

# The Nature of the Future

by Trevor Zelman

It is tempting to imagine that humanity has entered a post-natural age. Armed with the capacity to alter the genetic code of every thing on earth and clone ourselves, the potential to create anything from the atom up and merge with massively intelligent sentient machines, and the freedom to utterly destroy remaining ecosystems if we so choose and head for space, we seem to be breaking free of nature and the constraints that bind it: disease, aging, death.

So then: Is nature still useful to us? Aside from resources, what does it give us? Do we really need it anymore?

The questions mark this as a critical juncture in the human story. If we can denature the world with impunity—if technology can supplant nature and deal with all contingencies—then independence from nature is inevitable and even desirable.

But what if the very distinction of natural and unnatural is outmoded? Wolfram's Principle of Computational Equivalence makes clear that the behaviors of all systems—whether ecosystem, human, or machine—show analogous traits and manifestations. Thinking in terms of in or out of balance with the world around us is more useful; we do not call scorching summers, megafires, and calved icebergs the size of small countries unnatural, but we may recognize them as signs of imbalance.

Reassessing human actions and their effects as neither natural nor unnatural but more or less conducive to balance clarifies the path to profit: emulate nature's balanced approach. Far-sighted businesses and individuals are using biomimicry (the modeling of nature) and bioadaptation to bridge the divide between those who would leave nature in pristine form and those who would control it. By replicating processes that have worked brilliantly for million of years—reusing waste products as inputs elsewhere, putting at least as much back as is taken out—biomimicry inexorably favors the use of nontoxic inputs and regeneration of environments, now making the profitable model “treasure in, treasure out.” One application among many: pollinator companies functioning as conduits between corporations with (waste) byproducts to sell and others with a need for them.

In the new paradigm, rewards accrue to organizations and societies to the degree that they imbue themselves with qualities of balanced natural systems. Pollinator companies dealing in effluents/influents least toxic and most condign for their environments have competitive advantage. Decision-makers who factor services provided by local biospheres into calculations of value and productivity (as natural systems, with manifest results, always do) leapfrog competitors as nature-based modeling exerts positive pressure on all sides: regulatory costs obviated, natural capital maximized and conserved, corporate public images strengthened.

Design that replicates nature at ever deeper levels creates products that actively respond to their environments on an ongoing basis rather than remaining static: buildings that move on pedestals with the sun as a plant does, transpire rain and fresh oxygen through porous skins, even enclose within transparent sheaths like flowers at night to conserve energy.

Bioadaptation also has countless applications lying in wait: antibiotics from ants, superresilient fabrics from worms, pest repellents from plants, robot dexterity from spiders, and on and on. In time, all woodlands, wetlands, and rainforests, teeming with life above and below the surface,

will be valued as such endlessly rich treasure-troves of medicines, materials, and energy that to denude them or destroy support systems will be fundamentally poor economics. Seen in this way, more biodiversity is strength, lesser biodiversity a waste that corrodes productivity, stability and the capacity of systems to withstand disease.

The widening adoption of nature modeling should affect the legal, regulatory and taxation spheres, leaning toward incentives and away from proscriptions seeking to impose uniform solutions onto continually changing and chaotic systems. Rather than imposing politically infeasible taxes on fossil fuel usage (which also create public dependency, since tax income falls as the desired behavior is adopted), tax policy could progressively lower taxation (with caps) for progressively higher adoptions of natural capital valuation, renewable energy and waste reduction. Such an approach sends precise signals regarding which social goods are intended and preserves life-sustaining natural capital for all.

New prohibitory regulations would address areas of societal repugnance (like cloning humans for organs and terrorizing with bio-weapons).

Nested laws and incentives can be designed to respond to unpredictability: policies in abeyance, activated only when probabilistic conditions are present (as with cell enzymes that react only to specific messages from genes); businesses could map corresponding actions in advance. Like natural phenomena, such laws would be impermanent, introduced with specified termination or phase-out conditions to build in responsiveness.

Nature is proving to be not only a paragon of effective design but also a perfect mirror of evolving attitudes. As the global communications web tautens, the societal view of nature is progressing beyond nature as self-seeking, brutal and amoral to nature as collaborative, regenerative, robustly complex, and exquisitely, interdependently networked—another reminder that there is no fundamental nature of “nature,” only a lens through which it is perceived.

