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The Architect of Life

[Dr. Mae-Wan Ho](#) reviews

The Nature of Order, An Essay on the Art of Building and The Nature of the Universe, Vol. 1, The Phenomenon of Life, by **Christopher Alexander**, The Center for Environmental Structure, Berkeley, California 2002, ISBN:0-9726529-1-4, 476pp. This book is available online from <http://www.natureoforder.com/>

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When the author tells you he spent 27 years on a four-volume work, most people would hesitate to ask to read it. But that's exactly what I did.

When the first of four hefty volumes landed on my kitchen table, I knew that the 476-page lavishly illustrated text was not going to be easy reading.

The pictures are captivating, but what's the message? I knew I had to make time for it; something told me it was important.

From the very first page, Volume 1 of *The Nature of Order, The Phenomenon of Life*, is a journey of initiation. The author gives a few guideposts, but not until I have followed him to the final pages does the full significance of his thesis dawn on me.

I am swept off my feet; not just because his quest for 'good architecture' so closely parallels my own quest for 'good science', but especially by the majestic scope and originality of his findings, based on years of relentless, meticulous observation. Not only do I begin to see architecture with fresh eyes, but also galaxies, landscapes, trees, leaves, flowers, thunderstorms, waves, ripples, *all* natural phenomena, and yes, even 'empty space' itself...

Building creates physical order, but what does 'order' mean? There is a way of understanding order that's general and universal, Alexander asserts. He starts with the simple question: how to make beautiful buildings? A question all the more urgent as the new century begins.

The past century is one in which architecture was "unimaginably bad". It suffered from a "mass psychosis", creating a form of architecture that's "against life, insane, image-ridden, hollow." Many readers will resonate to those criticisms.

Why? Because architecture depends on our picture of the world, Alexander explains, and the 20th century is characterized by a struggle with a world-picture that's essentially mechanistic, which "makes it impossible to make buildings well."

It is "the nature of order" which lies at the root of the problem of architecture.

Trained as a mathematician in Cambridge Trinity College, Alexander found he was able to construct a coherent view of order, "one which deals honestly with the nature of beauty" only by formulating "new and surprising concepts" about the nature of space and matter which lie outside mathematics. No, this is not another book about 'sacred geometry', or eternal, Platonic forms; far from it.

Nor does it follow any other scientific conception of order. For example, scientists have suggested using 'negative entropy' – roughly speaking, the degree of improbability - as a measure of order, but that doesn't help make a beautiful building. Crystals have order, but that's static and limited. Proposals of "generative process" are important for biological development, but not immediately applicable to buildings. Similarly, French mathematician Rene Thom's "theory of catastrophes" describing morphogenesis (the formation of shapes), and American-born quantum physicist David Bohm's "implicate order" of space-time, all are inadequate to the task of creating beautiful buildings.

This book has no obvious precedent; the author has not followed well-worn paths.

Describing an earlier book, *A Pattern Language*, published in 1977, to a huge audience gathered to celebrate a film about his work, Alexander explains, "*We assumed from the beginning that everything was based on the real nature of human feeling and - this is the unusual part - that human feeling is mostly the same... in every person...[T]he pattern language is ...a record of that stuff in us which belongs to the ninety percent of our feeling, where our feelings are all the same.*"

I read that with mounting excitement. To me, feeling is the key to scientific understanding, indeed, of *all* understanding; it is the conduit to the universal "ground" of nature to which all are connected.

And in any case, how can we claim to understand something we do not feel? Yet that's what we are urged to do as 'objective' scientists. We must leave our 'subjective' feelings and prejudices behind, for science is 'neutral' and 'value-free'.

Without feeling, science has become the manipulation of meaningless symbols; no wonder some scientists have compared computers to human beings, and believe computers can be conscious like human beings.

It is the negation of feeling that makes scientists insensitive to people's aspirations and ethical concerns, and to conduct cruel and inhumane experiments in the name of scientific research.

The "feeling" Alexander is talking about, the "huge ocean" that connects the consciousness of human beings, is what distinguishes us from a computing machine. I called it, coincidentally, "a sea of meaning" that immerses us all. But I had no idea how concrete this could be until Alexander points to a yellow tower (tower of the wild goose, Hunan Province, China, AD 600, photograph on p.10) as having "the smile of the Buddha, of life and simplicity". This sent a bolt of recognition through me, making the hairs on my back stand on end, for it *was* unmistakably "the smile of the Buddha" that I saw in the yellow tower.

What is the elusive order that makes 'good' architecture, arousing feelings that could so unerringly connect the smile of the Buddha with the yellow tower?

Mechanical order is what mechanical physics talks about, that has all but taken over the whole of science, infiltrating into the public consciousness at large. But the order in a Mozart symphony, a tea bowl, and the yellow tower is "a harmonious coherence which fills us and touches us", which cannot be represented as a mechanism; "the mechanistic view always makes us miss the essential thing."

