

WILD DUCK REVIEW

Literature, Necessary Mischief, & News

"In literature it is only the wild that attracts us. Dullness is but another name for tameness. It is the free and wild thinking in *Hamlet* and the *Iliad*, in all the scriptures and mythologies, not learned in the schools, that delights us. As the wild duck is more swift and beautiful than the tame, so is the wild – the mallard – thought."

– HD Thoreau



KEEKOK LEE: AN INTERVIEW.....

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"WILDERNESS"

THE NATURAL AND THE ARTIFACTUAL

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WILD-DUCK REVIEW

“The novelist is neither historian nor prophet;
he is an explorer of existence.”

—Milan Kundera

Literature, Necessity Mischief, & News

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HANK MEALS

END OF HUMAN NATURE?

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CASEY WALKER founded Wild Duck Review in 1994 and has edited and published twenty issues to date. The last issue on Biotechnology is now available from Sierra Club Books, Made Not Born: The Troubling World of Biotechnology, October 2000. She was educated at UC Davis and the Institute for European Studies in Vienna, Austria, in International Relations: Western European History; with graduate studies in English Literature: Fiction Writing.

INTRODUCTION TO "END OF HUMAN NATURE?"

The last *Wild Duck Review* assessed biotechnologies on a number of levels—the scale of genetically engineered and transgenic crops, livestock, and fishery foods currently grown and consumed; the scale of projected engineering for human beings; corporate incentives and industry strength; patent and trade law on intellectual property rights; regulatory vacuums; incomplete and flawed biological science; real and projected impacts on the living world and on human beings; and issues of ethics, morality, activism, and worldview. All of these issues, as we can see from the daily news, are rapidly gaining attention in ways that are both forceful and complex. Yet the question of what can and should be done with biotechnologies rests within a still wider and more difficult problem. With rising new technologies such as molecular electronics and nano- and terraform-technologies, we are suddenly contending with the capacity to structurally design and create physical matter from scratch.

How do we best respond to this newfound and exceedingly powerful capacity? What can we do now that will enable us to look back years hence and say that we responded wisely, contributing our best efforts to widening rather than narrowing the possibility of existence on Earth?

I think this question goes beyond basing arguments for or against such technologies solely on issues of safety, efficacy, or rights. While these arguments should be pursued in order to identify harm, check abuse of power, and slow the consequences of premature deployment, they are not radical enough. For even if each new engineering technique were proven safe to all donors, recipients, and succeeding generations; even if each were guaranteed to do its job precisely and accurately; and even if all concerns for democratic process and equal rights were met and approved by a unanimous, global culture, still such standards would not in themselves prevent the creation of a world devoid of human or wild nature—the creation of a technohive in a technosphere.

And even if life in a technospheric technohive sounds promising (as it does to a number of people) in

its defiance of material and biologic limits, yet its promise is for an existence merely of a kind and is neither progressive nor inevitable. More significantly, such a world permanently forecloses on the possibilities of a human and wild nature akin to those any of us have ever known throughout our entire human history. Thus, the radical argument—the challenge taken up in this issue of *Wild Duck Review*—is that of the “possibility of existence.” Is human nature possible without wild nature, and if not, are we willing to engineer ourselves into our own peculiar extinction?

First, as philosopher Keekok Lee argues in her book *The Natural and the Artefactual* and in her interview here, there is a key distinction to be made between something that merely looks natural and something that is natural in its *being*. We cannot say that any single thing—whether it be a plant, animal, acre of soil, freshwater lake, or child—that has been designed at its structural level to fulfill the intents and purposes of its designers is in fact “natural.” It is a cultural artifact. It lacks its own being for its own sake and will always be an artifact imposed upon a world that is already, and cannot be otherwise, living out deeply embedded and emergent relationships of the past, present, and future.

Further, regardless of whether any artifactual entity fulfills the plans of its designers and meets the expectations of its consumers, it cannot be thought of as a product that is “controllable.” It will interact in the world, affecting its environment just as natural things do—with impacts so profound we barely comprehend them. Its chemistry will affect the chemistry of the world. Its wings will create hurricanes. In fact, the more artifactual entities successfully mimic their natural counterparts, the less control their designers have over them. Hence the significance of concerns, such as those expressed by Bill Joy in “Why the Future Doesn’t Need Us,” (*Wired*, April 2000), about self-replicating, mutating biological or mechanical plagues causing a final extinction of the human species.

As Florence Shepard’s essay makes clear, wild nature does exist, if only in tattered remnants, and it is wild in the most commonly understood meaning of the word. It is independent of humans, genetically intact, highly bounded, dynamic, self-determining, and self-organizing. And contrary to much of postmodern thought, which seeks to extend and democratize values, the existential values of natural and artifactual beings are not relative. Natural beings are vulnerable in relation to artifactual beings, and as Bill McKibben points out, it is inevitable that as artifacts interbreed with natural kinds, there will come a point where natural kinds cease to exist. Genetically engineered rabbits will be the existential equivalents of Coke bottles.

As Chris Desser suggests in her essay, we must now ask on behalf of most of western-going-global culture: If our realities are increasingly urban and almost exclusively artifactual, what risks do we run of an “extinction of experiences” previously bound to and made real by the natural world? Do we lose a responsiveness to all that is not ourselves, all that is *not* the sum total of our manufacturing? Are we to deprive ourselves of the very stuff and scale and mystery of being alive amidst a creation of four billion and more years?

Along these lines, interviews with pediatric neurologist Martha Herbert and cognitive scientist Francisco Varela both refer to an article brought to my attention that describes the reduced capacity in a significant number of people to perceive subtleties and nuance in

smell, taste, sight, hearing, and touch. In the studies, urban children had a diminished ability to hear the range of sound contained in a classical symphony. The article theorizes that the sheer load of information in urban lives is so rapid and intense, so sensorily overwhelming, that the brain is “adapting” by storing information in larger categories without cross-indexing and without synthesis. The implication? Less perception of discrete entities, less affect for those entities, and less ability to care.

As Martha Herbert points out, we are already experiencing neurological change at population levels in the United States. Nearly one in five children exhibits neurological, cognitive, learning, and behavioral disorders. Many of these disorders are attributed to neural-toxin exposures in utero, with profound developmental effects on the brain and nervous system. In addition, such environmental stresses appear to affect children’s developing nervous systems in ways that are enduring. Instances are rife of environmental toxins that react with our physical systems to close down human capacities that would be flourishing were we in a toxin-free, socially just world—a world we can call natural to our minds and bodies.

In the work of Francisco Varela, notably *Ethical Know-How: Action, Cognition, and Wisdom* and *The View From Within*, and in his interview here, we see being itself as an embodiment of the cognitive structures made possible by the interactions available to us—not by the mechanisms we choose to equip ourselves with. In a fundamental way, our cognition is the substance of our experience, which both makes possible and constrains all rational thought. Should we deprive ourselves of an environment that would call us forward in our bodies and minds, we would run the risk of becoming, as Varela says, “solipsistic ghosts.”

In their book *Vanishing Voices: The Extinction of the World’s Languages*, linguists Suzanne Romaine and Daniel Nettle demonstrate that the loss of human languages, which are the richest and most diverse cultural expression of human nature, is tied to the loss of wild nature. Linguistic losses and biodiversity losses are inextricable phenomena. Pluralism in its deepest sense—as a value of difference that is resistant to conformity or flattening—can exist only in a world in which biological diversity thrives. We cannot have different sets of knowledge, languages, or cosmologies if we do not also have an Earth with ecological differences; hence Jim Dodge’s observation that metaphoric capacity is always “better” when it is bioregional—it is more specific, more layered with association, and more resonant with actual experience.

Finally, an underlying theme throughout this issue is that there is a price to be paid for the loss of “context.” It is an existential price—a price of consciousness—that is deeply consequential to a world comprised exclusively of our own artifacts. Accepting human cloning or permanent germline engineering or lives extended into immortality via replaceable or synthetic parts just because we can do so, ignores and violates our only basis for wisdom: consciously discovering ourselves in a world just beyond our grasp. Intuitively we know, and our various sciences are just beginning to verify, that there is a threshold at which we fall into the machinations of our own minds, and having fallen, lose sight forever of what Ernest Becker called the “lived truth of creation.”

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them "unsafe."

In contrast to genetically engineering our food, agroecology (<http://www.cnr.berkeley.edu/~agroeco3/>) is a scientific approach to agriculture that is grounded in and respects ecological, cultural, and socioeconomic context. It sees crops and weeds and insects and fungi and bacteria in their ecological interrelatedness. It takes seriously a traditional agricultural practice like multi-cropping, as such a practice has developed through ages of experience and reflects the wisdom of sustained observation. Finding out why planting marigolds next to tomatoes keeps the bugs away can lead to low-tech, low-chemical, high-intelligence, innovative practices. I should say that these questions are quite parallel to those raised by the context-sensitive study of self-regulatory processes I just discussed: How do we raise our agricultural practices and science to the complex potentialities of nature rather than dumbing nature and science down to our market and patent systems?

Like traditional agriculture, the transformative experiences facilitated by traditional "inner arts" are generated slowly and as a result of sustained observation, discipline, and enculturation. These kinds of changes lead to a wisdom about life from experience and are fundamentally incommensurable with the gimicky techno-quick fixes consumer society has trained people to expect. As agroecology refutes genetically engineered food, so the inner artful sciences are a deep refutation of "human enhancement" as promoted by advocates of permanent, germline engineering, such as those in the Extropy Society, who are absolutely sure that we can and must do better than "Mother Nature." Here we see our most serious confusion between constraint and liberation. Those who earnestly believe that the potentiality of the human body must be liberated from its current design constraints, and re-created beyond nature's conception, seriously and tragically confuse constraint with deficiency or deprivation. They do not comprehend that instead of escaping the "limits" of our bodies and the "limits" of nature, we need to reinhabit our bodies and our rightful place in nature, lest we lose them forever to a techno-hive in a techno-sphere. We must pursue the constrained but infinite potentialities of both. Once we experience constraint not as deficiency but as the actual basis of art, we will understand the structural integrity that creates open-ended potentiality, and might just begin to exercise what is already possible within us and in the world around us.

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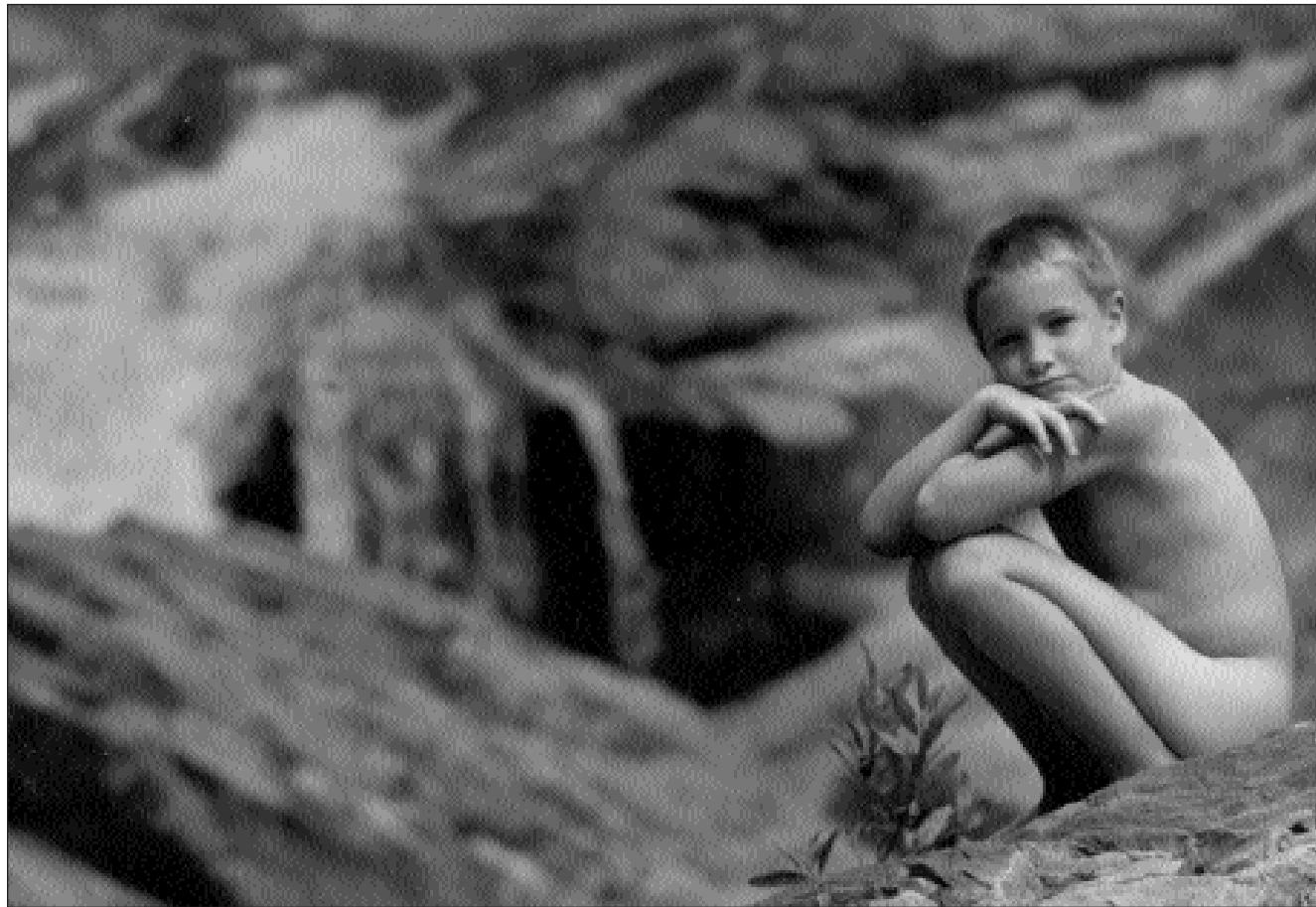
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BIOTECHNOLOGY

EDITED BY CASEY WALKER

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HANK MEALS

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of our inner-indeed, I would say, bodily or "somatic"—potential for ecological integration and maturity. He says:

"Beneath the veneer of civilization, to paraphrase the trite phrase of humanism, lies not the barbarian and animal, but the human in us who knows the rightness of birth in gentle surroundings, the necessity of a rich nonhuman environment, play at being animals, the discipline of natural history, juvenile tasks with simple tools, the expressive arts of receiving food as a spiritual gift rather than as a product, the cultivation of metaphorical significance of natural phenomena of all kinds, clan membership and small-group life, and the profound claims and liberation of ritual initiation and subsequent stages of adult mentorship. There is a secret person undamaged in every individual, aware of the validity of these, sensitive to their right moments in our lives. All of them are assimilated in perverted forms in modern society: our profound love of animals twisted into pets, zoos, decorations, and entertainment; our search for poetic wholeness subverted by the model of the machine instead of the body; the moment of pubertal idealism shunted into nationalism or ethereal otherworldly religion instead of an ecosophical cosmology."

"But this means that we have not lost, and cannot lose, the genuine impulse. It awaits only an authentic expression. The task is not to start by recapturing the theme of a reconciliation with the earth in all of its metaphysical subtlety, but with something much more direct and simple that will yield its own healing metaphysics."

From where I sit, the approaches to science that are context-sensitive do conserve a human responsiveness to the natural world. They express an old and enduring vision and practice that are to me the only real way out of our destructive tailspin. The question of our millennium is really, How can we regenerate our bodies and minds so that living is bearable and safe? So that cultural and biological diversity thrive? So that material needs are simple and spiritual life is rich? So that everybody has enough and nobody has too much? A regenerative vision requires these sciences—not only to untangle our big mess but to demonstrate the whole-system approach. We desperately need a sensitive, complex sophistication in our scientific culture and in our culture at large. And we need to generate this ourselves—we're not going to get it from the dominant sciences, industries, or cultural mythologies, which flourish when all of us humans are dumbed-down, obedient consumers, disembodied from the real feelings of life.

Yet Shepard's poignant hopefulness rests on a delicate interplay between our intrinsic potential and a facilitative ecocultural environment. What remains for us if we poison and engineer not only our environments but also our very selves beyond the bounds of our integrity? From where do we then draw our regenerative powers? Do we give up and revel in the ostensibly infinite combinatorial possibilities of nano-digito-genotranspeciation? This is a "post-modern" choice, but its dismissal of any integrity that can be violated contradicts its championing of diversity, which was hardly generated digitally. It is a sellout to an opportunistic and misguided reductionism that reduces the world's phantasmagoric complexity to a set of codes (genetic,

digital, etc) which are presumed a priori-and wrongly-to interface without residual. Then it engineers on the basis of these ideological reductions, and ignores the screams of those whose non-digitizable qualitative realities are thus violated.

If we don't take a fundamental stance against this triumphalist reductionism, we won't be able to fight it. We won't have any real arguments against industry's picking away at nature gene by gene, chemical by chemical, extinction by extinction, to the point of cultural decimation and ultimately genocide and ecocide. If everything is reducible and interchangeable, like money on the international market, then we're just dickering over spoils, not fighting for sustainability.

Pitted against these true believers in false progress are the rest of us, a ragtag and harried bunch who are dependent upon, implicated in, and damaged by the forces we need to overcome. Shepard's work gave me a new kind of compassion for the unevenness in—or virtual lack of—maturity in every adult I've ever met. Growing up as we have, disconnected from nature and all its wild non-human beings who could have provided models of wisdom different from our own, growing up in denial of the price we pay for our dominion over nature, we haven't stood much of a chance to do better. Add to this the enormous karmic burden from millennia of organized barbarism, and what we've created for ourselves is even sadder and more barren of possibility for psychic health.

"Development" and "progress" have deprived us of any culturally developed basis for imagining how things could be truly different. Paul Shepard's evocation of an intrinsic capacity for ecocultural maturity represents a source of resistance and regenerative creativity that may not hang on as its wellsprings dwindle or are deformed. Yet there is still intrinsic outrage, and we can only work hard to channel it into regenerative, complex, and sensitive directions away from the fundamentalist, nationalist, sit-com, simple-minded hell that otherwise awaits us.

Will you describe the kinds of scientific approaches you see today that are conserving and could advance the Shepardian ideal through "systems-modulating, context-sensitive" practices?

If we were interested in the epiphanies people experience—those moments of great transformative insight—and if we had instruments sensitive enough, we could detect many ways in which the mind affects matter. We could learn about how changes in neural circuitry, neurotransmitter concentrations, and gene expression accompany one another during such experiences, as well as about larger-scale bodily functions such as breathing, heart rate, and skin conductance that are also affected. It will be a very long time, if ever, before we model in detail the totality of such experiences. Indeed, understanding the processes of such experiences would not enable us to engineer them. In fact, the folly of the quest to engineer ecstasy comes home to us in the drug crisis—playing with neurotransmitters out of context of cultural meaning and self-discipline hardly leads to wisdom. Biofeedback, on the other hand, is a technology that enhances awareness of other-

wise imperceptible somatic processes and enriches our capacity for sensitive self-regulation. The biofeedback device translates the participant's normally imperceptible physiological responses to relaxation into perceptible sound or light messages, that help the participant learn to work with his or her own inner capacity to relax. The participant can learn to enhance the perceptible signals—by making the sound deeper or the light cooler, for example—and thus alter his or her own physiology. Biofeedback is a participatory dialogic technology, rather than one to which we subject ourselves passively.

Were we oriented to developing more such participatory dialogic technologies, we might exquisitely inform the discipline, should we realize it, of lived experience. The more we learn about the interplay of experience and our system of physiology and regulatory mechanisms, the more we might deepen our understanding of when things are working or not working systematically. With these intentions, monitoring molecular, genetic, and other technology-mediated markers may help us to fine-tune how we modulate our body-mind systems, but I don't think these technologies will ever substitute for long-term programs of sophisticated training and discipline, like t'ai chi or yoga or meditation. Those complex practices were developed over generations of cumulative observation in cultures much slower and more mindful than our own. Our technologies may uncover some mechanisms underlying the effectiveness of such practices, and possibly somewhat fine-tune them or help people get started, but could probably not replace them or invent them *de novo*. This is what I mean by searching for an elegance and appropriateness of technologies—in this case a participatory somatic technology. How do we ask questions that grow intrinsically out of the wisdom of the process, not out of the naivete of the investigators or the limitations of the measuring instruments? When I study complex self-regulatory practices, I don't want to reduce those practices to my instruments; I want to raise my instruments to the practices. We have all but buried our indwelling dimensions of sensuality, perception, and profound, enormous creativity. In what ways can the new technologies for body-mind exploration help us re-embodiment rather than caricature our intrinsic sensibilities?

It's these kinds of sensibilities that make genetically engineered food so viscerally repulsive in cultures less ravaged by commercialism and corporate agriculture than ours, cultures in which people perceive food as something entirely different from "consumable products." Food is an inextricable part of the lives of the individuals, families, and communities who grow it, trade it, cook it, and eat it together. This belief is the foundation of the "slow food" movement we see in Europe, which wants to put the "food" back into agriculture. Sticking genes into patented food commodities, which are grown as manufactured products and sold in identical packaging all around the world, obliterates the reality of food as plant or animal and the reality of people sharing the bounty of field or hunt around a communal hearth. Once the context for food is obliterated, we slip into thinking it's normal and even virtuous to pass off all sorts of abominations because no one has proven

AN INTERVIEW **MARTHA HERBERT**

Casey Walker: In your recent essay "Incomplete Science, The Body and Indwelling Spirit," you sketched the difference between a science shaped by a "control-oriented, disconnected" belief system and a science shaped by a "systems-modulating, context-sensitive" belief system. What are these differences and why do they matter?

Martha Herbert: I don't believe we can adequately critique the uses of engineering technologies if we don't understand the assumptions driving them, just as we can't critique the life and physical sciences if we don't understand the assumptions driving them. We seem to have no problem understanding all other areas of inquiry, such as literature, history, politics, philosophy, or economics, in the cultural settings that generate them, yet fail consistently to question the same for science.

Briefly and obviously, there is a world of difference—all too literally!—between basing a scientific enterprise on the belief that a sufficient scientific control over the body or nature will achieve an end to human suffering, and basing a scientific enterprise on the belief that the body or nature and all it expresses is our primary source for learning how to live well.

The first, which I would call a "control-oriented, disconnected" belief system, informs most of our recent powerful technologies, from nuclear power, dams, pesticide development, and psychopharmacology to genetic engineering. This belief system tends to make negative assumptions about nature and the human body, suggesting that both are essentially limited, imperfect, undifferentiated, uninteresting, inherently inferior, and morally dismissible entities awaiting the improvements of engineering technologies. Pests have no purpose and should be obliterated; rivers that flood should be paved and straightened; emotional pain is purely chemical and should be drugged. Human suffering can and should be eliminated. Human "nature" is viewed as essentially weak, nasty, selfish, greedy, and lustful, with destructive anti-social impulses that should be controlled externally. The wild spirits of children must be tamed by harsh discipline. The body is a source of pain, appetite, sex, sickness, suffering, and death, which should be fixed, escaped, or transcended. Similarly, the body's pleasures are sinful, dangerous, and degrading and must be vigilantly restricted. Spiritual beliefs consistent with this view of disconnection and control invoke an authoritative deity remote from the body, mind, or earth. Such beliefs aim for a salvation based on transcendence or escape.

