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Expanding our Natural and Civic Imagination

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INVENTING A NEW LANGUAGE OF DISSENT

AT A PIVOTAL MOMENT OF IAN McEWAN'S NEW novel, *Solar*, the main character, Michael Beard, a Nobel Prize-winning physicist who is trying to promote a technology for artificial photosynthesis, gives the following speech to a group of pension fund managers:

> The basic science is in. We either slow down, and then stop, or face an economic and human catastrophe on a grand scale within our grandchildren's lifetime … How do we slow down and stop while sustaining our civilisation and continuing to bring millions out of poverty? Not by being virtuous, not by going to the bottle bank and turning down the thermostat and buying a smaller car. That merely delays the catastrophe by a year or two … Nations are never virtuous, though they might sometimes think they are. For humanity en masse, greed trumps virtue. So we have to welcome into our solutions the ordinary compulsions of self-interest … and the satisfaction of profit.

In a commentary perhaps on the idea expressed in this speech, or perhaps on his character's greed, McEwan has Beard retreat backstage immediately after the speech and vomit.

At another point the novelist remarks of one of Beard's girlfriends, "to take the matter [climate change] seriously would be to think about it all the time. Everything else shrank before it. And so, like everyone she knew, she could not take it seriously. Not entirely. Daily life would not permit it."

Solar is supposed to be a comic novel, but what it satirizes is very serious indeed, namely, the games the world is playing with climate change; the tendency to assimilate this most epochal and apocalyptic of all threats into business as usual. How can we make daily life permit us to take it seriously? Pace Beard's girlfriend, we must find a way to do that.

"We abuse land," Aldo Leopold wrote, "because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." He holds that a change in our behavior may follow from a change in how we conceive of nature and of ourselves; a change in the way we live may follow from a change in how we see. He does not speak about changing behavior within the old way of seeing by altering incentives and changing the calculus of self-interest while still remaining owners and consumers of the land. He talks about moving to a new way of seeing altogether.

I wonder if we yet comprehend the importance of this distinction. I wonder if we still believe that such a gestalt shift in perception is possible? Let's pay close attention to Leopold's formulation and choice of words. This is a statement of profound opposition, which begins with a simple, powerful assertion—we abuse the land. He does not say, as he easily might in keeping with the tenor of his times and his profession, that we "misuse" the land. This is not a question of inefficiency, lack of good management skills, misaligned incentives, or economic externalities and market failure. This is a question of malignancy rather than misalignment. Having set up the fundamental opposition of abuse versus right relationship, he fills it out with the language of commodity and ownership, on one side, and the language of community, belonging, love, and respect, on the other. This is the language and resonance of prophetic, not managerial discourse: Thoreau, not Pinchot; Wilberforce, not Jevons.

Leopold is recovering and deploying a particular language of dissent. Today the responsibility to oppose the abuse of the land is as valid and as pertinent as ever. The imperative of opposition and dissent calls us as urgently as it called to Leopold's generation. But do we have a serviceable language of dissent any longer? Can we recover it? Or, if, as I suspect may be the case, much of the resonance of the prophetic tradition upon which Thoreau and Leopold could still draw is unavailable to us, can we invent it anew?

What change of vision is involved? The required vision, the content of the dissent at issue here might be described in the following way. Only human beings may have the capacity to understand and act in accordance with complex moral ideas and rules. But value in the world does not reside within human beings alone. The value in the world, for the sake of which ethics and morality exist in the first place, resides in the natural and biotic context of which human individuals

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and societies are a part. The content of human duty and the good for which we strive should be understood in terms of systems of interdependency, relationship, sustainability, and resiliency.

In seeing the need for a new vocabulary within which to articulate a dissent of this kind, we could do worse than take our bearings from the noted historian, Tony Judt. In a recent interview, talking about politics and society broadly and not just ecological and climate issues, he said:

> We need to rediscover a language of dissent. It can't be an economic language since part of the problem is that we have for too long spoken about politics in an economic language where everything has been about growth, efficiency, productivity and wealth, and not enough has been about collective ideals around which we can gather, around which we can get angry together, around which we can be motivated collectively, whether on the issue of justice, inequality, cruelty or unethical behaviour. We have thrown away the language with which to do that. And until we rediscover that language how could we possibly bind ourselves together? We can't come together on the basis of 19th or 20th-century ideas of inevitable progress or the natural historical progression from capitalism to socialism or whatever. We can't believe in that anymore. And anyway, it can't do the work for us. We need to rediscover our own language of politics. (*London Review of Books*, 32:6 (March 2010), pp. 19-20.)

In this issue of Minding Nature the theme of a new vision and a critical language of dissent from business as usual is approached from several different angles. Christopher Preston argues that the power of both an understanding of nature and an ethical vision have importantly to do with the physical nature of the place one inhabits and the ways in which one is shaped by the characteristics of that place. Seemingly starting from the other end of the spectrum, Julianne Lutz Warren reflects on the power of "no-place," utopia to reconstruct in the space of imagination something of the shaping power of material place. Few examples of the interaction between lived particularity and concreteness and an aspiration to a corrected fullness in our moral lives are more fruitful than the process described by Kathryn Kintzele in her reflections of the Biosphere Ethics Initiative, and in particular the lessons of the BEI "Relatos." Finally, the utopian aspiration takes on yet another shape in the subfield of biological research known as "synthetic biology," for which Joachim Boldt provides both a roadmap and a set of concepts for the careful assessment of the implications of that particular form of humans and nature relationship. It is interesting to think about the respective worlds and endeavors that Kintzele and Boldt explore. The future of life in question, indeed.

Materializing Ethics: Shaping the Environments that Shape Us

By CHRISTOPHER J. PRESTON

In my 2003 book, *Grounding Knowledge*, I attempted to articulate in somewhat respectable philosophical terms a thesis that has largely escaped the notice of environmental thinkers. This is the thesis that the places in which a person dwells and the landscapes they call home can, on occasions, exert a subtle influence on the way they construct their understanding of the world. This is not the trivial claim that the world supplies much of the contents of our minds through our sensory faculties. It is the much more radical thesis that a physical landscape can sometimes form part of the machinery of the mind, subtly influencing the way that we think about things. On this view, landscape is not wholly exterior to the mind. It works with the mind to give us both a sense of who we are and some shape to how we think.

Framed in part as an exploration of Paul Shepard's provocative claim that there is "a strange and necessary connection between place and mind," the book engaged in turn with science studies, anthropology, native American thinking, philosophical psychology, cognitive science, and personal narrative in search of support for the view that "thinking, knowing, and believing [are tethered] to some rich and earthbound material roots."[1] The book offered a wide-ranging pursuit of the idea that the contours of a physical environment are not just a blank canvas upon which a human drama is scripted. They co-constitute the drama, taking an active role in determining some aspects of how that drama gets written. Place is not simply a backdrop for thought. It exudes a power that can bring shape to portions of our conceptual life.

There was a strategic reason to write the book, namely, to start to tie environmental philosophy into epistemology and the philosophy of mind and give it a more mainstream purchase. There was also a personal reason. As an immigrant to America from England, living in Oregon, working in Alaska, it seemed clear to me that I was very much influenced by the landscapes from which I had come and by those landscapes I was now inhabiting and exploring. The idea of an "epistemic location"—literally "a place from which one knows"—developed by feminist thinkers such as Lorraine Code and Sandra Harding and originally referring primarily to a social context[2], seemed like it also had an obvious, but neglected, application to physical context.

In what follows, I plan to revisit the thesis and explore a bit further some of its normative implications. In particular, I am interested in considering how the thesis bears on the way human activities shape the large scale landscapes in which we dwell. Much of the inspiration for returning to the topic comes from my Montana colleague, philosopher of technology Albert Borgmann, and the ideas articulated in his book *Real American Ethics*.[3] In *Real American Ethics*, Borgmann urges us to think about the moral import of the material reality that surrounds us. In contrast to theoretical ethics (which he thinks is too theoretical) and practical ethics (… too applied), he posits 'real ethics' as a third strand of ethics that begins its analysis rooted firmly in the common practices of day-to-day living. He considers initially how those practices can hinder or enhance our ability to flourish.

Practices, Borgmann then asserts, typically take place within a set of built structures that in some sense set the parameters for how those practices end up influencing us. The built environment matters, in other words, for the constraints it imposes and the opportunities it opens up. He urges us to pay attention to the virtues of economy and design for they way they can helpfully (or harmfully) construct that material reality. The arrangement of the household, for example, or the layout of the interstate highway system can do something to us, Borgmann thinks, and what they can do is ethically significant. Borgmann's ideas amount to the claim that material reality is morally thick and so philosophers need to pay more attention to the lives it creates.[4]

The claim about the moral power of constructed objects has its origin in the philosophy of technology. Peter-Paul Verbeek, for example, suggests that technologies can be seen to "materialize morality" and claims that designers of those technologies are "doing ethics by other means."[5] Don Idhe has also discussed in detail how

technologies can shape us by directing our possible interactions with the world.[6] Most of the work done by philosophers of technology on these topics, however, focuses on small scale artifacts such as cell phones, computers, hearing aids, or perhaps automobiles. But, as Borgmann shows, these insights can also be applied to the constructed physical environment writ large. Though larger physical environments such as cities and rural landscapes tend not to be designed as unified wholes and in such an intentional fashion as cell phones or iPads, they presumably exert no less of an influence on the lives that we lead and the range of interactions available to us. If technological devices can embody ethics, then these wider constructed environments are unlikely to be silent in conceptual and moral life. Presumably they too carry moral values, values we would do well to notice.

If the surrounding environment can itself be a purveyor of values, actively shaping thought processes, we might ask what different surroundings contribute to our sense of how to live?

In *Grounding Knowledge*, the only normative conclusion I drew was that the diversity contained in natural landscapes was a cognitive resource of a sort, with more variety of landscapes having the potential to sponsor more diverse viewpoints. It seems, however, that there is much more to say about the epistemic impact of physical surroundings on our thoughts. If the surrounding environment can itself be a purveyor of values, actively shaping thought processes, we might ask what different surroundings contribute to our sense of how to live? If physical surroundings can indeed perform the function of "materializing ethics," then is there a way to shape these environments so that those who interact with them are more likely to develop appropriate ethics? Clearly there is plenty to investigate about the impacts of the built world on the contours of our mind, impacts that Shepard calls the "reciprocity of place and person."[7] Here I only offer very rough and preliminary remarks on the possible impacts of three general types of environment. Splitting the landscapes humans influence into three rough types, what messages about moral values should urban, rural, and wild landscapes convey?

URBAN

Consider first the environment that is changed most deliberately and dramatically as the result of our actions, the urban environment. It is in the urban environment that humans take the most active role in designing the spaces within which they work and live, utterly transforming their surroundings into places that serve perceived needs. Urban planners, architects, and landscape designers are fully aware that these constructed landscapes are not silent but exert an influence upon us. Borgmann quotes Winston Churchill in this regard who cautioned architects charged with the rebuilding of London after the German blitz, "First we shape our buildings, and afterwards our buildings shape us."[8] Borgmann is no architect, so in *Real American Ethics* he does not speak so much to the shape of the buildings themselves as to an insidious effect that a poorly designed material environment can create.

Borrowing an idea from E.P. Thompson—an idea with obvious roots in Marx—Borgmann starts the argument by lamenting what he calls "moral commodification." Moral commodification is a process that strips goods and services from the context out of which they arise and the important connections that make them into what they are. The geographical origin of a market good, the labor and materials that went into producing it, the ecological impact of its production, and the lives that were impacted at point of origin and in transit become increasingly veiled, less "transparent" and "direct," as moral commodification takes place. The social and environmental costs are hidden, often pushed "beyond the space and time horizon," as Maria Mies has put it, and dumped on the global poor.[9] The worst kinds of moral commodification suck meaning from our lives, says Borgmann, by taking "the things and practices that are dear to us, reduc[ing] them to slick and available merchandise, and sell[ing] them back to us…without their centering and consoling power" (161). The overall effect of such commodification is to make our lives shallow and banal, what Charles Taylor has called the "narrowing and flattening of our lives."[10]

Borgmann's complaint about moral commodification sounds like it is directed towards the character of consumer goods and artifacts such as processed foods and laptops and certainly, in part, it is. But the commodification Borgmann laments operates not just on things, but also more abstractly on places, spaces, and other aspects of our lives not so typically thought of as consumables. One of the examples Borgmann uses is the US interstate highway system. The *empirical effects* of the interstate highway system on generating suburban sprawl and contributing to inner city decay are familiar to us already. Here Borgmann focuses more on how the highway system has the *moral effect* of commodifying space and time. The pleasure of not having to drive through the traffic of every small town on a cross-country trip is alluring. But the system also comes with moral costs. Borgmann describes the trips he used to make with his wife through the old mining town of Wallace, Idaho on his way from Missoula to Seattle:

> For twenty years we would look forward to Wallace with dismay and pleasure. Wallace invariably arrested our smooth and pleasant progress, ensnarled us in slow-moving traffic, and more often than not stopped us at Seventh and Bank Street. But inevitably also we were captivated by the courageous grace of the Victorian buildings and by the waning aura of mining and prostitution. At times we stopped to look at the fading splendor of hotels and banks and to immerse ourselves in the talk and smells of a coffee shop, witnesses to the slow and familiar ways of small town life.…On th[e] day [the overpass went in] the heroic substructure had become invisible; Wallace was reduced to a picturesque jumble of roofs and facades (178).

The time saved by the highway reduced Borgmann's interaction with Wallace, both with its history and its present. As Borgmann put it, "public exertion imploded into private ease" (ibid.). The implosion dematerialized and depersonalized the surroundings. Wallace no longer had texture and depth, it was reduced to a two dimensional scene worth only a moment's glance. The time saved might in principle be put to good use. But it could also lead the drivers of air-conditioned cars hastening to the malls in Spokane or Seattle to forget the trials of unemployed miners in Idaho or to ignore the toxic legacy of metals extracted from the mountain west.

The point here is not that an interstate highway is an inherently

bad technology. The point is that the technology and the material structure of the highway system are playing a largely unnoticed role in deciding for us what to take as significant in our lives. It quietly dictates where to focus attention, what to value. The highway system is neither neutral nor silent in our moral epistemology. Material constructions such as interstates possess a largely unnoticed power that points our attention in one direction or another. The structure we utilize has *materialized morality* for us in a way that it is easy not to notice.