The mechanistic idea of order can be traced back to French philosopher-mathematician Descartes around 1640. His message was: if you want to know how something works, you can find out by *pretending* it is a machine. Descartes was thus prescribing a method for investigating nature, he didn't really believe mechanism was the nature of things. But people took him far too literally, and that's what resulted in the mechanistic modernism of the past century.

The mechanistic view also led to the disappearance of "I" from the world picture, what it is to be a person, as is inevitable from the emphasis on 'objectivity' in science. It has annihilated our inner experience. Value disappeared, or went underground, and with it, feeling; and so the idea of order fell apart.

A sneak preview of things to come appears in a cryptic footnote on p.4, where it says that "all space and matter, organic or inorganic, has some degree of life in it...matter/space is more alive or less alive according to its structure and

arrangement.... all matter/space has some degree of "self" in it, [and]...this self...is something which infuses all matter/space, and everything we know as matter but now think to be mechanical..."

There are other clues. Contrasting old and new buildings, the author points out how the fake arches of Frank Lloyd Wright's Marin County (San Francisco) Civic Center in California are "purely decorative, not structurally real" and damns Eero Saarinen's war memorial building in Minneapolis as "gross, brutal, and appalling".

But aren't these judgments purely subjective and a matter of taste? No. Alexander's proposal is precisely that such things as *relative degree of life, of harmony, or degree of wholeness*, which he demands of good architecture, "objectively exists", and are not merely subjective or matters of opinion.

In *A Pattern Language*, he and his colleagues described a number of key patterns in cities, buildings, gardens and building details, which are 'good' and necessary to support life. But how is that related to the degree of life, harmony or wholeness?

According to strict canons of modernist science, one cannot make statements about 'good' patterns, but many people became convinced that those statements in pattern language are "in some sense true". Most modernist/postmodernist architecture reflects a "one-sided mechanistic way of understanding order", contrasting with an "organic view of order" that's 'good' and life-enhancing.

Before we talk about the degree of life, we need a new, expanded concept of life. Life is much more than 'a self-reproducing biological machine' that one reads in biological textbooks. "It is a quality which inheres in space itself, and applies to every brick, every stone, every person, every physical structure of any kind at all, that appears in space. Each thing has its life."

But that's precisely how traditional Chinese artists have viewed nature: nothing is dead; everything is vibrant and alive. There is no category of painting corresponding to *nature morte* or still life.

"The active creation of a non-natural structure which clearly has life, and which is alive, is very much more than merely preserving nature." Alexander insists. And needless to say, it is also *not* about slavishly 'mimicking' or copying nature.

A breaking wave in the sea has a kind of life that *moves* us, so does the ripple on a tranquil pond. A clear mountain pool has life, as opposed to a stagnant pond. Marble *feels* alive, as wood does, more so than polymerized stone dust or chipboard.

Although Alexander doesn't say so, I believe that's at least partly because natural things and phenomena result from real *processes* with a coherent history, and carry the imprints of the successive 'gestures' that brought them into being.

Similarly, there's degree of life in human events, and it correlates with the quality of freedom. Or should I say *spontaneity*: an unplanned, unpremeditated coherence of action.

In a remarkable passage (p.38) Alexander captures the ideal of spontaneity and freedom that describes the sublime moment of creation in Chinese art and poetry, that I identified with the state of perfect (quantum) coherence with the universe; but he sees it also in the most ordinary living transactions.

"The freedom which arises when life is at its most spiritual, and also most ordinary, arises just when we are "drunk in God", as the Sufis say – most blithe and most unfettered. Under these circumstances, we are free of our concepts, able to react directly to the circumstance we encounter, and least constrained by affectations, concepts, and ideas. This is the central teaching of Zen and all mystical religions."

He invites us next to experience the feeling of life in traditional buildings and works of art: a Minoan vase, a Danish courtyard, a Korean ceramic stand for a teapot, Green and yellow tiles from a mosque, a stone column capital carved by Romanesque masons, an archway in India: "dark shadows, bright light, cool and soul-like".

"In every one of these examples we experience an intense feeling of life. We experience it in the objects themselves and in their parts. And, in keeping with the idea of order, the life we experience seems very much to lie in the geometry, in the actual geometrical arrangement of the thing."

This passage reminds me of Clive Bell's designation, a century earlier, of the "significant form" supposed to underlie all 'good' works of art, which has greatly influenced my own thinking on the seamless connection between science and art. The "significant form" is a coherence of part and whole, an authenticity and transparency that captures and moves the human soul, that arouses feelings of the "sublime"..

