

Complexity, form and design¹

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Introduction; form, flow and uncertainty

Our current dominant worldview – which underpins most mainstream schools of thought, in economics, architecture, management, education and development – still centres on the idea that the world is objective, measurable, predictable and controllable – despite almost overwhelming evidence to the contrary. Has this always been the case? Early philosophers in both the East and West held a much more sophisticated view – of the world as changing and flowing, but yet with a degree of order and patterning that arose intrinsically, from within.

This image is captured in the following fragment, part of the very few remaining writings of Heraclitus¹.

“Upon those that step into the same rivers different and different waters flow...They scatter and ...gather...come together...and flow away...approach and depart.”

The Hindu Upanishads and the Dao de Jing present a similar sense of temporary patterning emerging – without the need for extrinsic design or planning. And the Dalai Lama, speaking at a conference in April 2008, captured this beautifully when he said:

“There is no self-defining discrete reality to cause or effect. Forms or feelings are devoid of inherent existence; it is only on the basis of aggregation of subtle elements that forms exist; form can only be understood in relational terms to their constitutive elements.”

Plato refused to believe that form or patterning could arise without external design and introduced the idea of a Creator who, building on perfect forms, created a world, which emulated and aspired to these perfect forms. Uncertainty and fluctuations were seen as irritating limitations and something to be overcome; they were not seen to serve any useful purpose.

This theme of perfection and order then paved the way for the seizing of Newton’s mechanics as the dominant world view - where order, prediction and control are regarded as attainable and desirable and variation viewed both as a nuisance and largely irrelevant.

It was Darwin who recognized that uncertainty was indeed *necessary* for change to happen. Whilst the realization that animals and plants evolve had been recognized for nearly one hundred years before Darwin’s expedition on the Beagle, Darwin’s contribution was to suggest that variation was the part of the key to how this happened.

The need for variation in order for evolution and change to happen was a Big Idea that subsequently captured the imagination of philosophers, psychologists, sociologists - and eventually even hard scientists.

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The Pragmatist philosopher Charles Peirce² was one of the first to recognise the wider implications of evolution as a worldview. In 1891, he wrote:

“Now the only possible way of accounting for the laws of nature and the uniformity in general is to suppose them results of evolution. This supposes them not to be absolute, not to be obeyed precisely. It makes an element of indeterminacy, spontaneity, or absolute chance in nature.”

James³, also part of the Pragmatic school, explains in his lecture, ‘The Dilemmas of Determinism’, given in 1884:

“Of two alternative futures which we conceive, both may now be really possible; and the one become impossible only at the very moment when the other excludes it by becoming real itself.... To that view, actualities seem to float in a wider sea of possibilities out of which they are chosen; and, **somewhere**, indeterminism says, such possibilities exist, and form a part of truth.”

The pre-Socratics noticed the world *was* uncertain but nevertheless had form; Darwin recognised that variation and uncertainty was in fact *central* to the emergence of new form; it was Prigogine⁴ who took the next step. He started to explore *how* uncertainty led to emergence and evolution – and how the future is *in principle* unknowable. This was the start of the so-called new science of Complexity.

Complexity

Complexity theory⁵ has arisen, over more than half a century, out of the work of many scientists and social scientists who seek to investigate the implications of embracing the world as messy, interconnected, open to influences and change, able to learn – indeed more like the river Heraclitus envisaged. Essentially, this work tells us that:

- Things inter-relate, affect each other in a messy, complex, systemic fashion
- Variation and diversity are **necessary** for creativity, change, evolution, emergence
- Things build on the past, but not with clear one-to-one correspondences and cause-effect relationships
- There is more than one possible future; the future cannot be reliably predicted from the past
- At key moments or tipping points, radically new features and characteristics can emerge
- Top-down design and control will certainly have an effect, but may lead to unintended outcomes
- Systems which are diverse, richly connected and open to their environments can evolve a sort of form, or patterning - and this may be more harmoniously in tune with its surroundings than one imposed from above.

This emerging worldview, which seems more in tune with our personal experience of life, creates a powerful new image for all sorts of institutional thinking – including spiritual traditions. It is itself paradoxical and uncertain in that we are less clear how to act, how to intervene. Does it mean there should be no design, no leadership, no control? Is emergent structure always helpful and generative? May we not just sink into chaos and disorder? Indeed, are our current problems the result of too much

control or not enough? It raises issues of ethics, of the politics of participation, of power and domination.

There are no easy answers – but imagining the world is predictable and controllable when it is not is not helpful either; our current economic, social and environmental crises are, perhaps, ample evidence of that.

Architecture

The architect Christopher Alexander⁶ has grappled with what the ideas of complexity theory mean for design of buildings and communities. As he comments:

“The huge difficulties in architecture are reflected in the ugliness and soul-destroying chaos of the cities and environments we were building during the 20th century – and in the mixed feelings of dismay caused by these developments...in nearly every thinking person.”

These sentiments are echoed by Jane Jacobs⁷, who, in the landmark book *The Death and Life of Great American Cities*, challenged the dominant establishment of modernist professional planning and asserting the wisdom of empirical observation and community intuition.

Alexander poses a series of linked questions that must be addressed in relation to architecture. These are paraphrased below:

1. There are issues of *value* that cannot be separated from the main task of serving functional needs. Thus aesthetics lies at the core of architecture
2. There is the issue of *context* – a building grows out of, and must complement, the place where it appears. Thus there is a concept of *healing* or making whole and building into a context.
3. There is the issue of *design and creation* – processes capable of creating unity
4. There is the issue of human feeling; buildings must connect to human feeling
5. There is the issues of *ecological and sustainable and biological connection to the land*
6. There is the vital issue of social agreement regarding decisions that affect the human – and wider- environment
7. There is the issue of the emerging *beauty of shape*, as the goal and outcome.