If the thesis is correct that our surroundings have the potential to direct us towards some sets of values and away from others, we might consider how to intentionally structure the built world so that it directs us towards desirable values and away from problematic ones. A helpful suggestion in this regard is made by philosopher Yuriko Saito. Offering an echo of Churchill's point in the arena of environmental aesthetics, Saito suggests that "[D]esigned objects and human environments are never mute; they always have something to say if we know how to listen."[11] Saito suggests that we develop more respectful attitudes towards environments that we perceive as taking care of us, promoting our well-being, and providing us with pleasurable experiences. Cultures with such perceptions, Saito suggests, tend to be more sustainable and enduring. Saito thinks we ought to work to preserve, create, or restore environments that promote well-being and transform those that do not.

Putting the lessons from Saito and Borgmann together, one might urge the construction of built environments that palpably take care of their residents, doing so in visible ways, without the veils that are raised by moral commodification. We face a design choice about whether the fabric of urban space will be revealed or concealed. Built environments can be designed so they make visible their contribution to the food residents eat (though urban gardens), the recreation residents enjoy (through cafes, entertainment, parkland), the workspaces they depend upon, the social connections they are nourished by, and the shelter that all urban residents require, including those that are low-income or homeless. Making visible the richness and diversity of urban spaces and especially the way that urban spaces support (or fail to support) their residents creates a material environment that is, in the first instance, more honest, and, in the second, is more capable of speaking an ecological message of relationships and dependencies to its residents. Surroundings might regain some texture and depth as the full range of their contribution to our lived experience is revealed.

The flip side of this honesty is also to make visible the costs. It is important not to hide landfills, power stations, polluted, diverted, or buried waterways, and sewage treatment plants. They should be located as close to the population cores as possible (and particularly close to those who consume at the greatest rate). Costs that are visible speak with a clear voice to the impact of our lives on the local ecology. Costs rendered invisible, or 'externalized' in the language of economics, are no longer perceived as costs but as inconveniences that need to be made to go away.

In towns and cities across the nation there are numerous examples of places where costs are made visible. A striking example is Valdez, Alaska. One of the notable things about Valdez is that planted squarely in the viewshed of every resident is the terminus of the Trans-Alaska pipeline. America's dependence—and Alaska's own extreme dependence—on petroleum is made appallingly (but perhaps beautifully) visible across the water to residents of Valdez. Residents can see the tankers that ply those waters 24/7 with their grubby smokestacks staining the brilliant white of the snowcapped peaks and the glaciers that disgorge their melting ice into the Valdez Arm.

There is an unusual honesty about petroleum embedded in the Valdez landscape and that honesty can sometimes pay dividends.[12] I was surprised when returning to Valdez after a seven year hiatus to see the low-hanging blue smoke of airborn particulate matter that swam with benzene and ground-level ozone mostly cleaned up in the time I had been away. Citizens had got active on the issue. It was, after all, in their face every day. No doubt the consortium responsible for operating the terminus owed the town after the 1989 Exxon Valdez disaster. Nevertheless, if the terminus had been in the next bay over, it is less likely that these changes would have occurred.

The constructed landscape is rarely morally neutral. The values it carries are not silent but get into our minds and shape our attitudes both towards human neighbors and towards the non-human environment. Making costs visible does not automatically lead to those costs being ameliorated. It does, however, lead to a fuller understanding of the dependent relationships of human communities on natural communities, communities which sometimes lie firmly within the space and time horizon, and sometimes lie beyond it.

RURAL

In the urban environment, humans have the most dramatic influence on the structures that might shape thought. In the rural and the wild, the landscape is progressively less shaped by human intention. Natural forces occupy more of the resident's gaze. Humans are not so liable to rapidly and completely transform the character of the landscape. And yet clearly neither rural nor wild landscapes are entirely free from human influence. It seems important to pay attention to ways that we can shape the messages these landscapes convey. Is there an equivalent to a moral commodification that can be wreaked on rural and wild landscapes? Are there better and worse ways to transform these landscapes so that the way they speak becomes more, rather than less, conducive to flourishing individuals living in flourishing communities?

Consider first the message sent by industrial farmlands that provide the food that satiates American's immense appetites, appetites that, according to Michael Pollan, have steered productive land in the United States progressively more towards the production of corn.[13] Compare these industrial lands to the image of a small scale Shenandoah Valley family farm or the stereotypical picture of farming in the English countryside. Pastoral landscapes such as those found in some parts of the UK can, at their best, display signs of a long term integration of humans and nature. Farms can speak a message of longevity. There are cart tracks visible on active farmland on the cliffs of Southern England that are 2400 years old. The Sussex downs, previously oak forest, have been grazed by domesticated sheep for over a thousand years, with a high level of biodiversity now re-established. It is a historically peopled landscape, with the character of the land shaped by the

human residents responding to natural conditions over long periods of time. The fields are shaped by the topographical contours. The many hedgerows and small woodlots point away from monotony. The message is one of the integration of human and natural worlds over the long term. The rural landscape in the UK in places conveys a sense of stability and acceptance of a human/nature co-habitation.

Industrial farms tell a completely different story. Hedgerows are ripped out and creeks diverted. Fields no longer follow the contours of the land but the property lines of agribusiness. The woodlots are replaced by more crops and the eroded soils collect in the valley bottoms. The message conveyed is that the land can be forced into production without consideration of the topographic or ecological realities. This is also the message conveyed by those center-pivot irrigated fields of the US mid-west and inter-mountain west. Those circular oases of green fascinate from the airplane only because they speak so clearly of manipulation on a grand scale, of engineering for purpose, despite the hydrological reality.

“A landscape that conveys a message of reciprocity between people and place shapes a people for whom reciprocity is natural. The influence is self-reinforcing.

The shape of both of these types of rural landscapes is morally thick. Ethics is materialized in they way they have been constructed. They carry messages about how to live, messages that can convey desirable values like permanence, co-habitation, diversity, and integration or less desirable values like homogeneity, control, forcible change, or manipulation to serve economic needs. Some landscapes convey better messages and embody more desirable values than others. A landscape that conveys a message of reciprocity between people and place shapes a people for whom reciprocity is natural. The influence is self-reinforcing. Those people are likely in turn to treat the landscape with more care. As Saito said earlier about the urban environment, humans could surround themselves with rural environments that are seen to nurture and support or with structures that serve some other goal, perhaps a distant economic goal. Only through a very contrived translation is it possible to read the landscapes of industrialized agriculture as nurturing and supporting by providing cheap grain. The first impression is of a vast monotone that serves an economic purpose. How can this not leave an effect on our minds?

Sometimes even more so than with urban environments, rural environments can be painfully honest. Since rural environments tend to grow in a more piecemeal fashion than cities, it is sometimes harder to hide their costs. It is the in-your-face honesty that makes me perversely grateful that, near my home in Montana, I can readily see the sprawl that fills the Bitterroot Valley (a valley Jared Diamond described as being on the point of “collapse” in his book of that title).[14] In the Bitterroot, the cost of Montana’s loveliness and the privilege of living here is laid bare before your eyes. As well as seeing the sprawl, those who venture into the Bitterroot can see rivers that rise or fall depending on the variable snowpack, carcasses of road-killed porcupine, moose, and white-tailed deer on the highways, and cattle grazing next to the orchards and plots that supply the weekend community markets. The lesson is one of transparency and directness that is a necessary counter to those who would always seek to push the costs of growing populations and affluence beyond the space and time horizon. The message that such environments convey is more nearly a reflection of how those environments function ecologically in the lives of local residents. When done well, such landscapes are shaped so that the material surroundings convey a message of nurturance. When done poorly, the surroundings make it quite clear how residents are not living sustainably.

WILD

Consider finally those wilder environments that are the least impacted by human activities. Are there messages that such lands also convey? Is there a moral epistemology to wilderness? The problem of starting with the suggestion that a wild landscape conveys a certain message is that the whole concept of “the wild” in North American is tarnished. It has become one of the accepted truths of contemporary environmentalism that the idea of wilderness “unimpacted” and “uninhabited” by humans was the product of an ignorant myth, a myth simultaneously both attractive and repellant to European immigrants who spread themselves, their religions, and their diseases through landscapes already well-inhabited by indigenous peoples. Ideas contained in the U.S. Wilderness Act such as “untrammeled” or landscapes described as places where humans are “visitors that shall not remain” are clearly problematic in the light of what is now acknowledged about the historical indigenous presence on the North American continent.[15]

While acknowledging the problems inherent in the North American idea of “wilderness” is it possible to still identify a way that such landscapes do consistently speak? Are there any aspects of the wilderness idea that might still contain something important about what the structure of those wild lands convey?

Consider the ideas that the US Wilderness Act tries to capture of land “retaining its primeval character and influence” and land “with outstanding opportunities for solitude.”[16] Here an important and consistent message might be found. Provided one understands solitude as “relative freedom from other humans,” as opposed to the absence of all inspirited beings, and provided one understands primeval character and influence as something approximating “consistent with the historical accounts used in a culture,” it might be argued that the retention of such undeveloped lands exerts a significant and similar influence on both immigrant and indigenous imaginaries. The sense of being in the presence of land that embodies distant time and of being in encounter with only non-human others might to some extent transcend cultural differences. Wild lands might speak a parallel message to different peoples, informing cultural ideas about the people’s relationship to the land, about the historical past and promises of the future, about life and death. Despite all the problems with the concept of wilderness, there might still be an important and consistent set of values that are picked up through interaction with wild lands.

The Lewis and Clark National Forest in Montana recently implemented its new travel plan for an area of the Rocky Mountain Front adjacent to both Glacier National Park and the Blackfeet Nation.[17] The Badger-Two Medicine area, known to the Blackfeet as the “backbone of the world” is a roadless landscape not currently protected as wilderness, nor part of the National Park system. The

Lewis and Clark National Forest recommended designation of that part of the forest as a "traditional cultural district." The travel plan recently implemented bans most motorized use of the area and recommends non-motorized traditional uses only in the Badger-Two. The overwhelming support for this decision both from indigenous and non-indigenous residents of Montana and surrounding areas suggests that the conflict between indigenous and non-indigenous visions of this landscape is less significant than the confluence. The physical character of the land might be characterized by different people in different contexts as "vast", "dynamic", "peopled", "empty", "historic", "wild." Yet despite all the different characterizations, these lands speak with a clear enough voice to both indigenous and non-indigenous parties. The message is to some extent a common message. It is a voice that provides a recognizable meaning to the land whether it is conceptualized as "wilderness" or as "sacred land." It is also, evidently, a voice compelling enough to warrant the land's protection from human impacts.

Jack Turner, Tom Birch, and others have lamented the commodification of wildlands.[18] They complain with some justification that the boundaries, the regulations, and the recreational emphasis used to manage wild lands turns them into artifacts, in the process squeezing what is truly wild out of the landscape. It seems as if they are saying, with Borgmann, that there is a moral commodification of wildness taking place, one that detracts from the true texture and depth of these wild landscapes, contributing to a narrowing and flattening of our experience there. One can imagine a wilderness so intensely managed that the land starts to speak with only a muted voice. Moreover, this may not be true only of heavily trammeled 'pocket wildernesses' in the Eastern US. There are parts of Montana's huge Bob Marshall wilderness complex where the trails are badly cut up by the mule and horse trains favored by the outfitters. Backcountry permits in Alaska's Denali National Park are issued by quadrants in order to reduce the chance of running into other users and the chance of encountering a bear that might be having too frequent human contact. Even a backpacking trip in Denali turns out to be, against the odds, a heavily managed experience.[19]

The worry about commodifying these landscapes is real. The experience of wild lands should not be packaged in a way that human interests impede upon the qualities the natural landscape offers. Generally speaking, however, Birch's and Turner's claims would appear to be exaggerated. Those experience of "primeval nature" and "opportunities for solitude" are still there in both Montana's Bob Marshall and North Carolina's Bob Creek Pocket Wilderness. As Bill Cronon and others have pointed out, wildness can be found very close to home, in the arc proscribed by the blowing of a glacier lily in a spring breeze.[20] The richness, texture, and depth is still usually present even after the land becomes, in Birch's term, "incarcerated" in a park. Birch's and Turner's mistake, perhaps, is an over-emphasis on how the *idea* of wilderness is impacted by management rules, GPS's, and eager recreationalists. They exaggerate the effects the actual practices on (what can still remain) a vibrant material reality. Wild processes, given room to operate, and appropriate conditions to be experienced, can continue to speak a clear and important message about size and scope, history and transience, humility and care, points made with clarity by Holmes Rolston, III in his defense of the management of Yellowstone National Park.[21] Management decisions do not automatically destroy the quality of wild lands, though it is important to notice how some decisions (e.g. ATV access) create more impact than others (e.g. fee structures).

ENVIRONMENTAL ETHICS AND ENVIRONMENTAL EPISTEMOLOGY

In each case of urban, rural, and wild landscapes, it is evident that there are better and worse ways of designing and managing the environment so that the values materialized in those surroundings are more likely to be desirable ones. Recognizing the power of surroundings to influence the mind is an important first step in the process of paying increased attention to how we construct the physical spaces through which we move. This recognition is part of the larger project shared by almost all environmentalists of emphasizing the connections and dependencies that exist between landscapes and human cultures. If we don't simply depend on the environment physiologically and ecologically but also *psychologically* and *cognitively* then we have additional reasons for treating the land with a great deal of care and attention.

Before closing I wish to offer both a brief caveat and a note of reassurance about this paper's central claim that environments can influence the thought processes of those who dwell on them. First, the caveat. On the one hand, it may seem entirely progressive to talk about surrounding landscapes being able to permeate the mind. It could be a way of making sense of the powerful but enigmatic notion of a 'sense of place.' On the other hand, it is important to notice that this line of inquiry also has regressive elements to it, while raising a number of tricky additional problems. For example, it raises a worry about environmental determinism, it risks ignoring the diverse standpoints of different social groups within the same geographical community, and it avoids the question of how material environments and cultural environments might interact. Furthermore, it leaves out the question of how people are influenced, not only on an individual level, but also through a particular sociocultural imaginary, and it does not talk about the inflections of power (whether they be felt through race, gender, class, embodiment, sexuality) that are present for every resident of every environment. All of these worries would need to be addressed as part of any fuller investigation of how a place can influence the mind. For now, I simply note that these hazards exist and stress that they are serious. I also note that, despite the dangers of the territory, there may lie an important insight to be gained from recognizing this epistemic power of the land.

