Environmental rehabilitation of the formal city: The case of Rio das Pedras in Rio de Janeiro

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ABSTRACT
This article explores the notion of "value" that lies beneath architectural preservation in order to establish a relationship between cultural and environmental values of the built heritage. To illustrate this case, an analysis has been done of the physical, social and environmental drama of the community of Rio das Pedras in Rio de Janeiro, adjacent to a lagoon where sewage flows from formal areas as well as informal settlements. Even though as a physical fact this informal settlement is a counter-image of the city architecture, the environmental load received by the urban environment is mostly produced by the formal neighbourhood next to Barra de Tijuca.

*The rehabilitation of informal settlements is nowadays a marginal topic as an architectural issue, even though it is not so for other disciplines. The physical or material maintenance of buildings is relevant as a construction question: structurally, they must be stable and have sufficient infrastructure and space. At an urban level, material preservation of informal settlements – in this article also called "slums", "*favelas*" or "*barrios*" depending on the context – has to do with the geological and topographic conditions (that they are not in areas of risk or polluted) and the legal aspects (that they do not violate rights of property or land use).*

Beyond its physical consideration, the social entity which the informal settlement is, too, is protected by the "right to the city" that countries increasingly apply to urban regulations. This right emphasises the social nature of private property and, with this it privileges the right of its residents to constitute the city by living in it and using it, beyond interests that intend to obtain an individual economic benefit from the land. Exceptionally, some informal settlements like the favela *in Morro da Providencia, in the heart of the historic centre of Rio de Janeiro and with a history of over a century, acquire, in addition, a cultural value that serves as an argument to consider them as heritage and thus preserve their physical structure and protect their cultural substratum.*

But, as a built form, as an architectural matter, informal settlements are not usually acknowledged as architectural heritage of the cities. Slums are, in fact, the counter-image of architecture: they do not comply with basic urban, construction and health standards and, what is more important, they are built without a previous plan. This double state degrades its "architectural projects" to mere "constructions" and creates the generally accepted antithesis that slums are averse to the city. Even well intentioned projects of urban improvement recently developed, underline this antithesis: from the "Cities without Slums" initiative of the United Nations, to the urban acupuncture projects of Giancarlo Mazzanti in Medellín or of Urban-Think Tank in Caracas. These initiatives reify a proto-modern view of heritage: that of the cultural "object" in front of the popular "fact". Architecturally speaking, slums are the children of a lesser God.

THE PRODUCTION COST OF THE FORMAL CITY

In turn, the formal city has an enormous cultural asset which is hegemonic. This asset is reflected, among others, in a series of regulations and quality standard linked to individual and social needs (streets must have various types of pavement; offices, air conditioned, and so on). One of the undesired consequences of these regulations that define the formal city, is that together, all of them require unsustainable quantities of several types of energy. The physical construction of cities is responsible for a large part of the ecological footprint that human beings[1] produce, and this footprint is exponentially larger in formal areas, in almost any quantifiable aspect: its creation itself implies huge quantities of pollution and energy in the production of reinforced concrete, tarmac, copper, plastic, and so on; and its

maintenance perpetuates the production of waste and the consumption of electric energy and water[2].

The cultural and economic asset of the formal city has its correlate in the environmental liability produced by itself, a problem that has been called "environmental justice" by authors like David Harvey (1998). This article argues that the environmental liability created by the city is absorbed by, or saved in, the informal city and that, in this way, informal settlements are part of the collective heritage where society must reflect itself. The article also argues that, in order for slums to be considered part of the built heritage of the cities, the discipline of the architectural heritage needs to overcome the cultural paradigm that limits its field of action.

The way in which informal settlements "save" the ecological footprint that the formal city consumes is both in its production as in its maintenance. In other words: if we take the quality standards of the formal city as universal, the resulting urban scenario – once the informal city has been incorporated into these standards – is dystopian. For example, to expand the slum of Dharavi to the population density standard of Mumbai would require expanding its urban sprawl more than 10 times (Fernando, 2014). Adapting the informal city to the standards of the formal city would require increasing the amount of electric energy and water consumed exponentially, and saturate an urban perimeter which has already been exhausted.