Alexander insists that the quality he calls life in those traditional buildings exists as a quality, *not* the same as the biological life we recognize in organisms, but "a larger idea, and a more general one."

The feeling of "deep life" in traditional artifacts is less common in the 20th century, because "the processes needed to create life were damaged in the 20th century."

In part, those examples feel alive because they are, as far as possible, "concept-free"; so much for contemporary 'conceptual art'.

For Alexander, the "comfortable ordinariness in its thousands of manifestations" as much as "the high points of modern art", are all produced by the same structure, which is "life". So it is that the slum in Bangkok, Thailand, ends up having more life than a postmodernist house in West Stockbridge, Massachusetts, in the United States.

In a series of paired photographs, Alexander invites his readers to compare the relative degree of life in each, and people almost invariably agree with him; even my seven-going-on-eight year-old granddaughter. If that's not evidence of 'objectivity', it certainly is a sign of universality and transparency.

Alexander then develops the idea of cohering 'centres' that define wholes. Wholes are unbounded, because centers "help" one another to define larger wholes. He found it impossible to draw boundaries around wholes.

This converges with my notion of "entangled organic wholes" that inhabit the quantum universe, which was inspired, in part, by the writings of English mathematician-philosopher, Alfred North Whitehead, who was intent on creating an 'organic' physics as opposed to the mechanistic, soon after quantum theory threw the static Newtonian universe of absolute space and time into disarray.

The organic whole, as opposed to the mechanistic whole, cannot be decomposed into parts, for the parts are mutually entangled in the whole.

Alexander illustrates the concrete reality of the organic whole in the four different self-portraits of the 20th century French artist Matisse: the features are different in each case, only the wholeness remains the same in every drawing. "In portraiture, as in architecture, it is the wholeness which is the real thing that lies beneath the surface, and determines everything."

"Life comes directly from the wholeness." I cannot agree more. Alexander continues, "Centers themselves have life. Centers help one another, the existence and life of one center can intensify the life of another. Centers are made of centers.... A structure gets its life according to the density and intensity of centers which have been formed in it."

This sounds quite abstract until he illustrates it using a fragment of tile work from the Alhambra in Granada, Spain. And he makes it even more explicit in another passage that could be read as a description of what I have referred to as the "universal, mutual entanglement" of all Whitehead's "organisms", which include 'inanimate' things from galaxies to electrons.

"...[A]// systems in the world gain their life, in some fashion, from the cooperation and interaction of the living centers they contain, always in a bootstrap configuration which allows one center to be topped up by another, so that each one ignites a spark in the one it helps, and that the mutual helping creates life in the whole."

There are ecological examples. The combination of reeds, shallow water and insects at the edge of the lake help one another create life. In agriculture, fruit tree 'guilds' are familiar, in which different tree species mutually affect one another's health. Acacias help apple trees to be vigorous and healthy; mulberries also help apple trees. Walnut trees, on the other hand, have a negative effect on the health and productivity of apple trees. Plants on the ground, including comfrey, clover, iris and nasturtium, all have positive effects on apple trees.

The idea of organizing centres in the organic whole actually came from an earlier systematizing of years of observation on what constitutes good architecture, of things that have life. He had identified 15 structural features.

Later on, he found that all fifteen features are interdependent, and could be reduced to ways in which centers can help one another in space.

Nevertheless, by presenting concrete examples in which each feature figures most prominently, Alexander leaves us in no doubt of the practical, empirical nature of his thesis.

Many of those features translate to the ones I have proposed for the living organism, or sustainable systems.

Referring to the feature, "level of scale", Alexander has this to say (p.176): "In poor design, in order to give an entity good shape [another feature], the background space where it lies sometimes has leftover shape, or no shape at all. In the case of living design there is never any leftover space. Every distinct piece of space is a whole."

This is reminiscent of the deep "space-time differentiation" that all living systems possess; the fact that living activities bridge all space-times, from the very fast to extremely slow, from the global to the most local, which optimizes energy transfer through the system as a whole.

Referring to "good shape", Alexander emphasizes that it is "an attribute of the *whole* configuration, not of the parts"; though it comes about "when the whole is made of parts that are themselves whole". This corresponds to the multiple levels of local autonomy that exists in the living system, a property that writer and scholar Arthur Koestler has earlier referred to as "holons", wholes that are themselves parts of larger wholes.

"Local symmetries" amid global asymmetry is illustrated by the plan of Alhambra, which overall is "wildly asymmetrical", and has nothing in common with the "excesses of neoclassicism", for "it is free, free as a bird. Yet in its detail, it is simply *full* of symmetries at many levels." Symmetrical rooms, courtyards, pieces of wall, windows, columns, "the plan is a maze of intricate and subtle smaller symmetries, symmetries of segments or subsymmetries, yet none of this ever creates that dead and lifeless overall neoclassicist symmetry of which we should rightly be afraid."

