ARCHITECTURE AND SYSTEMICS – IN PRAISE OF ROUGHNESS

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Abstract

Architecture is a complex idea in its own right. In architectural culture, systemic references are not new. Design theories, in Europe as well as in USA, have often referred to many concepts more or less strictly linked to Systemics and to scientific domains such as Information theories and Cybernetics.

Quite often, such references have been a mere metaphorical suggestion or, as in the field of "rational" design and process engineering, they mostly have heavy functional overtones. Such is the idea of "performance", whose original definition was meant as an industrial design tool pursuing optimization, linking together the users' needs and the requirements an artifact must possess to satisfy those needs.

But, as we know, "bottom up" emergence processes have nothing to do with "top down" design strategies for optimization.

Nevertheless, the idea of performance conveys the meaning of a strong influence intercurring between two entities, one of them on the "giving" and the other one on the "taking" sides, both of them interacting through feedback. For this reason, I believe the idea of *performance* should not be discarded lightheartedly. Rather, a "softer" notion of performance, linked to the realm of social perception and attachment to places, should be brought to thorough definition. It might be useful to find a more productive, non-metaphorical use of systemic references to understand and (then) to design - or to redevelop - human settlements.

In the first Book of his monumental, ultimate theoretic work[1] about the principles of architectural and urban design, Christopher Alexander identifies fifteen structural features which "appear again and again in things which do have life". These properties are: levels of scale, strong centers, boundaries, alternating repetition, positive space, good shape, local symmetries, deep interlock and ambiguity, contrast, gradients, roughness, echoes, the void, simplicity and inner calm, not-separateness (Alexander, 1980). The property of ROUGHNESS seems to me a promising starting point on the way of clarifying the possible links between Architecture and Systemics.

Roughness, according to Alexander, is an essential structural characteristic of things which have real life because these things "have a certain ease" which prevents them from being morphologically perfect and thoroughly regular. Roughness is not a residue of technical flaws or manufacturing inaccuracy: it is "an essential structural feature without which a thing cannot be whole"[2]. Provided that the industrial idea of optimization is eliminating uncertainty and flaws from the product, Alexander claims that in architecture "life" and "wholeness" have nothing to do with

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[1] C. Alexander, *The Nature of Order – An Essay on the Art of Building and The Nature of the Universe. Book 1 – The Phenomenon of Life; Book 2 – The Process of Creating Life; Book 3 – A Vision of a Living World; Book 4 – The Luminous Ground*. The Center for Environmental Structure, Berkeley, California; 1980 – 2002.

[2] C. Alexander, *Op. Cit.* Book 1, p. 210.

flawlessness. Rather, the act itself of making things gives them life, as "process is the key to making life in things"[3]. More than that, roughness becomes an inherent, essential quality of architecture, and it should be pursued by design at all scales.

In public spaces, Alexander explains, "the power of instincts" encourages people to take up positions from which they "can protect their backs". He says that, in a courtyard as well as in a public square, "something in the middle" – such as a tree, a monument, a seat, a fountain – is a necessary feature precisely because it allows people to feel more protected[4]. Alexander argues that these centrepieces should be placed according to the pattern of the natural lines of communication which cross a public space, as traced by the people's movement, as in the teaching of the great Viennese planner Camillo Sitte[5]. On this point, Alexander makes a significant observation, noting Sitte's critique that "the impulse to centre something *perfectly* in a square is an "affliction" of modern times."[6] That is the reason why the title of this chapter of Alexander's great treatise is: "Something *roughly* in the middle".

At the other end of the scale we find the design of a component, such as a window. Windows are capital transition points in a house, connecting indoor and outdoor space, letting air and light in, keeping cold weather and rain out. In windows, different parts open and close, and different materials meet and connect with each other, according to functional as well as to aesthetic requirements. Industrial components, and the modern system building, normally guarantee the functional quality and the "perfect fit" required. Alexander argues that "the precision of the component can only be obtained by the most tyrannical control over the plan" in order to reduce tolerances and inaccuracies, while a natural building should be able to keep adapting to the site all along the construction process. Thus, "a free and natural building cannot be conceived without the possibility of finishing it with trim, to cover up the minor variations which have arisen in the plan, and during the construction". In such a way, tolerance can be larger and mistakes on the order of half an inch or more can be allowed. While concealing inaccuracies from variations, trims give life to the building, they make its image richer and whole. "Indeed, within this attitude to building, the trim is not a trivial decoration added as a finishing touch, but an essential phase of the construction (…) [it] is in fact a vital part of the process of making buildings natural"[7]. So, ornamentation goes along with function, within a design approach which is actually a philosophy: "Totalitarian, machine buildings do not require trim because they are precise enough to do without. But they buy their precision at a dreadful price: by killing the possibility of freedom in the building plan"[8].

Arguably, perfect symmetry does not belong to Nature: the interplay between the well-defined order of natural objects and living things, and the constraints of the three-dimensional space in which they

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[3] C. Alexander, *Op. Cit.* Book 2, p. 4.

[4] C. Alexander et Al., *A Pattern Language*, The Center for Environmental Structure, Berkeley, California, 1977; pp. 606 – 607.

[5] Ibidem.

[6] Ibidem.

[7] Ibidem, pp. 1113 - 1114.

[8] Ibidem.

grow and develop, seems to result in roughness as a natural quality. In itself, Nature constantly puts constraints in any developing process, which result in variations of each individual – being it a sea-wave, a crystal, a flower … – within the boundaries of the customary features of its own kind. Thus, the quality of roughness is not caused by inaccuracy but it is the consequence of a well-defined and necessary order[9].

These considerations refer to the introduction of ideas and words coming from the realm of systemics into the world of architectural design, in the early '60s of XX Century. In those days, design method was investigated and developed as a discipline in its own right[10] . Morris Asimow, one of the most influential author, in his seminal book *Introduction to Design* [11] describes design as an information process[12] consisting in "the gathering, handling and creative organizing of information relevant to the problem situation; it prescribes the derivation of decisions which are optimized, communicated and tested or otherwise evaluated; it has an iterative character (…)".
The idea of performance stemming from this approach was part of a complex design device aimed at reducing uncertainty in the design/construction process and promoting regularity in the product. Architecture is about life, and – as life itself – is admits and endless variability. A wider idea of performance should take into account that "the system chooses among equivalent configurations according to opportunities which are not prescribed. Equivalent configurations are such because all of them have freedom degrees and thus all of them are *allowed to happen*. In this way, the system takes on a unique behavior among infinite possibilities. This is the richness of indetermination, as investigated by emergence processes. (….) Concepts such as correct, precise, comprehensive, rigorous, true-false, exact (…) are inadequate for the systemic complexity"[13].

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[9] C. Alexander, *The Nature of Order, Cit.*, Book 1.

[10] G. Broadbent, Design in Architecture, Wiley, 1973.

[11] M. Asimow, *Introduction to Design*, Prentice-Hall, 1962.

[12] In: G. Broadbent, *Op. Cit.*, p. 254.

[13] G. Minati, "Note di sintesi: novità, contributi, prospettive di ricerca dell'approccio sistemico", in: L. Urbani Ulivi, *Strutture di mondo. Il pensiero sistemico come specchio di una realtà complessa.* , Il Mulino, Bologna, 2013