With the recent advent of biotech, nanotech, and infotech, we see a techno-utopian expression of this belief system promoting "exciting" projections for the future-physical "conquests" and "upgrades" via Francis Bacon's notions of human designs escaping natural limitations. Plants, animals, and babies can be engineered to specifications we choose. The human brain can be enhanced by genetic or synthetic engineering, and, indeed, the brain can be left completely behind once we download it into a supercomputer. A limitless supply of replaceable body parts will ensure immortality. On the face of it, this vision appears less punitive and harsh than the control-oriented view of nature and human nature, but in reality it would subvert both. Cognition

would be subverted into a mechanistic process, while bodily sensuality and earthiness would be demeaned as immaturely coy, comic book versions of super-sexual, super-muscular, super-sensory prowess.

In contrast, a "systems-modulating, context-sensitive" belief system tends to make positive assumptions about nature and the body—physical constraints are inherent to a flourishing corporeality and, one could say, the artfulness of existence. This belief system comprehends life as connected and emergent at a profound level that is larger and more complex than we currently understand. While this intricacy and complexity militates against promiscuous or wholesale engineering, we may yet come to understand, engage with, and work with life both elegantly and appropriately at its structural levels. Organisms and ecosystems have capabilities that, when understood, can be gently modulated toward greater articulation. And, while human suffering can and should be minimized, it is nonetheless an ineluctable condition of existence essential to developmental competencies and maturation. Through experience and cultivated awareness, the inherent drives of human nature for love, cooperation, curiosity, creativity, and conviviality can mitigate fear-based defenses. Rage, impatience, self-centeredness, greed, and other defenses caused by harmful experiences (isolation, danger, deprivation, humiliation), can be overcome under properly nourishing conditions. Indeed, the full repertoire of the human body and mind is the very substance of a robustly mature physical, mental, and spiritual life.

Admittedly, these characterizations are highly polarized. Yet they do intimate the wholly different worlds that can be created by two such widely divergent belief systems. We live in a time when most of science has been shaped by beliefs about nature and the body that are primarily disconnected and control-oriented and that are supported by motives based on fear and defensiveness. I think it is essential, therefore, that large numbers of people quickly come to see the problem: In whose hands do we entrust the power of manipulating the smallest genetic, molecular, and atomic levels of living and inanimate matter?

It is also obvious to me that we are hugely mistaken if we believe the first worldview is not dominant in the engineering sciences or is capable of self-correction without confrontation. There isn't just a misunderstanding between these worldviews, there is a basic conflict about the nature of life and existence that is dangerously out of balance. Even worse, the conflict is not in conflict. Where is contention? Will you speak to the deafening silence in media and within the scientific community?

To my mind, there's a dominant sophistry going on. Where is the press for existing, complex system alternatives such as agroecology, alternative medicine, or somatics—all of which work strategically within whole systems, are locally variable, and are not patentable? I had the opportunity to speak to the National Academy of Sciences last spring on health monitoring of biotech food—which currently is not being done at all and would be extremely difficult to do. After sketching how hard it would be to trace or control the many infectious, allergic, toxic, and other risks this technology pos-



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es, I asked my listeners: "How can we know if genetic engineering offers the techniques we really need to use, in spite of all the risks, when we haven't seriously discussed alternatives? Why haven't we consulted people who already argue convincingly, and with a lot of evidence, that there are many other ways to grow and produce all the foods we need?" I suggested that if the National Academy of Sciences wanted to exercise genuine scientific leadership, it would set up a serious dialogue between biotech scientists and agroecology scientists. How does each group define the problems, and how do they approach solutions? How would each fare if they were compared rigorously and in good faith? I don't think it would look so good for biotech—in fact, the kind of genetic engineering currently employed would look pretty foolish.

One reason that molecular biologists are uncompromisingly blind to complex system oriented alternatives is that they have not been required to study ecology or other higher level biological systems for the last several generations. Of course, another problem with these contextualized alternatives is that they can't be patented or privatized. Insofar as industry gets interested in indigenous knowledge, it takes the form of "biopiracy." For example, industry scouts will learn about herbs from a traditional shaman, identify some active ingredient in the laboratory, patent it, market it, and give none of the proceeds back to the shaman or the community where the knowledge originated. Such industries also don't have much interest in the complex cultural contexts in which the use of these herbs is embedded—systems of understanding that are hard to patent and commodify, and is less real to them, in any

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PRAYER FOR THE WILD HEART

— FOR ROBERT

JERRY MARTIEN

We think that like the earth our hearts can take Care of themselves & tend themselves like any Part of nature that without need of our tender Ministration the wild heart will beat to life's Music & take all we give it in our voracious waking Lives & while we sleep the autonomic nervous System blithely makes the tide of blood to Ebb & flow our inner rains to rain our sun & Moon to rise & set with nature's usual perfect Rhythm. Then o god. it stops. Some inner thing up-Heaves. Core melts. Down. Valve sticks. Open. Lights Flicker. Dim. Go out. The whole great wheeling Dynamo winds down. Goes silent. Stops. Shudders. To life. Stops again. The salmon can't make it up-Stream. The earth will not stay still beneath our Feet. Our lungs can't breathe the air. Something Strange is in the water. The system goes into arrest. Authorities are standing by. It is the moment our Civilization is always waiting for. Now it goes into Action. Emt's & social workers & fisheries biologists Get into gear. The hook & ladder of the heart goes Careening through our towns. It is all chrome & Brass & bright enamel & pure speed efficiency de-Signed to always be a second too late. It thrives on Crisis adrenalin electroshock tube & duct & wire Total bypass traffic flow & yellow tape diversion systems. Only why is it after all this split second crisis inter-Vention & all those thousands saved that nothing's Better. The earth our hearts we can't just get on the Net or pick up the phone & call our broker say Buy. Can't get another to replace it. All the king's ad-Visors & experts have driven the ambulance of Life off the side of the road. Black & whites line Up for miles. Red lights & blue lights & yellow lights Are going off everywhere. There is martial law for Every living thing. A sheriff for every stream & River. Deputy to every tree & bird. A cop for every Organ of the body. A magistrate is somewhere at this Moment making rulings in the heart. Telling it to Beat. Live goddam you. Beat. Do your time. Beat. Get a Job. Beat. Shop. Beat beat. Don't be dead. Thump. & it Does. It does until o god again we break down on the Arterial median strip or we stop or get stopped or Attacked by some mutant cell or some clause The boss put in our contract or it's the ex-Boyfriend the surgeon general & all you can Remember is that this started with the stopping For too many things besides beauty & truth & it Quits. The heart. It quits its lousy job. No more night-Shift spiritual disassembly line. No selling tickets At the soul's disaster movies. The heart needs the Real thing. It goes into the mountains. Hunts the Sad clearings. Fishes the laughing rivers. Joins Other wild hearts. Gets eaten by wolves. Comes Back for more. Begs for one more of life's beatings. Gradually remembers that it began to beat with Love. That it began beating with the earth's first Breath. That it beats our first syllable. Beats the Time till the last word. It beats while we speak. Beats when we sing. Beats when we pray for life. Pray for the heart. In winter & summer sing. For the wild heart of earth. Let it beat. Let it Beat for itself. Let it beat & beat & beat.

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HANK MEALS

case, than genes or chemicals.

Imagine what it would mean for science if we didn't have our kind of free-wheeling, intensely escalating, "win-lose" economic pressure. If we could pour all the incredible resources that we're currently wasting on toxic tech "fixes" into sustainable, context-sensitive practices, we could live a lot more simply, effectively, and ultimately more peacefully with one another and the planet. It's a tragic waste that so-called economic imperatives have forced the commercialization of molecular biology and genetics. We could study molecular biology because it's remarkable and beautiful to learn about these mechanisms, and not lose sight of the correctives that come from remembering that these mechanisms operate in larger frameworks.

The sin comes, as I see it, when we use incomplete knowledge to make technological products for mass marketing—and with a hyped urgency, at that. Once we turn these neat little laboratory tricks into products (and one could say this is the essence of commercial biotechnology), we are actively intervening in a system that we don't understand. Technology gives us the power to devastate and to rape without first requiring us to understand.

In "Dialogue on the Art of the Novel," Milan Kundera raises Kafka's question, "What possibilities remain for man in a world where the external determinants have become so overpowering that internal impulses no longer carry weight?" It's troublesome, isn't it, to extend that question to: What possibilities remain if the external and internal determinants for all living things become radically overpowered by engineering projects and their unintended side effects? Will you speak to what you are seeing as a pediatric neurologist, clinically and professionally, in terms of internal change—the numbers and kinds of cognitive, neurological, and behavioral disorders in children?

I think that we are witnessing change in the neurological wiring of this generation of children and that this can be attributed to an unfortunate mix of early chemical insults and social/emotional derailments.

Neurologists and neuropsychologists who have been

practicing for a few decades or more often comment on the changing character of their caseloads. More than a few of my colleagues (myself included) have dealt with four-year-olds who pull knives on their mothers, something that would have been astonishingly rare twenty years ago. Overall, more children are presenting with diffuse difficulties—not discrete learning disabilities where everything else is more or less intact, but difficulties spread across multiple cognitive, sensorimotor, social, and emotional domains. And the scale of this is enormous: 17% of children in the United States have some kind of attentional or learning problem, and a significant number of them are on medications of one kind or another. I think we are dealing with the impact of the disintegration of family and community bonds and a profound environmental insult on our very neurological wiring.

We know that rapid brain growth and development begins before we are born and continues at least through the first three years of life. After the initial structures are laid out, the brain "edits" itself—keeping some connections and eliminating others—in what has been called an "experience-expectant" process. Many palpable, but hard to measure, qualities of ambient experience impact this process in ways we are only beginning to look for and discern. For example, an infant raised by a depressed mother can develop more right-hemisphere electrical predominance, which predisposes him or her to depression. Or, children raised in busy, jangled households will accustom their autonomic nervous systems to this level of stimulus and find it very hard to relax. And children who have been emotionally or physically abused can show repetitive, stereotyped motor activities as well as inappropriate aggression and abnormal sexual activity. The patterns of such symptoms strongly suggest that brain circuitry and chemistry are altered by experience in ways that are enduring.

Chemically, the effects of malnutrition and intrauterine drug and alcohol exposure have been fairly well-researched and documented. We already know that children whose mothers used cocaine or drank or smoked often during pregnancy have behavioral, atten-

eth century philosophers, the issue of self-restraint also strikes me as the underlying thread. But, self-restraint seems to be the possibility that we may be forever turning our backs on.

If we lose whatever it is in our biology and our culture that makes it at least possible to entertain the idea of self restraint, then this other view of human nature—the selfish and grasping—may simply triumph forever. That's really what's so strange, or awesome, about the changes that are taking place right now. Changes in the climate are not like other forms of pollution that we might correct and clean up. What our period of activity generated is going to be very visible in the geological record of the planet a million years from now. So too will this revolution of engineering the biological world. It's not like getting a face-lift. It's like making the face-lift permanent for all generations, which represents an ultimate and perhaps permanent triumph of a consumer's view of the world—a view that is perhaps the most uninteresting and least satisfying culture in thousands of years. We may be giving that worldview a permanent, *de facto* victory.

It seems to me that one of the problems is that our view of self-restraint usually connotes an inherent deprivation, rather than identifying what one is beholding or enacting that makes restraint automatic and incidental. Acting spontaneously, wisely, is always a choice toward the good and true, not merely away from the bad or wrong, yes?

That's a good way of looking at it. And I should say that what we're talking about, are seeking to identify, are community and nature and love. Without restraint, all those things are easily damaged. We see this kind of call for restraint or resistance from the beginning of the American conservation movement. With people like John Muir, one could really see the assault on things that made life real and good in particular places such as Yosemite Valley. That call for restraint was at the same time a call for an insistence that people could derive great joy and pleasure out of contact with the natural world—out of being uncomfortable, tired, cold, and out in the woods for a long time. There are an awful lot of people who have found just that in the ensuing century. And they're one of the forces that remain the bulwark of the Sierra Club and all the organizations that followed. I'm not sure that particular protest could have happened any other way.

Now I think we're seeing the same kind of recognition spreading across the board, where people feel the acute losses that have occurred in landscapes, communities, and in their personal lives. They feel the absence acutely because they can remember or imagine what a real community or meaningful life and work feels like.

One of the reasons that things like global warming are so tragic is that they make it much harder to imagine what it is you're defending. What does it really mean to talk about wilderness anymore? Or, what will it mean twenty years hence? Progressively less and less. Will a denatured world produce another Muir? Can nature still nurture and inspire us when it is us?

It's like trying to love another human being—it's only meaningful if it's them you love, not a them you've tried to make over in your own image, or in the image presented by Hollywood or *Playboy*. This kind of denaturing is proceeding fast in our society too—though here again, at least sometimes, we see resistance growing.

And it better grow fast. Because the more the other view wins out, the more self-reinforcing it becomes; and, the lonelier we get, the easier it is to convince ourselves

that what we need to do is acquire more or therapeutically treat or engineer-away our neuroses and anxieties born of alienation.

It's so important to see that the position we've suddenly gotten ourselves and the earth into over the past twenty years—global warming and rampant genetic manipulation—had nothing more than the slightest sort of theoretical existence prior to 1980. Now, in 2000 these specters are absolutely full-blown, and, in some ways dominant forces in our economics, our politics, our conception of who we are and where we're going. It's little wonder that we haven't quite figured out how to respond to it all, but we're also unlikely to be given unlimited time to come to do so. One of the correct responses is to be really angry, and that anger explains why it didn't particularly outrage me when someone broke the windows at Planet Hollywood or McDonald's or Nike Town in Seattle. Even though by nature and by conviction I'm a deeply non-violent human being, I think the most alarming observation we can make about human nature, right now, is the deep passivity that is out there. Sometimes I feel it is myself—which is one reason, I think, that I decided to go get arrested in the Capitol this spring, at a demonstration about global warming. Even if we lose, I don't want this moment to pass by unnoticed.

Kundera observed that the end of nature and of poetry will be a silent ending because we've already got our gaze on something else. But, if there's anything natural to any and all of us it's outrage.

Yes, and that's a very good thing. So, please, can we summon it in the next few years?

But it's not our only job. Another of our tasks for the moment is to pay careful attention, to witness what the world is like right now. Even in the best of circumstances, people aren't going to see a world even this intact or diverse, biologically or culturally, for a long time to come. It's incredibly important for those of us who are thinking about these things to create a record, a description that will endure. At one time, I thought of that record only in terms of the physical world, witnessing the vanishing glories of this world. Happily, there's been an amazing blossoming of nature writing. But it also means paying a lot of attention to who we are in the context of nature before we're someone else in a context without nature.

Still, resistance is probably the paramount task. That's what was so great about Seattle. It didn't have anything to do with the precise laws of world trade. It had to do with people saying: "There's something more important on earth than money and I'm ready to lay down on the street and get arrested." (They didn't



know at the time that they were volunteering to be shot with rubber bullets and swallow teargas.) It was also amazing to watch how instantly power tried to co-opt all that energy. Bill Clinton didn't miss a beat in saying, Well, we can make some changes here and there, in this and that, but of course we don't want to upset the general direction in which we are going. In fact, though, upsetting the general direction is what a lot of people want, and a lot more are going to have to want it if there's going to be real change.

Not that it's easy. The question of how to be subversive in a consumer culture is extremely difficult. It's very hard to be subversive when everything is allowed you.

I've lived deep in the woods most of my adult life and one of the best things about it is that, as long as you don't have a TV, it's still possible to go through days on end without anyone trying to sell you anything. There's some chance that you'll actually hear what your heart is trying to tell you. Aside from all else that's going on, we've perfected distraction to such an art that it's very difficult to perceive anymore. The metaphor I sometimes think of this: We all have a personal kind of broadcast that's coming to our own ears about what it is we really want, what it is that is really satisfying, but that broadcast is coming from inside ourselves at such an extremely low volume that it is easily jammed. Our enormous number of devices—TV, radio, e-mail, videos, or the voices of six hundred magazines—currently overwhelm that signal. But maybe reality in all its actual glory will still break through.

I think it's approaching the time to make statements with our bodies. The life that we know and care about is passing away.

that, and that it's going to be a very strange world when we're gone. In an odd way, it's going to be difficult to know whom to trust. I'm just old enough to have a kind of visceral distrust of people who are getting face lifts and this and that. If we continue on the same path, I guess my kind of attitude will fade quickly as a last-ditch Luddism of the self. Pretty soon we won't even remember ugly. And the scalpel is one thing, but soon we won't need such crude tools to eliminate the possibility that our skin will age or hair fall out. Soon it might seem absolutely normal to engineer our bodies.

That's why right now we should take a moment to look around and witness the preciousness of the imperfect world we inhabit—we might well be in the last days of so many things, so many ways of being.

The question is, does enough reality remain that we might still break the enchantment of a hyper-consumer society. The only analogy for this enchantment is the kind of spell cast in fairy tales. We are constantly being told what it is we want—more comfort, more convenience, more ease, more stuff.

To live forever.

That's right, immortality, which is a fairytale notion. Whether or not it's possible to break our own incantation strikes me as an extremely open question. There are those who think it will be broken by a physical disaster of some kind. Certainly when we talk about global warming, which is the area I've spent the most time thinking, there are a lot of people who say it will provide a long overdue wake-up call. I don't think there's anything automatic about disaster as a wake-up. I think it's just as likely that a disaster will only heighten our fears and make us all the more prone to try to chant the incantation even louder.

How one snaps that spell is an incredibly important question for whatever we're calling the new kind of politics we're trying to evolve. It is essentially, in many ways, a literary question: What metaphor can come along that is as powerful or more powerful than the kind governing our lives right now? That's what one searches for, tries to figure out. I think your intuition is right that it has something to do with real joy, experienced and expressed, reflected in the crow's feet around one's eyes, as opposed to ersatz pleasure and controlled beauty. How to make that case is hard, and harder all the time, because the deeper we get into that enchanted world the harder it is to remember that there's any way of being outside of it. Which is why the few moments that enchantment seems to lift are so powerful.

It was so great to see Europeans suddenly say last year, But we really don't want to eat this GM crap. In fact they said it more rudely than that, which was correct:

FIRST SNOW

DAVID HINTON

Things become themselves only as they belong to more than themselves: I to we, we to earth, earth to planets and stars, countless planets and stars more themselves kept in mind here, leaving room to spare for whatever occurs next:

Autumn trees tick. A dozing moth's tracery wings buffet under a slight breeze. Dusting hilltops each morning this week, snow melts before evening returns. Along the lake's wandering edge, days thaw think shoreline ice nights leave. Seasons waver, seasons balanced so precisely even the slightest touch would start them effortlessly turning again. Then, as the temperature drops and the year's first snow begins falling here in the valley, I plumb ancestral touch.

A nuthatch startles away. Lakewater darkens. More themselves than ever, things vanish in us like this, and keep vanishing: A yellow ash leaf stalls in mid-air, hovering over the edge, then falls, twisting, rising nearly as much as

Falling along slightly overhung granite to sway at last down into a pool (floating center-sunken there). Then it happens again, another falling leaf, occurrence more itself than ever, more elusive, its clarity tracing this exquisite blind where we are where we are perfectly apparent. I can see through my death:

From nowhere else, effortless occurrence: Thoughts wander in and out of view. Evening skies clear. Searching cragged lichen-encrusted apple bark headfirst, a nuthatch preparing against winter murmurs, faint hinge in its throat gently creaking. Left ajar here in the only wind, this is again that door I cannot too lightly touch: Vega, Deneb, Altair,

Summer's familiar stars swing open into deep winter skies and effortlessly away.

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Don't shove this crap down our throats. Then at the WTO in Seattle last December, sometimes after inhaling several kinds of teargas, I had the very strong sense—as tears poured out of my eyes—that an important sort of veil was lifting, that people were saying, No, what matters to us are things like sea turtles and ideals like human solidarity. These are the things that make life real and meaningful for us. So one hopes against hope that we can build on these moments of crystal clarity.

In Seattle, there were a lot of people wearing stickers on the backs of their jackets and that said, Wake up Muggles. Have you read the Harry Potter books? Muggles are these people who live in England and can't see that there's this other magical world around, full of wizards and things. I've sort of taken to calling the new movement the "Anti-Muggle Movement" It doesn't have much to do with the old left, which is used to

thinking of progressive politics in terms of identity politics and getting everybody fully enmeshed or enrolled in the system. It is, of course, completely and obviously and intuitively necessary that black people and gay people and so forth participate equally in our society, but I think the next step has a lot more to do with figuring out whether the system makes any sense, whether it gives any of us or the living world what is real and meaningful.

I think questions of what constitutes human nature are very important. One of the real tragedies of genetic manipulation is that we should be questioning the idea there's a technological solution to every problem, and we're not. Here we are, at the very moment we can see that our last set of technological solutions altered the very climate of the planet! We are wreaking the most unimaginable changes to the world, changes that people would have dismissed as bizarre science fiction only twenty five years ago. This should be a moment in which we all expect a real critique of our actions. Instead, there's the next group of people in power saying, "Well, don't worry, there's a high-tech way out. We have another escape hatch. We have even more tricks left up our sleeve!"

And I don't know if the greater danger is that they turn out to be right or wrong. Maybe they're right. Maybe they really can use genetic engineering and nanotechnology and all the rest to create for us a comfortable, convenient space station, where all nature is subservient to us, where absolutely everything would be designed for our compliance, convenience, and ease. If they are able to do that, then it really is an end of history.

In my usual, simplistic way, I posed this question in the *End of Nature* with a kind of homely example. When a time comes in twenty-five years or so that we have so many genetically changed and altered rabbits that they've fully interbred with all the other rabbits out there, we have to ask: Does a rabbit then cease to have any more meaning than a Coke bottle? What does it mean to live in a world where everything around us is actually some artifact?

This raises the perilous question of what makes us special, different, *human*. I would argue that it is not our intelligence. That instead our particular gift is the possibility of self-restraint, of not doing things we can do. Altering our genes is easy. Not altering our genes would be tough.

Which requires intelligence of a kind—wisdom.

Yes. If you go back and look at every important religious mystic in our various traditions—eastern or western—the theme of self-restraint is the underlying thread that connects them. If you look at most of our great twentieth-

tional, and language problems that are hard to control. Yet far less research money has been spent on studying the impact of industrial chemicals on brain development. In fact, out of the 85,000 chemicals in our environment, only twelve—that's one dozen—have undergone the developmental neurotoxicology testing protocol (www.preventingharm.org). Thus far, testing is voluntary for industry, which is fiercely resisting any more rigorous requirement even though fetuses are almost always more sensitive to toxins than are mature organisms.

Now, in clinical medicine it's hard to make cause and effect connections between cellular-level changes and behavioral problems because of course we don't routinely take brain biopsies on our patients. So although brain-behavior connections have been found in animal models of intrauterine chemical exposure, making such connections gets complicated when you bring these models back to human beings. For one thing, unlike laboratory animals, human beings don't get exposed to toxins in controlled, systematic ways. Instead, exposure happens to different people at different times and in all kinds of combinations with other toxins. Even babies exposed to the same chemical may show different effects depending on when the exposure happened and what else was in the mix. Two pregnant sisters could visit their aunt near Lake Superior and eat fish with PCBs in it, but if one were two months pregnant and the other seven months, the consequences to themselves and their babies would be different. So unless there is a massive, well-documented toxic exposure, like a factory explosion or a major chemical leak, it's hard to pick up patterns of toxic effects in groups of people—and industry exploits this problem in its denials of toxicity. Even so, effects are being demonstrated from chronic or intermittent lower-level exposures.