Alexander’s list captures beautifully the paradox inherent in complex, systemic thinking; how do we design yet do it in a participative fashion, how do we balance use, context, sustainability and aesthetics, how do we take notice of what people *feel*, how do we incorporate qualitative questions with quantitative design principles?

“We design outdoor wooden play systems - for schools and families. If we work with a school, we get the pupils to draw what they would like; sometimes we work with thirty drawings. We can pick out common features, understand what matters to them. Obviously it is up to us to make it all work, do the technical bits - but they can come up with ideas that we would never have thought of. Also, when they have been involved in the design, they are proud of it and don't want to vandalise it or rubbish it”.

– Mark Hughes, Designer, Bigwoodplay

Brian Goodwin⁸ is very interested in Alexander’s work and invited Alexander to become involved in designing possible new structures for Schumacher College in Devon; the process would take account of the nature of the land, the nature of existing buildings and the intended use of the proposed new buildings. Goodwin

explains that this involved a week studying the qualities of the land and ‘brought us into a relationship of sensitivity to place’. Goodwin goes on to say: ‘what we experienced was a design process that offered the possibility of a deeply authentic and participatory involvement of those engaged in it, giving us some insight into Alexander’s principles of design based on the properties of living form with its wholeness, coherence and capacity to heal’.

Where does this take us?

Christopher Alexander asks us, when designing buildings or developing communities, to slow down, to take account of the particularity of place and context and history and feel, to consider the views of the people who will use the building; he asks us to try things out, at least conceptually, and see how they feel – not just forge ahead with a standard model. This is not to deny the limitations of cost or the value of expertise, nor does it necessarily imply consensus.

This approach embraces the ideas implicit in complexity thinking. Viewing the world as complex tells us that every situation is a bit different, that good ideas can emerge through joint inquiries, that aesthetics, use, sustainability and economics can be addressed concurrently - with much to gain in so doing and little to lose. I am reminded of visiting my demented aunt in her nursing home. The home had individual rooms down long corridors; the rooms were beautiful, complete with personal showers, TVs and expensive carpets; all this was of little use to demented patients, who spent most of their time in the inadequate, crowded, small sitting room. There was also no contact with the outdoors. What would it have taken to modify the basic design with the needs of the patients in mind? It is hard to imagine it would have cost more. And as the ‘green’ geriatrician William Thomas has shown with his Eden Alternative programs for elder care in the US, designing such care around the perceived needs of patients – especially their need for contact with Nature – can significantly lower running costs as well, since increased patient and staff wellbeing dramatically lowers staff turnover and absenteeism.⁹

What seems so pernicious about the dominant worldview is that it is predicated on the idea that there is an optimal solution, a right answer, a best way. Alan Greenspan¹⁰ points this out. In a recent article, he said: “...our economic models, as complex as they have become, are still too simple to capture the full array of governing variables that drive economic reality.” He goes on to suggest that economic thinking fails to grasp the fact that consumers do not make what economists regard as rational choices. Perhaps the more worrying issue is that economists ever did imagine people made rational, consistent and predictable choices.

Our world is increasingly complex; this does not imply we should not take action, but that we should regard actions as experiments and be prepared to learn, modify our approaches, listen to feedback and, quite often, just be prepared to pay more attention to what is there, what is plain to see. This is not to say that an evolutionary approach, applied naively, necessarily leads to a positive outcome; the story of evolution is as much about what did not work and was destroyed as much as it about what sustained. Consider the dinosaurs! How can we do our best to create a future which is harmonious, just, rich and sustainable? Complexity thinking shows that it is important what we put into the mix – by way of intentions, values, ‘right action’ in a Buddhist sense. In that way we do our best, in the knowledge that the future cannot be controlled and designed, to enhance the emergence of a positive future – the intention to provide ‘good’ ingredients for this co-created future is what elevates this

approach to the sacred, as Kaufmann¹¹ describes in his book, *Reinventing the Sacred*. William James¹² captured the essence of this approach in the following. He said:

“I am done with great things and big plans, great institutions and big success and I am for those tiny invisible, loving human forces that work from individual to individual, creeping through the crannies of the world like so many soft rootlets, or like the capillary oozing of water, yet which, if given time, will rend the hardest monuments of pride.”

The task of 'greening' and re-sacralizing our culture's institutions begins with a stepping back from our previous assumption of narcissistic assurance, hubris, dominance and control. It begins with a movement towards humility, towards admitting our ignorance, honouring mystery, learning from Nature, careful observation, trusting the process, and asking, in the broadest sense, *what is needed* rather than imposing our will. Alexander's approach illustrates this process beautifully. And Heraclitus, Darwin and Complexity suggest that this is the way the Universe indeed works.

Our willingness to take this step and to learn from Nature rather than try to control it is what can make *all* our institutions whole and by doing so can begin to heal the sickness we've imposed on Gaia. Green spirituality in action can allow the Universe itself to flow through us into the creation of new forms. Through an ongoing process of relationship - with materials, with place, with all the stakeholders, both human and other-than-human - we can play a positive part in design, creation and evolution, help to sustain the diversity of life that makes Gaia thrive; and hopefully bequeath our role in all this to our great, great grandchildren.

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