

Living Systems and Living Architecture

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ABSTRACT: The precise scientific distinction between organic and non-organic life and matter has extended the dichotomy of a living and non-living world. The attempt to define living systems in ecology as being composed of organic as well as non-organic matter, including people and space, plants and animals, rocks and concrete in one system, has helped to bridge the gap between these two worlds. Architects, builders, planners and gardeners can look at and approach the design of buildings, the urban structure, and the urban landscape with one unified view and process.

While this new view has become popular in green and sustainable architecture theory and practice, a more specific theory of living architecture has been developed concurrently with this ecological view, that sees organic and non-organic nature in one systemic view. In this theory the nature of space and matter forms the foundation of living structure and living architecture. The key terms are that of 'centers and field of centers,' that help the architect to work on a building, a bench, an urban plan in such a way that starts to create a living structure.

The paper will explore differences and similarities in the approach and meaning of living systems as proposed by the green architecture theory and the theory of 'centers' proposed by the living architecture theory.

Keywords: Living Architecture, Sustainable Architecture, Green Design, Ecological Systems

1. Introduction

In this paper we are employing a classical method of discourse in teaching and learning that has already been applied by the early Greek philosophers: the dialog. We are recording such a discussion between a teacher and a student about the topic of living systems and living architecture, where the student asks sometimes very difficult questions and the professor tries to answer these questions from the point of view of the living architecture tradition that he and his colleagues were working on in Berkeley, California.[1]

2. Definitions: life, organisms, systems

2.1 Life

Andrea: *What is the "precise scientific distinction between organic and non-organic matter?" Are you talking about carbon-based substances versus substances without carbon (as in the chemistry definition of organic)? Are you talking about "organic" as in "organic" food--food that is grown without the use of artificial chemicals? Are you talking about "organic" as in "organic" growth--growth that occurs spontaneously and piecemeal, in the style of A Pattern Language? [2]*

Hajo: In some ways I am talking about all of these, but for our purposes I am more interested in the definition of life. And in the twentieth century scientific conception of

life, what we mean by life is defined mostly by the life of an individual organism. And we consider as an organism any carbon-oxygen-hydrogen-nitrogen system that is capable of reproducing life.

A: *You say that this definition "has extended the dichotomy of a living and non-living world." What is the dichotomy? Has it extended the dichotomy or blurred its meaning? How has it extended the dichotomy? What is the relationship of "organic" to "living?" Are you using "organic" and "living" as synonyms?*

H: Here is a central point of this discussion. We do not have in twentieth-century biology a useful, precise or adequate definition of 'life' that includes both man-made and natural things – together. The definition of life has only been applied to a limited set of phenomena. So far we have no description of life that clearly applies to larger and more complex systems such as those we deal with in architecture, urban design and planning. And many people agree that we want to build towns and buildings that play their proper role in the preservation and continuation of life on earth. This has come about in large part because of the growing interest in ecology.

2.2 Living Systems

A: *"The attempt to define living systems in ecology as being composed of organic as well as non-organic matter..." What do you mean by "living systems" here?*

Does this mean that "living systems" include everything? What do "living systems" not include?

H: In ecology we have begun some extrapolation of the idea of life to more complex systems and have managed to somehow extend the mechanical to cover ecological systems. A living system in ecology is roughly described as a system that contains living organic entities and non-living non-organic entities that nevertheless live together in one system that is capable of sustaining itself. Like life in a pond with fish, frogs and ducks, water and rocks, and plants and algae may be considered such a living system if it fulfills the condition to sustain itself.

A: "...including people and space, plants and animals, rocks and concrete in one system..." Are you saying that "people and space" are fundamentally different, as are "plants and animals" and "rocks and concrete?" Do people have something in common with plants and rocks? Does space have something in common with animals and concrete? Why did you write this list this way? It's very intriguing.

H: Just as in a pond, we could look at a building with people and animals, and plants and building materials that may be considered a living system. Traditional farms were capable of sustaining their life, and modern buildings with green equipment and infrastructure are trying to do the same thing. [3] And in this sense the ecological definition of living systems has certainly helped to bridge the gap between living and non-living systems by putting them together in particular conditions of ecological balance. Since you are asking what is not included in this definition, it is obviously non-living systems by themselves, such as rock formations or sand in the desert.

3. Theories

3.1 The Unified View: Preserving Life

A: You wrote: "Architects, builders, planners and gardeners can look at and approach the design of buildings, the urban structure, and the urban landscape with one unified view and process." What is the "one unified view and process?"

H: Well, the unified view is to understand life on earth as living systems that are capable of maintaining themselves. The view is that these systems need to be preserved. And the view is also that we would like not only to preserve what we value but also create living systems in our buildings, gardens, neighborhoods, urban centers, suburbs, towns and communities. And in more general terms we can simply say that the objective is to create life as an effort to increase organic life in a particular part of the world.

3.2 The Living System Understanding

A: "While this new view has become popular in green and sustainable architecture theory and practice..." What is the "new view" exactly? Is it just that designers can use one unified view and process? (Is it a view about a view?)

H: I think the view I have briefly described can be and is accepted by many people especially in the green community. But as we probably already noticed this view has difficulties in understanding truly complex systems as living things. The mixture of natural and man-made, which exists in any city, or any building, raises complicated questions of definition. In all of these cases that are described as living systems, we obviously have non-living systems mixed in with living systems: the rail of a bridge, the double glass in a window, the concrete columns of a building. In normal scientific understanding one could not possibly call these elements alive, but they still play an important part in the overall life of the system. In a strict sense however, a city is not a living system, nor is a building a living system. So, are we stuck with the incomplete living system understanding?