> "The call to construct environments with a particular care is made not simply because it is consistent with our conscience but also because it turns out to be good for our minds.

Now the note of reassurance. The reader may have noticed that the scattering of normative recommendations made for how to shape the urban, rural, and wild landscapes differ very little, if at all, from recommendations that are common throughout various environmental literatures. 'Make visible the environmental costs', 'keep manipulation of the landscape to a minimum', 'pay attention to diversity', 'notice how an ecology takes care of us', 'work with natural processes rather than seek to control and redirect them.' It

may legitimately be asked what, if anything, is new amid this suite of familiar sounding environmental recommendations? Where is the special insight in environmental epistemology that will be useful for policy?

The convergence of these recommendations with those found in other types of environmental thought should not be viewed as a disappointment, I suggest, but as a relief. It is a relief that the message from environmental epistemology is consistent with the one from environmental ethics. If it were not, environmentalists would not know what to think or how to proceed. The difference is that the starting point is not a set of moral values but a concern about how we maintain our values in the first place. The call to construct environments with a particular care is made not simply because it is consistent with our conscience but also because it turns out to be good for our minds. The focus remains on how to design, manage, and shape the physical spaces that surround us so as to enable our minds operate in ways more conducive to shared visions of a good life. The fact that the recommendations from environmental epistemology coincide with the recommendations from environmental ethics should offer some reassurance.

A philosopher friend once said to me, perhaps a little cynically, "You know, we rarely say anything new or different. We just keep saying the same things over and over again in different ways till someone listens." If environmental epistemology is primarily about how nature speaks, ideas such as the ones sketched above might, at the very least, give us a new rationale for becoming more careful and attentive listeners to the messages conveyed by the physical spaces in which we dwell.

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NOTES

1. Christopher Preston, *Grounding Knowledge: Environmental Philosophy, Epistemology, and Place* (Athens: University of Georgia Press, 2003), p. xii. Some of the arguments in the book suggested that the tethering is literally a structural attachment of cognitive architecture to certain parts of the external environment, a claim explored through work in what is known as "the extended mind." This not the part of the argument that I wish to take up here. The part I intend to focus on is the suggestion that there are values or norms that environments can convey to their residents through the experience of dwelling in them.
2. Sandra Harding, *Is Science Multi-Cultural?: Postcolonialisms, Feminisms, and Epistemologies* (Bloomington: Indiana University Press 1998) and Lorraine Code, *Rhetorical Spaces: Essays on Gendered Locations* (New York: Routledge, 1995).
3. Albert Borgmann, *Real American Ethics: Taking Responsibility for Our Country* (Chicago: University of Chicago Press, 2006).
4. An earlier exploration of this idea can be found in my essay "Moral Epistemology: Real and Grounded in Place" *Ethics, Place, and Environment,* vol. 12 (2) (June 2009): 175-186.
5. Peter-Paul Verbeek, "Morality in Design: Design Ethics and the Morality of Artifacts" in *Philosophy and Design*, eds. Peter Kroes, Pieter E. Vermaas, Andrew Light and Steven A. Moore (Dordrecht, NL: Springer, 2008): 91-103.
6. Don Idhe, *Ironic Technics* (Venice Automatic Press, 2008)
7. Shepard (1977), 25.
8. Quote in *Real American Ethics*, 5.
9. Maria Mies, "The Myth of Catching-Up Development," in Mies, M and Shiva, V., *Ecofeminism* (London: Zed Books, 1993): 55-69.
10. Charles Taylor, *The Ethics of Authenticity* (Harvard University Press, 1991), 6.
11. Yurko Saito, "The Role of Aesthetics in Civic Environmentalism," in Berleant, A. and Carlson, A. (eds.) *The Aesthetics of Human Environments* (Orchard Park: Broadview Press, 2007): 203-218, p.209..
12. The visible costs in Valdez are, obviously, disproportionate to the impact of the petroleum consumption of the four thousand residents themselves. But for various circumstantial reasons there happens to be an honesty about petroleum dependence there that is missing in the typical manicured suburb of a North American city. The idea that this honesty "pays dividends" is a deliberate reference to the annual dividend payment that Valdez residents receive from oil royalties.
13. Michael Pollan, *The Omnivore's Dilemma (*New York: Penguin, 2006)
14. Jared Diamond, *Collapse*: *How Societies Choose to Fail or Succeed* (New York: Viking, 2004).
15. For a detailed account of the problems inherent in the concept of wilderness, see Michael P. Nelson and J. Baird Callicott's *The Great New Wilderness Debate* (University of Georgia Press, 1998) and *The Wilderness Debate Rages On* (University of Georgia Press, 2008)
16. Public Law 88-577 (16 U.S. C. 1131-1136), The Wilderness Act, Section 2(c).
17. See the announcement of the implementation at http://www.fs.fed.us/r1/lewis-clark/news/2009/new-travel-restricts-badger-twomedicine-effect-10-01-09.pdf (accessed 3/31/10).
18. Jack Turner, *The Abstract Wild* (Tucson: University of Arizona Press, 1996), Tom Birch, "The Incarceration of Wilderness," in Callicott, B. and Nelson, M., *The Great New Wilderness Debate* (University of Georgia Press, 1998): 443-470.
19. This poses the puzzling question of whether the wildness in Denali would speak louder if it was less managed and the chances of running into another backcountry party were higher.
20. William Cronon, "The Trouble with Wilderness. Or, Getting Back to the Wrong Nature," in William Cronon, ed., *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W. W. Norton & Co., 1995): 69-90.
21. Holmes Rolston, III, "Biology and Philosophy in Yellowstone," *Philosophy and Biology* 5(2)(1990): 251-258.

The Waste of Hope: Exploring the Crux of Utopia, History, and Ecology

By JULIANNE LUTZ WARREN

"A world without utopian longings is forlorn," writes historian Russell Jacoby.[1] So is a world without history. So is a world without nature. Each of which, if incoming reports are true, are at their ends. If the world today seems forlorn, perhaps there is something worth discovering at their crux—at the intersection of utopia, history, and nature—that might help us to understand what is going on and help restore much-needed, fresh-grounded hope.

For half a millennium—since Sir Thomas More's 1516 work naming and inaugurating a new literary genre—the crafting of utopian narratives has waxed and waned. Over time, they have come to embody a continuous history of Western imaginations of the good world. Playing an important part in the development of the novel, utopias are, by definition, fictions. "They deal with possible, not actual worlds," as utopian scholar Krishan Kumar puts it.[2] Yet, at the same time, utopias emerge out of and return to their contemporary realities, especially real crises of the day.[3] Moreover, they offer to help alleviate them in presenting alternatives. The realm of utopia, then, is expansive, but not boundless. While literary utopias liberate imagination, in other words, they also set limits.[4] Both serious and playful, they create "speaking-pictures"[5] of a world and its daily life that might be. They also aim to educate and encourage readers to desire the world portrayed.[6] Even if utopias do not succeed in this, they provide mental spaces for thought experiments involving complex scenarios. Utopias allow people opportunities to think through in detail the outworking and consequences of merely abstract ideals.[7] Utopias provide, that is, opportunities for discovery. What alternatives for the world might be possible?

History, too, as Czech novelist Milan Kundera reminds us, discovers humanity's possibilities. It does so by revealing, as a result of exploration, various, actual situations: "what man is, what has been in him 'for a long, long time,' what his possibilities are."[8] In its discoveries of such truth, he says, history may even dazzle us. And when Kundera speaks of humanity, he embeds us as "beings-in-the-world"—as a snail is bound to its shell.[9] Both an actor and his or her surrounding world must be understood together. In this sense, then, all history must be environmental history and as such may help us discover possibilities for nature, as well as humans, and the relationship between us as it has been, as it is, as it might be.

While history, utopia, and, indeed, novels more generally share the potential for making discoveries of fresh ways of being in the world, they seem to have fallen on hard times. "Hasn't it [the novel] already mined all its possibilities?"—as a seam of coal is exhausted, asks Kundera, reflecting the opinion of the disillusioned. And then he answers, but "isn't it [the novel's history] more like a cemetery of missed opportunities, of unheard appeals?" The novel, after all, "might be a place where the imagination can explode as in a dream."[10] If the novel were to disappear, Kundera believes, it would not be because its potentials are exhausted, but because it would whither in a world that had overshadowed, alienated it—a world that had become too homogenous to need a venue that carries continuity and complexity.[11]

Utopia as a particular novelistic form, has come to an end, a consensus of scholars seem to believe, or at least fear,[12] both in terms of the quantity of works, but also the quality of innovation and imagination.[13] Many utopianists are claiming that 1989 marked the "definite end of utopia,"[14] at least in the form in which it has influenced Western history from its 1516 beginnings with More's text. If so, the end may have been coming for some time. "Our utopias," wrote Lewis Mumford in 1922, "have been pitifully weak and inadequate." If they have not succeeded, "it is because….they were simply not good enough," not because we haven't needed them and don't need them all the more today.[15] Especially since the time of the 19th century industrial revolution, Mumford criticizes utopian works for not stimulating values broader than the "goods" of today, but demanding merely more of the same.[16]

In a similar vein, Frank and Fritzie Manuel, the authors of a classic historical survey of Western utopias ask in conclusion whether

utopias are now virtually exhausted. Or is utopia just in one of its slumps, such as has occurred in times past?[17] Few thinkers, however, no matter how barren the outlook may be believe that the utopian propensity is really quite dead.[18]

History, too, however, may have come to an end, we are told—in three different senses. American political economist Francis Fukuyama argued in 1989 that the conclusion of the Cold War ushered in the triumph of the "Western Idea."[19] History had ended, that is, in the sense of its finding ultimate fulfillment in mankind's most mature, ideological stage—a global, consumerist, liberal, capitalist culture—so the story goes. True, this victory had not yet completely transformed material conditions for the whole of humanity, but inevitably it would. Humanity, in other words, had come to the last page of its modern narrative of the formation and growth of society and with confidence could close the book and live happily ever after. The attainment of this stage of presumed human satisfaction closed off alternatives because there was no longer a perceived need for them.

Alfred Lord Tennyson expressed something of the same view in his 1842 poem "Locksley Hall," "For I dipped into the Future," he wrote, "far as human eye could see." Tennyson saw a world society at peace with itself and "the kindly earth" slumbering, "lapt in universal law."[20] Indeed, Mr. Julian West, the main character in Edward Bellamy's best-selling, highly influential 1888 utopia, *Looking Backward*, found solacing inspiration in these lines, as he, a visitor to the 21st century, rested contentedly in the imagined equitably thriving society that reflected them.[21] While, on the other hand, Mumford particularly criticized Bellamy for inventing, "a high-powered engine of repression" and portraying the possibility of the "nightmare" of an, albeit materially comfortable, modern society "moving along its present path without any change in its aims and ideals."[22] Indeed, Fukuyama himself predicted nostalgia for "the time when history existed" forecasting centuries of boredom to come, which might just eventually kindle a new beginning for a new history.

There may be no time for such boredom, however. A new history may already have begun. Lapping the Earth in the "universal law" of humanity is, ironically, according to Bill McKibben, what has precipitated an end of history in a second sense. In this sense, history is no longer useful in helping us predict what is to come in the future. McKibben in his best-selling *The End of Nature*, published in 1989—a big year for endings—explains that history has ended because nature has. By the end of nature, McKibben means, in this case, neither its fulfillment nor its disappearance, but that humanity, in its pursuit of material comfort for all members of its burgeoning population, has ushered in an era in which there is nothing on Earth that is not mixed up with us. There is no area of land, ocean, or sky sheltered from the tumults of humanity. And a paradox of that human dominion of the world is that we don't have the insight to predict the consequences. "There is," McKibben explains, "no easy way to say that something can't happen or is unlikely to happen." "Such forecasts," he continues, "are based on the past, and now there is no relevant past."[23] Earth is a different planet now, he asserts. We might as well give it a new name.[24] Or as landscape ecologist Monica Turner, winner of the Ecological Society of America's prestigious MacArthur Award put it in her 2009 keynote speech: "The past may not predict the future" as much as we thought to date.[25]

"Conventional utopian ideas," therefore, are "not much help either," McKibben contends.[26] They make little sense in a world that has alienated its past from its future. They invariably meant to advance human happiness without directly promoting the well-being of Earth. This is a sobering statement, particularly if we consider that utopianism, as Oxford political geologist David Pepper argues, "in one form or another…permeates all environmentalism."[27] Indeed, McKibben worries that the intellectual scaffolding provided by environmentalists for the past century is sturdy enough to deal with the weight of the problems we're piling on it.[28]

We are losing history in a third way, too, McKibben argues. In altering everything from Earth's atmosphere to Rainbow Trout,[29] we are losing our memory of wild nature as it was before we changed it. We have detached material nature from its greater meaning in a Thoreauvian sense—the sense in which loving something wild is an enterprise having no knowable beginning or end. A young Thoreau in 1843, was able to see this sense of nature's end approaching and with it alienation from our home planet. Responding to the then-popular vision of John Etzler in which humans harness Earth's energy to transform the entire globe into palaces and gardens of luxury,[30] Thoreau asks with foresight and irony if humans may acquire so much power as to change the vicissitude of the seasons. Perhaps, he suggests, not abiding "the dissolution of the globe," humans bring about, future humanity will "migrate to settle some more western planet," even if it may be "unearthy."[31]

Responding to clamors for a more positive outlook post-*The End of Nature,* McKibben offered another book—this one titled *Hope, Human and Wild.* "We might," he wrote, "if not get the original Earth back, at least keep something recognizable with fresh potential." By hope, McKibben means, "a vision of recovery, renewal, resurgence."[32] Indeed, recent dystopic works—of which there are a plentitude—seem paradoxically to reveal humanity's potential to believe in the regenerative capacity of life. Even as hope for much of Earth's life is eroding, we humans do appear to hold some deep, perhaps deepening, faith in something more important than us, transcending our impulses to dominate and our alienations with the past.[33] Even the bedrock and bones 21st century vision of *The Road* (2006) by Cormac McCarthy discovers—amidst what may be the most barren, hopeless world ever painted in words; indeed, where "10,000 dreams" are "sepulchered within [the]…crozzled hearts of incinerated corpses"[34]—even here the fire of goodness burns on in a child, love between father and son sustains them (if barely), God still breathes, the backs of Brook Trout with "vermiculate patterns that were maps of the world in its becoming" wimple in "amber currents"[35] not yet having disappeared from memory. The long, long history of life on Earth and its mystery remain beyond human meddling. McCarthy echoes Edward Abbey's earlier prophecy. Let man "blast earth into black rubble and envelop the entire planet in a cloud of lethal gas," he writes, "no matter how long, somewhere, living things will emerge and join and stand once again, this time perhaps to take a different and better course"—"bedrock of animal faith."[36] Margaret Atwood's 2009 *Year of the Flood* portrays a sizzling, bioengineered, disease-plagued world. Yet it reaches back to bear witness to the life of the Earth before human activities radically altered it. It discovers at the end that "you can't kill the music."[37] *Remember*, these voices

seem to remind us, if not haunt us. Remember to remember—your father, God, the maps on the backs of trout. Say the names: Archaeopteryx, Sabre-Toothed Cat, Blue Pike, Rainbow Orchid, Rwandan mother Donatille and the baby on her back, Maldive Islands…Earth. There may still be time.

