introduced by the users. The second, related to the plumb of the building: its limit is no longer the original, but a series of new possibilities have been introduced, often vaguely defined and varying from one flat to another. The third fluctuation is related to the multiple materials, textures and colours that form the surfaces: the original façade, designed with a limited palette of materials, has become a sum of small patches, a true vertical landscape without a pre-established order. The actual width of the balconies, 109 centimetres, makes it difficult to use them as a room, therefore, they are frequently used as storage or utility places or as extensions of the flat. What can be seen is a double process of constant settling and modification in time, where the concrete structure is hardly enough to provide a framework of order.

FLOOR PLATE

The floor plate of the building consists of a three-storey elongated volume. Its largest façade faces the Municipality of Santiago directly and, diagonally, the Plaza de Armas. Its structure is the result of a combination of concrete buttresses and walls, with an off-centre rigid node that incorporates de lift shaft and the stairs. The program it houses is wholly commercial, formed by shops of small dimensions. The ground level shops have access from the street, while those of the second level open onto the interior gallery, so that all the efforts of the owners are made on the inside. What we can see from the street, then, is the back façade, where there is usually a storage room or small office. Modifications, deterioration, incorporation and removal of elements at this level are so vast that it is no longer possible to perceive the tidy and modulated façade of the original project.

The roof terrace of the plate was never used as the public space[6] once imagined, partly due to the fact that the programmes initially projected were not built and partly due to the effect of the limited space and circulation flow between the levels of the floor plate. In its place, the shops of the third level use the public terrace as a backyard or private storage, with the consequent material deterioration that produces. There is also a quantity of waterproofing work that has added more layers to the original pavement, increasing the weight on the structure and drawing a certain artificial topography. On the other hand, the management of rainwater has produced a structure of its own, not considered in the initial project (the original drainage, embedded in the structure, is not being used). Thus, a rainwater management system can be seen that was originally hidden.

The descriptions above clearly show the close relationship between the resolution of the architectural project and the way in which the users modify the building over time. In this context, the plant defines the weathering of the building: it determines whether a room is used more or less, conditioning the degree of attention and intervention of the users over it. Those modifications show an imbalance between what has initially been projected and the final use of the work, which eventually affects the façade. Hence, weathering

fulfils an unexpected role by making externally evident the maladjustments that take place internally.

CONCLUSIONS

In the light of what has been said, it is interesting to propose ways that allow rethinking the destiny of modern buildings, opening the options beyond restoration or demolition and understanding that the degree or type of intervention in each particular case is preceded by the definition of the elements that have a patrimonial value, that is to say, by an analysis that indicates what original aspects, configurations or intentions is worth preserving and what are not.

In some cases, it will be interesting to preserve not only the structure or volumetry, but also the logics or configuration of its façades, without implying that it would be necessary to replicate the original building methods or materials. First, because they are often obsolete and discontinued, but above all, because the original spirit of the modern movement, as has already been said, always wished to use the latest technology available. A good example of this option is precisely Lever House*: taking into account its immense historical value, its façade was rebuilt in 2012 by the same office that originally built it, replacing the old curtain wall by one of the same appearance but of a much better building quality (Ayón & Rappaport, 2014).*

In the case of more anonymous buildings or of less historic value, like the ones intervened by Druot, Lacaton and Vassal, it is possible to think of changes of a wider scope and at a larger scale. In these cases, the proposed definition of heritage as a value of current use or as a potential of transformation makes more sense. This possibility, more radical in appearance, has been included in the DNA of the modern movement since it proposes, triumphantly, the separation between structural elements and the light ones like partitions or closures, a consideration that distinguishes this architecture from the one of previous periods, when space, form and structure formed an indivisible unit.

Taking the above into account, structures of this type in modern buildings could be read as framework (or infrastructures), around which new configurations may emerge that consider not only changes introduced by climate, users or other factors, but also those that facilitate them. More than designing a specific form, what could be designed is the degree or type of entropy or change that the work is ready to accept.

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NOTES

(1) Sergio Larraín García-Moreno (1905-1999): Considered to be one of the most important Chilean architects of the modern movement.

(2) Emilio Duhart Harosteguy (1917-2006): Representative of modern architecture and considered to be one of the most relevant Chilean architects and urban planners of the middle of the 20th century.

(3) There are interviews with the architects, authors of this project, in which they comment on this topic and describe the possible reasons for it. Sergio Larraín says: "Those things were made of a very ordinary material [wooden lattice windows]. Here was the whole idea of economy to sell (...) low cost to make more money" (as quoted in Fuentes, 1997). In turn, Emilio Duhart states that they were "bearers of a message [the buildings], it can be said urbanism and architecture, (sic) (...) but unfortunately it was horrible, a badly delivered message because it could hardly be finished" (as quoted in Pérez, s. f.).

(4) Mohsen Mostafavi: Iranian architect and academic, studied architecture at the AA and is currently Dean of the Harvard Graduate School of Design.

(5) David Leatherbarrow: Architect and academic, studied at the U. of Kentucky and did postgraduate art studies at the Essex U. Currently professor of architecture and Director of the Graduate Group in Architecture of the Pennsylvania U. School of Design, Philadelphia.

(6) The use of the floor plate cover was, from the beginning, part of the architectural project. It was proposed as an elevated public space, with vegetation on its eastern border and a privileged view of the Plaza de Armas. That space would be made active by the restaurant that would be located towards the north of the base.