This is reminiscent of the "symmetrical coupling of activities" and "reciprocity of energy transfer" in living systems, which is the key to achieving dynamic balance and conserving energy within the system.

"Boundaries", similarly, correspond to levels of physical and dynamic closures in living systems that are necessary for capturing and storing energy.

"Alternating repetition", "roughness", and "echo" are all features associated with the cyclic nature of living activities, the ubiquity of biological rhythms; and yet, this is important: each cycle is never quite the same as the one before, for life never exactly repeats.

I recall once being taken by my son to a string of shops in Los Angeles to admire Mexican folk sculptures for the 'Carnival of the Dead'. These sculptures were profusely diverse, though repeated around the same themes; they were also 'rough' as though created in the full flight of freedom and spontaneity, and hence very much alive. Later on in the art museum, we came across the same sculptures, now technically perfect, but quite dead. They have become mechanical objects manufactured to order, no longer inspired creations.

Alexander concludes: "Systems in space which have these fifteen properties to a strong degree will be alive, and the more these properties are present, the more the systems which contain them will tend to be alive." These include living systems and natural structures, but also apply to "a bowl, a picture, a bay window, a temple, a tiled surface."

In other words, all nature is alive, and good human artifacts partake in creating living structure.

Alexander continues (p.292-3): " ..[A]ll of what we loosely and traditionally call "nature"... is then characterized by just that actual life which I have identified in the better human artifacts. Within the terms of my definitions,...nature as a whole – all of it – is made of living structure. Its forests, waterfalls, the Sahara desert and its sand dunes, the vortices in streams, the ice crystals, the icebergs, the oceans, all of it – inorganic as well as organic – has thousands of versions of living structure...The living character of these structures is different from the character of other conceivable structures that could arise, and it is this character which we may call *the* living character of nature."

This living character, though pervasive in nature, appears only in the *good* ones among human artifacts.

Moreover, order – and living structure – cannot be fully understood if we regard them merely as something in Cartesian space, separate from ourselves. "Rather...living structure is at once both structural and personal."

Again, according to Whitehead, all organisms are centres of "prehensive unification", they are wholes that perceive and complete wholes.

Alexander invites us to experience certain objects as having more "self-quality" in it than others, which correspond to those with more life, by applying the "mirror-of-the-self test". This involves asking "which touches the soul more deeply" , and "which creates the greatest sensation of wholeness"?

But surely, aren't "selves" distinct? Yes, but there is a common core, a common ground of shared experience that has to do with life in general.

Akido-trained individuals, Alexander tells us, are quite used to discerning, and then using, their inner awareness of relative greater harmony in themselves as a measure of the goodness of the action contemplated. There are humanity contracting and expanding experiences, as we are all aware, as when we commit random acts of violence or of kindness. The same is true of buildings. It is not psychology, but physics, Alexander insists.

Indeed, action can be more or less coherent, as I have pointed out, which has implications for the coherence (wholeness) of the organism. Coherent action is action at its most spontaneous, most effortless and free.

In the Cartesian method of modernist science, shared experience is arrived at based on the observation of limited events - from which the self is absented - tied to a limited and machine-like view of some phenomenon, stripped of extraneous associations, stereotyped and reduced; in order that the same results can be reproduced under the same circumstances.

Alexander's method is different, it is, as said, more like an *initiation* into a mature artist's seeing that's almost tactile, richly associative; the grain of experience, the texture, based on the self, "extend and supplement the arena of permissible scientific observations *in such a way that the self of the observer is allowed to come into the picture in an objective way.*"

Ultimately, "space must be considered an almost living entity – a kind of stuff which, depending on the recursive structures that are built up in it, becomes progressively more and more alive."

Why is that important? Because "the geometry of the physical world – its space- has the most profound impact possible on human being; it has impact on the most important of all human qualities, our inner freedom, or the sense of life each person

has. It touches on internal freedom, freedom of the spirit." This sense of freedom is coherence by another name.

Too many inner city slums have been generated by bad housing projects that dehumanize and degrade our sense of life.

But this does not mean we should be plastering buildings with useless ornaments. Alexander reminds us (p.404): "No building (and no part of any building) has real life unless it is deeply and robustly functional. What I mean by this, is that the beauty and force of any building arises always, and in its entirety, from the deep functional nature of the centers that have been created.

"In nature there is essentially nothing that can be identified as a pure ornament without function. Conversely, in nature there is essentially no system that can be identified as functional which is not also beautiful in an ornamental sense."

Life is in the very substance of space itself. "As such, it is capable of laying a foundation for all of architecture, for the construction of a living world." This is not merely a poetic way of talking, he reminds us. It is a new physical conception of how the world is made and how it must be understood.

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