In a human-altered world in which life, ironically, is and feels out of our control, in which people are busy with worry and fear about the future, even as it may be eroding, there is "a surprising return of the word hope," claims the editor of the *Hedgehog Review* in an issue dedicated to imagining the future.[38] Perhaps people are trying to shore up hope as they might a gullied hillside on which they depend. One thing we know, people will not, perhaps cannot work toward the good without both faith and hope—that "desire combined with expectation."[39] What is it, then, the editor asks, that we are hoping for? How is hope shaped by the "contours of contemporary life," with all of its terrors? How is hope shaped by the past and by our understandings of and alienations from it? How is hope molded by the expectations of our imaginations, in particular, of the kinds of futures for our "being-in-the-world" that we have considered desirable and good? By our utopias? What can we discover in the history of utopias, as Mumford put it,[40] that might still define, if not inspire, what is still possible? Or, falling short of that, what is worth bearing witness to? Moreover, how is hope possible within the bounds of and in response to the certainties and uncertainties of geo-ecological realities—past, present, and future? What new stories shall we tell about ourselves and our place in a good world?

> "Perhaps people are trying to shore up hope as they might a gullied hillside on which they depend.

In Old English, according to the *Oxford English Dictionary*, another meaning of the word hope was a piece of land surrounded by fens, marshes, rugged mountains or other expanses of nature that were more or less uninhabitable or otherwise useless to humans. The 17th century naturalist John Aubrey tells of a place in the English country of Surrey where a landholder had "ingeniously, contriv'd a long Hope…in the most pleasant and delightful Solitude for House, Gardens, Orchards, Boscages, etc." Delighting in cherry, orange, and myrtle trees and 21 sorts of thyme, the Hope's inhabitant's, Aubrey tells us, "do enjoy themselves so innocently in that pleasant corner, as if they were out of this troublesome world."[41]

Words carry "memory traces of earlier usages," Russian philosopher and literary critic Mikhail Bakhtin suggests. And words may embody long historical development.[42] If this is so, we may rediscover in our utopian novels—which are worlds of Western hope—that more fundamental to their stories than social and political schemes or mere petty material wants, is humanity's relation to land. Where have people, over generations, wanted and imagined boundaries between themselves and what is not themselves?

For example, drawing upon the old grounded meaning of hope as a piece of inviting land surrounded by waste, if we think about it, there can be no hope, without the waste surrounding it.

The *Oxford English Dictionary* takes up 10 pages of definitions of waste—from "a wild expanse of countryside," to a part of a mine from which coal has been extracted, to something (e.g. natural resources) that has been used up. It may be, in fact, that the ways we define "waste" and what we decide to waste or not waste, is as vital as anything in determining what we hope for or whether we hope at all. Like utopia, hope emerges out of its surroundings and returns back to them, desiring to discover how *good* life can be, driving humans on to embrace life in a body of stories reaching far back in time.

Philosopher John Dewey, historian Charles Beard, and Atlantic editor Ed Weeks, in 1935, felt that Bellamy's 1888 *Looking Backward* had done more in the previous half century to shape the whole of the thought and action of the societies of the modern world than any other work, aside from Marx's *Das Kapital*.[43] From beginning to end, *Looking Backward* confronts the dismal inevitabilities portrayed by Thomas Malthus in the 18th century.[44] How can a growing human population feed themselves in a virtuous way and bypass misery? Bellamy's answer, one seemingly in the air—captured earlier in the works of the great Vermont intellect George Perkins Marsh[45] and echoing in the later ones of path-breaking American scientific forester Gifford Pinchot[46]—had to do with not wasting the Earth. In Bellamy's utopian world, lands left to grow up to weeds and briers and not food for people, were "eyesores and inconveniences" or wasted land.[47] Driven by Hunger and Fear of Hunger, Bellamy's whole society--a great National Army—was labor organized to sustain or "support" the world in abundance, largely by preventing waste.[48] In Bellamy's world, we can see now, for all the good intentions—foremost, an inspiring love for and confidence in humanity—that in an effort to make the whole world one great Hope, we end up with none at all. Kundera calls this a terminal paradox and it deserves long thinking.

Bellamy's novel is an example of a fictional world crafted in response to the real crises and fears of its day. It aimed not merely to assess, but to offer possibilities for assuaging them. More than a century ago, it offered chances to mull over society's contemporary aims and ideals—not merely the satisfaction of hunger, but also "a share in the refinements and luxuries of life."[49] It presented some opportunities, among many others, to wonder whether efficiency and security were themselves means or ends and whether or to what degree exchanging "weeds and briers"—the wastelands of the world—for food, radios, and velvet really would make the world "a great deal richer than it was."[50] Was a "higher standard of living," as conservationist Aldo Leopold raised the question 60 years later, "worth its cost in things natural, wild, and free,"[51] including the spirit of human being? If so, to what degree? What did Bellamy's guiding character, Dr. Leete, mean by "liberty,"[52] when he claimed that it was dear? Were the highly regulated society and the cultivated earth blooming "like one garden"[53] that Bellamy pictured in the outworking of the machinery of material progress possible, appealing, and healthy?

Though Bellamy's work in its time did not lead Western society to alter its aims and ideals in any widely effectual sense, we may yet go back to utopian works like Bellamy's to explore them as a history of our Western imagination and desire in relation to its time—our own past—to help us better understand why we made the choices we did, leaving others aside. We may also return to utopian works such as *Looking Backward* to learn what has been in us, in Kundera's words, "for a long, long time." We can, moreover, revisit Bellamy's work and use it to imagine different histories, different post-1888 trajectories. Potentially, we can discover

fresh possibilities—and set new compass-bearings, as Mumford puts it[54]—for flourishing humanity. What if, for example, keeping Bellamy's emphasis on each member of society cooperating to take responsibility for all his or her neighbors' well-being, he had included pasque flowers and wolves as members of the neighborhood? How would the picture have been changed? What if we were to do so now--what would that daily world be like? If we go back to imagine different trajectories, we can, perhaps, find less traveled paths that take us beyond 19th century ideas of economy and sustainability,[55] the insufficiencies and misjudgments of which Earth's and humanity's current conditions bear out. We may yet discover the regenerative capacity of flourishing Hopes in better concert with ecological realities.

Indeed, as Bellamy understood—an ideal world is one in which all humanity has plenty to eat and more to spare. But we may be pleasantly surprised at our choices in promoting these goods, if we are open to a kaleidoscope of possibilities—gleaning lessons from the past, incorporating our best imaginations of what goodness can look like, and assimilating respect for the creative nature that has sustained humanity throughout its history. With good-hearted courage and enthusiasm, like Dorothy from Frank Baum's 1910 *Emerald City of Oz*, we may embark with good-hearted courage and enthusiasm on some new adventures. In this story, Dorothy, one of America's best-loved characters, her aunt and uncle, the wizard, and a talking chicken named Billina are encouraged by Queen Ozma to explore the country—the small towns and the wastes—surrounding the glimmering city. Along the way they experience worry and hunger as well as joy in their discovery of little-traveled pathways and fresh possibilities:

> Wandering through the woods without knowing where you are going or what adventure you are about to meet next, is not as pleasant as one might think. The woods are always beautiful and impressive, and if you are not worried or hungry, you may enjoy them immensely; but Dorothy was worried and hungry that morning, so she paid little attention to the beauties of the forest, and hurried along as fast as she could go. She tried to keep in one direction and not circle around, but she was not at all sure that the direction she had chosen would head her to the camp. By and by, to her great joy, she came upon a path. It ran to the right and to the left, being lost in the trees in both directions, and just before her, upon a big oak, were fastened 2 signs, with arms pointing in both ways. One sign read: TAKE THE OTHER ROAD TO BUNBURRY and the 2nd sign read: TAKE THE OTHER ROAD TO BUNNYBURY. "Well," exclaimed Billina, eyeing the signs, "this looks as if we were getting back to civilization again." "I'm not sure about civilization, dear, replied the little girl, but it looks as if we might get somewhere, and that's a big relief anyhow." "Which path should we take?" inquired the yellow hen. Dorothy stared at the signs thoughtfully. Bunbury sounds like something to eat, let's go there.[56]

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NOTES

1. Russell Jacoby. *Picture Imperfect: Utopian Thought for an Anti-Utopian Age*. New York: Columbia University Press, 2005, 143.
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44. Thomas Malthus. *An Essay on the Principle of Population*. Oxford: Oxford University Press, 2004 edition. The 1798 essay (expanded in 1803), the author explains, began with a conversation on the subject of the "general question of the future improvement of society" brought up in the work of political philosopher William Godwin. "It is an obvious truth," Malthus explains, however, "…that population must always be kept down to the level of the means of subsistence." It is this reality and the mechanisms behind it that presented, to his mind, "the strongest obstacle to any very great future improvement of society" (3-4). Episodic misery was "an absolutely necessary consequence of it" (14). In the end, however, Malthus believed: "Evil exists in the world not to create despair, but activity" in order to avoid it, exalt people's minds, and "fulfil the will of his Creator" (158). Edward Bellamy appeared to be putting some of political economist Henry George's alternative views into play (while drawing from some of Charles Dickens' imagery). See Henry George. *Progress and Poverty: An Inquiry Into the Cause of Industrial Depressions and of Increase of Want with Increase of Wealth: The Remedy*. Fiftieth Anniversary Edition. New York: Robert Schalkenbach Foundation, 1942, p. 559-560: "Political economy has been called the dismal science, and as currently taught, *is hopeless* and despairing….properly understood, the laws which govern the production and distribution of wealth show that the want and injustice of the present social state are not necessary; but that, on the contrary, a social state is possible in which poverty would be unknown, and all the better qualities and higher powers of human nature would have opportunity for full development." In Mr. Barton's sermon in Chapter 26 of *Looking Backward*, for example, the minister explains: "In place of the dreary hopelessness of the nineteenth century, its profound pessimism as to the future of humanity, the animating idea of the present age is an enthusiastic conception of the opportunities of our earthly existence, and the unbounded possibilities of human nature," (237-238). Humanity by working together and sharing all land and its resources in common would itself become a "fertilizing stream" to "render the Earth habitable," supporting all humans in abundance (269-279).
45. See Gerorge Perkins Marsh. *Man and Nature; or, Physical geography as modified by human action*. New York: Charles Scribner & Co., 1869, Chapter 1. The need he observed was both to cultivate Earth's productivity to its highest capacity and also to restore land and water that had already been ruined and prevent such conditions of waste in the future: To supply a growing population of Europeans, increasing more rapidly than its subsistence, and thus immigrating to America, he writes, "the soil must be stimulated to its highest powers of production, and man's utmost ingenuity and energy must be tasked to renovate a nature drained, by his improvidence, of fountains which a wise economy would have made plenteous and perennial sources of beauty, health, and wealth" (26). Achievements already rendered, such as replanting forests, damming over-flowing streams, draining swamps and lakes for agriculture, making coast dunes productive with plantings, restocking depleted fisheries, and irrigating deserts, Marsh observed were "more glorious than the proudest triumphs of war, but, thus far," he continued, "they give but faint hope that we shall yet make full atonement for our spendthrift waste of the bounties of nature" (45).
46. Gifford Pinchot. "An American Fable." National Geographic 19(5): 345-350, May 1908. For example, Pinchot writes: "Nothing like our growth, nothing like our wealth, nothing like the average happiness of our people, can be found elsewhere; and the fundamental reason for this is, on the one side, the vast natural resources which we had at hand, and, on the other side, the character and ability and power of our people" (346). And: "We must suffer because we have carelessly wasted this great condition of success" (347). What was needed were means of managing resources that would both stop up leaks and prevent monopolies—nationalization of forests and scientific management were what was needed to protect the well-being of the country and keep and enhance flows of resources. Shall we, Pinchot challenged, live in a flourishing country or, through cooperation, science, and moral regard for humanity, avoid turning the country into one like "the miserable outworn regions of the earth which other nations before us have possessed without foresight and turned into hopeless deserts" (350). "We are no more exempt from the operation of natural laws than are the people in any other part of the world" (350). Perhaps not, but neither are we exempt from the responsibility of carrying out those moral laws that seem to set people apart from it.
47. Bellamy, *Looking Backward*, 178.
48. Bellamy, *Looking Backward*, 269.
49. Bellamy, *Looking Backward*, 8.
50. Bellamy, *Looking Backward*, 8.
51. Aldo Leopold. *A Sand County Almanac*. New York: Oxford University Press, 1949 (1968 ed), vii.
52. Bellamy, 149.
53. Bellamy, 270.
54. Mumford, *Story of Utopias*, 24; See also the Summer 2007 Issue of *The Hedgehog Review*: "The Uses of the Past."
55. Newton [Warren], Julianne and Eric T. Freyfogle. "Sustainability a Dissent." *Conservation Biology* 19(1): 23-31, 2005.
56. Frank Baum. *The Emerald City of Oz*. New York: Harper Collins Books of Wonder, 1910, 180-181.