Will you speak to the difference between the unintended effects of pollutants or deprivations and the intended effects of engineering technologies on human beings? Could we say that before accepting engineering technologies as instrumental to increased “health or reproductive” options, it's absolutely critical to see how the more radical technologies, such as cloning, germline enhancement, anti-aging, or anti-death engineering, determine people's lives at a structural and experiential level? Are we permanently foreclosing on a biologically natural, situated consciousness and its human potential?

Yes. I think our ability to say no to these more radical technologies can and should come quite easily from this insight: We may permanently foreclose our human potential for a biologically situated consciousness and, one could even say, conscience. This same tension already exists in the recent and pervasive bioengineering of the human mind and body through psychopharmacology in the United States. We don't have to deny that schizophrenics can be helped by their medications to wonder why everyone knows someone on Prozac or Ritalin. When patients come in with medical or psychiatric problems, medicine tries to manipulate or fix them so they can return to their lives without making waves in their particular situations. We then expect everything to return to normal. For medical psychiatry, “normal” is a static concept that is, arguably, increasingly reified



HANK MEALS

by the need for high-functioning, competitive performance in the workplace—doesn't our culture prize an evenly energized extroversion? Such a notion is at odds with natural bodily rhythms, having time and attention for loving relationships, and the ability to perceive depth and nuance, or the feelings that many of us have that allow us to know ourselves as well know and feel empathy for others.

Now, so much of the time the cause of a person's distress or disease makes it impossible to go back to “normal,” because that crisis has revealed what previously seemed “normal” to be bankrupt. A major attraction of alternative medical practices is that they involve patient participation and validate personal awareness and change at a level more meaningful than the symptom. Neither western allopathic medicine nor mainstream psychology (especially psychopharmacology) gives us any kind of vocabulary for that kind of change within life. Yet many people are desperate for a deepening of experience, for a way to respond transformatively to the messages of their discontents.

Still in the realm of fantasy—but a very active quest for some researchers and advocates—is the genetic modification of human behavior and intelligence. This fantasy reflects a belief that we are basically bags of genetically determined fixed traits into which we can plug new traits as if they were spare parts. The “cracking” of “the human genetic code” is viewed by these people as further proof that we are just as digital as computers and that upgrading humans should be little more complicated than plugging in a new memory card. There are a number of problems with this concept, not the least of which is that the “code” metaphor does not hold up to research. The initial hype that we would find “genes” for neurobehavioral disorders like schizophrenia or autism has deflated after more than ten years of work. These disorders are far more complicated than people originally thought. Similarly no one has found the gene for intelligence or high scores on college admission tests. Even so-called “single-gene” biomedical disorders such as cystic fibrosis or sickle cell anemia

turn out to be modulated by other factors in highly variable ways that we hardly understand at all.

So, can we dismiss bad science as bad science and depend upon its own self-correction? No. Techno-utopian visionaries, many of whom hold prestigious medical positions, still deny that our knowledge is exceedingly incomplete and enthusiastically forecast catalogs of traits that yuppies of the future will choose from to customize designer babies. The frightening truth is that the limited scope of our knowledge will not in itself stop experiments with human genetic “enhancement.” The danger that such experiments will fail or produce human beings with unforeseen illnesses or complications (who can neither be forbidden to have children nor eliminated like sick lab rats) does not stop such fantasies either. Indeed, the danger that such experiments may threaten the “human genome” does not occur to these people.

Industry knows there are vast markets of people—supported by much of urban, media-driven western culture—who are so alienated from the promptings of their inner experience that they see no other way to enhance human potentiality for themselves, their children, or others than through externally imposed engineering. These sorts of people may already push themselves professionally and physically, but to external rather than internal measures. They run more miles, lift more weights, climb more peaks, get more promotions, buy more things, network more cyberconnections—and refuse to admit there may be more than quantity to life, that they don't or can't literally “have and be it all.” For these people, acquiring even more of all these externally measurable things seems a self-evidently worthy goal for genetic or synthetic engineering. Once such attitudes are set, we can see how difficult it is to register, let alone value, aspects of existence that involve sensitivity to private feelings, other people, communities, or nature. It logically follows that these people see no problem with a social Darwinism built on a selection of the “fittest” and are genuinely mystified by objections

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to eugenics or human genetic "improvement." Indeed, these people appear to be parochial and presumptuous enough to believe that the qualities making for "success" in a domineering, planet-destroying, corporate culture represent the pinnacle of evolution and should be immortalized in the genome/germline. For them, the suffering of "losers" is theoretically regrettable, but a "price to be paid" for the advancement of the human species.

So, the horror of these various levels of bioengineering is three-fold. First, these technologies are not as precise as their advocates suggest because they are based on a simple-minded model that is at odds with the great complexity of biological systems. Second, the intended use of these technologies is based on a conception of human beings and nature that is ecoculturally destructive and impervious to reasoned discourse. Finally, full employment of bioengineering technologies is capable of bulldozing both biological and cultural systems in spite of the incredible flaws in the basic assumptions of such technologies. In fact, this bulldozing may be approaching, or even already have passed, a critical point of no return.

From a neurological point of view, what did you think of the Waldorf education article describing German studies that show a degeneration of consciousness due to overwhelming sensory stimulation in modern environments—that 4,000 people were showing a decreasing ability over twenty years to perceive and synthesize information such as nuanced subtleties in color, sound, and taste, while showing an increasing tolerance for dissonance. Are you seeing neurological evidence for what amounts to a change or restriction in consciousness?

This study at least has a conception of transformative experience, even if by investigating its absence! To have an increased tolerance for dissonance along with problems perceiving and synthesizing information means that you are less likely to engage in the process of integrating complexity. You simply let it sit there as a mess, and you don't rise to the challenge of coming up with a more comprehensive framework that could account for why it is dissonant, why it doesn't seem to hang together.

I wish more had been said in that article about how these researchers went from their electrophysiological measurements to characterizing specific brain pathways that, at one time, had helped people integrate information and that now apparently are no longer used as much. This process is not obvious and I would like to see it elucidated. However, I am sympathetic to the notion, both for neuroscientific reasons and because it is easy to infer that attention spans have in fact shortened for people living in highly mediated, urban environments without a sustained focus on just about anything. It is also easy to infer that the ability of such people to perceive the world has become constricted. Many of us don't have the time or space to settle into perceiving the world's more subtle and nuanced features. Things don't get time to weave themselves together in intricate patterns. Information is thrown at us in increasingly



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bright colors and at higher decibels just to get our attention. And the information is so ungrounded it doesn't repeat itself in any kind of a natural pattern—it doesn't have to do with regular routines or rhythms, it just has to do with whatever somebody threw into some video somewhere on your tube. This creates an arbitrary reality of brutal thrills. And because we perceptually fatigue in these environments, the producers of film, music, radio, TV, and fast foods are always upping the ante on effects. So, the idea that we are losing the ability to perceive subtleties on all sensory levels makes good sense. Alarming.

The neurobehavioral disorders I see clinically in kids, such as autism, attention deficit disorder learning disabilities, and the various results of intrauterine drug exposures, seem to me like exaggerations of the sensory and mental processing issues the rest of us face daily in our overloaded lives. These kids are usually swimming in chaos—which looks like a mix of disorganized daily routines, hyper-vigilant jumpiness, and genuine problems with processing experience. A lot of these kids are clumsy and get overwhelmed by tasks that require coordination they can't muster. I often see major problems with processing sensory input, particularly with autism. Some of these kids have complete meltdowns because they can't tolerate things the rest of us don't notice, like the scratchiness of labels in clothes or the high-pitched noise emitted by fluorescent light bulbs. They also melt down if they have to process too many sensory modalities at once or process them too fast. Some of the so-called explosive behavioral problems also seem to be set off by some combination of sensory, cognitive, and emotional overload. And some of these kids engage in what people call "self-stimulatory behaviors" that can range from head-banging to cutting themselves with razor blades—compulsive self-infliction of extreme

sensations. Some of my more articulate patients have told me that they do this because it makes them feel "real."

But to lay the blame for this degeneration of consciousness only on psychological, sensory overstimulation doesn't go far enough in comprehending the amount of injury our bodies and minds sustain from chemical and emotional insult. It's clearly ominous for any individual and for society as a whole to have our brain's capacity to process experience first impaired by toxins and then overwhelmed by sensory and informational input. How, then, can we rely upon our thinking, our feeling, our judgment?

Taking the effects of toxins and the effects of sensory overload a step further, we are forced to acknowledge that the possibilities of the human body and mind are inseparable from the possibilities within our environments. It's here that things get interesting to me: Can we become conscious of how we are shutting down the living substance of possibility—both wild nature and human nature—before we extinguish it entirely? This is where Paul Shepard's work becomes provocative. Is there a genetically conserved human "nature" that retains genuine impulses—or are we witnessing a threshold disintegration of that human "nature"?

There are several ways to look at this question. One is that yes, we do need to deepen our critique of our actions, to see quite clearly the assumptions and outcomes of designing and determining the exterior and interior worlds of wild nature and human beings. I do think we must question the results of our creativity and judge them—where and how do they violate life at a systemic level and at a level of being or ontology? But if we have to make these judgments from our own sense of life that has not been corrupted, violated, or simplified to begin with, then, obviously, we're skating on thin ice, some of us more than others. After all, global chemical, cultural, and increasingly genetic meddling has affected all of us and all life on the planet—and we cannot call it an "experiment" because we have no "normal controls" anymore. We know that physically and cognitively we become the world we create, which brings back the original problem of what kind of worldview is driving our creativity and what constraints does it work within—what does it rub up against? If we acknowledge that we do not "create" life at the structural level, but engage in a discovery of what exists wildly, naturally, we comprehend life much differently.

Reading Paul Shepard's *Nature and Madness* was a transformative experience for me. His idea that the "progress of civilization" has meant the loss, rather than the gain, of conditions necessary for the epigenetic unfolding of our potential profoundly reverses deeply conditioned assumptions. Shepard was really courageous to make his argument, as others are who don't buy the central hegemonic myth of "progress" that claims the past was brutish, miserable, and dumb.

Shepard ends *Nature and Madness* with an evocation

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AN INTERVIEW BILL MCKIBBEN

When a time comes in twenty-five years or so that we have so many genetically altered rabbits that they've fully interbred with all the other rabbits out there, we have to ask: Does a rabbit then cease to have any more meaning than a Coke bottle? What does it mean to live in a world where everything around us is actually some artifact?

Casey Walker: *In The End of Nature, you wrote, "I cannot imagine any change more extreme than the change from four billion years of nature to year one of artifice." Will you describe this scale of extreme change and how it seems to slip past our grasp?*

Bill McKibben: Look—human beings have always tinkered with nature. That's us. But in our lifetimes—in a 10 or 15 year period—we're crossing a threshold so quantitatively different that it's qualitatively different as well. A good example, the one I've spent most of my career on, is global warming. We now alter everything on the planet's surface—when you change the temperature, you change rainfall, flora, fauna, windspeed, the course of seasons. In 1980 we didn't do that, and by 2000 we do. And of course genetic engineering is just as striking.

There's a human tendency to think things will happen very slowly over a long period of time and that we will deal with developments as they occur. But, the accelerated speed at which the revolution to engineer life is moving is astounding and a problem if we assume we are keeping up with it. I wrote *The End of Nature* in 1988, which was not particularly long ago, and at that time biotechnologies were still entirely novel. Researchers had just succeeded in producing the so-called "Onco mouse." Six or seven more Onco mice were in a cage some place, but we were still considerably closer to Watson and Crick's discovery of DNA than to today's full-scale manipulation of crops, livestock, or forests. Statistics on the acreage already growing genetically modified crops are just astounding.

During those same twelve years I don't think our ability to think about these things has grown very much at all. With rare exceptions, biotechnologies have not sparked an incredible outpouring of thought from our philosophy departments, our few remaining public intellectuals, our theologians, or anyone else. Though now, perhaps, the public is beginning to take a lead role.

And yet, much of the questioning that is going on is focused on second order cause and effect—issues of safety, efficacy, and

rights—rather than questioning what kind of a world is being created.

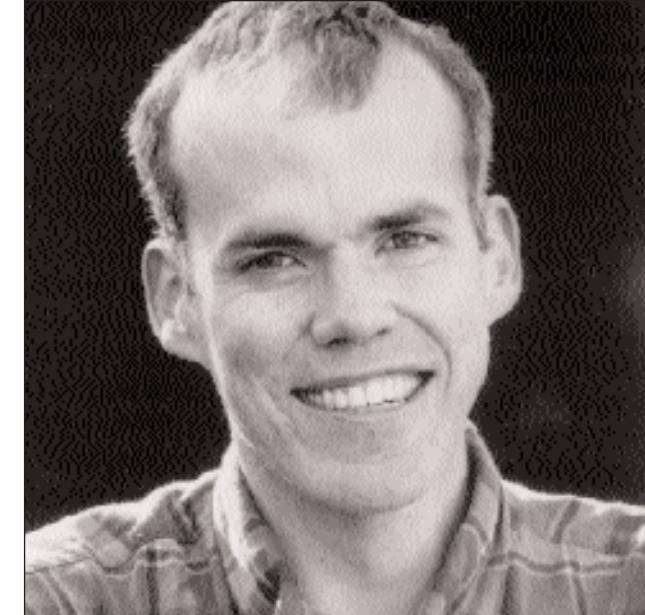
Yes, it's interesting. I got to think a little bit about this problem in a previous incarnation. During college in the late 1970's and early 1980's, I covered the city of Cambridge and its politics for the Crimson. One of the recurring debates, over and over, was on the setting up of some of the earliest biotech labs. All that the politicians examined hearing after hearing and ordinance after ordinance (and some of it actually quite marvelous), were questions of safety. Were super bugs going to escape from the lab and harm Cantabrigians in their sleep? Even then it was clear to me that these were not the real issues, that treating genetic engineering simply as a technology—as if it were nuclear power—did not get to the more interesting questions and problems underway.

On the one hand, it's terrific that proponents of genetic technologies are willing to admit there are serious problems, such as world hunger, disease, global warming, species extinctions, and, on the other hand, it's scandalous that none of these problems are posed in terms of root cause.

Right, when you talk to people about genetically modified crops, for instance, you often hear of a virtuous responsibility to "feed the world." It's indisputable that it would be a good thing if we actually fed the billion or so people in the world who are malnourished or dying, or if we came up with drought resistant plants as global warming kicks in. In fact, there's an infinite list of problems that we have never gotten around to solving because these problems would involve changing the ways in which we behave. Genetic technologies as solutions seem to offer the promise of having a heavier cake and eating it too. Here's how we can solve feeding the world without having to modify what or how much we eat, or how we can continue profiting without sharing our wealth with the rest of the world. We can forget all of those questions because somebody in a lab is going to invent a new miracle rice or super corn and sell it to the people who need it. But having just come from Bangladesh, where I listened to peasant farmers inveigh against the new "golden rice" inoculated with vitamin A, I'm pretty sure these magic solutions won't work any better than the last ones.

I appreciated your observation in The End of Nature that Thoreau went into the woods to redeem man, that "man's desecration of nature worried him less than man's desecration of himself." Will you speak to what we are willing to ignore about ourselves, and how such willful ignorance is tied to desecration?

I think it's clear that the 20th century trashed human nature almost as effectively as wild nature. Take the discussion we were just having, about "magic" technologies. One reason we fall for them is the seductive idea—the idea that these technologies are inevitable, and there's nothing we can do but make the best of them. Behind the idea of inevitability is a view of human nature as predominantly selfish and grasping. It is a view that is certainly to be expected from a world of hyper-consumption, and from our belief that harnessing our grasping, self-centered nature to capitalism is the only way to encourage people to do remarkable and brilliant things. That it's "romantic" and "against our nature" to posit restraint as a solution instead of new technologies. Clearly that dark view of human nature is, in part, true. We all know what self-centeredness feels like, and we all see the many spectacularly powerful results of ambition and ego. But, the notion that these motives and incentives



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represent the full extent of human nature strikes me as the place the argument turns.

In fact, everyone can conceive of other parts of human nature and experience quite easily. Human beings, at different points in their history, have had different things at the center of their lives. The tribe, the community, God, the natural world, or some amalgamation of these at their cultural center, always imposes certain limits on behavior. There are things you wouldn't do, and humans haven't done, if the wellbeing of people or the natural world is the most important thing to you or to the health of your community. In fact, it's those other parts of human nature that, ultimately, are the most important aspects of our lives. Very few people lie on their deathbed and wish that they could make another trip to the mall or wish they had spent more time at the office. Instead, we remember those times when we were most open to the world, whether our openness was directed to other people, nature, or both. The times when we were in service to others, or fully exposed to nature in all its glory and uncaring power—those are the moments when we come most fully alive. These are times when a different part—not the grasping or self-centeredness—of our nature takes over. The fact that these experiences or desires are viewed by our society as secondary or unrealistic makes it difficult to fully engage the question of technology and society. People assume that being realistic means admitting only to a grasping, self-centered view of human nature.

A review that appeared in the Atlantic Monthly of How to Make the Body Beautiful, by Holly Brubach, points to another operative view of ourselves. There's a rising phenomenon of middle-class Americans seeking "aesthetic surgeries" which go beyond simple vanities. When people erase years of laughlines, thoughtlines, or squintlines for a younger-looking, less experienced, less expressive face, they think they are becoming more themselves, not less. It seems to me that there's a wholesale rejection of individual experience afoot, which I also see in the zeal to genetically engineer children.

Yes, it's often occurred to me that we live in the last generation where there's going to be people like me, who are kind of funny looking and balding and all of

“We have to be awake and active inwardly with the intention of meeting phenomena with open receptivity, knowing they always hold more and always point us beyond what we can grasp at the moment.”

knee-jerk criticism, anything but passive, spiritual, or unscientific.

It's ridiculous to imagine, as some do, that the opposite of scientific reductionism is that I could go outside and sit down in front of a tree and to await illumination. A contextual approach demands that we take rigor a step further than in traditional science. We have to become more conscious of our own participation and of the boundaries of any particular method or framework we apply. This is a kind of internalization of the rigor that science traditionally achieves by using outer controls. Moreover, everything that I've learned, not only about a particular species of tree but also about air temperatures, migrating birds, hatching insects, soil microbes, pesticides, fertilizers, the arc of the sun, the lay of the land, other trees, and the sum of my past experiences comes into play. I must imagine more and more complexity as both possible and observable in the presence of any organism. I don't want to imply that we need to—or ever could—know all the “facts” concerning any given organism. Complete cognizance of all the facts would not necessarily be contextual understanding. It's the way of viewing, not just the content, that's contextual. It's the search for the wholeness or integrated nature of the organism, landscape, or whatever the phenomenon may be. We have to be awake and active inwardly with the intention of meeting the phenomena with open receptivity, knowing that they will always hold more and always point us beyond what we can grasp at the moment.

Will you address human capacities that occur at different ages—such as concrete logic, magical thinking, self-agency, or abstract thought—and how these capacities create age-appropriate learning and teaching? Is our ability to transcend the barrier of mental vs. sensory perception dependent on an education of a certain kind?

Yes. It's important to lead children into an immersion in phenomena, such as a night of stars. I'm always saddened when adults expound on their “knowledge” of galaxies, light-years, and black holes in the presence of young children. Children, if we have not corrupted them already, live in the sensory world and can gain rich meaning and joy from it. We can point out things they might overlook, like the different nuances in colors in different parts of the sky, the shape and direction of the Milky Way, the reddish hue of Mars, and so on.

Each age has its own kind of questioning, its own kind of cognitive and emotional development, which is critical for adults and teachers to understand. If we stuff certain abstractions down the throats of kids, particularly before about age seventeen, the abstractions will be taken in literally and naively; they will be mistaken for reality. Take chemistry, for example,. How many students “know” about molecules and atoms before they've ever observed a chemical transformation in a flask? Students, in elementary and middle schools, should get to know how warmth, solutions, and different substances act and interact. They need a rich phenomenology of the world of substance and transformation. Then in high school, teachers can begin to focus on, say, the lawfulness of relations and reactions of substances and introduce chemical formulae. Finally, teachers can introduce the concepts of molecules and atoms - an historical introduction often provides the best context for understanding these concepts. In this way the concept of molecule or atom is embedded in the students' lives. If, in contrast, teachers begin with atoms in middle school, they are educating for dogmatic materialism later on. An atom is not any-

thing like a solar system of billiard balls, but it exists in this form in the minds of far too many people.

The real tragedy in our educational system is that by prematurely teaching various concepts or abstractions as facts, we're ruining our children's faculty for a contextual approach, which should mature through experience well into adulthood. We need the faculty of abstraction, but its use should be based on previous immersion in the world, which is exactly what gets cut short in our technological society. But we must also be able to get beyond abstraction - we must not get stuck in a dichotomy of self as distant from world or in the virtual reality of the pseudo-science that we have around us. I'm amazed at what my students think they know because they've heard or seen it on the Discovery channel. They cannot say how they or anyone else would know whether a rock is a billion years old or not. But if students are taught to become aware of statements as judgments in or out of context, if they learn how concepts arise out of a living interaction between human beings and their world, then they become sensitive to empty generalities. They can begin to discern the difference between the literal and the metaphorical. They become aware of knowledge as a process and develop an antenna for a decontextualizing vs. contextualizing approach. Awareness of context makes all the difference when we get around to speaking about black holes and big bangs or genetic engineering.

*Evelyn Fox Keller's biography of Nobel prize-winning scientist Barbara McClintock, *A Feeling for the Organism*, is exceptional in documenting a life in science that was radical and brilliant for precisely this reason—Barbara McClintock approached genetic organization contextually. Two crops of corn each year yielded more in complex processes than she could integrate, whereas geneticists in the mainstream were studying rapidly reproducing fruitflies and bacteria to isolate genetic outcomes from single material causes.*

Right. Mainstream genetic science pursued Crick's central dogma of single material cause, of a one-to-one correspondence between gene and outcome. Once scientists exclusively sought a determining mechanism, they found determining mechanisms. The price was, of course, that they were blind to all of the phenomena excluded from the inquiry. It's a classical, wonderful example of the power of reductionism. There is no question that we got an exceedingly clear-cut picture of how DNA structures protein and how the structure of proteins determines function. There's no question that the discovery of DNA is the result of a single trajectory of inquiry. But that inquiry does not include an awareness of the decontextualization that occurs through the experimental method, nor does it include the importance of processes over time, the importance of environmental conditions, or, for that matter, the importance of organisms themselves.

The concept of “gene” is perhaps the most decontextualized concept in biology today. It is reified as an all-powerful entity in the organism. But genes do not really “belong” to organisms; rather, they “belong” to our repertoire of abstracted information based on experiments. By ignoring qualitative differences between organisms, scientists have isolated genes as ubiquitous and interchangeable information packets. It isn't too far a leap to perceive growth hormone genes as categorically present in humans, chickens, or salmon and then to launch the exchange of growth genes—placing, as we have, human growth hormone genes into salmon. In this approach we render each organism an abstraction that

can be filled with new qualities as we see fit.

I try to emphasize in *Genetics and the Manipulation of Life* that the activity in the organism as a whole determines a gene's function. It is impossible to understand a gene without its context. The “same” gene can have a different function if it changes its place in the chromosomes and can also have different functions in different organisms. We understand a gene only inasmuch as we understand its context. Because the relation of the gene to the whole has largely been ignored, the actual success of genetic experimentation is small. Very few genetic experiments work in the narrowly circumscribed way they are supposed to. One often gets very different results from what one would expect. All indications are that we need to look at genetic information with an eye for a larger system, a living context.

