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The building concept in hybrid systems constitution (Kiron system)

Ernesto C. Curiel-Carías*

Facultad de Arquitectura y Urbanismo, Universidad Central de Venezuela, Apartado Postal: 89.748, Caracas, Venezuela

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Abstract

Environmental devastation caused by the existing dissociation between the organizational logic of living systems and that prevailing in artificial systems, is accented in inter-tropical areas where a great habitation demand coexists with important ecosystems. Based on the vast information on living systems, this paper outlines a first approach to the building concept (as an environmental conditioning apparatus) which would contribute to reconcile both organizational logics through the constitution of new hybrid systems.

Keywords: Buildings; Living systems; Artificial systems; Hybrid systems

1. Introduction

In recent years, serious difficulties to implement the Brundlant Report aspirations [1] in regions of the Third World have been made evident. The double purpose of increasing the exploitation of natural resources, which the increasing human needs in those regions do require, without compromising even more the dynamic stability of the biosphere results in very difficult goals.

This is due, as it is known, to multiple and complex causes, some of them being factors that "... are inseparably tied to the conception we have of the relationship between society and nature" [2]. More specifically, it can be said that this is a product of the profound dissociations existing between the logic that guides the structure and functioning of natural systems and the one prevailing in artificial systems, giving place *to two interpenetrated but poorly integrated worlds* [3]; systems of different nature forced to coexist in one planet, seriously compromising the future viability of the global system.

The existence of a unique system also implies that we adopt the premise that artificial systems constitute only subsystems of it and, as such, their partial objectives should be subordinate to the interdependence principle and to the achievement of an important common objective, the dynamic equilibrium of the planet as a whole.

In this paper the magnitude and complexity of discussions on the subject are limited to two aspects: on one hand, to the regions of the Third World, concretely, to the protected areas of inter-tropical regions as depositories of particularly important and fragile ecosystems, and, on the other hand, to the built up environment, to the discussion on buildings (as an environmental conditioning apparatus) located in those scenarios and their surroundings.

The specific problem is then restricted to the distortions arising from relationships between the building and nature in the indicated context, that is to the negative effects of buildings on the immediate landscape (ground, soil, vegetation, microclimate, natural drainage systems, wild life habitat, water and air quality, etc.) and on the biological requirements of their occupants (thermal, acoustic, luminous, anthropometrics, ergonometrics and water and energy supply deficiencies, etc.).

*Fax: +58 0212 9916260.
E-mail address: ecuriel@reacciun.ve (E.C. Curiel-Carías).

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The impacts that can frequently result are common to buildings in general, get more serious in the intertropical regions of the Third World due to circumstances such as: (a) extensive habitational demand in the immediacy of protected areas—as a product of fast population expansion and the fight against poverty—and to the same infrastructures foreseen inside of them to locate diverse activities, (b) the particularities of their ecosystems, especially those fragile and vital for the rest of the biosphere, including the rain forest, the mangrove formations, the coral reef and the gallery forest, (c) the precarious concepts and criteria used in building design, a matter contrasting with the huge amount of information available on the behavior of the natural systems where they are located.

Such problems can be approached from diverse disciplines and different scales, but an integral approach to building design (including their environment conditioning) is, by definition, an architectural problem.

In professional architectural practice in low latitudes it is frequently observed, for instance, that there is a tendency to deal with images more than with concepts. The image of a possible building rigorously designed according to the exigencies of its natural context, even though paying attention to its formal values, will hardly have acceptance in front of those used to the images of the architecture in vogue. In this way, buildings constitute *artificial systems* generated by unrelated *value systems*, and even opposed to the exigencies of the *real system* in which they are inserted.

Then, the indicated distortions concern to a great extent the architecture as a discipline. It is possible to say in advance and to remember, from such a perspective, two possible explanations for this problem: (1) the difficulty of the local architect to interpret and apply the knowledge arising from other disciplines. Even though the vast information contained in sciences that offer a great level of depth in many of the natural variables that influence or should influence building design, a huge amount of information related to design remains repressed in those sciences. This happens because of the lack of adequate techniques and conceptual resources allowing the capture and incorporation of that information as design determinants [4]. (2) In these regions the explanations offered decades ago by authors such as Hillier, Leaman and Steadman are still in force, in the sense that construction technology does not derive from intrinsic nature building, which is to say from a theory that underlies the function this technology pretends to execute "... arising its improvement and innovation on a simple preoccupation on the media more than on the endings... we are suggesting that the answer should be the ⟨what⟩ of the construction more than the ⟨how⟩" [5].

Assuming this last point, the specific goal of this work is the conceptual development of the environmental conditioning function of buildings and, particularly, of those located in ecosystems characterized by their importance and vulnerability. It is followed then to conceptualize ⟨*which*⟩ thing is or should be a building (as an environmental conditioning apparatus) located in those scenarios, relaying for that the large information that natural sciences are offering nowadays on living systems.

The pressure that habitation requirements are exerting on the biomes in dozens of countries in the intertropical regions, justifies efforts to develop concepts that allow us to conciliate the exigencies of natural and artificial systems located in those scenarios, because even though new areas can be declared protected, the activities foreseen inside them (research, surveillance, education, recreation, administration) are asking for an elaborate installation design departing from *ad hoc* concepts that have not yet been sufficiently developed. The experiences obtained in those scenarios (or *laboratories*) would serve as reference for other buildings to be constructed in nearby zones, which are not protected by special regulations.

2. Method

The initial emphasis on the analysis of one of the many functions which a building should meet (environment conditioning) suggests that the selected theoretical context for it should be broad and flexible enough to facilitate its articulation with other aspects that also integrate the building design (symbolic function, economic function, contention and activities organization function). In that sense, it is proposed that we adopt the Systems General Theory (SGT) as a fundamental basis for discussion. This theory tries to reduce the behavior of systems as different as the physical, the biotic or the socio-cultural to a common group of principles. Similarly, in view of the importance that biophysical factors have on the selected function, the emphasis will be put on those theories of living systems compatible with SGT. While adopting elements from those theories as initial propositions it will be possible to infer, through analogies and deductions, some of the attributes that should integrate the concept of those artificial systems tightly related to living systems.

Knowing the potential deviations and limitations of this kind of reasoning (analogical and deductive), it is convenient to clarify the following:

(a) Due to the risk of getting into senseless analogies, these will not be used for establishing a correspondence between elements of living systems (LS) and elements of buildings or artificial systems (AS), but between the relationship system that links the elements of every category system. Moreover, they will be used to guide or suggest possible attributes of the AS that only have the