The Biosphere Ethics Initiative: Building Global Solidarity for the Future of Life

By KATHRYN KINTZELE

At the end of February 2010, I had the pleasure of representing the Center for Humans and Nature, alongside Center Board Member George Rabb, at a development workshop and the formal launch of the Biosphere Ethics Initiative (BEI) at the Paris Muséum nationale d'Histoire naturelle, co-hosted by the Center for Humans and Nature, the Ethics Specialist Group of the International Union for Conservation of Nature (IUCN) Commission on Environmental Law (CEL) and the IUCN Comité français. The aims of the workshop were to finalize drafting of the evolving Biosphere Ethic and to structure the program's Action Plan. The work was then taken to a formal presentation and launch before IUCN Director General Julia Marton Lèfevre, followed by remarks of key figures from several partner organizations. This article will provide a background to the Initiative, as well as the results from the workshop and formal launch.

BACKGROUND TO THE BIOSPHERE ETHICS INITIATIVE

The Biosphere Ethics Initiative originated in 2004 from Resolution 3.020, Drafting a Code of Ethics for Biodiversity Conservation, presented and adopted at the 3rd IUCN World Conservation Congress. The Resolution, drafted by members of the IUCN Comité français, appointed the task of developing the code to the Ethics Specialist Group of the IUCN Commission on Environmental Law. As the work of the commissions is dependent upon commitments from volunteer member organizations, the Center for Humans and Nature has been leading this effort since the program's inception, working alongside over 60 cross-disciplinary, government and non-government, partner organizations.

The governance of the BEI consists of four co-chairs and an active membership from across the world. The BEI Co-Chairs are: Dr. Patrick Blandin, Professeur, Le département Hommes, natures, sociétés, Paris muséum d'Histoire naturelle (Paris, France); Kathryn Kintzele, Esq., Director, North American Global Responsibilities Program, Center for Humans and Nature (Chicago, USA); Karla Monteiro Matos, Diretora, Departamento de Cidadania e Responsabilidade Socioambiental, Ministério do Meio Ambiente (Brasilia, Brasil); and Dr. Razeena Omar, Chief Director, Integrated Coastal Management and Development, Department of Environmental Affairs & Tourism (Cape Town, South Africa).

The overarching goal of the Biosphere Ethics Initiative is to develop and advance a living soft law program of practical conservation ethics, with foundational principles applicable to everyone, yet workable to be region-specific. It seeks and highlights the evolving ethics of biodiversity conservation as experienced through communities of practice and, through them, promotes ethically responsible action. Since 2005, the BEI has held four formal Relatos and several development workshops, including the Chicago Wilderness Relato (2007); the South African National Parks Relato (2008); Brazil's Local Agendas 21 Relato (2009) and the Yunnan Province of China Relato (2009). "Relatos" are mutual learning experiences between members of the BEI and a particular local, regional, national or global initiative. The work of these programs informs the living BEI, and the BEI provides feedback to their ethical questions. The Relatos are the heart of the BEI process.

The BEI is comprised of three main elements: (1) the evolving Biosphere Ethic, or concise document stating the nature of the Initiative and the values learned from our workshops; (2) the Action Plan, or a methodology for implementation with practical deliverables (e.g. target/raise the ethical concerns of the IUCN Program; target/raise the ethical concerns of the Agenda of the Convention on Biological Diversity; incorporate the BEI into National Biodiversity Strategies); and (3) the Annex, giving the history and philosophy of the Initiative, as well as the living examples of good action, or the BEI Relatos. An important aspect of the work is to also implement the BEI at the local level and to highlight local conservation ethics specific to that area. This first implementation will take place in September 2010 in the Indiana Dunes region of the United States.

BEI AT THE PARIS MUSÉUM NATIONALE D'HISTOIRE NATURELLE

After two days of complex and intricate drafting, building from a previous four years of development, the skeleton of the evolving Biosphere Ethic was finalized. It is a concise, 2-page document, which includes: (1) a short introduction to the Initiative; (2) the foundational worldview; (3) the foundational principles; (4) the foundational aims; (5) the process of ethical inquiry [through questions]; and (6) an invitation to contribute to the evolving ethic through local dialogue. I have attached below excerpts of the shared ethical values. (The entire document can be found online at http://www.humansandnature.org.)

THE EVOLVING BIOSPHERE ETHIC

As noted above, the AEI focuses on biodiversity conservation as experienced through communities of practice around the world. The central goal of the BEI is stated as follows: "From these communities of practice, informed by a scientific understanding of the biosphere and the place of humans within it, the evolving Biosphere Ethic gives voice and commitment to the following shared ethical values, seeking to guide concerted action for a sustainable and flourishing life within the biosphere."

The foundational worldview of the evolving Biosphere Ethic contains the following ideas:

1. We value the ecological integrity of the biosphere and its diversity of interacting ecosystems and species, independently of other values that humans place on them.
2. We value the genetic and cultural memories carried by species and human communities and recognize their continuity as the basis of the biosphere's resilience, adaptive capacity and potential for transformation.
3. We live within and are dependent upon the biosphere, which we understand as a diverse and dynamic system with limits that human societies must respect.

The evolving Biosphere Ethic contains the following foundational principles:

1. Promote ecological solidarity between humans and nature, with the obligation to respect and the compassion of love as the basis for genuine care of living beings, places and people: love for the beauty and gift of the natural world with all of its living diversity; love for our places and our homes; and love for the people of today and tomorrow.
2. Support universal human rights and efforts for social, economic and environmental justice.
3. Recognize the danger in the commodification of life, the appropriation of life processes and the synthetic creation of new life forms being introduced into the biosphere.
4. Maintain, promote and nurture bio-cultural diversity.
5. Foster local and regional alliances which recognize the knowledge and understanding that each has o contribute.
6. Recognize that the application of scientific knowledge is not value-neutral.

The evolving Biosphere Ethic has the following foundational aims:

1. Keep nature alive and flourishing in the biosphere.
2. Provide representation of nature in decision-making on policies at all levels that affect natural resources and the living world.
3. Uphold decision-making that is participatory, inclusive, self-critical and democratic.
4. Advance just and sustainable forms of governance within our political and economic structures, including supporting efforts to recognize and implement the rights of nature.
5. Establish an economy rooted in ecological realities that reflects the diverse ways in which we understand and value our relationships with nature.
6. Exercise ecological reconciliation by confronting the truth of the past and reconciling ourselves with those impacts and consequences.
7. Promote a universally fair manner of human development and consumption patterns, sharing both the burdens and the benefits.
8. Act with precaution when faced with scientific uncertainty.

THE BEI ACTION PLAN

After finalizing the skeleton and shared values of the evolving Biosphere Ethic, the group began to structure its Action Plan, or methodology for implementation. Some of the general elements to the Action Plan, now in development, include (1) a continuation with the formal Relato process as points of mutual learning, as well as with developments of local biosphere ethics; (2) a process to begin to unpack the foundational worldviews, principles and aims in an Annex; (3) a process to build a website with real-time identification and responses to ethical dilemmas, to be used when teasing out the ethical issues in the current IUCN Program and CBD Agenda; (4) the creation of a communications strategy; and (5) the development of a strategic plan to inspire and engage ethical inquiry.

To this last point, several specific recommendations were proposed on the final day of the workshop, prior to and when meeting with the IUCN Comité français, as well as the final day of the entire event, when participants gathered for a ceremony to formally present the work and hear remarks from Director General of the Paris Muséum nationale d'Histoire naturelle Bertrand Pierre Galey; President of the IUCN Comité français François Letourneux; CEL Chair Sheila Abed; IUCN Director General Julia Marton Lèfevre; IUCN President Ashok Khosla; and the French Director General of l'aménagement, du logement et de la nature Jean-Marc Michel.

Sebastien Moncorps, Director of the IUCN Comité français, and François Letourneux, President of the IUCN Comité français, would like to use the BEI when working with the French National Biodiversity Strategy in several ways. First, to assist in the promotion of the text at the Convention on Biological Diversity in Nagoya, Japan in October, 2010; next to assist in communicating the work to all relevant partners, possibly through a signatory process; and finally to assist in the unpacking of specific topics in the Annex. They would also like to use the BEI to inform the CBD process of access and benefit sharing (an existing project of the Comité); and to use the BEI to contribute to their work with the TEEB study, or The Economics of Ecosystems and Biodiversity study of the United Nations Environment Program and the European Union.

Vincent Graffin, Director General for Développement Durable

et Expertise (Sustainable Development) at the Paris Muséum nationale d'Histoire naturelle, would like to continue to work with members of the IUCN Comité français and use the committee as a platform to interact with the French Environment Ministry, which already has a successful working relationship with the IUCN Comité français. As "ethics is part of the story of this institution (the Muséum)," Director General Graffin would like to host internal seminars on the BEI, as well as working with us to use the material for Museum exhibitions as part of the communication strategy and our interface with the public. He also proposed that the BEI work alongside the "Appel Citoyen" to incorporate the BEI principles of biodiversity conservation alongside the existing human rights principles.

Support for the BEI is strong. The Chair of the IUCN Commission on Environmental Law, Sheila Abed, hailed the work as one of the most important efforts under the Commission, yet one of the most important efforts for all of IUCN, as "ethics is the foundation of law and good governance." She, along with Deputy Chair and Justice of the Supreme Federal Tribunal of Brazil, Antonio Herman Benjamin, has offered to approach each of the Commissions to make them aware of our work and to invite them to the process. This is in addition to the already strong support given by CEL in BEI substantive development and communication.

IUCN Director General Julia Marton Lèfevre also showed strong support for the Initiative, giving a personal story of her history with the drafting of the Earth Charter, and stating that the BEI offered a model of good governance that is needed to "walk the talk," have "courage to protect humans and nature" and "speak up for nature." She very much liked the fact that the heart of the BEI is found in local communities, in existing local ethical action, as found in the Relatos. In order to help us build a movement and to incorporate these principles into all levels of IUCN, she has already begun to disburse the documents of the Initiative to all membership and Councilors. She would also like to highlight the BEI before all membership as a model for successful implementation of an IUCN resolution. Ms. Marton Lèfevre continued that she would like the BEI to have big visibility at the 5th IUCN World Conservation Congress in late 2012 and hopes to see the Initiative at Rio+20 in early 2012 to help crystallize its impacts at the Congress. As we approach these benchmarks, she has offered to help the BEI in any way to ensure its development and implementation alongside all work of IUCN. She is excited to see the outcomes of the local biosphere ethic that will result from the 5th Annual CHN Global Symposium this fall, highlighting the Indiana Dunes region of the United States.

IUCN President Ashok Khosla also spoke of courage and that "courage is a necessary attribute of ethics." He supported that the BEI was a message of learning through real examples of ethical action and that ethics shows us how to deal with issues in the most practical sense. He stressed the need to be always aware of the diverse sources of ethics, from parents and families, to religions and faiths. He stated that the BEI is an ecological necessity because there is no survival if we do not change, and the ecological consequences of today are a result of the current ethics.

Finally, the French Director General of l'aménagement, du logement et de la nature Jean-Marc Michel, supports the continued relationship between the French government , IUCN and the IUCN Comité français and work to incorporate the BEI into their National Biodiversity Strategy. He stated that biodiversity conservation should be made through the "publique politique" and it is a part of a citizen's "contrat sociale." He wants to use the BEI in the revision of the National Biodiversity Strategy and to assist in taking the work before the Convention on Biological Diversity. Also, the Grenelle de la biodiversité will begin soon (a public debate of government officials specific to biodiversity), and they will take the BEI into these negotiations with other members of the French government. He was impressed by the local examples, as they are the heart of the Grenelle de l'environnement.

Following the ceremony, I traveled to the office of the IUCN Environmental Law Center and met with Senior Counsel Françoise Burhenne Guilmin, Legal Officers John Costenbader, Thomas Greiber, Juan Carlos Sanchez and several ELC legal externs. The ELC supports the work of the BEI and is available to assist with substantive input and communications. I will be working closely with Juan Carlos Sanchez to incorporate the principles and Relatos of the BEI with the ELC's Rights Based Approach program, including a series of case studies and an interactive website.

> "... the heart of the BEI is found in local communities, in existing local ethical action, as found in the Relatos.

The Biosphere Ethics Initiative aims to keep nature alive by building solidarity for the future of life. Our efforts are going strong, motivated by benchmarks along the way and growing by increments of individuals, governments and organizations. It is an exciting exercise in thinking and acting across disciplines and across regions of the world, and I invite you to join this movement to change the world.

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Synthetic Biology: Origin, Scope, and Ethics

By JOACHIM BOLDT

Synthetic biology looks poised to change the world in which we live in a manner that parallels the transformation brought about by synthetic chemistry a century ago. Within a few decades, products generated by synthetic biology could become as commonplace an element of our everyday lives as those from the chemical industry that shape all facets of our lives today—frequently in ways that are no longer consciously perceived. Like chemistry previously, biology—the study of life—is on the verge of generating technically realisable knowledge.[1] The potential applications are manifold, ranging from microbes that can detect and curb pathogenic mutations in the human body to bacteria that neutralise harmful substances or generate energy.

And yet synthetic biology—unlike chemistry—is involved in the technical alteration of animate nature. Building on recent advances in genetic science and technology, synthetic biology aims to understand the molecular fundamentals of the metabolic and reproductive functions of simple single-cell organisms precisely. It thereby seeks to enable us thoroughly to manipulate and rearrange existing organisms in a standardised manner, and to equip them with characteristics that do not occur in nature.

It is hardly surprising that this technology provokes heated response. Colloquially, the term "life," (even when it is artificially constructed) is not merely a descriptive but invariably also a normative concept. Vitality—being alive—is the nucleus of that which, with wider cultural reference, implies worthiness of protection, at the very latest when living things display evidence of pain perception and simple forms of awareness; moreover, vitality frequently means unpredictability and individualism. Finally, we often associate vitality with some sense of an inherent right to exist.

The creation of life in the laboratory counts as one of the literary and culturally pivotal codes for the goals of modern humanity, both in the form of the ideal and the "writing on the wall". The latest advances within the research impetus of synthetic biology, which has been developed with zeal in recent years, give rise to expectations that there will soon be more news from this code. This is particularly the case since one of the objectives of this subdiscipline of biology is precisely to produce microbial forms of life with properties that do not occur in nature. In the wake of such research, old ethical and philosophical issues, expectations and anxieties arise again in acute new forms.