One good example is the experiment of trying to make female mice into male mice by injecting them with the DNA tied to sex determination. It worked in one case, which put it on the cover of *Nature* magazine, but there were three or so other cases in which the same transformation should have worked but didn't. These riddles persist, and they're present in every single genetic experiment. Geneticists will say, that it's just because we haven't perfected the method yet. In one sense, that's certainly true, and I'm sure they'll get better at it. But it's also true that the success rate is about 1% and has been that way for the last twenty years. That indicates to me that viewing and manipulating biological processes as mechanisms has its boundaries, which is not to underestimate its ability—when it “succeeds”—to affect the whole, often in unhealthy ways.

Some of the most interesting work that could be done, but would probably never get funded, would be to look at the genetics of “normal” people to see how many normal people have “abnormal” genes. Instead we focus on the abnormal, pick out a symptom, then maybe a malformed chromosome, and focus on genetic causes. Of course, we completely lose sight of everything in that person and his or her life that contributed to the symptom.

With time, the euphoria around new technologies and what they promise pales in the light of day. It's always interesting to note that with the extremely materialistic sciences come extremely euphoric ideas of the metaphoric—the holy grail of DNA—that have no real correspondence to the actual world.

In the meantime, the search for a disease-free existence, accidents without consequence, and immortality is going to drive people to do certain kinds of research and to continue coming up with new and enticing technologies. And because these searches become motivational, they do create change. Maybe we will eventually have the ability to extend human life to an age we can't imagine today. I don't even doubt this could happen, with enough research and design.

But another set of questions remains. How might people see that as these technologies race ahead of us, we are forced to wake up, to ponder how life and death are experienced as our own processes? If we can become aware of our own selves as part of the project, as part of the inquiry, then everything switches. We don't need to get rid of getting ill or old. People hope to avoid death because they have absolutely no sense of living processes. I would say that acquiring that sense is number one on the agenda of changing our culture toward a contextual approach to life: people need to understand the processes of life by consciously returning to them, not by

“WILDerness”

WILDerness. I borrow this enunciation from an activist at the last World Wilderness Congress in India who passionately protested the exclusionary policies in recently designated wilderness areas, which unjustly restricted the traditional foraging practices of indigenous people and, in some cases, drove them from their homelands. I use this intonation, however, for a different, but not opposing reason: Social justice will never be achieved if the Earth's ecosystems are not healthy and self-sustaining. Or, perhaps better said, social justice in an ecological wasteland is a social justice we would not choose to imagine. By emphasizing the WILD in wilderness, I call our attention to the truth and reality of wild nature and the truth and reality of our dependence upon it. It is time to dedicate our efforts to the devastation before all of us and to work harder than ever to preserve wild nature wherever it still exists.

Unfortunately, the “great wilderness debate” of the last decade has almost thoroughly obscured the truth and reality of WILD. Is wild nature a social construction? Throughout the decade, a postmodern discourse of “deconstructing” traditionally endowed significance for all aspects of life, including wilderness, has frequently played into the hands of adversaries whose tactics to obscure, divide, and redirect attention are well known. Yet, while wilderness advocates mend their rifts and regroup, the ongoing destruction of pristine lands continues at alarming rates, especially in unglamorous areas with little scenic or cultural value that nonetheless harbor irreplaceable and diverse webs of life. Close to my home on the sage brush-bunch grass steppe of western Wyoming, human intrusion, primarily from intensive oil and gas exploration, is presently affecting the once abundant sage grouse, whose numbers are in dangerous decline.

My late husband Paul Shepard, a human ecologist, worked most of his life to uncover the sources of ecological madness, particularly as it occurs in large-scale societies disconnected from experience in the natural world. Philosopher Holmes Rolston III has also consistently identified many flaws in the contemporary wilderness debate. Both are joined by a diverse group of “environmentalists” whose strength and commitment to wild nature is unflinching. My question here is to wonder how those of us in the environmental community—grassroots activists, scientists, scholars, and writers as well as the majority of concerned citizens—will move forward together on the work before us.

Today polyphonic voices circle each other in a vortex of multiple meanings. As in the past, *wilderness*, *wild*, *wildness*, and *wild nature*, continue to take on various meanings in various cultural contexts. In our discussions we rely on language to clarify our differences, but it often fails us when our experiences vary as widely as they do in our wild, rural, and urban lives. If we had more specific words such as *iyu ēso*, a Lakota verb, meaning “when a man rides through water and gets wet in spite of lifting his legs,” mentioned by Ian Frazier in his book *On the Rez*, we might better express ourselves, and if all people knew what that expression meant from experience on a horse and in a river, literally and metaphorically, we would certainly understand one another better. Or if we had the ability of the original Kalahari Bushmen (possibly some of the most sentient humans existing in recent history), who used a magnificent range of inflections and variations in their voices coupled with the art of mimicry, and could convey

meaning even to those who did not understand their language, perhaps, we could communicate more effectively. As it is, we must not sidestep the inadequacy of our words or get mired in semantics but must try our best to clarify what it is we mean.

So, how do we communicate? Contemporary theorists tell us that we must first tear down language barriers that privilege some, exclude others, and keep us from seeing all sides of a problem. Language, it has been pointed out, inherently favors those who control the resources. Thus, we must “deconstruct” recognizably “privileged” meanings to see the impenetrable barriers they erect to the freedom and fulfillment of any sentient being. This insight has been an enlightenment all of its own. Words are mere reflections of reality as it is perceived from different, and often conflicting, points of view. We can be thankful for the astute wisdom of those who question authority and hallowed suppositions and who allow us to see the all too-habitual and mistaken reduction of human and nonhuman life experiences. This is a valid democratic process.

However, such emphasis is not all good news. The effort to give equal voice to all meanings has created a relativism that permeates all aspects of our lives and is one of a host of misrepresentations in the ongoing dialogue on wilderness. At the beginning of the 20th century, anthropologists pointed out that differences in cultures do not imply a superiority/inferiority dichotomy in people. We humans are all equally endowed. As a result, it has become “politically incorrect” to identify cultural practices as “flawed,” since such criticism would demean members of that group taking part in them. Instead, cultural practices are seen as context-dependent and accepted without judgment. Yet cultural practices are not of equal consequence. Some are not moral or wise. Genocide and ethnic cleansing permeate many contemporary cultures, and so-called development ravages the natural world. None of these practices sustains the integrity of culture or biotic communities, and they are not good practices no matter who is doing them and what their context is.

The problems within the wilderness debate are not, however, limited to linguistic failures or values-relativism. In his essay “Nature for Real: Is Nature a Social Construction?” (*The Philosophy of the Environment*, ed. T.D.F. Chappell), Holmes Rolston astutely analyzes some of the recent thinking behind critiques of wilderness. Consider the following quotations for their content, perhaps, as a mental experiment, judging them from the point of view of a bristle-cone pine tree that has been alive for thousands of years:

“Humans and nature construct each other.”

—Alexander Wilson

“Persons and environment are continuous.”

—Arnold Berleant

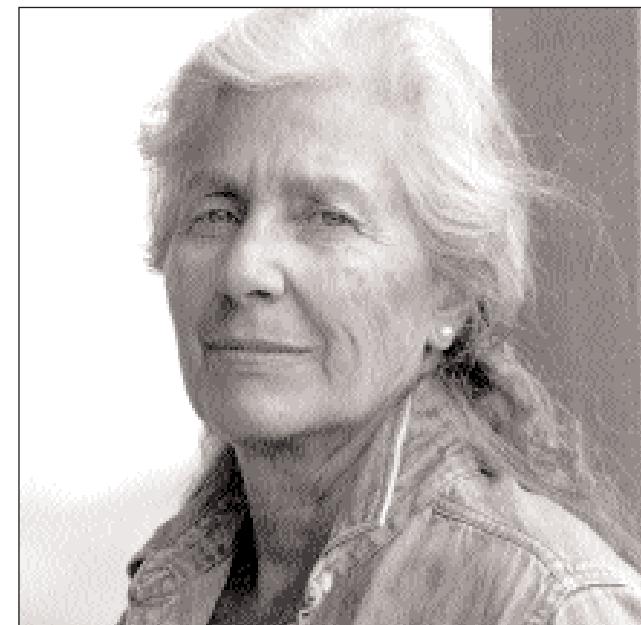
“Wilderness is a state of mind.”—Roderick Nash

“Civilization created wilderness.”—Roderick Nash

“What we know as nature . . . is the social creation of nature.”—Neil Evernden

“The wilderness is a social construct.”—David Gruber

“There is no such thing as a pure, wild nature, empty of human conception.”—David Rothenberg



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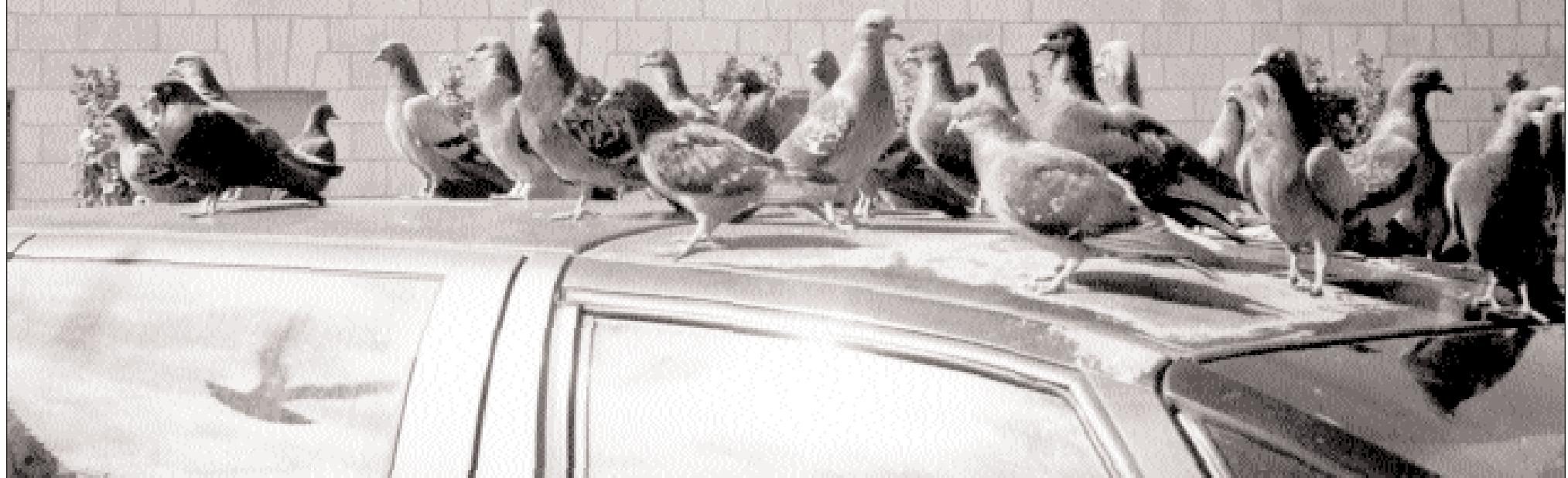
And to these I add:

“Wilderness is a place where an idea is expressed—the idea of wilderness.”—Gregory H. Aplet,
“On the Nature of Wilderness: Exploring What Wilderness Really Protects,” *Denver University Law Review*

“I think we must surrender the idea of wilderness . . . and invest our care and hope in civilization.”
—Marilynne Robinson, “Wilderness,” *The Death of Adam*

Rolston sorts through the problems in these kinds of statements by pointing out that a very critical confusion is afoot: the confusion of meaning with being. To illustrate his point, I shall use my own being as an example. I speak or write my words before you and others. As each of you looks, listens to, or reads my words, my being takes on different meanings for each of you. Yet what I mean to you and what I actually am are two separate things. It would be impossible for you, even after studying my long life and experiences, to know my reality fully, even though you could try and you might come close. This dilemma tends to plague us with existential angst, even if it need not do so. How can we know anything beyond our own perceptions? Are we consigned to perpetual questing? My reality, however, does exist. I am me, and I am separate from any ideas you might have about me. So it is with wilderness. Here then is a key point: We must ask not only what wilderness is but what wilderness means to us, with the understanding that what wilderness means to us does not negate nor signify what wilderness is “for real.” Here we have two different domains, two different questions, and two different explanations.

Understanding the confusion of these two domains of meaning and being, however, still doesn't fully clarify the problem in some of the statements above; for example, “There is no such thing as a pure, wild nature, empty of human conception.” Here, the problem is that



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meaning is all that is considered and being is denied. Just because we can access wilderness only through our senses does not mean that what we perceive is all that exists. We can broaden and deepen our interpretations of wilderness by including factual data collected through scientific studies, by considering other persons' perceptions, and by acknowledging its numinous quality through firsthand experience. As Paul Shepard explains, wildness is the complex, living web of organisms in spontaneous, wild nature and is found in a place we call wilderness. Wilderness and wildness are realities as well as something we perceive through our instruments and senses. These realities are not just a web of words, social constructs, or perceptions. Although scientific evidence does not comprise the whole picture and can be used to bureaucratize language or obfuscate meaning (as anyone who has studied Environmental Impact Reports or Statements can attest), it also gives us empirical evidence that brings us a persistent reminder of what we do know about life on earth. In a world where shared meanings are of paramount importance, these kinds of truths (that must always be under revision) are either denied or flattened by the din of voices in contest for meaning.

Now we arrive at a troublesome place. The idea that nature is merely a reflection of our shared meanings is seductive and empowering because, for the many people who live their daily lives in artificial environments, acknowledging that there are a multitude of "others" and laws of nature that profoundly shape and constrain human lives appears irrelevant and/or threatening. Thus, while the goal for wilderness advocates may be to work toward an all-inclusive, shared value and reality for wilderness, many persons do not have access to wilderness areas, have not experienced wilderness directly, and do not understand either its value or its reality. The solution to this dilemma, it has been proposed, is to suggest that wildness can be found anywhere and everywhere, from large cities to the Arctic wilderness. According to Aplet, wilderness is an experience on a continuum.

Although the continuum paradigm has some truth in it, it is misleading at best, underscores complacency, and ignores entirely the reality of wilderness as Paul Shepard and others recognize it. It is true that wild species can be found anywhere. These organisms, also called native or indigenous species, are plants or animals that have not had their genetic make-up altered through direct human intervention. Our own human genome can be considered wild, as Shepard pointed out, and is today much as it was 10,000 years ago. Native plants with intact wild genes can be transplanted and survive in suitable habitats and may be used to restore lands that have been degraded. Wild animals

may be raised in captivity and introduced in habitats where they have become extinct. But no matter how successful and valid our purposes, none of these efforts can replicate inviolate, self-willed, self-regulating, self-generating, numinous, wild nature.

I can dig up a penstamen from a wilderness area and plant it in my garden, but that does not mean that I now have a wild garden. What I have is a cultivated garden with a wild plant in it. And that organism will not retain its wild state for long because to be truly wild it must remain in wild nature where it evolved. Look at our animals in zoos and their neurotic and degenerate states. As Jane Goodall has so faithfully told all who will listen, it is next to impossible to rehabilitate a domesticated chimp back into the wild. In order to retain its wildness, an organism must be free of constraints and human intervention in a habitat whose bio-physical processes have not been interfered with—ever.

Making wilderness a continuum and supposedly more understandable to everyone is a non-exclusionary, non-elitist, postmodern distortion of the problem. To deconstruct the exclusionary and privileged elitist perceptions of wilderness is important but does not make the idea of wilderness wrong or the reality of wilderness nonexistent. Wild nature means wild species and wild land. If all we are interested in is the dynamics of language, where does that leave the animals and plants? Like feminists who have insisted that their bodies are texts that can be read and misread, wild creatures take us beyond description to the inscription of their lives upon the land, the same sort of language that appeared on the walls of prehistoric caves. In the wild animal body, its beauty, its congruence with place, its inherent knowledge, its dance with other creatures may be an unwritten language wherein meaning and being, in fact, are one.

There are additional problems with the postmodern language of wilderness. Denying that anything essential exists is joined by pronouncements against preservation. We are told that ecosystems, like the universe, are constantly in flux. Here we come down to something essential after all—change is the only constant on Earth. Change is not news to ecologists, who have always recognized that it is an inherent component of life. Natural catastrophic events—fire, flood, wind, volcanism, earthquakes—occur daily throughout the world. Processes of regeneration, which take place over a long period of time, begin immediately to restore the overarching balance. Neither destruction nor creation is static in time and space. Studies of the events and aftermath of the Mt. St. Helen's eruption and the Yellowstone fire constantly amaze and inform us in these ways of the world. What wilderness advocates are proposing is not an unchanging state, but the protection

of untrammeled ecosystems from devastatingly rapid changes incurred by mindless human intrusion. But the faulty conclusion of the adversaries of wilderness is that since nothing can be kept from change, preservation is an impossibility.

Related to this anti-preservation argument concerning change is the claim that pollutants, exotic plants, and overgrazing have defiled wild lands, making preservation futile. Yet if a person is suffering from an environmental disease such as asthma or allergies, do we say that this person has been altered to the extent that he or she is no longer human? Likewise, if an ecosystem (which we can also view as a whole entity) has not been completely disrupted, that is, has not had its soil and complex relationships of microorganisms disrupted, its stream habitats wasted, or its flora and fauna drastically altered or exterminated, it is still wilderness. It is still ecologically intact and, in most cases, can go through natural restoration if the sources of contamination and disruption are removed. We must not give in to the idea that wilderness no longer exists or is not possible except perhaps in Alaska. Instead, we must focus on the circumstances of exploitation that allow a few to reap unprecedented profits by ravaging the environment and leaving behind their wastes at the expense of the rest of the living world. The cause of habitat degradation, not the result, is the more critical problem before all of us.

A similar anti-preservation argument proposes that because indigenous peoples altered landscapes long before settlers began arriving, there is no original or existing wilderness to consider working toward. Although many indigenous peoples did alter their habitats, mostly by use of fire, it is also likely that the threshold of impact was minimal because the scale of their numbers and kinds of technologies did not interfere substantially with wild processes. Indigenous peoples did not, for example, plant thousands of acres with transgenic species or set up hatcheries with transgenic fish.

As noted at the start, there is also an associated anti-preservation, anti-wilderness argument made in the name of social justice that places indigenous peoples and wilderness in opposition. There are special cases where indigenous peoples are living in critical wilderness areas. And social justice does demand that the rights of native inhabitants to lands and cultural practices be acknowledged and supported. But special cases should not set precedence for general policies used to establish wilderness. Nor should these cases be identified as problems for "environmentalists" alone, which then creates another excuse to divert attention from the social and economic causes of the victimization of poor and indigenous peoples everywhere.

We live in a world where there is a tremendously uneven distribution of wealth, with the vast majority of

AN INTERVIEW CRAIG HOLDREGE

How might people see that as these technologies race ahead of us, we are forced to wake up, to ponder how life and death are experienced as our own processes? If we can become aware of our own selves as part of the project, as part of the inquiry, then everything switches."

Casey Walker: As you've written in *Genetics and the Manipulation of Life: The Forgotten Factor of Context*, there is a focus to genetic manipulation that ignores the role of context at a great cost to scientific inquiry and to our understanding of life. Will you begin by describing the problem of "context"?

Craig Holdrege: In science we learn to approach the world in a powerful but very narrow fashion. We have particular questions about nature, frame hypotheses, and then carry out experiments to see if our hunches are correct or not. This brings us into greater and greater detail on the one hand and into the realm of abstractly formulated laws and theories on the other. We are always in danger of losing sight of the fact that we are continually decontextualizing nature in order to understand it. And when that happens, it is as though nature has slipped through our fingers: While we've built a grand picture that may be very consistent and yet have startlingly little to do with the actual phenomena we're trying to understand.

Let me give an example. In the 19th century scientists in England began to notice that a dark variety of the nocturnal peppered moth was becoming increasingly prevalent, mostly in forests around industrial areas. The question was, Why? Their conceptual framework to answer the question was the Darwinian theory of natural selection, which they could test through experiments. The scientists formed the hypothesis that the dark variety was becoming more prevalent in forests with trees that had lost a light-colored lichen covering on their bark, or that had been darkened by soot from air pollution. According to this hypothesis, the darker variety of moth would be better camouflaged against the darkened tree background, while the light specimens would be eaten by birds because they stood out. To test this hypothesis, experiments were done - first breeding and then setting out dark and light moths out onto trees, then observing their consumption by birds, and finally recapturing marked survivors. In dark forests more dark moths were recaptured, and in lighter forests more light moths. The conclusion seemed logical that birds feed on poorly camouflaged specimens and thereby act as agents of natural selection, contributing to an evolutionary shift in the population from light to dark. The peppered moth came to be a classic textbook and classroom example of evolution via natural selection. It was viewed as "proof" of the Darwinian theory.

The problem is that no one knows where the moths live during the day! And this despite years of work. In the experiments everything seems (at least superficially) clear, but this clarity may have nothing to do with the actual lives of the moths in the wild, about which next to

nothing is known.

This example shows drastically how one can gain so-called solid scientific knowledge and yet be far from any real understanding of the natural phenomenon. Scientific knowledge becomes dissociated from reality by losing sight of the fact that the experimental method changes the phenomena, as neurologist and holist Kurt Goldstein put it, through a procedure of isolation. The experimental process itself contributes to the results, and we can't naively act as though experiments tell us about the "world as it is." A first step in recontextualizing our knowledge is to become keenly aware of this fact.

You wrote: "While it may sound simple to restore context in order to gain understanding, it is not. Our contrary habits run deep." Will you describe those contrary habits?

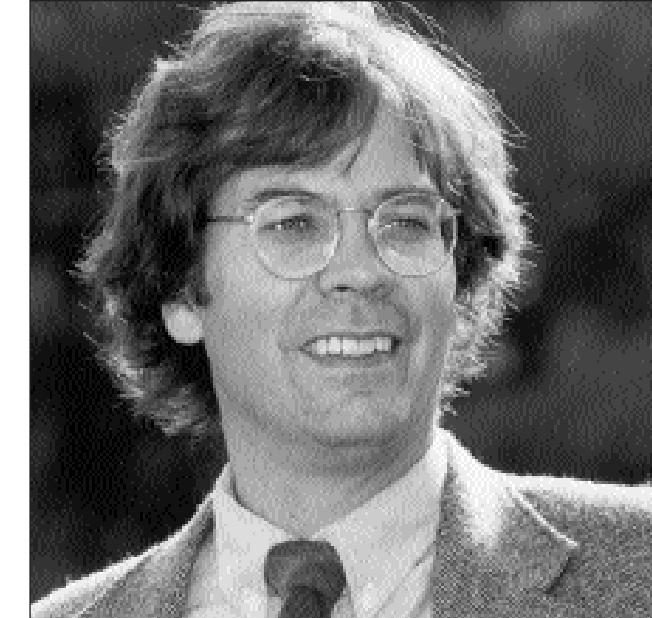
Because the experimental, hypothesis-driven approach is in its way so successful—you get results—there is little reason, once you've got going, to question the direction you've taken. Anyone who's done experiments knows well the drive to just keep going: one experiment stimulates new questions, a next experiment is conceived and carried through, which in turn raises new questions, and so forth. The process takes on a life of its own. It is then extremely difficult to step back and ask: What am I doing? How is my approach affecting the phenomena? What am I leaving out? How do the "genes" I discover through an elaborate experimental setup, which is based on a particular theoretical framework, actually relate to the organism out of which these genes have been isolated? Exactly these kinds of questions need to be asked in order to move from reductionism to a knowledge that puts things back into context.