This paradox is described in the article "Environmental and Informal Urbanism – A Comparison", by Christian Werthmann (2008), coordinator of the Informal Urbanism Hub, United Nations. The article compares the transport and energy saving system of the SolarCity neighbourhood in Linz (Germany) with that of some favelas *in São Paulo. The result of the comparison is that* favelas*, with very underdeveloped technologies, manage to reach levels of energy consumption similar to those of SolarCity. Besides, the social support present in the* favelas *does not exist in the Linz neighbourhood, considered to be monotonous and disperse. Werthmann proposes, in this sense, that* favelas *should be considered as environmental urbanism.*

Werthmann´s argument runs the risk of being interpreted as a slippery slope that leads to confirm that the problems of informal settlements are necessary because they help to maintain the "balance" of the urban environment shared with the formal city. Far from accepting this conclusion, this article assumes that the lack of public and private space, as well as the lack of infrastructure and resources in the slums, are serious problems, caused partly by an "ideology of the affluent" that in cultural codes sanctifies the abundance present in the formal city and is part of the cause seen in informal settlements.

RIO DAS PEDRAS: EXPROPRIATE OR PRESERVE

The problem existing in favela *Rio das Pedras may be useful to illustrate this case[3]. This community, located East of Rio de Janeiro between the areas of São Conrado and Rocinha, emerged as a result of the demand for construction workers during the 60s, when the affluent residential zone of Barra da Tijuca, projected by Lucio Costa, was built. Due to the increasing demand for housemaids in nearby residential zones and construction workers for the building of the Olympic area of Rio 2016, the work attraction and the population of Rio das Pedras has continued to grow. Thus, its urban area has gone on expanding towards the adjacent Tijuca lagoon, around which there are numerous luxury residential zones such as the Via Privilege condominium.*

Formal as well as informal areas around Tijuca lagoon pour their sewage directly into the lagoon, polluting it and producing damage to the bottom of it, which represents an environmental problem in the medium term. This problem affects mainly the southern area of Rio das Pedras, getting all the time nearer the border of the lagoon. The frequency of floods has increased in the area and also the presence of mosquitoes that cause serious diseases such as dengue fever. The lack of a good sewage system and an adequate supply of drinking water increase the seriousness of this public health situation. In order to address this problem, the city of Rio de Janeiro recently looked for land where to relocate people who live in areas of risk of flood and infections. Most of the neighbours, represented by the Residents Association of Rio das Pedras, are against this plan that would take them to live in areas separated from their social and work connections. The neighbours propose the regularisation of property titles in Rio das Pedras, which would allow building permits in the zone and, in time, to have their own sanitation system with which to deal with sewage water.

Neither of these alternatives completely solves the root of the problems derived from the pollution of the water in Rio das Pedras. This is a consequence of uncontrolled sewage drainage all around the lagoon. The contribution per inhabitant and the damage to the bottom of the Tijuca lagoon is, in fact, exponentially lower in Rio das Pedras than in the luxury residential areas around Tijuca lagoon. The residential towers have been built higher than the lagoon and have a mangrove zone that muffles the stench of the lagoon; they also have swimming pools and gardens. Relocating part of Rio das Pedras eliminates the responsibility that residential housing areas have to cover the environmental cost that they produce. This option is not included in any known plan for the zone, partly due to the pre-eminence of the "ideology of the affluent" of the formal city: given a common problem, it is preferable to adjust informal settlements to the formal standard (by means of expropriation and relocation) than change the statu quo of the formal city (assume that most of the environmental cost is produced by formal areas). In this case, the devalued state of Rio das Pedras as an irregular settlement does not allow considering the degree of its contribution to the problem, in spite of the fact that the architecture of the formal city produces most of it.