ORIGINS

The first isolated references to the term "synthetic biology" can be identified as early as the beginning of the 20th century. For instance, the French medical scientist and biologist Stéphane Leduc published a book in 1912 entitled "La Biologie Synthétique".[2] In this volume, Leduc maintained that, besides the method of analysis, fact compilation and classification, there also existed in science a synthetic method that attempts to reproduce observed phenomena in a rule-governed and reproducible manner. According to Leduc, a science can only develop in its entirety if this second method is acknowledged and employed. In his era of biology, Leduc felt that the consistent implementation of this scheme of the controlled reproduction of observations was missing, and he advocated such an application. It can thus be said that the conviction—according to which the task of theory is primarily to deliver knowledge that enables the object of theoretical reflection to be controlled and utilised—is transferred to the area of living things in Leduc's first attempts. Knowledge, and therefore also biological knowledge, can only accurately be called such if it enables objects to be controlled and applied practically, since knowledge is only confirmed in this manner. This, at least, is one way in which this assumption, central to the modern natural sciences, can be stated.

In 1911, the biologist Jacques Loeb, who lectured in Germany and the USA, formulated his hypotheses in a similar fashion:

> [It] must be emphasised that modern biology is a purely experimental science, the results of which can take only one of two possible forms: either we succeed in controlling a life phenomenon to the extent that we can evoke the

> same whenever we wish (for example, muscle twitches or the chemical stimulation of the development of certain mammals' eggs); or else we manage to identify the numerical connection between an experimental condition and the biological result (such as in the Mendelian law).[3]

The prerequisite of this natural science-based understanding of biology is that the phenomena of living things can be completely reduced to simple powers and laws that govern the organism and whose modes of action can be clearly predicted. Applied to the question of how life can evolve, this assumption must lead to the requirement that living things must be artificially producible. Entirely in this spirit and typically for his era,[4] in 1906 Jaques Loeb declared "abiogenesis"—the creation of life from inanimate material—to be an objective of biology.[5] John Butler Burke, an English biologist, also believed that there must be a transition from that deemed inanimate to that considered animate; he describes the experimental production of "animalcules" as a task of biology.[6]

These early scientific/programmatic approaches to "synthetic"—i.e. "assembling" or "producing"—biology illustrate the fact that the technical realisation of each body of knowledge is not a contingent ingredient in that knowledge understood to be natural science, but rather a constitutive part of this research. The reproducible application is the confirmation of the findings gained from analysis, and hence not only the result but simultaneously the catalyst of research. In this general sense, synthetic biology is not "merely" a branch of biological research alongside many others, but is an essential element of science-based biology. Its existence is an expression of the fact that biology has established itself as a programmatic natural science, and moreover complies methodologically with the respective requirements.

This orientation towards the replication and recreation of nature, which makes the ability to control living things the central research objective and the central test for knowledge advancement, is also described in later literature as the "engineering science viewpoint" or the "engineering science ideal".[7]

At the level of intra- and intercellular molecular processes, this scheme could only be developed systematically after the discovery of the DNA double helix. Following this milestone, the term "synthetic biology" was also swiftly applied again in this area of molecular biology, where its meaning was used analogously to that found at the beginning of the century. Thus, in 1974 the Polish-American geneticist and molecular biologist, Waclaw Szybalski, wrote in terms that sound almost prophetic from today's perspective: "Up to now we are working on the descriptive phase of molecular biology. […] But the real challenge will start when we enter the synthetic biology phase of research in our field. We will then devise new control elements and add these new modules to the existing genomes or build up wholly new genomes. This would be a field with the unlimited expansion potential and hardly any limitations to building "new better control circuits" and […] finally other "synthetic" organisms […]."[8]

Four years later, in 1978, marking the occasion of the awarding of the Nobel prize in Physiology and Medicine, Szybalski and Skalka wrote an editorial in the journal *Gene* that displayed a very similar set of assumptions. The pair proclaimed the dawn of a new era in biology:

> The work on restriction nucleases not only permits us easily to construct recombinant DNA molecules and to analyze individual genes but also has led us into the new era of 'synthetic biology' where not only existing genes are described and analyzed but also new gene arrangements can be constructed and evaluated.[9]

The final step on the road toward current developments involves endeavors to establish the field of "synthetic biology", which commenced at around the year 2000. In continuation of the molecular biological research approach described by Szybalski, a group of American researchers defined synthetic biology as a scientific activity that aims to analyse the interactions of complex cellular processes at the molecular level and to test these analyses by modelling and replicating the processes and structures, and to make them technically utilizable. Thanks to a close connection between biology and engineering science, an attempt is therefore made at conducting genetic engineering, previously characterised as being "manual", in a more systematic manner and on a greater scale—despite its analytical foundation and its synthetic realisation.[10]

This more recent approach in establishing the discipline of synthetic biology has been inspired and supported by the increase in knowledge in the area of systems biology on the one hand, and on the other, and primarily, by the quick-paced development of electronics, rapidly improving sequencing technology and the possibilities offered by DNA synthesis, which is becoming increasingly cheaper and more accessible.[11] Gene sequences no longer need to be synthesised in the laboratory by the scientists themselves, but can be ordered via e-mail from specialist companies and dispatched by mail. Prices for sequencing a base pair are constantly decreasing, while the length of the gene sequences that can be synthesised is increasing.[12] It is impossible to forecast an end to this development. One thing is clear, though. With these technical and economic foundations there are also greater possibilities for more easily testing hypotheses about how the molecular building blocks of simple organisms function with regard to their application and reproduction. Accordingly, the possibilities for replicating or recreating gene sequences and genomes have also burgeoned.

SYNTHETIC BIOLOGY'S SCOPE OF RESEARCH

With regard to current research within the field of synthetic biology, a distinction can be drawn between two ways in which attempts are being made to achieve the overarching research objectives. Some approaches aspire to produce a single-cell organism or a cell in the laboratory from scratch, from non-living molecules. Other approaches attempt to minimise the genome of an existing bacterium to such an extent that the organism is only left with the above basic properties of life, with no further specific abilities. The aim of "hollowing out" existing bacteria, in other words, is, if possible, to leave the organism with only those genes that ensure the organism's metabolism and fertility—and that are capable of mutating. According to the basis from which the minimal cell or minimal organism is set to be developed, the two main directions of research can be separated into "top-down" and "bottom-up" or "*in-vivo*" and "*in-vitro*" approaches of synthetic biology.

The advanced idea of the *top-down approach* is to add genome sequences, assembled as the need arises, to the engineered minimal organism so that it can perform precisely defined tasks. The basic organism would act as a "chassis", to which the desired func-

tions are added.[13] In this context, the genomes are often called the "software", while the remaining structures of the organism are described as "hardware". Following genetic essentialism (which is a disputed perspective outside of the field of synthetic biology), it can be said that the aim of the top-down approach is to equip the hardware of a cell with new, tailor-made software, designed to control it.

On the other hand, the aim of the *de novo* production of a so-called minimal cell in the laboratory, the paradigmatic case of the *bottom-up approach*, is to assemble a basic form of life from simple parts. In doing so, no existing organism is used and altered *in vivo*. Instead, an organism or, in general, a biological system is created *in vitro* from scratch. This second approach can in turn be subdivided into those approaches that deploy already existing biological building blocks to assemble the artificial or "synthetic" cell, and those approaches that attempt to develop a kind of "protocell" (or cell analogue, rather than actual cell) and which set out with chemical precursors.[14] The typical feature of these two research approaches is that they do not only comprise the pure replica of natural cells, but also envisage the construction of cells whose mechanisms for realising the functions of life are very different from naturally occurring cells. Where the latter is the case, reference is also made to engineering an "orthogonal" nature. In this context, and following the parlance of information science, "orthogonal" means biological systems whose basic structures are so dissimilar to those occurring in nature that they can only interact with them to a very limited extent, if at all.

The top-down (or *in-vivo*) and bottom-up (or *in-vitro*) approaches are typically associated with two differing research interests and research traditions. While the *in-vivo* approach is primarily oriented towards technical application and easily tolerates an engineering-based access to modularisation and standardisation, the *in-vitro* approach is more akin to fundamental research that aims to explain and reconstruct the origin and basic functions of life. The foundation and driving force behind this research is the question of how the origin of life can be explained and reproduced in the course of natural history. Nonetheless, this approach is also related to issues of application within the context of synthetic biology. It cannot be ruled out that an *in-vitro* created cell analogue may turn out to be more suitable than a minimal bacterium as a basis for technical realizations.

Although this classification of the research landscape of synthetic biology is useful in obtaining an initial overview, it must nevertheless be emphasised that a range of research approaches exist that cannot be neatly fit into this classification scheme. This is particularly the case for all types of research that deal with the analysis and the replication and regeneration of metabolic processes and cellular signal structures. In these cases, research involves analysing and replicating how cellular constituents in which the genome is embedded function. These studies will in all likelihood have to be counted among the *in-vivo* approaches, which also follow the top-down procedure in that—in analysis and synthesis—they seek to split up complex biological structures into easily describable sub-areas. However, this type of investigation does not generally aim to engineer a minimal bacterium; in this respect, this kind of research distances itself from the top-down procedure, which is otherwise frequently deemed typical for *in-vivo* approaches.

This difference can also be illustrated with regard to the use of the imagery of hardware and software in the minimal bacterium project. Inquiry into understanding metabolic pathways and signal transmission mechanisms cannot be focussed on the conception of the genome as the software of the cell and the remaining biological cell structures as the hardware due to the fact that it becomes clear from such imagery that these remaining structures are also integrally involved in the behaviour that an organism ultimately has. Moreover, these structures can also be used to control the behavior of organisms in a similar fashion to the genome. It is not improbable that this kind of research into cell functions, "beside the genome," will also lead to technologically far-reaching developments. Synthetic biology as a whole is thus more complex than what can readily be portrayed in the media, which already tends to reinforce genomic reductionism and to focus on the major projects of the bottom-up and top-down models that can be conveyed more succinctly.

Finally, a further area of research exists within synthetic biology that is slightly out of line with the top-down and bottom- up framework. This area of research involves the attempt to create genetic structures that are not founded on the same material basis as those occurring in nature. There are thus approaches to supplement the four natural base pairs of the genome with additional base pairs, and other research is being carried out that goes one step further and tries to create genomes that function completely independently of the four base pairs of natural life. In the first instance, such approaches belong to the *in-vitro* field of synthetic biology since the synthetic genomes are assembled from simple building blocks. They therefore blend in, and are partly also a direct element of research within the context of engineering a minimal cell. However, it is also conceivable that non-natural genomes can be used in natural cells and organisms—in other words, to deploy them *in-vivo*.

SPECIFIC CHARACTERISTICS

In order to grasp the specific ethical and philosophical challenges of a newly emerging direction of research, it is essential to ascertain in precise terms how this science differs from already existing areas of science. What, in other words, is novel about synthetic biology?

Application-oriented sciences—to which synthetic biology belongs—are generally subdivided into "enabling technologies," (which create the prerequisites for realising the respective research), "basic development technologies," and "applied technologies." In the case of synthetic biology, the technological prerequisites mainly include gene synthesis technologies, the possibilities of which are constantly expanding. The field of research consisting of *in-vivo* and *in-vitro* approaches and the research surrounding these paradigmatic cores form the area of basic development. The applied technologies include all technical applications that are conceivably associated with synthetic biology. Out of these three areas, the technological prerequisites and the basic development are primarily of interest when exploring the question of what is novel about synthetic biology.

As our brief tour of the history of the subject has already demonstrated, synthetic biology is not a topic that has emerged "out of the blue". On the whole, there are continuities and mechanisms

internal to science that have facilitated the emergence of today's synthetic biology; moreover, in miniature there are also many specific points of contact to existing areas of research. The main points of contact are gene technology and systems biology, as well as engineering science, information technology, and nanotechnology. Due to these manifold references, some commentators consider synthetic biology to be almost a prime example of the much-evoked "converging sciences".[15] In particular, the vicinity to genetic engineering leads to the justified critical question of what is actually novel about synthetic biology and, concurrently, whether this science implies new ethical challenges.

In the first instance, this question can only be answered using quantitative references: In the area of technological prerequisites, the capabilities of gene synthesis are increasing up to the ability to synthesise entire genomes. In the area of basic development, depending on the research direction, the aim is not simply to replace or modify individual gene sequences of an existing organism but to insert a whole synthesised genome into a genetically minimised bacterium. As we have already seen, research is also be carried out into replicating metabolic cell processes and signal transmission mechanisms, and supplementing the "alphabet of life"—comprising four different organic bases—with other bases, or else completely replacing them and incorporating non-natural amino acids into synthetic organisms.

For this reason, there has been a noticeable extension of that which is technically manipulable and controllable. With the synthesis of larger genomes and the advent of also being able to handle large gene fragments, it is no longer only individual, short DNA segments, but also entire genomes that come into practical reach.[16] For instance, scientists recently managed to synthesise the entire genome of Mycoplasma genitalium, a DNA structure with over 580,000 building blocks—a significant difference to the classic gene technological synthesising of a plasmid with 5,000 elements.[17] Gene technological research, such as transplanting parts of the human immune system to mice in order to produce human antibodies[18] and implanting beta carotene synthesis into rice[19], are being continued and quantitatively expanded in this manner. Furthermore, as already mentioned, the genome is being expanded with novel starting materials and recreated in research into synthetic biology. In addition, other molecular cell structures beside the genome are being replicated, making them controllable.

> If scientists seek an organism to serve certain interests, the ideal of synthetic biology is specifically to design and engineer these organisms according to these interests.

In the ethics of technology there is a meaningful distinction to be made between quantitative and qualitative change; change in degree and change in kind. Quantitative change extends the scope of pre-existing human power and control; qualitative change ushers in a new kind or dimension of power and control. Taken individually, new characteristics of synthetic biology appear to represent a quantitative rather than qualitative advance. However, when viewed on the whole it can be maintained that synthetic biology opens a new field of research and technology from a qualitative perspective, even if it is impossible to define where the transition from quantity to quality lies exactly.

The crucial element of this transition is that the focus on the organism to be explored and controlled is changing. The basis of gene technological manipulations is an existing organism with properties that are of keen interest to humans. These existing properties are then optimised by genetic engineering to make them economically exploitable. However, the perspective of synthetic biology is no longer necessarily oriented towards existing organisms. Since, for synthetic biology, the entire genome and the whole molecular structure of single-cell organisms are technically configurable, therefore existing organisms and existing properties are ultimately only incidental examples of what can be assembled from the building blocks of nature. If scientists seek an organism to serve certain interests, the ideal of synthetic biology is specifically to design and engineer these organisms according to these interests.