We can't, I believe, get around analysis if we want clear knowledge, since reducing allows us to focus our attention on details so that we can be precise. But if we are interested only in our hypotheses and not in understanding the actual organism, then we get decontextualized knowledge. The interest in the organism as such is key to the ability to see things in their context.

Another problem is that we tend to view nature as consisting of discrete entities—separate organisms, separate factors, separate causes, separate substances, etc. This view is itself the result of taking things out of context; that is, isolating them in the lab and in the mind. The moment you turn to a concrete organism and take it seriously, this world of separate entities that interact in moncausal fashion shows its highly abstract nature.

We all "know" the lowly dandelion. But if we take the trouble to actually observe different specimens, we are confronted with an extraordinary variety of forms and sizes. We learn to see how these differences are related to a particular place (a microenvironment with all its qualities) but also to heredity. The dandelion gradually becomes for us a dynamic process in time that is in continual and subtle interplay with its past - heredity - and its environment. The tiny dandelion growing in a crevice on a mountain reveals to us a wholly different world from that revealed by a large and lush specimen in the clearing of a woods. We see the environment through the plant, and in this way the plant continually points beyond itself. It shows us, if we care to look, that it's part of a vibrant context in which no one can delineate fixed boundaries. But because the intellect thrives on fixed boundaries, achieving a contextual approach is very difficult.

Will you describe "object thinking," as you call the non-contextual approach to science in your book, and suggest how it might be overcome?



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tual approach to science in your book, and suggest how it might be overcome?

An essential step is for scientists to become aware of themselves as part of the process. The project is not out there. Organisms aren't out there in isolation. You would think that an endeavor built on an experimental method, which is all about human beings interacting with nature, would be exceedingly sensitive to this. Instead, it is ironic that scientists are as unaware as they are of their own participation. The moment they begin to see themselves as participants, as questioners and as doers everything changes. It is liberating to move past the restriction of science as we've come to know it—not to reject science but to use it in the pursuit of wisdom. Science can then become a highly interesting and open-ended discussion—a conversation with various organisms in various contexts that runs back and forth and continually reveals, continually surprises.

What happens in this process is that we become increasingly interested in the richness of the concrete world and general abstractions lose their appeal. The more we see the world in terms of abstractions, the more we're seeing only our own concepts. The concrete appearances are dynamic, variable, and ever changing. This demands that our thinking become more flexible. I've spoken of "fluid thinking" in my book. It is a thinking that stays with the phenomena, moving between them and connecting them. We can then build up living pictures of biological processes that at least lead us much nearer to reality than do our models of mechanisms.

This has very practical consequences. Working within the framework of mechanistic models, we aim to achieve specific, clearly defined results. Because life isn't linear but multidimensional, however, contemporary scientific and technological applications set all kinds of biological (and other) changes in motion that were in no way foreseen—the world of unintended consequences. The moment we take a contextual view, we expect that any particular manipulation will have an effect on the whole organism or system and that there will be surprises. We become much more conscious of the responsibility we have for the way we view and interact with the world. This reversal is key. The rigor here is greater, and is, contrary to

CONTINUED NEXT PAGE



AN INTERVIEW **BILL JOY**

Bill Joy is chief scientist of Sun Microsystems and is a co-founder of the company as well as a member of the executive committee. In 1997, Joy was appointed by President Clinton as Co-Chairman of the Presidential Information Technology Advisory Committee, which provided guidance and advice on all areas of high-performance computing, communications, and information technologies to accelerate development and adoption of information technologies. His cover article, "Why the Future Doesn't Need Us," in Wired Magazine, April 2000, ignited worldwide discussion on the dangers from and ethical issues in the development of new, transformative technologies.

Casey Walker: Will you describe nanotechnology and molecular electronics and what can be done with them?

Bill Joy: Nanotechnology is any engineering technology applied to the scale of a nanometer—it can be at the atomic scale and can be with organic or inorganic material. Nanotechnology enables us to manipulate or create any substance that you can imagine. Molecular electronics works much the same way as the electronics we use today, but at a scale that is about three thousand times smaller.

Today, we can certainly recognize that science has created powers that are perhaps beyond our ability to manage well. We had some of that same sense with nuclear power and nuclear bombs, but the particular danger with these new technologies is that many people, perhaps almost everybody, has the ability to use these new technologies to make living or nonliving things with far-reaching consequences. This is something new. We've had a confluence, really, of these incredibly transformative, incredibly powerful technologies with the democratic notion that goes with these technologies being available as information-based technologies. So, for example, genetics is more and more about computers manipulating and helping us to understand a lot of the effect of the transformation that we do. Today we still need to do things using laboratory experiments, but, over time, the dream of biologists is to genetically engineer computationally. Nanotech is very much a computational science and robotics certainly is. As these things become more and more computational, the barrier to entry, if you will, for people to make things gets to be very low, and finally disappears completely.

Besides the order of magnitude, and the accessibility, there's also the problem of people thinking that they're in control. Will you describe the problem of these technologies and self-replication?

Genetic and nanotech are part of a spectrum of technologies that can be used to make things that would self-replicate much like a natural disease. Take a flu, for example. Someone sneezes and passes it on to somebody else. The flu basically commandeers part of our bodies and replicates itself. But the flu bug is directing that

replication, so, essentially, once it goes from one person to another, it can make more of itself. That's what I mean by self-replication. This is a far different scenario from people in a factory spitting out a bomb that someone else would then set off. These kinds of technologies are like infections spreading on their own. Nanotechnology might be used to make a little machine that could manage itself in the physical world and then make more of itself. And, if you had a robot that could replicate itself, it would be almost like a wild species such as a rabbit. Once we have something that can make more of itself, we have the possibility that it will just spread until it reaches some sort of limit. Just as you can have a flu that becomes epidemic or pandemic, you could also have a creation that is suddenly impossible to get rid of. The destructive technologies that we've had historically were not of this character. Once a person can release something that can self-replicate, the ability to do harm can score far beyond the scale of the initial act.

When you write of Drexler's gray goo or Frank Herbert's white plague, you've also make the point that the original intention may not have been evil, but may well begin from good intentions.

That's correct. We can have disastrous results from bad or good intent and, really, from anyone. It could come from a nation, a company, a group, or an individual, and it could start as an accident, or even from a couple of benign things that come together in an unexpected way. Once we have widespread practices with technologies that are very, very powerful, we're likely to have some accidents. We've been very lucky with nuclear power in terms of not having more accidents, but that's partially because they've been managed very carefully. Management is a key problem with these new technologies.

What can be done now in terms of management?

There are two frames of mind at work. One says, well there's nothing we can do about it, and we should just invest a lot more money in all this technology and try to find solutions to the problems each creates. The other frame of mind says, maybe this isn't the path we should move down and we shouldn't give everybody this kind of power. Now the first path is superficially attractive, because it certainly lets us stay with the whole system that we have of a democratic, unlimited individual pursuit of innovation for these technologies. But I think it ignores the evidence that there are offensive or inappropriate uses of these technologies. For example, in the case of nuclear capability, offense has real advantage over defense for the simple reason that defense has to be perfect. In the case of biotechnologies, you cannot defend yourself against all viruses with a single action, you have to stop every single one. And defending against them all is, fundamentally, like having a perfect immune system that can deal not only with what is known but unknown. Impossible.

We're now facing a historical situation. We have a convergence of problems. One kind of problem results unintentionally when our individual behaviors are rational and reasonable but the collective sum of that individual behavior produces an unacceptable outcome. We see this today in the environmental problem. Everybody's consuming a certain amount of materials and energy, but there are a lot of us and it adds up to a whole heck of a lot for the atmosphere and other species' extinctions. But, as much trouble as we're having with that problem,

and as important as that problem is, it's also an indirect threat from our collective behavior. Now, with these new technologies, we have as large a scale of threat in terms of global effect, but it presents itself as a direct threat from individual behavior. In this sense our problems with new technologies are more dire. I'm personally not so concerned about some sort of a Mission Impossible or James Bond megalomaniac, as much as I am about some sort of normal business venture that has an unforeseen outcome that is disastrous. And it's those kinds of things that we can't as readily address in terms of policing or managing.

Do you see a political movement capable of constraining the entire sector of technological development?

That would be very rational. Historically, scientists have rejected constraints on the theory that pure science and science in general was good, and people doing pure science shouldn't have to think about social or political concerns. The line between pure and applied science is becoming very blurry, with universities getting involved with companies, and most everything these days is being pursued with much more of an eye toward commercial application. So I think that argument is becoming less and less valid. I like to say science was originally a branch of philosophy, and it's only the modern experimental science with testing hypotheses that we've become divorced from ethical concerns. I think that as uncomfortable as it may be, we have to look at where we are going. If we want to go a world where everything is possible, then many bad things are going to be easier too. I'm not sure if we'd collectively choose to go there. So my preference is that we look at this larger picture, but we don't really have the mechanisms institutionally. We'll have to develop some new mechanisms.

Technological evolution is threatening to take over from what we used to think of as cultural evolution and it is moving at a rate of about one thousand times faster than cultural evolution. The danger is that the mechanisms that we have in our society for making policy decisions and coming to collective agreements, for culturally expressing some wisdom about these things, is not running at the same speed. How do we respond? If we can all agree that we can get to wherever we want to go and don't need to rush, then maybe the aspects of danger and recklessness can be eliminated. Unfortunately, science and technology is almost a religion. We have to get some control over its ultimate direction.

It's also awfully arrogant to think that we're going to design a new postbiological world. It's fanciful to think that we're going to create some sort of improved silicon-based human and that it's going to be anything at all like us. If we create silicon life forms and let evolution go, which is a very natural process, it won't be human for long. To think that we're going to make humans in a new and improved way seems very unlikely. That doesn't mean we couldn't extend our lifespans substantially in our bodies as we know them. I think we just need to proceed with extreme caution, and we seem to be at the opposite end of the caution spectrum at the moment.

It's a real challenge for us to think on the kind of scale we need to be thinking on. Our humility should equal the danger before us especially when dealing with systems that we understand as little as we do.

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“I can dig up a penstamen from a wilderness area and plant it in my garden, but that does not mean that I now have a wild garden. What I have is a cultivated garden with a wild plant in it.”

it going to those who have access to and use up most of the Earth's resources. It is perfectly understandable that people who struggle each day to eat, drink, find shelter, protect their children, and avoid death by violence or disease would not take on the fight for wilderness. Quite the opposite. It should be an embarrassment to those of us who exploit resources to expect those who suffer exploitation to surrender the only terms they have for survival—land and animals and water and hiding places. At the same time, social justice for all people cannot be addressed unless the health of this planet is maintained, for the lives of all creatures depend on the vitality and sustainability of wild nature. When the biological base of existence is destroyed, people die of starvation or in conflict with each other over resources. Thus, we cannot afford to construe the wilderness issue as one in conflict with indigenous peoples and social justice, for doing so deflects attention away from the real injustice of unfettered greed. We who advocate the protection of every last vestige of wild nature must do so to protect the continuing cycles of change according to the laws of nature, not according to the impulses of erroneously motivated, short-sighted modern humans.

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I was raised on a sheep ranch in southwestern Wyoming, playing in fecund sloughs and along river banks, and occasionally, while shepherding, I scuffed around under sandstone overhangs in cold charcoal and shiny lithic chips left by the Shoshones long before. But it was only in mid-life as a biology teacher, during an ecology course in the Wind River Mountains of Wyoming, that I came face to face with wild nature. Here was a place I had never known before and for which I was totally unprepared. My responses to numinous, sacred wilderness, and my feelings of mystery and awe, of peace and humility, and of exquisite perfection and incomprehensible connectedness touched a wild chord that was still within me. I knew I had come home.

The intrinsic forces that guide the natural systems of this home can be traced, although very incompletely, through the processes of evolution. But many of us who know of this process, and with all that we understand about the universe beyond our planet as well, respond additionally to a perceived presencing, in time and space, that many call spirit and that may be a wild process of both source and scheme. As self-conscious and mindful humans, we must, I believe, not only use our cognition to look at the world in a discerning way but also acknowledge and trust our deepest intuitions regarding the numinous aspect, our being within the being of wild nature.

In this light, using terms such as “urban wilderness” to promote the idea that wilderness exists and can be experienced as such in an urban setting thoroughly obscures both meaning and being. Paul Shepard saw quite early in his work that the opposite of wildness is not civilization; the opposite of wildness is domestication, the process by which gene combinations in living organisms have been interrupted and re-designed for cultural purposes. Civilization, on the other hand, is a condition of society including arts and sciences and the accoutrements of a culture. These are two different cat-



HANK MEALS

egories that cannot be collapsed into a term like “urban wilderness.” Urban refers to a life lived within the constructs and designs of people. Wilderness refers to genetically intact wildness, untamed.

This year I lived in a cabin in the Hoback Basin, a part of the Greater Yellowstone Bioregion in the northern Rocky Mountains about 35 miles southeast of Jackson Hole, Wyoming. Although it is a good place to write and live for about six months or so of each year, it is a very difficult environment in the winter or even in spring, for that matter. As spring approached this year, there were still over three feet of snow on the level. The fences and sagebrush were covered, the gullies and swales filled in, and the wind had sculpted a new landscape, one that was all soft contours and ridge-line serpentine curls. After clear, cold days, the huge, cup-shaped crystals that grew on the surface of the snow acted as prisms that picked up the long rays of afternoon sun and created a shimmering iridescent landscape of opal-like jewels. On snowy or cloudy days, it was all pure white and pearl gray. Sometimes, out there snowshoeing, its extraordinary beauty was so expansive and primal and deep that, standing in its splendor, I could only stop for a minute and weep. But I'd best not sidetrack my main emphasis here. This is not about scenery or aesthetics, although beauty does creep in.

My cabin is built in an old meadow in a tiny basin surrounded by high mountains where wilderness areas have been designated. Last winter I found great comfort in the thought of the plants and animals up there in their niveous element, the voles, pine martens, the bears and squirrels, the winter resident birds, the trees and plants that, like me, were waiting for spring. In order to make it through the winter, my civilized body needed the amenities of back-up electric heat set at 50

degrees, an efficient wood stove, a good supply of wood and groceries, a well-insulated cabin that took advantage of the sun's radiation, a computer and telephone that kept me in touch with the outside world, and snowshoes that got me to my car. But my inability to see them or hold discourse with them did not mean that the animals and plants and elements were not really there. In that crystalline, unforgiving landscape they were making it on their own, and together, because of the innate knowledge in their cells synchronized to the harsh environmental conditions in which they evolved. My perception or someone's counterperception of their circumstances did not affect their reality one iota. They really do exist; they really are wild. And whatever wildness remains in our genes is rooted in theirs, for in the very beginning we evolved in conjunction with them.

On a warm afternoon last spring, Nancy Shea, the executive director of The Murie Center, (a foundation dedicated to the value of wild nature and its connection to the human spirit), and I, discussing wildness all the way, drove north along the edge of the Tetons to visit Mardy Murie at her cabin in Teton National Park. Mardy is the recipient of the prestigious Audubon Medal and the Presidential Medal of Freedom for her lifelong dedication to the preservation of wilderness. Her cabin sits in the midst of pristine land where moose wander by, pine martens play, and comical porcupines with bad hair days come snooping. We sat on either side of Mardy who at 97 drew us to her magnificent matriarchal presence.

In the course of our conversation, Nancy asked, “Mardy, how do you define wilderness?” “Do you know the answer?” Mardy replied. “No, we don't. There is much confusion about it today.”

“Well, that's a good question that I'll have to think about for a minute,” she said, looking out the window at the Stellar's jays at the feeder on the porch. “Is it out there?” Nancy persisted, pointing out the window.

“No,” Mardy responded without hesitation, “that is not wilderness.” “What would you say wilderness is, Mardy?” “I would say it is a place where man's hand has not lingered.”

Thinking a moment about Mardy's wise words, let's imagine a world without WILDerness. Think of this Earth interfered with at a deep structural level of genes and molecules, its high pristine goat rock excavated for minerals, no free-flowing rivers, no ancient forests, seas that have been plundered, good lands turned to desert wastes—in Nancy's words, “a virtual, highly controlled, synthetically made world.” In such a place, what would our metaphors be for the good life? In such a landscape, what words would we use instead of wilderness, wild, and wild nature, and what would their referents be? Without primal examples, how could we carry on restoration? If the source of our being were plundered, how would we know who we are?

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KEEKOK LEE is a professor in the Institute of Environment, Philosophy, & Policy at the University of Lancaster, in Lancaster, United Kingdom. She holds degrees in philosophy from the University of Singapore and the University of Oxford, and a PhD in philosophy from the University of Manchester. She is the author of *The Natural and the Artefactual: The Implications of Deep Science and Deep Technology for Environmental Philosophy* (Lexington Books, 1999), as well as numerous articles and four other books on philosophy. Her interests lie not only with moral, social, political, legal and environmental philosophy, but also with the philosophy and history of science as well as technology.

*Casey Walker: One of the brilliant theses of your book, *The Natural and the Artefactual*, is that current and rising technologies should be evaluated for their potential to "humanize" nature and not simply for their potential to damage or fix nature. Will you begin by describing what you mean, and why the distinction between natural and artefactual is key?*

Keekok Lee: The major question in environmental philosophy up until now has mistakenly emphasized the polluting effects of our actions and technologies. This emphasis is mistaken for several reasons. First, it concentrates too much on existing technologies. Admittedly, it is true, existing technologies are somewhat polluting and in some cases very polluting indeed, but once we look beyond existing technologies to the current and rising technologies of biotechnology and molecular nanotechnology, we see a concentrated hope that these radical new technologies will offer "green techno-fixes" for pollution. Many proponents hope that these technologies will lower pollution or repair losses to such a degree that socially, culturally, and politically, these technologies will become an acceptable means to creating a better world. As I argue in my book, we must realize that the price we pay for "repairing" nature is the kind of nature we would be making in the process. I argue that at the level of ontology—the nature of being—we should be aware that our technologies transform nature through an ultimate process of 'humanization': thus transformed, nature would not exist independent of human intent and would, in a very critical sense, no longer be 'natural' but 'artefactual.'

Secondly, when we critique the polluting or remedying effects of technologies, we mistakenly place too much emphasis on empirical matters of fact—what kinds of technologies we invoke—rather than on grasping that a certain philosophical dimension, namely, the ontological, is missing from consideration. On the whole, up to now, we tend to evaluate technologies as more or less polluting, as more or less ecologically degrading, holding pollution or ecological degradation as a disvalue *simpliciter*. If, on the other hand, we evaluate technologies ontologically—through a system of types of being—then we

AN INTERVIEW **KEEKOK LEE**

begin to evaluate technology for its effects on primary characteristics of independence and autonomy, which only naturally-occurring entities and processes possess. I argue that it is essential to emphasize technology's effects on types of being if we want to throw light on this crucial problem. We should understand that there is an ontological distinction between what we humans can do as opposed to what the rest of nature can do, or may do.

Now, it is often argued that everything is natural, or that because humans are natural it follows that everything humans make or do is natural. However, from an ontological point of view there are important and distinguishable differences. In one sense of the term natural, we are all natural beings—the opposite of which is supernatural. This sense may be called cosmological "nature." There are other senses of natural, such as nonhuman nature, natural kinds, and so forth. (Editor's note: See inset "Seven Different Senses of Nature.") The most important distinction, however, is between what comes into being into existence—solely by virtue of our human intention and what comes into existence entirely independent of human intention. These are two distinct ontological categories: The first is the artefactual and the second is the natural.

To see more clearly what is meant by saying that the artefactual and the natural belong to two distinct ontological categories, let us imagine a world without humans. In such a world, human artefacts simply would not exist, and the notion itself would not be intelligible. However, the natural nonhuman world and the world of natural kinds would still exist. It is in this sense that I see the crises of our time. The important crisis is ontological—the prospect of an artefactual world—and not merely a crisis of polluting effects, cleanup, or replacement of habitat and biodiversity losses. We cannot write off this view simply an anti-technological, or Luddite. My point is not that I'm against technology *per se*, but that before we pay the price for changing the terms for being in the world, let us at least be clear as to what that price is.

Along these lines, will you address why it's important to see that an ontological "end of nature" through the artefactual is entirely different from "ends" caused by disturbances of the ozone layer or global warming or species extinctions?

First of all, take the example of species extinctions. Philosophically, we should bear in mind two very different contexts of species extinctions. There have been five major periods of extinction on Earth before humankind appeared, but these have no philosophical significance whatsoever compared to the extinctions we humans have brought and will continue to bring about. Up to now, the main causes of human-caused extinction have been habitat destruction and habitat fragmentation. But in clearing forests and draining swamps, we did (and do) not directly intend to render species extinct. Similarly, in releasing CFC gases or carbon dioxide into the atmosphere, we did (and do) not directly intend to destroy the ozone layer in the stratosphere or cause global warming.

But in the twenty-first century, such powerful technologies as biotechnology and computer technology are already capable of combining synergistically to produce results that, taken together, are even more powerful than their separate effects. Take the new Human Proteome Project, just announced, to which IBM is committing nearly 100 million dollars. This project will build the world's fastest computer and presumably enable biologists to find their next "holy grail": discovering how cells

Seven Different Senses of Nature:

1) Nonhuman nature, nature(nh), is opposed to culture. Culture involves human agency and its products. The products may be intended or unintended—for instance, a piece of legislation is intended whereas the origin of language is said to be an unintended product of human agency.

2) Cosmological nature, nature(c), is far too wide and obliterates the fundamental dichotomy between nonhuman nature and culture. According to it, the American Revolution, Hadrian's Wall, the Great Barrier Reef, the Grand Canyon are all natural events or objects, which they undoubtedly are, as they can be identified in terms of certain spatio-temporal co-ordinates. The opposite of nature(c) is the Supernatural.

3) Pristine nature, nature(p) is nature unaffected in any way by the impact of human action, whether intended or not.

4) Humanly Impacted nature, nature(hi); nature impacted by humans.

5) Foil to the Artefactual nature, nature(fa), is itself defined in terms of what is brought into material existence deliberately because of human intention. The "natural" is defined as "what is *not* the material embodiment of deliberate human intention" and is, therefore, independent of humans.

6) Foil to the Artefactual includes nature of natural kinds, nature(nk), which refers to what Aristotle called second matter, and can be biotic or abiotic.

7) Foil to the Artefactual also includes nature(f), what Aristotle calls first matter or what we call today the naturally-occurring elements in the Periodic Table, of which natural kinds are made.

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sweep."

The gardener flushed with anger and then said with a laugh, "I've heard my teacher say, where there are machines, there are bound to be machine worries; where there are machine worries, there are bound to be machine hearts. With a machine heart in your breast, you've spoiled what was pure and simple; and without the pure and simple, the life of the spirit knows no rest. Where the life of the spirit knows no rest, the Way will cease to buoy you up. It's not that I don't know about your machine—I would be ashamed to use it!"