HERITAGE, BEYOND THE CULTURAL PARADIGM

If the formal city contributes the most to the ecological footprint of the city: What is the specific cost for it to follow formal standards and to be in line with a previous project? To what extent does the cultural value of the formal city suppose a greater common good than the environmental cost of the informal one? Limiting the "architectural value" to its cultural side reduces the capacity of architecture itself to respond to the environmental problem of the cities. This reduction mistakes the part for the whole: what is not culture, does not have any value – and therefore, for disciplines like heritage, it does not exist. Engineering, or the science of materials, is studying how to limit the environmental impact derived from the form in which we build our surroundings (Solis-Guzman, Martinez-Rocamora, & Marrero, 2014), but the reality is that most of those surroundings have already been built either formal or informally. The "ideology of the affluent" would try to manufacture more sophisticated products all the time so that they do not alter the consumption level of hegemonic culture and would propose models of "tabula rasa", that allow demolishing and raising the informal city to the level of formal city. As an alternative, this article proposes the study of informal settlements as built heritage in contrast with the environmental unbalance produced by the formal city. In this context, architectural rehabilitation has the opportunity to incorporate informal settlements into its epistemological body, even though in order to do so, it must overcome the framework of what is "cultural" as the only window from which to understand the built environment.

REFERENCES

ALTSKAN, A., et al. (2014). *Rio das Pedras: A Toolbox for Community Improvement. Studio Report from the Graduate School of Architecture, Planning and Preservation, Columbia University*. Available in: http://www.arch.columbia.edu/files/gsapp/imceshared/cc.

EUROPEAN COMMISSION. (n.d.). Research & Innovation. Key Enabling Technologies Retrieved July 27, 2015, from: http://ec.europa.eu/research/industrial_technologies/eeb-challenges-ahead_en.html

FERNANDO, B. (2014, April 2). An urbanist's guide to the Mumbai slum of Dharavi. The Guardian.

HARVEY, D. (1998). What's Green and Makes the Environment Go Round? In F. Jameson, & M. Miyoshi, *The Cultures of Globalization*. London: Duke University Press.

SOLIS-GUZMAN, J., MARTINEZ-ROCAMORA, A., & MARRERO, M. (2014). Methodology for Determining the Carbon Footprint of the Construction of Residential Buildings. In S. Muthu, *Assessment of Carbon Footprint in Different Industrial Sectors (Vol. 1)* (pp. 49-83). Singapore: Springer.

WERTHMANN, C. (2008). Environmental and Informal Urbanism – A Comparison. In O. Hamm, & O. Bartels, *Metropolis: Resources (Vol. 2)*. Berlin: Jovis.

NOTES

(1) Institutions like the European Union acknowledge the fact that their homes and buildings represent 40% of the total energy consumption and they contribute the most to greenhouse emissions (European Commission, n.d.).

(2) The relevance of energy consumption and the ecological footprint in the production of space and architecture has been made evident in articles, magazines and recent lectures of the academic world. In Spain, Madelyn Marrero's research team is working on the calculation of the ecological footprint produced by building construction and demolition; in Chile this issue was dealt with as a monograph in the publication Revista ARQ No. 89 "Energía y recursos" ("Energy and resources", April 2015); on the other hand, in the anglo-saxon world, the symposium "Waste" (Harvard University, 2014) and the conference "Producing Waste, Producing Space" (Princeton University, 2015) also dealt with this issue.

(3) The information presented in this article is based on the research and development of a postgraduate course of an urban project on Rio das Pedras, which was carried out at the Columbia University between January and May 2014, whose co-instructor was this author. The course included a research trip to Rio de Janeiro and Rio das Pedras, as well as numerous interviews with social agents from related public, private and community institutions. The course result has been recorded in a research report (Altskan et al., 2014) and it is part of the "Rio das Pedras" GSAPP initiative, with whom a more complete report is expected to be published in 2016. It is worth mentioning Claudia Franco Corrêa, professor and community leader in Rio das Pedras, as an expert in the area, with a detailed study on the commercial use and "land right" in Rio das Pedras.