In the case of synthetic biology, therefore, the phenomenon of single-cell life—or indeed of life at the cellular level—is made accessible to human manipulation and design never seen before. While genetic engineering was linked to already existing forms of life and the exchange of single gene sequences, synthetic biology goes about creating and engineering forms of life that are largely detached from nature. Hand-in-hand with a manufacturing process that, according to ambition, will be characterised by computer simulation and construction, modularisation and standardisation, synthetic biology will henceforth initiate a change in perspectives from genetically engineered manipulation to synthetic creation, which can be fairly described as a qualitative leap.

This leap can be illustrated using the example of a scientific competition that has developed with the emergence of the latest initiatives at establishing synthetic biology: the "international Genetically Engineered Machines" competition (iGEM) was initiated by the Massachusetts Institute of Technology in 2003. In 2009, 112 teams and a total of app. 1200 participants entered the competition.[20] In it, young scientists and students design and develop DNA-based biological circuits, proteins with non-natural properties or artificial cell-cell communication or signal transduction processes.

A requirement for participation is that the genetic modules engineered for the competition have to possess compatible terminals to facilitate the quick assembly of various modules. Furthermore, these modules must be deposited in a material bank, the so-called "BioBricks" database. Not only contestants can access this database—other interested parties can also access it and contribute towards its expansion.[21]

This material bank is to be used as a building set geared towards simplifying and accelerating the future development of increasingly complex synthetic biological systems. Genetic building blocks will no longer be manipulated and replaced ad hoc in individual cases, as is the convention in genetic engineering, but rather will be specifically developed and made accessible in the form of standardised building blocks (it is no coincidence that they have been christened "BioBricks" analogous to Lego bricks) to perform specific tasks.

In this way, the iGEM competition highlights two central concepts on which synthetic biology is founded. On the one hand, the great extent to which synthetic biology is replacing the old gene

technological method of improving that which already exists becomes apparent through the creation of new things—phenomena which are to fulfil precisely defined tasks that no known natural organism can even remotely achieve. On the other hand, it becomes clear how much the interference of synthetic biology in nature relies on the modularisation and compatibility of the generated biological systems.

SOME ETHICAL REMARKS

Ethical reflection on synthetic biology has so far mostly been concerned with issues of biosafety and biosecurity.[22] These topics are indispensable if one is concerned about short- or medium-term legal or political regulations. Nonetheless, in order to get a hold on ethically relevant hidden dynamics of the research agenda, a complementary, more general approach to ethical issues is essential.[23] Given the specific historical and systematic background of synthetic biology described above, a number of relevant issues can be discerned, all of them hinging on the way in which synthetic biology approaches the phenomenon of life.

> Potentially, synthetic biology takes us beyond nature. "Nature 2.0", i.e. nature with novel functions or even an orthogonal system of life, is not pure speculation any more.

Synthetic biology fits an ideal of scientific progress in which scientific explanations of the behaviour of complex entities are based on explanations of the behaviour of those entities' parts. If one is to find an explanation of the actions and reactions of an organism, one is led to look for explanations in terms of patterns of actions and reactions of the molecular make-up of the organism. In this way, synthetic biology follows genetic engineering's epistemology, apparently giving further credentials to its aspirations by adding the ability of creation to genetic engineering's manipulative abilities.

This explanatory strategy stands in contrast to explanations that refer to an organism's perceptions of and attempts to accommodate to its environment, since in this latter case states of the organism as a whole are taken to be able to influence processes at cellular or molecular level. Taking human beings as an example, the contrast is obvious. One may explain the behaviour of a human being by referring to genetic determinants or, alternatively, to his or her perceptions and intentions. While the former knowledge can be used as a tool to identify Archimedean points of behaviour manipulation, the latter kind of knowledge is the prerequisite of the ability to talk to and understand the person as a whole person and to ascribe inherent value to it.

Now, if the organism is a single cell, one may assume that the two perspectives converge. After all, what can the ability to "talk to a cell" conceivably mean besides being able to manipulate cellular features? This is the reason why metaphors of signalling and sensing, often used in molecular biology without recognizing the tension between these concepts and bottom-up explanations, can be understood as containing a core of truth, although they are often criticized as misleading. Making use of molecular processes inside a single cell organism may be seen as a way of "talking" to the organism in this special case.

Nonetheless, the perspective of "talking" basically draws one's attention in other directions than does the bottom-up outlook, even in the case of single cell organisms. For example, if a cell is understood as sensing and transmitting information, the influence of the environment on processes inside the cell becomes a natural part of explanation of what the cell does, yet, when working within the bottom-up paradigm, the cellular environment appears to be a subordinate factor of influence. Accordingly, the bottom-up paradigm favors research on genetics and tends to construe the influence of genetic processes on the organism as deterministic, whereas the "responsive organism outlook" stresses the organism's ability to accommodate to its surroundings, including the ability to remake itself in this process.

It is commonly supposed that in moving upward from simple to ever more complex forms of life genetic bottom-up explanations give way to "responsive organism" explanations, necessitated by emerging phenomena such as sensitivity, consciousness, rationality etc. It is important to note, though, that no matter how complex a form of life is, it is always possible to maintain the ideal of a bottom-up explanation. Unexpected behaviour that may seem to renounce this ideal can always be explained away by referring to the complexity of causes and effects involved, a complexity that is not yet accounted for, but will in the future be accessible in terms of bottom-up explanations.

Moreover, it is difficult to see how "responsive organism" explanations are to be based on bottom-up explanations, given that the explanatory principles involved stand in stark contrast to each other. To invoke "emergence" as a solution to this problem is simply to invoke an explanatory "deus ex machina". Hence, if one wants to allow "responsive organism" explanations to play a role in explaining behaviour at all, one has to use this scheme right from the start, in accounts of even the simplest forms of life.

Now, this does not mean that bottom-up explanations are generally useless and ought to be avoided. For one thing, in the case of simple forms of life, the languages of the two schemes may overlap to a certain degree. For another, the bottom-up outlook can always serve as a tool for any inquiry that is aiming at effectively controlling and manipulating processes. It does mean, though, that in accepting the general validity of the "responsive organism" perspective one ought to be attentive to the one-sidedness of bottom-up explanations even in the case of simple forms of life. One should also be attentive to the ethical limits the "responsive organism" outlook imposes on bottom-up explanations if applied to higher organisms—especially, of course, to human beings.

> ... synthetic biology reconstructs and creates organisms as machine-like entities, while nonetheless as a matter of fact having to cope with all the uncertainties and idiosyncrasies of evolving life.

Everything that has been said so far applies almost equally to genetic engineering and synthetic biology. Therefore, in order to delineate specific ethical aspects of synthetic biology, one has to take a further step and look at synthetic biology's special features, i.e., first and foremost, the appeal to creation and, to a lesser degree, the role of engineering principles such as modularization and standardization.

Creation, from the point of view of synthetic biology, amounts

to being able to put together basic cellular parts, thus building a novel entity that exhibits all the characteristics of life. This is true both of *in-vivo* and *in-vitro* approaches. As an obvious first remark, it is important to note that this kind of creative activity is not "creatio ex nihilo", creation from nothing.[24] In other words, synthetic biology's creations cannot unqualifiedly be compared to the act of creation that theology commonly attributes exclusively to God—claims to this effect both by scientists and by synthetic biology's critics notwithstanding. Even if it became possible, following a bottom-up approach, to build a living cell entirely from non-living complex molecules, this still would have to count as creation by way of refined combination of given parts. One may say that in this scenario, too, scientists do not create life from scratch but supply necessary and sufficient conditions for matter to actualize its potential to form living organisms.

> the way in which newly created organisms are conceptualized has an ethical impact on how life in general is understood and valued.

Now, while the assertion to be able to create life from scratch surely must count as hyperbolic, it seems to be true that synthetic biology is a more creative activity than genetic engineering has been before. The aim and the success of the iGEM competition bear witness to the fact that synthetic biology carries with it a new level of aspiration, if not yet achievement. Whereas genetic engineering had its focus on optimizations of existing organisms (the benchmark being societal or consumer needs and preferences), synthetic biology gives free play to fantasy and imagination. Potentially, synthetic biology takes us beyond nature. "Nature 2.0", i.e. nature with novel functions or even an orthogonal system of life, is not pure speculation any more.

From an ethical perspective, the shift of perspectives is significant, since the results of the creative activity in question gain life of their own. Synthetic organisms interact with the environment and evolve just like natural organisms, which means that their future is to a large extent unpredictable. At the same time, the engineering ideal of synthetic biology suggests quite the opposite, namely a product that, since it can be created, can be understood and explained in all the details of its functioning. Condensed to a catchword, synthetic biology reconstructs and creates organisms as machine-like entities, while nonetheless as a matter of fact having to cope with all the uncertainties and idiosyncrasies of evolving life.

From this perspective it does not come as a surprise that in the cultural imagination closely connected to synthetic biology's aim of creation of life are the stories of Frankenstein's creature and Faust's Homunculus. Both stories may be taken to exemplify, among many other aspects, the gap between the highest accomplishment that science can aspire to, namely the creation of living organisms and essential autonomy of these organisms,which turns them into independent rivals and, in the case of Frankenstein, victims of their creators. In other words, Frankenstein and Faust are not always misguided associations of a scientifically under-educated public. Rather, these cultural narratives and cautionary tales can help us to stay aware of the limits of the general explanatory framework synthetic biology employs and to the necessity of sober multi-disciplinary risk assessment.

CONCLUSION

Synthetic Biology is a rapidly developing new field of biological research. Its aims to analyze intra- and intercellular processes and to use this knowledge in order to build hitherto unknown single-cell life forms. Thus, the shift from analysis to synthesis to which chemistry has been subject in the early 20th century is now about to become reality in biology.

In the case of chemistry, this shift has had a massive influence on the economy and society as a whole. It does not come as a surprise, then, that the rise of synthetic biology is accompanied by high-flying expectations: possible applications range from decisive advances in cancer therapy to microorganisms that degrade remedies and fuel-producing bacteria.

At the same time, the development of the research field is met by a growing number of critical voices. Under the heading of "biosafety", social scientists, ethicists and philosophers discuss topics concerning the unintended harmful effects of synthetic organisms to humans and the environment, and further attention is paid to possible cases of intended misuse—so-called "biosecurity" concerns. Taking a step back, it becomes possible in addition to focus on some general ethical implications of synthetic biology's endeavor.

First, calling an object alive is deeply connected, both historically and systematically, with the conviction that the object in question is to be valued as a (more or less) autonomous agent, a status that artifacts do not share. As a consequence, the way in which newly created organisms are conceptualized has an ethical impact on how life in general is understood and valued. When describing microorganisms and their signalling pathways, synthetic biology researchers often invoke computer metaphors of "hardware" and "software" as well as mechanical metaphors of "brick" and "chassis". Keeping in mind the difficulties of defining life and the normative dimension of the concept of life, it is important, though, not to prematurely conflate the concepts of "life" and "machine" in synthetic biology research.

Second, even though it is not correct to claim that synthetic biology attempts to create life "from scratch," synthetic biology does comprise a perspective of creation rather than manipulation. From point of view of creation, one does not have to settle for smoothing out nature's shortcomings but can engineer a nature without shortcomings from scratch. Using the abilities of nature through cultivation, manipulation or even exploitation differs from reinventing nature. Assuming all appropriate safety measures are in place, doing so might be justifiable in many specific cases. Nonetheless, taken as a general approach, it might lead to an overestimation of how well we understand nature's processes and our own needs and interests and of how best to achieve them.

Following up on this last point, it becomes possible to connect ethical reflections on life and creation with down-to-earth questions of biosafety and biosecurity. For example, given the ability to create single new forms of life, the degree to which we believe in our ability to understand and calculate nature's processes will increase, while at the same time our actual knowledge of complex interactions of different kinds of organisms in their habitat might not have expanded at all. As a consequence, the core characteristics—ethically speaking—of synthetic biology present a challenge to regulations and treatises originally developed to deal with risks and cases of misuse regarding genetic engineering.

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REVIEWS & REFLECTIONS

ETHICAL ASPECTS OF SUSTAINABILITY

By Bruce Jennings

Ethics or morality has to do with the principles, standards, rules, norms of conduct that make cooperation, justice, and freedom possible. Ethics is inseparable from questions of cultural meaning and social power; it provides a philosophically based touchstone for an ideal of justice, right relationship, and the proper use of power and authority.

The ethical analysis typically has the following four central components:

- an evaluation of the character and intentions of the agent—what virtues/vices does the agent exemplify?
- an evaluation of the inherent properties of an action—what rights or duties does the action fulfill or violate?
- an evaluation of the consequences (most often understood as causal effects) of an action—what benefits or harms are brought about by the action?
- an evaluation of the context within which actions take place—does the action support or undermine the system or context which makes the action possible and meaningful in the first place?

This fourth aspect has the most direct connection with the commonsense meaning of the concept of "sustainability"—not undermining the prerequisites of what you are doing, living on the land without ruining it, using without using up, limiting how much you draw down reserves so that you do not deplete fast than you replenish. But all four aspects are relevant to sustainability, which is not only about living with constraints, parameters, and limits but also about prescribing some inherently wrong or causally harmful types of action, and about creating the proper kind of sensibility, motivation, and moral commitment in people. In sum, virtue, rightness, consequence, and context are all ethically important in navigating sustainability.

A sustainable society lives within the carrying capacity of its natural and social system. It has a system of rules and incentives that promote replenishing and limit depletion and pollution. A sustainable society builds upon the commitment of its members to conform to these rules voluntarily, and it enforces them when necessary.

One final note about ethical discourse in general as it pertains to the issue of sustainability. Ethical analysis is deeply affected by the initial ontological starting point or orientation one assumes. In general, there are three such orientations, the theocentric, the anthropocentric and the biocentric. In the interests of time, I mention only the last two here. The human-centered orientation denies that non-human things have any inherent or intrinsic moral value; their value is only instrumental to human values, goals, and well-being. The biocentric perspective holds that value in the world does not reside within human beings alone. The value in the world—for the sake of which ethics and morality exist in the first place—resides in the natural and biotic context of which human individuals and societies are a part. Therefore, ethical rights and duties, and the good for which ethical agency and action strive, should be understood in terms of systems of interdependency, relationship, sustainability, and resiliency.

Human-centered ethics is the default position of our politics and public policy today, and it leads to a position that might be called unsustainable rapacity. (Not to put too fine a point on it.)