A similar understanding developed in Europe to temper the enthusiasm for progress that emerged with the Enlightenment. In the sixteenth century, Montaigne already felt a need to excite respect for what he called our *portee*, or reach: "To make a fistful bigger than our fist, an armful bigger than our arm, to hope to step further than the length of our legs—these actions are impossible and monstrous. The same is true for man's attempt to rise above himself and humanity." This intellectual undercurrent surfaced again in Mme. de Staël and her anti-industrial contemporaries Wordsworth and Blake. A proverb of the latter neatly distills Montaigne's warning, while alluding also to the myth of Icarus: "No bird soars too high, if he soars on his own wings."

A more recent heir to this tradition, Ivan Illich, has endeavored to clarify the distinction between technologies of soaring and those of flying too high. In *Tools for Conviviality*, he describes "two ranges" in machines, those of the first range serving "to extend human capability" and those of the second "used to contract, eliminate, or replace human functions." Within the first range, he continues, "an individual can exercise authority on his own behalf and therefore assume responsibility," but "the machine takes over" in the second, "reducing the range of choice and motivation in both the operator and the client, and . . . imposing its own logic and demand on both." In the realm of transportation, for instance, Illich reckons that the first range ends with self-powered technologies such as bicycles or sailboats; past that point, the tools become too complex for non-specialists to build, repair, or steer and make their users hostage to immense systems beyond their control—oil extraction, airline scheduling, computer programming, etc. Forgoing second-range technologies is unthinkable for many of us, but it's a healthy exercise to consider how heavily we rely on them and how much, as a consequence, we forfeit the "conviviality" of Illich's title, alienating ourselves from a major source of contentment.

The third question brings us full circle and, like the second, is larger than I can hope to answer: how could a practice of contentment provide those strengthened checks on human power that Mme. de Staël espoused? For well-contented individuals, of course, the checks are inherent; the red shoes remain on the shelf not through a muscular exercise of self-restraint but because the satisfactions of life as we know it completely outshine them. The actual question, then, is whether contentment could ever break out at a scale broad enough to put the brakes on our hyper-materialistic, technology-drunk society. It certainly looks like a long shot, but given the dubious feasibility and unattractiveness of the alternatives—warring against our own desires or others'—a campaign for contentment, through contentment, by the contented may be the best chance we have.

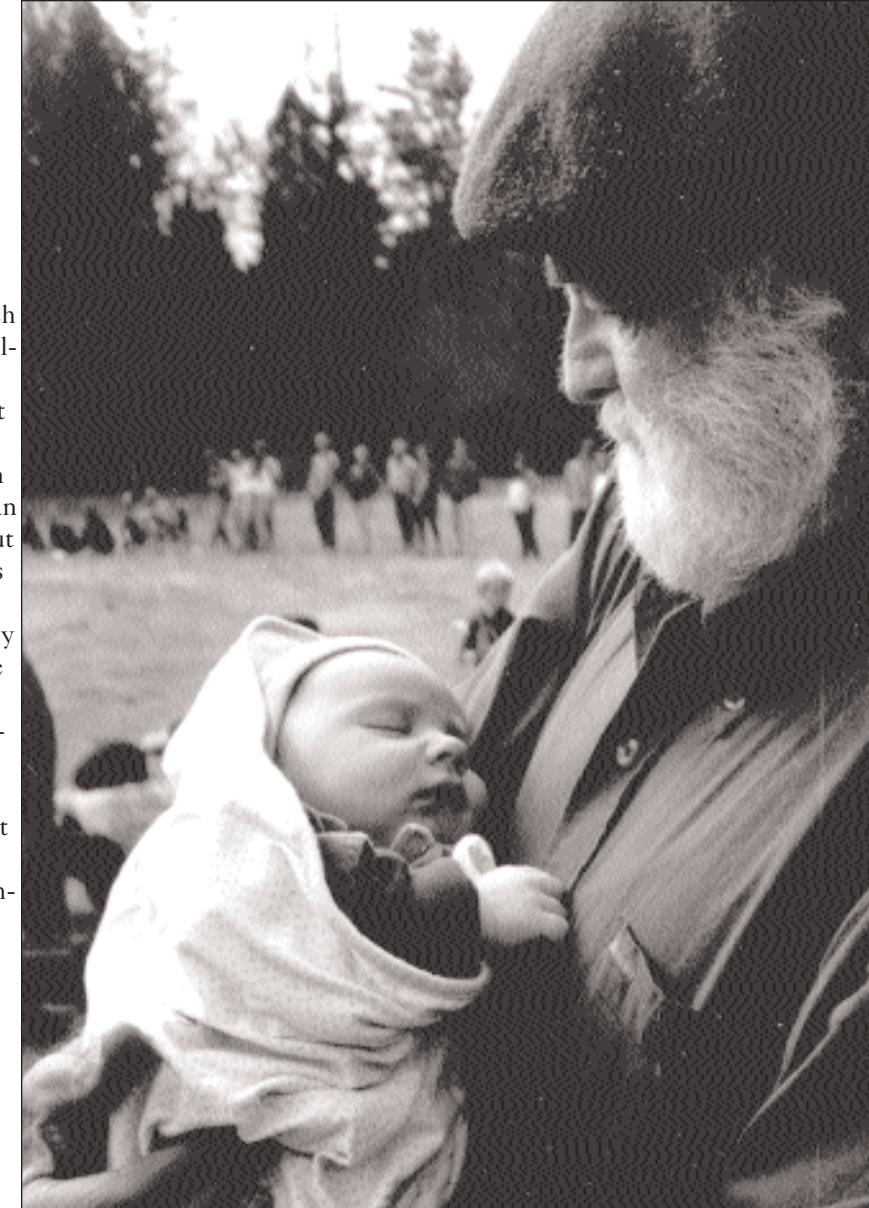
The most hopeful evidence that such a campaign could succeed today, in this country, is that it already has. I refer you to David Kline's description, in his

books *Great Possessions* and *Scratching the Woodchuck*, of the life he and his family enjoy as members of an Old Order Amish community their ancestors established almost two centuries ago in Ohio. Before you throw up your hands in disbelief, let me hasten to say that I'm not expecting Americans to undergo a mass conversion to Amish ways. I'm simply holding out an example of a group that drew its line (out of contentment) and within that line has managed to maintain, if Mr. Kline's reports are indicative, a culture that's richly pleasing to its members, no threat to the earth or ozone layer, and very good to other residents of the place, plant or animal, human or non-human.

If you harbor images of the Amish as dour farmers working nonstop to eke out a living with simple tools, read these books. For the most part, true, their technology remains within the bounds of eighteenth-century agriculture (thus within Illich's first range), but they've adopted later tools with wise discretion. "The Amish are not necessarily against modern technology," Kline explains. "We have simply chosen not to be controlled by it." To plow his fields, he drives a team rather than a tractor, but to fell a dead oak he lays aside his quiet hand tools in favor of a chainsaw, confessing with a blend of rue and humor that "the skill or art of crosscut sawing had been lost with the last generation." He and his family undoubtedly work hard, but their labor is balanced with leisure and with pleasures that Thoreau would instantly recognize. Dour? Kline vaults from his wagon to run down dust devils for the sheer pleasure of their "natural air-conditioning" and sneaks up on a dozing woodchuck to scratch its back with his walking stick, a feat that plainly tickles the man as well as the rodent.

I take one principal lesson from the Amish case, applicable to all who dare to practice the art of contentment, wherever we see fit to draw our lines: that it will be best if we establish and maintain those lines collectively, within the agreement of a community. As necessary and valuable as solitary resolve is in maintaining any set of limits, subjecting them to discussion and settling them with a decision binding upon all present will increase their power internally and externally. The effort the group invests in setting its bounds ensures that they can't be casually neglected or modified and, at the same time, greatly increases the likelihood that they will have an impact beyond the community itself. If one household decides to eat only organically grown food, for instance, its effect will be indiscernible, but if fifty households reach and implement that same decision jointly, the local economy will respond, particularly if their decision is credibly communicated to farmers and grocers.

Extreme as it may sound to some, what I'm suggesting is hardly novel; many and diverse groups have maintained commitments of this kind, for one reason or another. Among religious traditions, Orthodox Jews constitute a conspicuous example that is older, larger, and more urban than the Amish, but Mormons, Muslims, Seventh Day Adventists, Jains—a complete list would be long. Trade unions, corporations, civil rights groups, and other secular organizations have adopted



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such agreements, too, although almost always only for brief periods and for goals much narrower than those of this campaign for contentment. Any undertaking to put the brakes on the juggernaut of "progress" obviously must be religious, if not in the literal sense then certainly in the figurative-devoted, determined, consistent.

I want to close with a few thought-experiments, as a challenge to myself and to see how they might stir others' imaginations. What if we—you and I, our families and friends, a group of coworkers or neighbors, a congregation or sangha, members of a co-op or credit union—decided, say, to start doing all of our own baking? We'd forfeit some convenience, of course, but what would the returns be? Not just fresh, delicious breads, cookies, cakes, and so forth but also the therapeutic benefits of kneading, the aromas of baking, bowls and spoons for kids to lick, the opportunity to eat the results hot from the oven. . . .

What if we agreed to stay completely off the road one day each week, in the old tradition of Sabbath? To use no plastic bags or containers? To replace our computers no more than once a decade? To hold our air travel under 5000 miles a year? Only to patronize retailers with fewer than five locations? To spend as many hours making music as we do listening to recordings? To invest half our savings in local projects and enterprises, instead of turning it all over to transnational corporations? To limit our personal libraries to a hundred books, as the late Paul Shepard did? Only to buy and consume foods produced within a hundred-mile radius of home? To refrain from using medical apparatus unavailable in our grandparents' day?

All these ideas may miss the mark as far as you're concerned, but somewhere, surely, we must draw the line, both for our private contentment and for the good of all. "Enough is as good as a feast," an old proverb instructs. Or is there no limit?

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Ch'an also assimilated from Taoism that weirdest of virtues, *wu-wei*, which literally means *inaction* or *non-doing* and holds connotations of not scheming, not pursuing, not controlling, not manipulating, not forcing things, yet it doesn't equate to sitting on your hands either. To quote Chuang-tzu again, "Each thing minds its business and all grow up out of inaction. . . . Heaven and Earth do nothing and there is nothing that is not done." The challenge is to realize in our own lives the simultaneous ease and generative power of Heaven and Earth, mountains and rivers.

Among many I could offer as exemplars of this way, I want to mention the Zen monk, poet, and calligrapher Ryōkan, in part because he was an elder contemporary of Baudelaire and Thoreau. For about three decades, until retiring at nearly seventy, Ryōkan lived as a hermit, gathering greens and firewood in the forest and receiving from his village supporters contributions of rice, miso, and occasional luxuries such as sake or fruit. Not widely known in his own time, he is immensely popular with the Japanese today, remembered with particular fondness for his readiness to suspend an almsround in order to play with the children. "Desire nothing, and you're content with everything," he wrote, and he embodied this with considerable success:

*My whole life, never troubling to get ahead,
I've just ambled along, leaving things to the stars.*

*In my sack I've got three measures of rice,
by the hearth, one bundle of firewood.
Why ask about enlightenment and delusion?
What truck have I with fame and fortune?
Here in my hut I tilt my ear to the night rain
and stretch out my two legs just as I please.*

Ryōkan, like Thoreau, recognized peace of mind as prerequisite to contentment, and at his disposal he had a large body of teachings articulating how it can be found. In Zen, quieting the mind is merely a step on the path—but a crucial one. A classic text warns that anyone who fails to "cut off the mind-road" is no better than a ghost clinging to the underbrush, a rootless phantom hanging on to concepts, self-images, and the like to keep from being blown away in the gale of everyday life. Dogen Zenji, founder of the Japanese sect in which Ryōkan trained, advocated a form of meditation known as *shikantaza* (lit., just exactly sitting), citing an earlier Ch'an dialogue:

A monk asked Yüeh-shan, "What should I think while meditating?" Yüeh-shan said, "Think without thought." "How can I think without thought?" the monk asked. "Non-thinking!" Yüeh-shan replied.

ON ROADSIDE MEMORIALS

MIKE CONNELLY

We worked the herd over the weekend, and let the bulls out. Checking the empty feedlot this morning, I found a calf we had missed, whose mother had hidden her well enough. Weak from two days of missing teats, she had curled up next to a cow that had died some weeks ago.

A dead cow bloats and then she blows, and Lord what a stink she sends. The calf must have felt confused, what with it not being her mom in the first place, and what with the stinky sag besides. But it was all she could find, and it was closer than alone.

I learned some time ago that some things stain a spot forever, and this was one of them. I drug the calf out of the gooey whiteish rot, and rode her on my lap over to the pasture where her mother still waited. Scrubbed and showered, and still I can smell it, and will even after I can't.

Back at the spot the soft parts will soon sink in. The bones will lose their pink, then white, then gray, then everything. But as long as I remember, they will all still be there. And as long as I tell it, others will put them there, too.

Nothing dies for nothing. Other things will eat it, but that's just a part. This turn of the screw, this arc of a round gets turned into words, digested again and again to leach another kind of nutrient, to get the lesson learned:

Long ago a friend from the baseball days drove into the same oak tree twice in one year. The second time he came out with some brain damage, and we all got out of whack because he wasn't the same person anymore, which meant that nothing was the same anymore.

It wasn't really funny, but it was ridiculous and we had to do something, so we smoothed the bark off the tree and painted a giant baseball on it, because everyone knew he couldn't hit worth a shit.

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The thrust of *shikantaza*, as of all Zen practice, is less to experience what we usually call "peace of mind"—a restful emotional condition—than to realize and embody what Zen has called "the mind of peace." Deepest contentment flows from this:

*Better than knowing the body is knowing the mind of peace;
when the mind is realized, the body is no longer anxious.
Having fully realized both body and mind,
why would a hermit sage want to become a noble?*

I mention these precedents not to promote my favorite brand of meditation but to press the point that we who quit the pursuit of happiness in favor of contentment somehow have to quell the ruckus in our heads and know the mind of peace. Whether one's affinity lies with Thoreau or Traherne, or with Meister Eckhardt, the Kabbalah, Rumi, the Society of Friends, or some other tradition, each of us needs to find a reliable guide and get on with the job.

Finally, three critical questions. First, am I really advocating a practice of contentment for people (women, say) who find themselves living under conditions that are unjust, exploitative, violent, or all of the preceding? Yes, I am—but remember not to confuse contentment with complacency. Out of his contentment, Thoreau thundered against the status quo and took a cell in the Concord jail when he felt he had to, and I like to think Sojourner Truth may have done similarly. I'd go so far as to suggest that today all of us are living under unjust, exploitative, and violent conditions and that this only increases the importance of cultivating a knack for contentment.

The second question demands a much longer answer, and readers will have to provide most of it themselves: within what limits shall we find contentment? A sense of boundedness is inherent to contentment, but we live in a time when the illusion of limitlessness is widespread. The expansion of our scientific and technological powers, alienation from the elemental realities entailed in getting a living from the land and water, the dismemberment of families and communities—these and other factors have so deeply undercut a public understanding of limits that we who see through the lie of unlimited "progress" have no choice but to find our contentment within limits we find ourselves through reflection on personal experience, scientific discoveries, and the cultural record. (Since these limits will appear unfounded and self-punishing to most others, our contentment, like Thoreau's, will surely be tested by our neighbors' incredulity, if not derision.)

The cultural record is an inexhaustible resource on the topic of containing curiosity, greed, and *hubris* and offers specific counsel about where to set the limits on technology—and why. Again, a passage from Chuang-tzu comes to mind:

[Tzu-kung] saw an old man preparing his fields for planting. He had hollowed out an opening by which he entered the well and from which he emerged, lugging a pitcher, which he carried out to water the fields. Grunting and puffing, he used up a great deal of energy and produced very little result.

"There is a machine for this sort of thing," said Tzu-kung. "In one day it can water a hundred fields, demanding very little effort and producing excellent results. Wouldn't you like one?"

The gardener raised his head and looked at Tzu-kung. "How does it work?"

"It's a contraption made by shaping a piece of wood. The back end is heavy and the front end light and it raises the water . . . so fast that it seems to boil right over! It's called a well

in the human body build up each amino acid (of which proteins are made) atom by atom, using the genetic information provided by DNA and RNA; it will also tackle the problem of protein folding itself. If this "holy grail" were indeed found, it might open the way not simply to new forms of medical treatment but to the ability to construct life from scratch.

Molecular nanotechnology, in conjunction with computer technology, has similar ambitions for the abiotic world: to construct totally novel materials, atom by atom, from the elements themselves. If such projects were successful, we humans would be able to substitute even more thoroughly artefactual kinds for natural kinds in both the biotic and abiotic domains. The goal of this second "end of nature" is precisely the fabrication of artefactual kinds, an end which one cannot deny is directly intended.

The "end of nature" which Bill McKibben wrote about is not (and has not been) directly intended and deliberately brought about. Even now, when the evidence is more or less in, there are many nations in the world that feel they have no choice but to continue to burn coal. They may be adding to the greenhouse effect but most certainly do not set out deliberately to change Earth's climate—quite unlike those who set out deliberately to try to terraform Mars to make it as habitable as Earth.

The most serious threat posed to nature by such rising technologies is, therefore, for me, an ontological one. Every natural being has a "trajectory," by which I mean the whole fact and history of a natural being, including its coming into existence, its continuing to exist, and its going out of existence. Now, in principle, this whole history, as it were, is independent of human manipulation and human control, and therefore of human intention. But our technology, which manipulates biotic and abiotic forms at increasingly deeper levels, allows us to transform the natural being and divert its natural trajectory in order to force it to do our bidding—to become the artefactual.

Do you evaluate the impact of artefactual creations on natural systems in terms of acceptable or unacceptable thresholds-thresholds of transgression?

Science and technology are not static. They are dynamic. So we have to bear in mind that with each basic theoretical discovery, we generate a new kind of technology. Technology has a very long history, which, for the purpose of this discussion, may be divided into two periods. From the earliest beginnings, when humans started to use tools, to roughly the mid-nineteenth century is the period of technological history that may be called "craft-based." In other words, the primary method was trial and error. This remark should not be read as belittling such technologies. On the contrary, the advances made were quite spectacular, and some have not been equaled even today. What we understand as "modern science" did not begin in earnest till the seventeenth century in Western Europe. For roughly two and a half centuries, modern science did not have much to offer technology. Actually, it was technology that sometimes spearheaded fundamental scientific discoveries—witness how attempts to improve the efficiency of the steam engine led to founding the basic science of thermodynamics. But after about 1840, the causal arrow began to point the other way: Major technological breakthroughs became dependent on fundamental theoretical advances in the various sciences. Today technology is largely no longer autonomous but induced by scientific theories.



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....The direction we are going now with technologies such as molecular nanotechnology, genetic engineering, or terraformation technology is toward a very radical change in terms of creating the artefactual. The question is no longer simply one of spewing out chemicals having disastrous impacts on the rest of the environment. The proponents of nanotechnology like to point out that it is by and large minimally polluting, but it would enable us entirely to bypass "natural kinds," both biotic and abiotic, as we construct their artefactual substitutes. In the end, for example, we would no longer rely on wood, which, though renewable, presents problems. By leaving resources like wood behind and by constructing, atom by atom, new artefactual materials, we would avoid the problem of scarcity of materials and perhaps the pollution that comes from using them.

However, I think it would be very difficult to set a threshold of transgression, given the complexities of the world in which we live. If you were to press me on this point I'm afraid I would be a coward—I would say it is impossible to set a limit *a priori*. All I want to do is make people aware of what is at stake, so we don't just willy-nilly start transforming whatever is left of the natural world. Now, some further transformations may undoubtedly be required, given a world that is very unequal economically and politically, and given a world in which everyone aspires to have a decent standard of living. I think humankind must somehow confront this problem collectively.

In other words, at the practical level I have got no panacea, and it would be silly of me to think that I have. But at the theoretical level, at the philosophical level, I think we must realize there are important values at stake. Before we rush to use these radical new technologies, we should at least pause and ask ourselves: Is this absolutely necessary? Is there a way by which we could at least leave some of the natural aside?

It is often argued that today's genetic engineering—particularly with agricultural applications—is not fundamentally different from Mendelian genetics and hybridization techniques as we've practiced them for years. Yet mixing genes or organs between two different species clearly creates a whole new order of artifice. Where on the continuum of tinkering with crops, forests, and livestock do we determine a threshold of artifice that violates ecological autonomy and independence?

I wholeheartedly agree that the biotechnology we have today, via DNA genetics, is a very different kettle of fish from the kind of Mendelian breeding done be-

fore. However, to determine if there is a cutoff point at which we say it is not acceptable, we would have to break the question down into various scenarios, so to speak, and examine each scenario in detail. Take for instance the genetic engineering of bacteria: The genetic engineering of microorganisms would present different problems altogether from the genetic engineering of mammals or plants.

We'd have to ask what kind of biological being it is we are trying to engineer. Then, given the kind of being, we would also need to understand the context in which we were attempting to make that transformation. For instance, there may be some ways of engineering some kinds of biological beings in which the risk of ecological escape would not be great. It may be possible to isolate contexts in which we may be able to engineer biological beings without unacceptable ecological impact. Now, with other kinds of biological beings, this may not be possible. For instance, plants with pollen—because pollen floats about in the wind—would be next to impossible to contain. Also, it may be possible to genetically engineer a kind of biotic artefact that will be sterile and pose no risk. Again, I don't want to say *a priori* that there are no such beings or contexts or that there is a predictable threshold.

We should always bear in mind that there is a great disvalue in transforming nature to our own intent; but having said that, I can't see that we are all going to turn our backs on doing so. I think we must realize, therefore, that there is a disvalue involved that requires us to try to restrict this technology as much as possible in the real world. It's easy for me to say that because I'm not a policy maker! But that would be the way forward.

Do you see an inherent fallacy in the assumption that we can self-realize at higher levels if the world is, at the same time, ontologically simplified? If there's less to perceive and interact with, won't we, too, become diminished?

Yes. That's right. That's a very good point to bring out. Modernity takes two kinds of approaches to thinking about human life: One is the more materialistic approach, which says we human beings are here to improve our material standard of living and that improvement constitutes progress. The more spiritual and seemingly more noble approach says that we're here not simply to improve our standard of living, but to progress toward increasing freedom, self-realization, and individuality.

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Now, in the end, the latter turns out to be much more dangerous because, while it may be possible to demonstrate that a material standard of living has reached a saturation point, the quest for individuality and self-realization is idealistic or neo-marxist and is really an endless project. It's a Faustian thing. We think the human spirit has to aspire to higher and higher levels, and indeed, there are more and more projects to fulfill depending on the technology available. In the past we would never have had the aspiration to go to Mars or send machines to Mars. It is difficult to argue that there is a saturation point to self-realization.

Transhumanists, or those who believe in a posthuman world, are searching for the technological realization of that existentialist idea—that our freedom and our autonomy is unlimited—that we create our own essence. We are now rapidly reaching the point at which we can transform ourselves beyond biological limitation—we don't have to die after three score and ten. It all sounds sci-fi now; but with the exponential growth of technology, who knows if we will sooner or later be able to download part of a computer to become part of our human brain. This realizes the human project: creating our own essence using human technology!

Which completely ignores self-realization as being a part of the living world of “other.” How might we come back to your original argument that in our ignorance of the ontological we perpetuate a narcissism and solipsism that are in themselves stultifying and static?