3.3 The Living Architecture View

A: "...a more specific theory of living architecture has been developed concurrently with this ecological view, that sees organic and non-organic nature in one systemic view."

You've described the "view" so that I understand it much better now. However, I'm not sure what the "process" is. Also, how does understanding the importance of non-living aspects of living systems inform design?

Also, what do we gain by having a "complete living system understanding?" Or, what do we lose by having an "incomplete living system understanding?"

H: Here we come to another important point in our discussion. My colleague Christopher Alexander has developed an understanding, a theory that helps us out of this dilemma. Throughout his book *The Nature of Order* [3], he is actually looking for a conception of life, in which everything organic or non-organic actually has some degree of life. His aim is to define a scientific view of the world in which the concept – that everything has some degree of life – is actually well defined. Although this may sound a bit absurd for some scientists, it indeed would help us out of our problems of definitions and conceptualizations. And since quite a few people have started to use this concept in their work, teaching and research, it is certainly worthwhile to pursue this concept, certainly as much as the living systems approach from ecology.

And in this case, as Alexander points out, the particular degree of life that occurs in an organism will then be seen as a broader conception that can also help us as architects, builders, designers and planners and give us a coherent picture of what we are doing when we try to create something with life, to create what we may call living architecture.

4. Method and Process

4.1 Measuring Life

A: *To clarify, it sounds like you are contrasting three different ideas.*

One: the idea of the distinction between life and non-life, which I believe you sometimes call the "old view."

Two: the idea (stemming from ecology) that living systems include non-living elements. I believe you call this idea by several names: "new view," "green and sustainable architecture theory," "ecological view," "living systems understanding," or "one unified view."

Three: the idea (from Alexander and others) that everything has some degree of life, called the "living architecture view" or "living architecture structure theory."

How does each of these ideas affect design? What are the ramifications of each of these ideas on design? For the third idea, does this mean that sand in the desert has some degree of life? If so, how does it manifest its life?

H: Let us start with the last part of your question. The question of course is how to measure degree of life so that it is useful for the design, building, and planning process. The method used in this third view is a different method from the currently accepted methods in science, because the basis of this method is the use of the self as a measure of life in a thing, in a situation, in a process. And the scale for relative degree of life is not numeric or linear but simply more or less life.

Measuring degree of life that translates into building quality in our case can be done in this method by employing simple questions. These questions are aimed at evaluating the degree of resonance we feel in a physical object. Which of the two objects (or design alternatives) is more alive is an obvious question that can be employed over and over again in a design and building process. Other questions include which of the two or more windowsills is more alive? And then there are more advanced questions that go deeper into the subject such as: Which of the two is a better mirror of my inner-self? Here you can see why this view, and its method, has a direct impact on how we design and build. [5]

The extension of this operation to multiple scales (of a building) creates a process. This process is governed by the objective of creating more life at any stage by testing and questioning the degree of life and the choice we have to make to bring more life into the making of (for example) a column. It is one of the main ideas of this approach or view to develop and provide tools which help a student, a designer, an architect in establishing a procedure of designing and making, that addresses the degree of life (and value) in architecture that ultimately helps to create a better environment.

4.2 Fundamental Building Blocks

A: *I was wondering if you would go further into the concept of centers and fields of centers, because you haven't really talked about what this means yet.*

I think what you are saying is--in both the "green theory" and "the more specific theory of living architecture"--that organic and non-organic matter are part of one holistic system. However, the latter theory gets more specific by talking about centers and fields of centers. So I also think you are saying that the latter theory is a subset of the former--but that the latter theory is stronger and more powerful because it is founded on and inspired by the nature of matter and space.

H: Once you have accepted the broader definition of life and the measurement of life in terms of relative degree of life, at least as a working hypothesis, it is then possible to experiment with the method of measuring life as 'more or less' in a building, a garden, a window seat and a design procedure.

This then also opens up new possibilities for looking at architecture and the environment, the design and building process in formerly inaccessible new ways. One of these new ways is to look at space and matter as possible fundamental building blocks that might help to create more or less life in any region of space. The concept of centers and fields of centers are possibly more specific building blocks of life and architecture that can be explored as carriers of environmental and building value.

Overall, the green theory and the living architecture theory come from similar backgrounds, in particular systems theory. And they go partially in the same direction and partially in a different direction. Because of its similarity to a particular approach within the ecological range of approaches, the living architecture approach is also identified with what Guy and Farmer call eco-centric approach.[6] Nevertheless, the living architecture view of the Pattern Language background has particularities that make it specific and coherent on its own as a theory and practice in architecture.

5. Unanswered Questions

A: *Is the "living architecture theory" founded on our current understanding of physics (the nature of matter and space)?*

If so, what if our current understanding changes? Will this "living architecture theory" become obsolete? Or will it still be a valid basis for design?

Is the "green and sustainable architecture theory" founded on any kind of worldview (as the "living architecture theory" appears to be)?

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[1] The living architecture tradition was first developed in Berkeley, California, with Christopher Alexander as the main proponent. Hajo Neis taught with Chris Alexander in this area of emphasis and philosophical direction at the University of California in Berkeley from 1990 to 2000.

[2] Alexander, C. and Silverstein, M. et al. (1975). *The Oregon Experiment*. New York: Oxford University Press.

[3] One area where the value of people in the creation and maintenance of buildings as living systems can be seen is the literature on participation. Van der Ryn and Cowan emphasize that every person is also a designer, and a potential system's operator of a building. Van der Ryn, S. and Cowan, S. (1996) *Ecological Design*. Washington DC: Island Press.

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