The biocentric perspective gives us three different variants on the ethics of sustainability, which have been in contention throughout the history of American conservation and environmentalism, particularly in the area of forestry policy, where the concept of sustainability originated.

(1) Sustainability as efficient management of resources. This is the scientific and sustainable forestry of Gifford Pinchot.

(2) Sustainability as the preservation of wildness and the radical rejection of an ethic of human use in favor of an ethic of human respect and non-interference. This is the argument proposed by John Muir.

(3) Sustainability as the land ethic or land citizenship—a synthesis of both well-managed human use and respect for the requirements of the systemic properties necessary to the integrity, functioning, and health of a biotic community of which human beings are a functional part. This is the synthetic position developed by Aldo Leopold. (Precursors of it can be found in Alexander von Humboldt, Thoreau, and George Perkins Marsh.)

Arguments in favor of unsustainable rapacity tend to be arguments of convenience, expediency, and self-interest, rather than arguments of principle, so I would not call them ethical arguments at all.

The three versions of sustainability, however, are each grounded on recognizable and serious ethical arguments. No definitive ethical solution to this debate exists. Our navigation of sustainability will be a tacking back and forth among these three orientations and the policies and practices that follow from them. That tacking is a good thing, and it is on the border line between ethics and politics. For me, however, the overall course and direction of our navigation should be set by the third conception of sustainability as land citizenship.

Sustainability as efficient management inevitably falls prey to human ignorance

REVIEWS & REFLECTIONS

and human hubris. And experience since Pinchot's day shows that, despite its genuinely ethical and biocentric intent, it too easily falls back into an anthropocentric orientation in which nature alive becomes nature dead; that is, a system that supports us becomes a stock of raw materials for our consumption and use.

For its part, the conception of sustainability as wildness drives too sharp a wedge between humans and nature and is not ontologically sound, nor is it workable because the problem of sustainability is an agricultural, suburban, and urban problem and is not limited to undisturbed ecosystems in remote or protected areas.

The land ethic, a notion of democratic ecological trusteeship, provides the best moral compass for navigating sustainability in the Hudson Valley and beyond.

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IS IT TIME TO MOURN LIBERAL POLITICS?

A REVIEW OF WILLIAM OPHUL'S REQUIEM FOR MODERN POLITICS (BOULDER: WESTVIEW PRESS, 1997)

By Peter Brown

Despite the near decade and a half that has passed since its publication, this prescient book provides a fresh, if also virulent, perspective on our time. Its central argument is that embracing the central values of the Enlightenment—individualism, the separation of morals and politics, and the legitimatization of the conquest of nature—have backfired. Rather than the triumph of human virtue and achievement which can set us on the road to progress, we are on the road to a great ecological, economic, and political unraveling, the components of which Ophuls grimly, but compellingly documents.

Refreshingly, and unlike much work in social science, especially mainstream economics, Ophuls draws on a familiarity with science that is contemporary and up to date. In particular, he grounds much of his argument in the first and second laws of thermodynamics. The first law is the conservation of matter and energy; while the second law states that in a closed system all things tend toward disorder and uniformity—what is called "entropy." But as Ophuls points out, the second law also describes the process on earth in which nature captures energy, mainly sunlight, and transforms it into complex biological structures such as plants and other animals; and, of course, ourselves—over very long periods of time. And it is these living and formerly living structures (such as coal and oil) that have made the current political and social orders possible. But for Ophuls, as for Georgescu-Roegen, a principal founder of ecological economics, this party will inevitably end, and likely very soon.

Virtually nothing escapes the sickle of his argument. In the second chapter, "Moral Entropy," he describes how amoral individualism destroys civil society by destroying the complex social structures on which human well being and meaning depend. It sets us on a tragic course—where what we need and value the most is remorselessly destroyed by the hubris of the person liberated and, to themselves vindicated, by the highest values of human achievement—those of the Enlightenment. In the third chapter, "Electronic Barbarism," he writes: "...the American people are no longer a democratic public, but an electronic mob that reacts to events in the media arena by ricocheting from issue to issue, personality to personality, emotion to emotion without ever really understanding or reflecting upon what it is seeing." (p. 89)

But in *Requiem* the problem is not just what wrong in the United States—there are deep problems with civilization itself. The process of emergence from the primitive societies characterized by, for Ophuls, as embodying "liberty, equality, and fraternity," has been accompanied by four great ills: "...the careless exploitation of nature, organized violence directed at outsiders, political or religious tyranny exerted over insiders, and gross socioeconomic inequality, if not outright slavery." (p. 97)

The Enlightenment remedy is to address the latter two ills—tyranny and inequality, by worsening the other two. The consequence has been the hasty and ruthless exploitation of nature so carefully constructed over countless eons, and the pillaging of the resources of the "lesser peoples." Nature is not something to be respected, but a cluster of interchangeable resources to be exploited, and if they are of interest in the

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future to be subject to economic discounting. The original plan of global pillage was through military conquest, which led to the establishment of the European empires spread around the globe. But after World War II this bellicose endeavor gave way to the "development project" aimed, ostensibly, at assisting the "disadvantaged" in achieving the "benefits" of modern life. Yet the displacement of rural populations to vast megacities and their surrounding slums is but one instance of the destruction of life and community that followed in the wake of these "improvements."

But did the Enlightenment project work in the county where it found most fertile soils in which to take root—the United Stares? One promise was that economic development would end poverty and increase equality. According to Ophuls that was a bad wager. The war against nature is accompanied by more aggression between people—even if that aggression is, to paraphrase Keynes, waged by the checkbook, not the sword. The communities that are destroyed do not even show up in the maw of economic progress measured by GNP; and resulting affluence for the beneficiaries is a source of addiction, not satisfaction. Most paradoxically the simplification of nature amounts to the destruction of the principal source of true wealth.

The other promise of the Enlightenment was that religious tyranny would be avoided, but while organized religion was displaced from the seats of political power, another religion of reason, science and control of nature and humankind alike was put in its place. While the administrative state still goes through the rituals of democracy and accountability, the overall goal is economic development, the national security state, and the pursuit of an empty concept of human well being.

Such is the diagnosis of our conditions and prospects. What to make of it all? There is certainly room for questions. Is the picture of "primitive peoples" some romantic notion more grounded in Rousseau than careful anthropology? Is the characterization of the Enlightenment balanced and cognizant of its many threads and eddies? Does life in religious and other communities of our time fit the bleak picture of isolated individuals?

Is Ophuls plea for a reconstruction of moral politics and real community even remotely conceivable in the world he has described? How should the material progress of the last centuries weigh in the balance of our assessments of the project?

These and other critical questions should be asked, but one cannot shake the feeling that this is a devastating, deeply and carefully argued assessment of our circumstances and prospects. Indeed, one is left with the question: did Ophuls carry his critique far enough? For once we connect liberal politics to thermodynamics the implications are revolutionary. The first law—the conservation of energy and matter calls into question one of the most fundamental underpinning of that politics—that there are what John Stuart Mill called "purely self-regarding acts." Everything we do in North America has energy and material implications for the farmers in the coastal plane of Bangladesh. And the second law teaches us that the Earth's life support capacity is finite though not fixed—so everything we do affects life's prospects. These question lie beyond the range of the analysis undertaken by Ophuls, but they destabilize the political dimensions of the Enlightenment project far more deeply than *Requiem* envisions. Is there a deeper mourning still to come in this age of ecological sorrows?

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THE
LAST WORD

Brooke Hecht

POST SCRIPT TO AVATAR: LIVING WORLD, I SEE YOU

ONE RESPONSE TO THE 2009 JAMES CAMERON film *Avatar* stands out to me: depression—the unanticipated response of a sizeable segment of *Avatar* viewers who longed to live in a world like Pandora. Among others noting this response, CNN reported on the depressive effect the film had on thousands of viewers, drawn to blogging threads, such as, "Ways to cope with the depression of the dream of Pandora being intangible." CNN tracked some of the dialogue, bringing psychologists on the network to offer their interpretations. The psychologists concluded that *Avatar*-induced depression is a notable public phenomenon, caused by the inability of viewers to accept their own drab lives and the "reality" that the beauty of the Pandoran world is entirely fantasy.

James Cameron's *Avatar* was partly inspired by *The Wizard of Oz*, in which Kansas was filmed in black and white, and the land of Oz was in color. In *Avatar*, Cameron mirrors colorless Kansas with the steely gray corporate domain and scientific field station on Pandora. The bright beautiful "other" world of Pandora, echoing Oz, is only seen outside the human compound. As with *The Wizard of Oz*, are we meant to understand "reality" in *Avatar* as the bleak human outpost? At the end of Oz, Dorothy wakes up to the dreary reality of Kansas, but at the end of *Avatar*, Jake wakes up within the beautiful Na'vi world. Because of this, *Avatar* critic, Daniel Mendelsohn, ("The Wizard," *New York Review of Books*, March 25, 2010, available at http://www.nybooks.com/articles/23726), notes that Cameron's departure from reality reaches an unacceptable level; Jake does not follow Dorothy's path to wake up in the "real world."

As soon as we start talking about the "real world," I look to draw on the insights of multiple disciplines: ecology, philosophy, and history among them. What is "real" in *Avatar* anyway? Clearly, a superficial look at the particulars of the flora and fauna or the human-developed technology featured on Pandora places the movie in the fantasy category. However, if you look at some of the basic principles of Pandoran ecology and the philosophies/worldviews presented, there is quite a bit of reality worth noting.

Avatar scientist, Grace Augustine, reveals the wonder of "Pandoran ecology" to the viewer: a vast interconnected energy network spanning the living surface of the planet; a biosphere of astonishing diversity; interconnected trees storing memories of times long past; synergies among plants and animals; abundant bioluminescence. Represented artistically in *Avatar*, these are features of our own extraordinary earth.

There are of course a number of very important differences between Pandora and earth. For example, earth's evolution has favored two-legged and four-legged animals (as opposed to six); two-winged creatures (as opposed to four); bioluminescence on earth is largely a feature of the deep oceans, where 90% of creatures possess this quality (some carrying the "Pandoran" effect of lighting up when touched). However, our terrestrial ecosystems have bioluminescent creatures too. Fireflies, glow worms, certain arthropods, flies, centipedes, and millipedes, as well as a number of fungi, light up our world outside the seas.

As for interconnections—plant to plant, animal to animal, plant to animal—they are the rule on earth, not the exception. One well-known example includes a forest of Quaking Aspen in Utah which is in fact a single interconnected male individual (who also happens to be over 80,000 years old). The rings of wood that are added to trees each year store a vast amount of historical information sharing the journey of that particular tree and its ecosystem. My own ecological research has shown that even leaves, often made to last for only one summer season, can tell a story that spans the centuries (if only we would listen). Plants under attack can send signals through the air to nearby plants as they are being eaten, warning them of impending assault and allowing them to prepare their defenses. Below ground, tree to tree, roots are interconnected, exchanging information and nutrients. A felled tree (which does have a specific moment of death, just as a human does) can remain a "living stump" through these below ground connections to other individuals. These are all characteristics well known to *Avatar*'s Eywa.

In *Avatar*, the humanoid Na'vi have a distinctive organ (a long braid) that allows them to directly connect with the living world around them. Though we humans do not possess this particular organ, our connection to the living earth is just as intimate.

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To paraphrase my colleague Wes Jackson (www.landinstitute.org), of course humans are intimately connected to the earth—just try living somewhere else! Humans cannot exist apart from the interconnected energy network spanning the living surface of the biosphere. Sojourns to outer space are done only with a long umbilical cord that stretches back to earth.

Many aspects of *Avatar*'s philosophical message—about the destructive greed and insatiability of humans—remind me of William Ophuls' important, but not widely known book, *Requiem for Modern Politics: The Tragedy of the Enlightenment and the Challenge of the New Millennium*. (*Requiem* is reviewed in the current issue of *Minding Nature* by Peter Brown.) As noted by Ophuls: "Modern psychological research has confirmed the Buddha's fundamental insight: craving is intrinsic to the human mind, no sooner is one want satisfied than it is replaced by a new one." This craving is transparently symbolized in *Avatar* by the humans' insatiable drive to obtain "Unobtainium." While these cravings may be as old as our species, today we have important (and abundant) knowledge linking human greed to the destruction of the beautiful, diverse, interconnected life system upon which we and all creatures depend, as so clearly portrayed in *Avatar*. And, moreover, we spend most of our waking hours doing just that in order to maintain the Western lifestyle—which we are too harried to enjoy anyway. (See text box.)

Research shows that hunter-gatherer cultures (such as portrayed by the Na'vi) not only have a lighter ecological footprint, but also they are among the most leisured, relaxed, and economically secure people in the world. Again from Ophuls, "…after a careful comparison of 'stone-age' and 'civilized' economies, the traditional understanding that leisure is the product of civilization needs to be stood on its head, for in developed economies, the amount of work per capita increases and the amount of leisure decreases…we have only to read the complaints of old-time missionaries about the incurable 'idleness' of the natives….who do not 'work,' they live." Thus, we know that grasping for "Unobtainium" is not the only choice, nor is it the only reality. (For examples of alternative personal economic pathways, see the forthcoming book by Juliet Schor, *Plenitude: The New Economics of True Wealth*.)

In Hinduism, Avatar or Avatara refers to a descent from heaven to earth, a descent into earthly *reality* to bring the social and cosmic order back into alignment. Is the dream of Pandora truly intangible? Like Jake, let us all "wake up" to the living world around us to which we are all intimately connected. It is very real.

"I beg thee now to believe that, all miserable as we seem in thy eyes, we consider ourselves nevertheless much happier than thou, in this that we are very content with the little we have….Thou deceivest thyselves greatly if thou thinkest to persuade us that thy country is better than ours. For if France, as thou sayest, is a little terrestrial paradise, art thou sensible to leave it? … As to us, we find all our riches and all our conveniences among ourselves, without trouble, without exposing our lives to the dangers in which you find yourselves constantly through your long voyages. And whilst feeling compassion for you in the sweetness of our repose, we wonder at the anxieties and cares which you give yourselves, night and day, in order to load your ships. … Now tell me this one little thing, if thou has any sense, which of these two is the wisest and happiest: he who labors without ceasing and only obtains…with great trouble, enough to live on, or he who rests in comfort and finds all that he needs in the pleasure of hunting and fishing?"

– a Native American chief, addressing French explorers in Nova Scotia (William Ophuls, Requiem for Modern Politics*, p. 153)*

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