Yes. In that sense, we are poised at a cusp in human history—in the project of self-realization—that is taking us into a totally narcissistic world. I agree that this project of self-realization would ultimately mean that we would live in a techno-sphere, which means that ultimately not only are we no longer natural beings in the sense of being subject to biological constraints, but that we will be living in a world where biological beings have all been created at our bidding and at our will. The biological world will have lost its own *telos*. I think that is where the arrow is pointing, unless we miraculously draw the line now.

There are several points that make narcissism and its moral failures obvious and significant. First, it is obvious that we feel awe in the presence of some of our artefacts—Chartres Cathedral, the Taj Mahal, and the space shuttle, to name just a few. Some of us might even be moved to tears by such exquisite products. We are also

capable of feeling awe while watching a sunset or a volcanic eruption. We might also be moved to tears by such sights. But such reactions and emotions, though similar at one level, are profoundly dissimilar at another. In the first context, they have been elicited by our own handiwork, and in appreciating and admiring them, we are in reality admiring our own creativity, our own imagination, our own intelligence. But in the second context, our reactions have been elicited by some being (and its processes) other than ourselves—in appreciating nature, we are admiring nature's own creativity, nature's own ingenuity, nature's own handiwork. There is a world of ontological difference between the two contexts.

Secondly, according to standard ethical thinking, moral failure consists primarily of a failure to grasp the underlying similarities shared by two different classes of agents or states of affairs. For instance, all humans are capable of feeling pain in spite of the fact that there are differences between them—some are female, others male, some have darker pigmentation than others, and so forth. Likewise, nonhuman mammals are capable of feeling pain in spite of their differences, such as the fact that humans are bipeds and some nonhumans are quadrupeds. So just as it would be morally wrong to discriminate between dark-skinned people and light-skinned people in health care distribution, so would it be morally wrong to discriminate between humans and the higher mammals in the context of scientific experimentation—if it is wrong to vivisect humans, it would be equally wrong to vivisect nonhumans who feel pain to a similar extent.

While morality has advanced greatly along such lines, it might not have advanced far enough. This is to say that morality ought also to respect the differences between different sorts of beings, not only the similarities that they may share. It may be true that we and the chimpanzee share 98.4 percent of DNA or that we and the nematode worm share 70 percent of DNA. But it is the respective remaining differences which make humans human, make chimpanzees chimpanzee, and make nematode worms nematode worm. Each is its own kind of being with its own distinctive characteristics and ways of living, each deserves respect for the kind of being that it is, and deserves to be treated in a manner appropriate to its kind. Philosophically, it is a mistake for us to try to get chimpanzees to acquire human characteristics (such as teaching them human language) or for us to be more chimpanzee-like (such as trying to walk on all fours or swing from trees in their presence).

Thirdly, modernity has dispensed with God—a transcendent entity said to explain the world—since Lyell, who forged the modern science of geology, and Darwin, theorist of natural evolution in modern biology. Yet modernity has not been content merely to banish God from its worldview, but has proceeded systematically since the mid-nineteenth century by means of its science and its technology to transform the nonhuman natural world, which has evolved over the eons, to conform its image and requirements. Humans and their artefacts pose a constant threat to the natural, both in its empirical manifestation, and as an ontological category. This amounts to ontological impoverishment, leaving human will and intention supreme.

Lastly, the dominant form of ethical thinking in Western moral philosophy—namely, anthropocentrism—claims that humans alone are morally considerable because they possess a set of unique characteristics, including rationality and language. (Obviously, I do not buy anthropocentrism, although I do admit that humans, as a species, do possess a unique characteristic: namely, they are moral agents.)

Beings which are morally considerable are beings to whom we owe direct duties, not merely indirect ones. A tale about St. Francis illustrates this distinction well, though ironically so. Convalescing from an illness, one of his brethren expressed a desire to eat pig trotters. Jonathan, a disciple of St. Francis, rushed out to find a pig and chopped off its trotters to use for the meal. However, when St. Francis heard of it, he reprimanded them—not for damaging the interests of the pig, but for damaging the interests of the pig's owner. In other words, the pig's owner possessed moral considerability and, therefore, was a being to whom one owed direct moral duties. In contrast, the pig, which was not a morally considerable being, was owed at best indirect moral duties—we must be nice to the pig and not hurt it simply because by damaging it, we are damaging its owner's interests.

A standard challenge to this kind of anthropocentric thought is to deny that there is such a set of unique human characteristics. This strategy seeks to find underlying similarities in beings/things in spite of the obvious differences between them. If rationality—suitably defined in a certain way—is not unique to humans but is also characteristic of some of the higher mammals, for instance, then the domain of moral considerability will have to be extended to include, minimally, the great apes and, maximally, all the mammals. But this strategy has its limitations, as we have seen.

The strategy I advocate rests instead on recognizing the differences between beings/things. This leads me to emphasize the ontological value of independence and to lean on it as the basis for moral considerability. All naturally occurring items, nature(fa), whether biotic or abiotic, embody this value. However, each biotic or abiotic kind (and its processes) has its own trajectory. We humans, who are unique in being moral agents, have a direct duty to respect the different trajectories of nonhuman others.

In saying this, I do not wish, however, to be misunderstood to mean that one should never ever use nonhuman others to serve human ends. That would be a ridiculous thing to say. Drawing an analogy with Kant's categorical imperative (which holds for interpersonal conduct) is pertinent here. His imperative should not be distorted to mean that one should never ever treat other people as means to one's ends, but that one should not

*E*ven where intellectual ambivalence appears to question social ramifications of scientific/technological developments, its questions are still only questions of a kind. It doesn't challenge the trajectory of a technological development. It conducts *ex post facto* examinations of the results and implications of technological applications; but, it doesn't present serious or effective obstacles to the ultimate development of any particular biotechnology."



HANK MEALS

clear science is political, the problem of genetic science is commercial? How might the American public prepare for current and rising human engineering technologies in ways that will politicize these technologies as a debate for citizens rather than as debate for consumers?

I agree with the way your question distinguishes between a political nuclear science and a commercial genetic science. But I am not optimistic about how we can prepare for human engineering technologies as citizens rather than as consumers. When we look back on the kinds of biotechnological developments that caused serious public alarm in the 1970s and the possibility of moratoria on research or prohibiting use, we see they were developments by which people felt that they could conceivably be harmed-and harmed rather imminently through such crises as nuclear disaster, recombinant DNA (should the recombined product escape the lab), or the prolongation of death through mechanical ventilation. In these cases people could conceive of themselves as being the unwilling consumers of scientific products. And, importantly, benefits seemed abstract and distant. All this motivated people to speak out politically. Except in the case of unlabelled genetically engineered foods, the situation today is almost reversed-at least in terms of perception. Today well-financed biotechnological concerns make powerful claims, largely unchallenged, about finding cures for human diseases. And potential problems are made to sound abstract, abstruse, distant, avoidable, and/or remediable. An important question, of course, is whether or not claims made for benefits are merely swollen advertisements by profit-seeking entities. Might not other avenues of perhaps less glitzy research yield better results faster? The answer might be no, but the question is one scarcely asked by anyone. Another important question is which class, race, and gender could be expected to gain from any proposed research and at whose expense. The public (or the various publics) have pretty much abdicated interest and concern to the "experts" in the field of bioethics, and bioethics is not really doing a very thoroughgoing job of researching the answers to these questions or of publicizing them.

Will you describe how the Karen Quinlan case and the "right to die" movement that followed it impacted people's perception of biomedical technologies as rights-oriented and defined issues legally rather than ethically?

The Quinlan case made an incredible sensation in the 1970s because the press and others presented the case as a situation in which a new technology-in this case the artificial respirator-was in a sense torturing a human being by not allowing her to die even when there was no cure for her condition and she would have died, or so it was thought, without the respirator. Erroneous information spread quickly that Karen Quinlan was essentially brain-dead and was being kept alive artificially, against her own putative will and contrary to the preferences of her parents.

In fact, the artificial respirator was not really all that new (some version of mechanical respiration had been around since the 1950s), and Karen was not brain-dead. She was in a chronic vegetative state. Additionally, the way the case evolved made it seem as though doctors routinely kept patients like Karen attached to respirators. This also was not the case. There was commentary by physicians at the time, although not widely reported or admitted to in the courtroom, that doctors did "pull the plug" on patients who were in chronic vegetative states. Physicians were not professionally ready or willing to defend themselves on this point in the legal system. How all this came about is complicated, and a thorough explanation is perhaps best left to my book, but suffice it to say here that all these misunderstandings led to the popularly believed but erroneous conclusion that people were being denied the "right to die." The really unfortunate thing is that, with all the incorrect and misguided emphasis on rights, public discussion had pretty well missed the reality that dying, then as now, has so much more to do with the compassionate responsibility of the living to the dying than with the diseased-compromised rights of the dying themselves.

So, this case shows us, as you suggest, that ethics is a larger concern than rights per se. How is this relevant to genetic engineering discussions? I'm not sure. It may suggest that looking at rights alone is not the wisest way

of pursuing an ethical consideration of genetic engineering. For example, does one have a right to clone oneself? Is this right a reproductive right or an inalienable right of self-expression? Perhaps the history of the Quinlan case shows us that this formulation of rights is too narrow. If the past is instructive in other ways, though, I think that bioethics, as an institution, is likely to midwife the cloning issue into public acceptance as it has other, once exotic, technologies. It's almost just a matter of talking about things so much that the initial shock wears off, then drawing up some "guidelines" on how to proceed "ethically" and giving it a bioethical "imprimatur." I think such a thing is likely to happen.

From your point of view, what questions should bioethicists be asking?

By and large, whatever questions bioethicists ask, an unspoken assumption is that the development of whatever technology they're considering is inevitable. It would be useful, I think, to challenge this assumption. The process of bioethical inquiry has become a predictable one: Recommend delay until guidelines can be developed. Arguably, the predictability of this process has stifled more vigorous and more public debate: if prohibition of a biotechnological procedure is a believable threat, it might have the effect of fleshing out exacting social questions. For example, how and why were specific biomedical technologies created, by whom, or by what groups? And on what criteria? For the benefit of which group (race, class, and gender) and to whose detriment? How were such technologies tested? At what cost and at whose expense were they developed, both socially and economically? What alternatives were not developed? I think that you can find some bioethicists pursuing some of these questions some of the time. But I do not think that, as a social enterprise, bioethics as a whole is in a position to pursue these questions systematically or vigorously. Of course the remaining question is, Who will?



AN INTERVIEW **TINA STEVENS**

M. L. TINA STEVENS teaches history at San Francisco State University. She received her Ph.D in US history from UC Berkeley and holds a masters degree in Jurisprudence and Social Policy from UC Berkeley's Boalt Hall, School of Law. Her publications include articles for the *Humanist*, *Journal of Health Politics Policy and Law*, and *Cadeuces: A Medical Humanites Journal for Medicine and the Life Sciences*. Her book, *Bioethics in America: Origins and Cultural Politics* was published by Johns Hopkins University Press in October, 2000.

Casey Walker: Will you begin by describing the historical influence of an "ambivalence toward technology," as you identified it in *Bioethics in America*, and how that ambivalence has shaped a contemporary bioethical movement that is far more likely to accommodate a new or rising technology than it is to take a position against it?

Tina Stevens: Yes. Throughout American history, we can find a hesitant or ambivalent attitude toward technological and scientific development. Even during periods of overt boosterism, there has always been a substratum of thought that is suspicious of technological applications of scientific research. What is interesting, I think, are not those critics who perceived progress or technological development of any kind as always misguided, but those who saw that while they might benefit from technological progress they were, nonetheless, worried about aspects of it. The recurring nature of this type of intellectual anxiety is so marked throughout our history that I think we can say that, although it is a cautionary attitude, it has served as a buttressing structural feature of a technological society.

We can see how ambivalence actually plays a role in moving things along. Even where intellectual ambivalence appears to question social ramifications of scientific/technological developments, its questions are still only questions of a kind. It doesn't challenge the trajectory of a technological development. It might examine implications and results of technological applications; but it doesn't really present serious or effective obstacles to the ultimate development of any particular [bio]technology. Arguably, once scientific research has yielded practical applications or tangible realities to be dealt with, it's too late to alter what has been set in motion. Bioethicists, I believe, fit within this tradition of intellectual ambivalence. They belong to an educated elite whose larger social class essentially supports technological development. We can find evidence for this intellectual history in some form as far back as the Puritan settlement of North America. But we can see this tradition most distinctly in the period between 1880 and 1920 in the group Jackson Lears dubbed the antimodernists. These academics, journalists, and literati were uneasy with the dominant culture and with the modern technological nature of soci-

ety, yet they were also half-committed to it. It's important to note that through their half-commitment, anti-modernists inadvertently allowed modern culture to absorb their dissent. There is a strong argument to be made, I think, that the same absorption of dissent happened to early bioethics as well. Insofar as bioethical thinking follows technological development instead of investigating how biotechnologies are initiated socially and politically, it remains a technologically determined enterprise.

Will you recount the rise of the socially responsible science movement after World War II and its influence on the field of genetics? When did geneticists first address the capacity for eugenic practices—the deletion of "inferior" traits in people or the cultivation of "superior" genetic traits?

We see the tradition of ambivalence making its most noticeable appearance after World War II in the post-atomic, responsible science movement of the 1950s. Scientists who had worked on the development of the atomic bomb and who were distressed by the bomb's deployment at the close of World War II wanted to reclaim ethical scrutiny and control of the uses of atomic research and development. Geneticists working in the wake of the responsible science movement consciously modeled themselves after these scientists. They wanted to be very sure to examine the ethical implications of their research and to maintain ultimate control over uses of genetic manipulation.

Genetic discoveries during the 1950s and 1960s were seen by their discoverers as unprecedented and morally challenging. Some geneticists, notably Joshua Lederberg, actually wanted to implement eugenic practices. He called his pet proposal "eugenics," which he defined as the genetic engineering of human development. He clearly felt that mankind could be improved through genetic manipulation. Similarly, Francis Crick, the co-discoverer of DNA, offered eugenic suggestions when he questioned whether human reproduction should be considered a right. At a conference in 1962, he floated the idea of allowing people to reproduce only after being licensed to do so in order to discourage the genetically unfavorable from conceiving. Other geneticists, however, wanted to warn the public about the eugenic implications of genetic discoveries. Dr. Salvador Luria, for example, wanted to alert the public about the possibilities for "evil" applications of genetic research. Evidence reveals that the earliest bioethicists, including Paul Ramsey and Joseph Fletcher, were clearly concerned by what these geneticists were saying. They and other public intellectuals began the popularization of what eventually came to be called bioethical issues. How intellectuals came to parlay the difference between educating and representing the public, on the one hand, and managing the public, on the other, became one of the great silent social movements of the decade.

Taking a long historical view, what is significant about bioethics is that it is still around today, thirty years past its institutional birthdate in the late 1960s. Other historic movements that can claim a cautionary posture toward technological development (e.g., transcendentalism, antimodernism, and the responsible science movement) had more or less dissipated or stagnated, institutionally speaking. Bioethics, by contrast, not only became institutionalized, it has become a thriving institution. It has spread nationally and internationally.

We can explain how this happened, I think, by considering the fact that during the 1960s there were cri-

tiques of science and society far more radical than the limited critiques put forth by bioethicists—bioethics, in this context, was the lesser of two evils from the point of view of established biomedical interests, as was the case, for example, with those physicians and researchers trying to develop organ transplantation and to establish a new definition of death. Critiques by intellectuals such as Lewis Mumford, Jacques Ellul, Herbert Marcuse, and Theodore Roszak often saw scientific and technological development as an inextricable part of deeply rooted social institutions that cooperated in limiting individual freedom and social justice. Such truly radical critiques raised the stakes of ethical considerations of science and technology—sometimes calling for the dismantling of social institutions. In this highly threatening cultural milieu, it made sense for biomedical researchers to seek out and cooperate with bioethical scrutiny of their work, which was a much less hostile strain of oversight than what the more combative radical critiques had been calling for.

"By and large, whatever questions bioethicists ask, an unspoken assumption is that the development of whatever technology they're considering is inevitable. It would be useful, I think, to challenge this assumption."

What this means, basically, is that current bioscientific research and development is not really critiqued or challenged in any thoroughgoing way; it is really more or less just managed. Bioethical oversight has pretty much come to mean the development of guidelines for how to proceed ethically with whatever research and development is already underway. Whether or not any single line of research and development should be initiated or supported is not considered in a way that makes its prohibition a believable outcome. In this way, bioethicists typically manage problems that derive from technologies which are seen as value neutral in their creation, even though they are problem causing in their outcomes. In many ways, bioethicists don't have much of a choice here. If they were to be any more critical than they are, their institutionalization and longevity would be threatened. You can see how this is so in considering the history of the Hastings Center, the world's first bioethics institute. In this case, early founders had very high hopes for remaining an "independent" institute, free to pursue issues that they thought were important to society and unencumbered by university or other affiliation interests. But they soon learned that whoever gave them funds would, in subtle if not direct ways, get to set important aspects of the agenda. In the mid-1970s, they found themselves in the midst of what they called a "'bioethics backlash" in which they had to be concerned about losing funding because of a developing reputation of being too critical.

Will you elaborate on the idea that whereas the problem of nu-

always and only treat people as means, never as ends in themselves. In the same spirit, I do not wish to say that one should never ever treat nonhuman others as means to human ends; I merely wish to say that one should not treat nonhuman others always and only as means to human ends, but never as ends in themselves.

It becomes quite compelling then that we understand and begin to articulate the process of not being pathologically solipsistic or narcissistic—that if we're going to mature morally and ethically, we have to understand not only the ontological criteria for all of life, including our own, but the intrinsic value of the nonhuman.

I think your saying it that way puts very clearly the difference between my position and the position one sometimes finds in so-called "green theory." There are a lot of other green theorists who say we need the natural world because without it we would not be whole. They differ from my view because I see their position as still anthropocentric. All they're saying is that to be a whole human is to have human needs satisfied in nature. The human is still at center. I am saying we are not going to be whole until we see that the natural has got a value that is independent of us. Its value is not relative to our need of it.

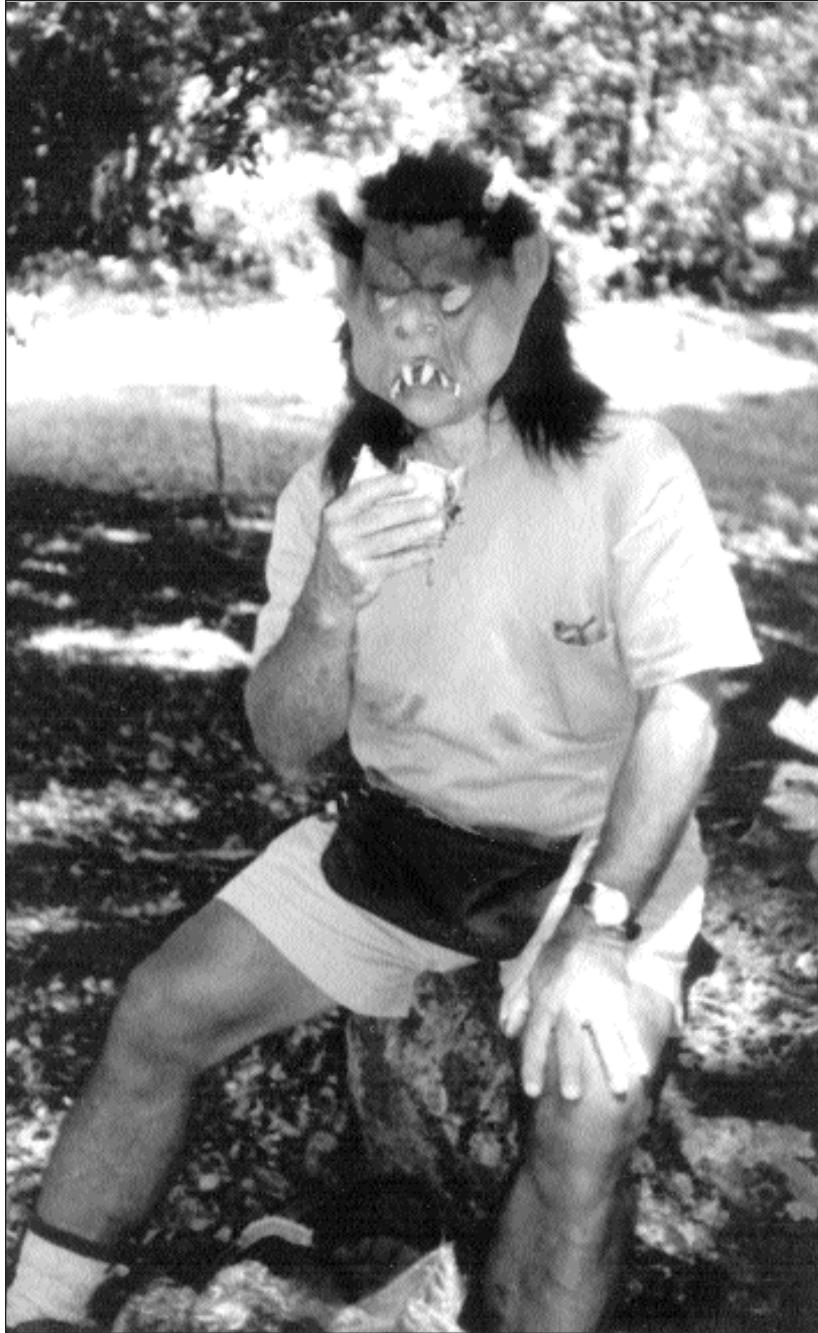
Along these lines, will you explain what is meant by teleology and why it is important to distinguish between the "old teleology" and the "new teleology"?

Teleology is a many-headed term. In general it means "with an end," or sometimes "with a purpose or a goal." By and large, I am not using the term in the sense of conscious purpose. When I say a natural, biological being has got its own *telos*, I'm not saying the plant or the animal is conscious of its own goals. I am saying that plants as well as animals can only be understood in terms of so-called "end states." Each has its own *telos*.

With that said, in "old teleology" one perceives the biological being—the plant or animal—as having its own *telos* in the sense that it has a trajectory of its own, independent of humans, which unfolds from its beginning to its final demise. It is controlled, as Aristotle says, by its own *telos*—how it behaves and at what rate of development it progresses and matures and so on. This I call "immanent/intrinsic teleology," which is distinguished from "imposed/extrinsic" teleology.

By extrinsic teleology I mean what happens to a plant or animal when we humans come along and manipulate the biological being, altering its *telos* so that in the end the plant or animal does what we want it to do. When we genetically engineer a human protein into a cow, for instance, the cow ultimately produces a human protein in its milk, and we are displacing its own immanent *telos*. External teleology is simply the view that biological beings are going to be of use—the grass has instrumental value to the cow, and the cow has instrumental value to us.

Yet one has got to distinguish between these kinds of teleologies and see that external teleology comes after intrinsic/immanent teleology. By this I mean that before the grass can be of use to the cow, the grass itself must carry out its own *telos*. Because the grass has and manifests its own *telos*, it can be of use. Logically speaking, intrinsic teleology precedes external teleology, and that is what Aristotle said.



HANK MEALS

Now, with "new teleology," the whole situation changes. We humans have put extrinsic/imposed teleology at the top of the list in that we are determined to manipulate and control nature, including biological nature, in order to remove or sidestep nature's own *telos* and get it to carry out and embody our own intentions. In other words, we have no respect for intrinsic/immanent teleology.

Will you describe the implications of imposed teleology for evolution, the trajectory of species and natural systems?

