



Editorial

# Christopher Alexander and His Life's Work: The Nature of Order

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Received: 22 February 2019; Accepted: 1 March 2019; Published: 7 March 2019



**Abstract:** This editorial briefly introduces Christopher Alexander, as a theorist, as a design practitioner, as an architect, and importantly as a scientist, as well as his life's work—*The Nature of Order*—focusing not only on the trinity of wholeness, life, beauty, but also on his new organic cosmology.

**Keywords:** life; beauty; wholeness; living structure; organic view of space

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Christopher Alexander is an iconic figure, not only in architecture and design, but also in computer science. He has long been recognized as the father of design patterns movement in computer programming since the 1980s [1]. He was widely known in the field of design, ever since he published his first book—*Notes on the Synthesis of Form*—arising out of his PhD study in architecture at Harvard. He published hundreds of papers, books, and essays on topics in architecture, design, and computer science. Many of his works are classic and/or best-selling, e.g., “*a city is not a tree*” and “*A Pattern Language*” one of the trilogy together with the other two: *The Timeless Way of Building*, and *The Oregon Experiment*. The pattern language book is a widely read architectural treatise [2], and it directly triggered the design patterns movement in computer science, and later the invention of the wiki framework—the basis of Wikipedia and many others [3]. *The Timeless Way of Building*—written in a hypertext format—is in some ways the foundation of his design philosophy, and an architectural book with deep philosophical meanings, or a philosophical book with architecture as examples, as described by Nikos Salingaros (1997) [4].

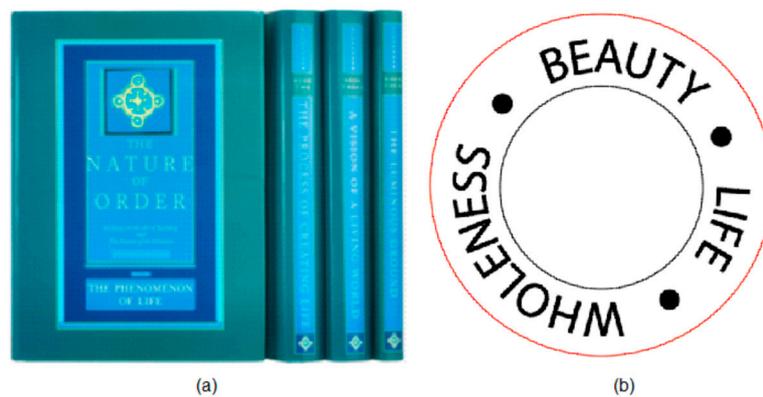
Alexander is not only a theorist, but also a design practitioner, seen from his hundreds of building or design projects across the entire world, many of which were through his life-long lab, The Center for Environmental Structure, and under his direction. He is not only an architect, but also a scientist. His education began at Cambridge in natural sciences and then moved to architecture. Although there was a beginning of scientific architectural theory at Cambridge, headed by Lionel March [5,6], Alexander strongly felt that the then-prevailing idea of architecture was baseless and arbitrary. He decided by then to conduct empirical studies and to develop a scientific foundation for the field of architecture. In 1958, as early as he could after completing his education at Cambridge, he left for Harvard to do his PhD in architecture [7]. His entire career effort was to pursue beauty in the built environment, to make beautiful things and environments such as gardens, buildings, streets, cities, and even artifacts. His works are substantially cumulative, so they should be read as a coherent whole rather than as fragmented pieces.

Among his works, the best is arguably the four-volume book—*The Nature of Order* [8] (Alexander 2002–2005)—on which he spent 27 years, immediately after the influential pattern language work. A first draft of the book as one volume was finished, and circulated among his close colleagues and friends, just before the famous debate between Alexander and Eisenman (1982) [9]. With the subtitle of *an essay on the art of building and the nature of the universe*, the book was intended to lay a scientific foundation for the field of architecture [10], but inevitably also engaged other scientific

fields, such as physics, mathematics, cosmology, biology, ecology, psychology, and cognitive science. The fundamental thesis of this book is that order in nature is the same as in what we make or build, as well as in what we experience. Alexander developed the concept of wholeness to characterize the degree of order that pervasively exists in our surroundings as well as in the universe, virtually ranging from the largest of the universe to the smallest with Planck length. Unlike those who limit their works to the understanding of nature or built environment, Alexander's work, or the very concept of wholeness, aims not only for the understanding, but also for the making or remaking of living structure.