Computer technology companies, engaged in seemingly unnatural quests making nature ever more dispensable, in fact display the operations most clearly aligned with nature's: richly connected and distributed networks with attenuated global coordination, supportive of new growth from the bottom up, tolerant of experimentation and errors in the service of growth, and reciprocally adaptive (and vulnerable) to the continuous flux of conditions in their environments.

Yet the very advances in computer and genetic sciences that allow us to recast genetic determinism have led to the limits of nature modeling and help birth a new secular morality. We are in uncharted waters, having to decide whether to limit research on cloning and gene therapy even though those stricken with deadly diseases might otherwise benefit, and beyond that, whether to usurp the role traditionally ascribed to God; yet the Wright brothers were forewarned that if God had wanted man to fly, He would have given him wings. How to know?

An ethos does not arrive fully-fledged, but rather is cultivated in part by choosing not to do what we are fully capable of doing. Deliberately chosen limits need not be limiting. As with the rules of sport, limits are essential for the game to perpetuate, and restraint in the service of ethics and balance raises our level beyond what it was before as a species.

An evolving ethos and understanding of how to promote balance can clarify parameters of judgment for a range of thorny choices, including those for technological advances yet unseen. Considerations of cloning and gene therapies might outlaw the cloning of brainless pigs for food or hominoids for organs as a first step. Discussions of genetic modification of crops would re-emphasize the voices of developing country citizens, echoing the control that arises from local

conditions in balanced systems. Decisions on energy sources would factor in the bias nature shows towards decentralized control and away from outputs that cannot be reused; such valuations would weigh in favor of hydrogen fuel cells' dispersed efficiency and clean effluent, and against nuclear power's centralized grid and radioactive waste.

Such charged and contentious issues are best met by elevating to leadership human exemplars of wise non-partiality, clear vision, and beneficial intention. Such a milieu promotes policy formulations in which cooperation and sharing are the default modes of interaction, intentionally generating reciprocally altruistic effects even as individuals seek their own benefit.

The emergence of a secular morality and its attendant global conscience is heralded by the rise of large-scale online reputation systems, highlighting technology's central role in their genesis; character will assume paramount importance in commercial transactions. Gradually, ineluctably, as the degree to which natural systems conspire to sustain and benefit us becomes more widely recognized, the instinctive human connection and empathy with the natural world is reemerging. We are far more dependent upon, a part of, natural systems than once imagined.

Renewed appreciation of nature's complex and generative interdependence is increasing our awareness of what we cannot create, or even without detriment, alter: gene pools, watersheds, wetlands, weather systems and the rest. Co-arising with this is a broad positive reevaluation of modes traditionally disparaged as 'feminine.' In light of their capacity to elicit connectedness and collaboration, yielding revalues as flexibility, effacement as receptivity; 'masculine' limits as boundaries, mastery as loving dominion. What was once seen as non-dominant, in retreat, is recognized as strength (when you come up against a boundary in this new world, the solution is rarely to apply more force), portending an imminent tidal wave of women's ascendancy.

Over time, the view of nature as neutral, amoral, lacking directionality, is being supplanted by another that perceives nature's tremendously beneficial, life-nurturing services as indicative of intention, of direction without a director, and knows the balance-seeking wisdom of nature as mirroring the human body—Hippocrates' *vis medicatrix naturae*—and pervading the cosmos.

The secular morality grounding this nascent worldview embodies features found at the heart of all religious traditions, including respect for life and a yearning to identify with something larger than oneself. It sees that all things and all processes innately seek balance and the highest happiness of which they are capable. It finds the thread of progressive moral refusals, from human slavery to today's punishment of war crimes and tomorrow's envisioned renunciation of nuclear weaponry, to be magnetized by an innate human goodness.

No one at the beginning of the last century foresaw nuclear weapons, computers or the Internet. For whatever lies ahead, a keenly developed secular morality will be our most potent inoculation against harm and the greatest magnifier of benefit. Many dystopian visions project fear onto the future, extrapolating from our present separated, cutoff state, and taking insufficient account not only of the human capacity for survival but of our capacity for awakening. It is useful to recall that of the signatories to the 1955 Einstein-Russell manifesto on the threat of nuclear annihilation, the experts who were least optimistic about the prospects for human survival were the ones who knew the most.