Everything—according to Alexander—possesses a certain degree of life, and the degree of life is an objective and observable characteristic of everything in our surroundings, including, for example, galaxies, waves, ripples, gardens, buildings, cities, streets, and even stones and dead trees. The concept of life—which has its original root in Whitehead (1938) [11]—goes beyond the biological meaning as something self-reproducible and animated, so it is a larger or more general idea. For example, not only a living tree but also a dead tree has life structurally, as long as there are far more small things than large ones, or more precisely as long as the notion of far more smalls than large recurs multiple times, which can be measured by the ht-index, a head/tail breaks induced index [12]. Life is synonymous with such terms as vitality, aliveness, and beauty. Life is in the very substance of space itself, and it is structural and objective, in terms of the underlying structure of wholeness, so it can be comprehensible from the perspective of mathematics and physics. However, by the time of publication of *The Nature of Order*, there was no mathematics powerful enough to capture wholeness, so Alexander used hundreds of pictures, photos and drawings from both nature and what we make or build to illustrate his thoughts. Recently, a mathematical model of wholeness has been developed, and it is capable of addressing not only why a structure is beautiful, but also how much beauty it has [13–15]. The science underlying *The Nature of Order* is not only to understand complexity in nature and buildings—the focus of *The Phenomenon of Life* (Volume 1)—but also to create a greater degree of life in our surroundings, as well as in artifacts (*The Process of Creating Life* (Volume 2) and *A Vision of a Living World* (Volume 3)). Thus, the central theme of the book is not only the nature of order, but also the nature of life and beauty.

Beauty is traditionally considered to be in the eye of the beholder, meaning that it is subjective, varying from person to person or from time to time. Alexander, however, challenged this traditional wisdom, arguing that what we call beauty exists physically as a living structure, not only in arts but also in our surroundings, and it can be quantified and measured mathematically [13]. He further claimed that the quality of architecture is objectively good or bad for human beings, rather than only a matter of opinion. There is a shared notion of beauty among people regardless of their faiths, ethics, and cultures, and it accounts for 90% of our feelings. The idiosyncratic aspect of beauty accounts only 10% of our feelings, and depends on relatively small differences of individual life and cultural history or biology. As Alexander claimed, beauty or order coming from a segment of music is no different from that of a physical thing like a tree, since both the music and the tree possess the kind of living structure with far more smalls than larges. Both life and beauty come from the same source, the very concept of wholeness (Figure 1). Thus, wholeness, life, and beauty constitute a trinity, which is the foundation of the nature of order, as well illustrated by his wife Maggie.



**Figure 1.** (Color online): The Nature of Order and its major theme. (Note: (a) the four volumes of the book, and (b) Maggie's circle on life, beauty, and wholeness, with the first two out of the underlying structure of wholeness.)

In order to create living structure or wholeness in our surroundings, Alexander in *The Luminous Ground* (Volume 4) conceived and developed a world picture or new cosmology. This cosmology is seen as an alternative to the limitations of the mechanistic world picture of Descartes (1637, 1954) [16], which was inherited from the past 300 hundred years of science. As asserted by Alexander, what we have achieved in science and technology over the past hundred years is largely attributed to the mechanistic world view. This world picture no doubt represents a very powerful breakthrough, but it is dangerously limited in two aspects. The first is that the "I" is out of the world picture, implying that the inner experience of being a person is not part of this picture. The second is that value has become sidelined as a matter of opinion, not intrinsic to the nature of the world. Under the framework of mechanistic thinking, it is almost impossible to make beautiful buildings or great art. This is because (1) the recursive nature of living structure cannot be well-represented in a mechanical picture, and (2) nor can the essential connection grow between an external world and our internal experience. In response, Alexander's new cosmology—essentially the same as that of Whitehead (1920) [17]—consists of two parts in one: the external world and the internal experience, with the latter reflecting the former. In other words, we human beings are integrated into—rather than separated from—the world, and our inner experience is tightly linked to the external world. In such a living, personal world, would not our daily life become more meaningful than that in the current lifeless mechanical world?

**Acknowledgments:** I would like to thank many who read and/or commented on earlier versions of this editorial including Nikos Salingaros, Michael Mehaffy, Yodan Rofe, Helmut Leitner, Ling Bian, Michael Batty, Philip Steadman, Maggie Alexander, and Dan Klyn. However, any errors or shortcomings remain my full responsibility.

**Conflicts of Interest:** The author declares no conflict of interest.

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