Yes. I'm afraid that if we go down this road, which we are in great danger of doing, and simply use radical technologies to transform the natural to become the artefactual, it is the end of natural evolution. That must be the conclusion to which modernity is leading us. Natural evolution involves, for me, not only biological evolution but also natural evolution of nonbiological things. So, for example, in terraformation of planets: At the moment we think there is no water or atmosphere on Mars that would make it habitable for humans, so we will have to use terraformation technologies. Using these technologies to make Mars habitable would interfere with the natural trajectory of Mars as a planet. For all we know, maybe in the course of many millions of years Mars would have water—we just don't know; and we may therefore be stopping its evolution by imposing our will by intention. The same is true, even more so, of biological evolution. The great fear we must have of biotechnology is, of course, that bio-engineered life forms will dominate the natural system and stop natural evolution. *How do you respond to people who argue that human creations*

are in themselves natural, that "evolution" includes our imposition of technology upon natural systems?

One has to remember that the modern theory of natural evolution does not presuppose an end. The idea that we humans are executing natural evolution with our radical and powerful technologies takes us back to the very senses of the word natural, which I am keen to distinguish. Without differentiating the meanings of natural, one can constantly get into confusions and muddles of this kind. In one sense of natural, of course we are natural beings and of course we are part of this so-called natural evolution; but in another very important sense of the term of natural, we are not natural. We are cultural beings. That is why what we would do constitutes cultural evolution. If we allow cultural evolution to run free, it is obviously going to overrun natural evolution and put an end to it.

How do you critique EO Wilson's concept of the confluent rise of technology and biophilia?

As far as I understand E.O. Wilson, it strikes me that he is trying to cling to two things—to have his cake and eat it too. On the one hand, when he is uncritical of modernity, he applauds us getting better and better at our technologies. On the other hand, he also celebrates so-called biophilia. Obviously, to me, biophilia is a very great value to have, although empirically I think he's wrong to say that all of us actually have it. Not many people have this value in my experience. But, as I said in my book, we've got to make a distinction between life as a naturally occurring phenomenon and life which is fabricated. Now, Wilson's fascination with modern technology means that in the end he may approve of any kind of life—he doesn't distinguish between life as natural and life as fabricated artefacts.

This is a great danger. If people fail to appreciate the ontological distinction between the natural and the artefactual, it becomes okay to destroy life because we can fabricate new life. In that sense, it's still life—and we love life, right? That's not the point. Biophilia as a concept should be refined to mean love for naturally occurring life forms, not love for humanly fabricated life forms. So, too, should our concept of biodiversity come to mean not just more and different animals brought to life in a world that is a living, manmade zoo.

Which returns me to the emphasis on the ontological dimension throughout this discussion. Biophilia is a value but it is a mistake to regard it as a value *simpliciter*; one should constantly bear in mind two very different types of contexts in which it may occur. As we have seen, naturally occurring life forms belong to an ontological type different from humanmade life forms, although both are undoubtedly life forms. So if biophilia is considered merely as a value *simpliciter*, there is no loss of value—indeed, there may even be a gain in value in certain contexts if naturally occurring life forms are replaced by humanmade ones. But on the ontological level, the loss of the former would constitute an irreplaceable loss. In such a world, only human beings and their artefacts would exist and prevail.

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Growing up in California, I spent many summers backpacking and rock climbing in the Sierra Nevada. Like most hikers, I kept a stainless steel cup hooked to my belt by its crooked handle so I could dip into a stream whenever I was thirsty. That mountain water, running black and deep or white and frothy, was icy, sweet, and delicious. It never occurred to me then to wonder if the water were safe to drink, but today I would have to wonder. Grazing and erosion have polluted most Sierra streams with giardia, an intestinal parasite. Drinking from these streams will surely make you sick. But it's not the pollution I'm interested in, it's the loss of freedom to experience a world we can call natural, a world in which our deepest instincts and individual lives still count.

Living in or near cities, as most people do, we dwell in increasingly self-referential environments. Streets, buildings, cars, billboards, airplanes, and helicopters—nearly everything around us has been made by humans, and we forget with astonishing ease that the world is, or ever was, otherwise. For several weeks in April, 1997, the Hale Bopp comet was a bright smudge in the western night sky. I was captivated—it appealed to a wordless and primordial place within me—as I crossed the Golden Gate Bridge on my way home. Knowing its visit brief, I felt sharply present. Like a mariner using the constellations, I located myself by it. I also felt related to the ancients who had been awed by it and to those yet to come, who would, if they could, witness its next visit. The comet stood out in a sky that was otherwise opaque, devoid of stars, the depth of dark space replaced by the smear of bright city lights. To look at a sky filled with stars is to be reminded that humans did not create most things—that there are other forces at work—a humbling and inspiring perspective, and one easily lost. As people migrate to cities, and cities engulf wilderness, the experience of looking up into the night sky and seeing stars is becoming extinct.

My grandparents lived in Mexico when I was growing up, and I spent part of every summer with them at

NO SURPRISES: MANUFACTURED REALITY & THE EXTINCTION OF EXPERIENCE

the beaches of Guaymas, Mazatlan, and Acapulco. I loved to sit on the warm sand, lean against a palm tree, and sip coconut milk from a coconut plucked from the shadow of the fronds high above. Today 29 percent of the palms in the world are endangered. But a plant doesn't disappear without wider ramifications—the whole web of relationship within which it exists is affected. That same grandmother loved roses, from the big, blood red, and lustily overripe cabbage roses to the small, fragile, pale pink dog roses on climbing vines. When I went to Russia as a teenager, the only thing she wanted me to bring back was an attar of rose that could only be found there. Since that trip, 14 percent of rose species, with their unique fragrances, have joined the endangered species list. Right now one out of every eight plants on the planet is imperiled—nearly 34,000 plant species at last count—including 14 percent of the cherries, 32 percent of the lilies, and 32 percent of the irises. The experiences that shaped my grandmother's life and character (and through her my own life and character) may be unknown to her great-grandchildren.

These experiences—drinking Sierra stream water, seeing the multitude of stars in the sky, smelling the fragrance of a wild rose—let me know with a cellular certainty that I am part of something greater than myself. Some may say that my attachment to these experiences is vestigial, that we are evolving away from the need for such unmediated experiences in nature. But my interest in these extinct and disappearing experiences is not nostalgia. It is rooted in my concern about how the choices we make as individuals and as a global society are reshaping the world—the actual sensual and conceptual context—in which we live. Perhaps more importantly, I am concerned about who we are, what we are becoming, and what it means to live a human life.

As the global natural environment becomes ever less diverse, global culture becomes ever more homogenized; the diverse, dynamically feral world is being replaced with a samer, tamer, humanly-constructed world. These changes are not simply ones of values and rights that can be adjudicated in courts of law. We must recognize we are redirecting evolution away from a predominantly wild process to one that is predominantly artificial. And, that this redirection carries profound consequences for any developing human consciousness, now and in the future. What will happen to an individual human life and to the human species as a whole without exposure to and participation with a world larger than ourselves?

We have good reason to feel viscerally repulsed by the kinds of experiences rapidly being made for “global villagers.” The global economy systematically reduces the function of human beings to one of spending money via commercial enterprise to support a transnational economic superstructure. This superstructure constricts the boundaries of our experience to serve its own economic purpose. Requiring a constant infusion of capital to survive, it effectively channels all experience into an economic one. Our money is its lifeblood, and we are being programmed to spend. As this happens, human behavior globally becomes more uniform, more predictable, and more marketable. This, of course, is the basis of “branding,” the golden goal of global business. A Starbucks or McDonald’s or Holiday Inn offers the comfort of familiarity, providing essentially the same experience whether we are in Los Angeles, Beijing, Milan, or Hong Kong. When we walk into a Target, a Burger King, or a Banana Republic—no matter where

we are in the world—we are in the “same place,” and we know why we are there, what we expect of others who are there, and what is expected of us. The Holiday Inn Hotel chain understood this early on; their motto was “No Surprises.” Although many people clearly take comfort in this predictability of experience, these manufactured experiences condition an ever deepening acceptance of environments designed to do two things: encourage spending and provide entertainment.

Architect John Jerde specializes in creating environments that generate these programmed and packaged experiences. In assessing his work in the *New York Times*, Las Vegas developer and impresario Steve Wynn boldly asserts that Jerde “is the Bernini of our time. . . . These are the cathedrals of our time.” The “cathedrals” he refers to are Disneyland, the Mall of America, and the Bellagio Hotel Casino in Las Vegas, a total environment developed by Mr. Wynn according to Jerde’s design. Clearly Mr. Wynn is suffering from confusion between two very distinct categories: the spiritual and the commercial. How might we reasonably compare, for example, our experiences of the cathedral and the casino? One arises out of an intention to create a spiritual experience and a monument to God; the other out of an intention to create an entertainment experience within which people will be parted from their money as quickly, mindlessly and in as many ways as possible. Bellagio boasts of its \$1.6 billion budget, \$3 million art collection, 1,800-seat theatre, expensive restaurants, and long list of luxury businesses. In these “cathedrals,” only money is on the altar.

Cathedrals have served as places of respite, succor, and inspiration for believers and non-believers alike. The architecture of a cathedral creates space and opportunity to encounter the unknown; it allows the unpredictable to occur. Every element of a cathedral connects us to those who have come before: the stone tiles underfoot worn smooth by thousands of feet over time, the wood pews with their mellowed patina of age, the myriad candles flickering with the prayers of thousands of people over hundreds of years. Every visitor participates in and contributes to the deepening quality of that experience.

Disneyland, the Mall of America and Bellagio, on the other hand, do not co-evolve with their visitors. Bellagio’s environment will not deepen over time as a result of the people who pass through; indeed, it is expressly designed not to age. Rather than providing an experience of relationship, it reinforces the myth of discrete individuals dwelling in a world made just for them—in large measure that is its appeal. Bellagio’s hotel rooms make visitors feel as if they were the first and only people to inhabit that space. Its newness is carefully controlled and so is the experience it engenders. Bellagio is “just this moment” frozen in time. It doesn’t change—and thus doesn’t allow us to change. For that reason alone, it is particularly pernicious and misleading.

Jerde and Wynn build on another confusion between two distinct categories: the authentic and the artificial. Mr. Jerde asserts that his projects “capture the essence of their environments.” Precisely what environments does he imagine he is capturing? There is a real Bellagio—a small town nestled in the Italian Alps beside Lake Como. Its character arises from a combination of many things: its human-scale buildings and cobblestone streets, its lush gardens, a feeling of its existence over time, and perhaps most importantly the nat-

as the clouds drifted overhead and their reflections drifted on the water against the slow pull of the current, and how I dreamed of her and that moment long after I'd moved away, irreducible dream-joy of being mammal heat in a cloud sandwich, and waking to a personal truth that love is never lost.

Ah, but I'm getting carried away, far away from Poe's pajamas, and swung around to oppose his raven's "Nevermore." But getting carried over or across, meaning to meaning, association to association, is exactly the nature of metaphor, and once the constellation of associations begins to precipitate, getting carried away seems merely a matter of course, especially when the mediating agent is the imagination and its powerful confluence of sensation, thought, feeling, soul, memory, and dream.

The raven dreams you have come to lick the blood from its eyes so it can see the clouds again.

No matter how it moves, metaphor is meant to excite the imagination, refresh the senses, enlarge our notion of possibility, put us literally in our place.

12 As I was writing this—longhand by propane light on an 8 1/2 x 11 college-ruled tablet—a tiny bug, half the size of a matchhead, entered the lower right hand of the page and began running up the sheet. Because the lines on the page reminded me of the yard lines on a football field, I started announcing, "He's to the 15, the 20, cuts to his left then bolts upfield, to the 30, 35, he's in the open now, crosses the 50"—and then the bug encountered the last line I'd written, stopped instantly at the word "possibility" and appeared to examine it closely, tracing the letter 'b' with its antennae, sniffed the blue ink; then, apparently assured the markings posed no threat, the bug put it back in boogie and continued full-speed to the end zone at the top of the page—"Touchdown, Bugs!"—then off the tablet and vanished on the paper-strewn desk.

The bug was not a metaphor, though stopping at the word "possibility" might be construed as a metaphorical act, a symbolic confirmation from the insect realm that "possibility" posed no danger. Of course, it might have felt differently if it had run into "Poe's pajamas" on the 50 yard line.

From the same domain, regard these two pro football scouting reports on a wide receiver as another illustration of the difference between figures and the figurative, quantitative measurement and qualitative claim:

Figures: Runs the 40-yard dash in 4.25 seconds; will go over the middle and holds onto the ball against hard hits; has not dropped a pass he touched with both hands in 238 attempts.

Figurative: Faster than half the cars in the stadium parking lot; more guts than a slaughter-house; can catch a BB between his teeth in a dark room.

Or from a related domain, golfer Lee Travino described the poverty he grew up with: "We were so poor, had so little to eat, that when Mom threw a bone to the dog, he had to call for a fair-catch."



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13 Facing the Figurative

Faces in the Metro Station:

Petals on a wet, black bough.

—Ezra Pound

His smile was like a cold toilet seat.

—Silas Goldean

His eyes are steelies that never lose.

—Thomas Pynchon

Her eyes had seen too many changes that hadn't changed anything.

—Ross McDonald

(describing a middle-aged cocktail waitress)

The touch of a blind man feeling the face of a darling child.

—Samuel Taylor

Coleridge (on the requirement for a great poet)

14 Besides multiplying the possibilities of perception, thus grabbing some traction on new angles of inquiry, and besides offering another mode of expression, metaphor further serves to remind us that it's our ass in association, our skull that's the alchemical crucible, for its eminently arguable that the hu-

man psyche is no more than the sum of its associations, that consciousness is merely the aggregate of the connections composing it in precisely the way an ecosystem is the totality of its interdependencies. This sum of constitutive associations we call a "self" begins with perhaps the most complex coupling of all: the double helix of nucleic acids that determine, to varying degrees, the color of our eyes, the shape of our smile, lung capacity, proclivities and susceptibilities for certain maladies, our potential intelligence, and an encoded blueprint to the carbon-based containers we call our bodies, which house us—and occasionally help or hose us—as part of our adventure in consciousness. When we enter the world, we grow by making connexions, primarily with food—we are what we eat. When we feed our head with metaphors, we become the connections we make, become the point of connection itself, like a jewel in Indra's net where each gem equally reflects and is reflected by every other—that's the metaphor anyway, if in fact most of the action is interstitial, and the process itself so wildly dynamic that nobody can grasp its complexity, leading to conditions easily mistaken for confusion or even chaos.

Although metaphor helps us make sense of our lives, its highest accomplishment may be the endless revelation that one's "self" is not something separate and apart, but rather is enmeshed in the weave and wealth of associations—every gene, every story we've ever heard, every bead of sweat, every dream—and our identities dissolve into the life composing them, become another particle in the river of light, and while each particle is unique, such individuality is negligible in the stream of things. As Bateson and others have pointed out, a creature simultaneously desires the assertion of its unique self and its integration into something greater. Metaphor blurs those boundaries.

15 Although I've gone on about the power and glory of the figurative, I don't want to leave the impression that the literal is, somehow, inferior. Metaphor may merge meanings and change our psychic relationship with the real, but the real isn't really altered. Good thing, too, because it's needed both as the point of departure and the anchor for our flights of fancy. Nor is one modality or state better than the other; rather, both have their pleasures, as do the multiple points where they interpenetrate. Individual humans may lose touch with reality—sometimes usefully—but the real never loses touch with itself. As Wallace Stevens put it:

"The plum survives its poems. It may hang
In the sunshine placidly, colored by ground
Obliquities of those who pass beneath,
Harlequined and mazily dewed and mauved
In bloom. Yet it survives in its own form,
Beyond these changes, good, fat, gizzly fruit."

~ • ~



-Basho

8 A GOOD FASTBALL

He has a good fastball.
His fastball has been clocked on the radar gun at 101.2 mph.
He's got a blazing fastball.
He throws heat.
He throws smoke.
His fastball, because it is traveling so fast, appears smaller to the batter, thus more difficult to hit.
His fastball is so fast it looks the size of a dime coming at you.
He throws dimes.
He throws aspirin tablets.
His fastball leaves batters swinging at its vapor trail.
He can throw his fastball through a car wash and not get it wet.

9. EMBEDDED METAPHOR

In 1996 I was lecturing on embedded metaphor to a writing class on a warm spring afternoon. I had just noted that in our culture temperature is such a common vehicle for mood, temperament, sexuality, and a hundred other tenors that most people don't even recognize its use is nearly always figurative. Just then—my students would immediately accuse me of staging this amazing moment of synchrony—two women walking past in the hall outside our open classroom door had their private conversation drift to our ears during one of my note-fumbling pauses:

First woman: "I mean, don't you think Rodney is, you know, just totally *hot*?"

Second woman: "Yeah, all the girls on my floor think he's way cool."

And, magically, we all understood what they meant.

Since most humans have agreed on basic directions, we often use them metaphorically to indicate position,

mood, and general state of mind:

Man, I'm feeling so high my nose is bleeding.
Got so high I could hunt ducks with rake.

Or someone's feeling down, low, so low you had to build a hut to keep the ants from pissing on you; lower than whale shit on the ocean floor; so low you could sit on the bottom and dangle your legs; so utterly low you could reach up and touch bottom.

10 While you can make metaphors of any tenor and vehicle you choose, with love being anything from axing the aardvark to the keys to the zoo, the natural world has essentially constituted the body of metaphor since the Paleolithic. As noted earlier, for a metaphor to connect, listeners must be familiar with the vehicle and, the speaker hopes, possess an understanding earned through direct sensory experience, further refined through conversations or books. Our planetary elements and their cycles, along with the larger figures of regulation like gravity and solar income, are common to all inhabitants, the closest we get to universal particulars. Whatever your language or locale, you've probably tasted salt, seen the moon, felt the wind, and experienced gravity by leaping and falling; however, while many folks may be familiar with take-and-bake pizza, speed dial, hang gliding, and frosted globes, a speaker or writer cannot depend on everyone's familiarity with those objects or activities, nor necessarily create a context that makes them apprehensible.

Because our own bodies, along with their drives and satisfactions, are extensions of the earth, they also serve as universal particulars, a common source in which we can anchor metaphors with the reliable expectation that they will be understood. Similarly, nearly every human's daily experience includes encounters with other sentient beings—animals, plants, and perhaps other beings who, in our provincialism, we still count among the inanimate. (Who can say with certainty that the stars aren't signaling each other with solar flares, or stones communicating through subtle shifts in electromagnetic fields?) Again, the point is elemental: the more common the metaphorical vehicle, the greater the likelihood it will be carried over, borne across that space between beings, that we will 'get' it, connect, understand, and then integrate that

understanding with others toward something approaching wisdom.

Poetry has been lightheartedly defined as that which is lost in translation, and in the sense that all communication must be translated, even if sent in the same language, much gets lost along the way. That's why I would argue the best poetry—"best" in the sense of most complete translation—is always bioregional. If I transmute that claim into the figurative, and say "the best metaphors are as clear as the Smith in July," a reader may grasp that I'm referring, first of all, to a river in the Cascadian bioregion, and secondly to its seasonal water quality—a figure that may be completely lost on you if you live in Istanbul, vaguely grasped if you make your home in Seattle, or deeply understood if you've actually stood on the Smith's banks in July and counted the legs on caddis larvae through fifteen feet of water, in which case the image's power is given greater focus and force through its congruence with your direct experience. The same is true if I liken a vein of color in a stone to the shimmering bronze of a California valley quail's breast feathers, which is different than the color on a mountain quail's breast, or a scaled quail. If you've never seen a California valley quail but have seen a "shimmering bronze"—maybe on the tail of a trogon—you'll still grasp the metaphor, but not with the same resonant presence that accrues to those who've held the bird in hand, or watched a covey feed in their orchard that morning. To the degree that poetry derives from place, its best readers are those who share the source, who draw their sustenance from the same body and therefore embody the domain, including its psychic dimensions. Landscape probably influences mindscape much more than we think.

11 While metaphor can move from abstraction to abstraction, or from one thing to another, metaphor generally arcs from the abstract to the real, from poof to palpable. But whatever the flow, one of the great pleasures of metaphor, the beer and hot-dogs of the true fans of the figurative, is that the connexion between tenor and vehicle is reflexive—that is, once the connexion is established in the psyche, you can move just as easily from vehicle to tenor. When love is a bird, and the bird is a raven, when you see or hear a raven you may associate it with love>spouse>sporting in the new mown hay your first year of marriage that late spring afternoon after raking the fresh cut alfalfa into windrows and laughing that if you languished much longer your entwined bodies might be baled together until some farmer snipped the wire to feed his Holsteins and found you there in skeletal embrace as the bale flaked open just as a raven cried from its perch on a wind vane atop the barn. Put simply, once the love/bird connection sticks, when you're feeling love you may think of birds and when you see a bird you may feel love.

Or consider this sublimely goofy simile from Tom Robbins, one of the modern masters of the figurative: "The clouds looked like Edgar Allan Poe's rumpled pajamas." For whatever reasons—though I suspect foremost the sheer delight of imagining Poe in pj's—I never see a certain sort of frayed and tousled cumulus formation without thinking of Edgar Allan Poe's pajamas rumpled on the floor as he prepared that morning's opium, and thinking about Poe I remember his raven—one of the first memorable images in American English poetry—and its implacable "Nevermore,"" love lost forever, and I remember Terri Corchran, my first love, impossibly rich brown eyes, making out with her along the river

ural beauty and setting of its Mediterranean environment. Bellagio, Italy, arose as an environmentally appropriate and culturally authentic expression directly related to place. Bellagio, Las Vegas, Mr. Jerde's bogus replication, is completely artificial. Jerde has (in part) captured the form of Bellagio, Italy, but not its essence.

Only vast wealth and modern technology allow the Bellagio Hotel Casino to exist in its real environment, the eastern Mojave Desert where Las Vegas is located. The Bellagio Hotel Casino exists in spite of its natural context, it does not arise out of it. Like Bellagio, Italy, Bellagio, Las Vegas, is also "nestled" next to a lake. But this one came into existence at the expense of 11 acres of sand and plants and myriad creatures in a place where water is scarce and lakes are ecologically antithetical. In its indoor botanical "experience," Bellagio, Las Vegas, replicates the seasons with four different scenes—summer, fall, winter, and spring. "Every 90 days we change for the season and then in each of the four seasons the blooms last for 30 days. . . . We can make a season change in 18 hours—three nights, six hours a night. . . . In the spring, we've got full size cherry trees—like in Washington." But not like in Nevada—cherry trees do not typically grow in Nevada. And not like in the natural world, where things do not spring into being fully grown, but are born and grow and wither and die. There is no birth in Bellagio, Las Vegas, and no death. At the Bellagio Hotel Casino everything exists always and only in its fullest, most beauteous moment, sustaining the illusion, the insidious delusion, that such an existence is real.

Jerde comprehends the power of the natural environment. His goal is "to imbue commercial, modern environments with a sense of the organic, of having accrued over time." Nature as design element. Bellagio reflects this understanding, which Wynn shares. An article in *Vanity Fair* reports the following exchange between Wynn and his associate, Sandy Gallin:

"Steve, am I right in saying that the difference between this hotel and the other hotels in Las Vegas," asks Gallin, "is that everything here is real?"
"Everything," says Wynn.
"Real plants," says Gallin.
"Yes, and real limestone," says Wynn.
"Real tile," says Gallin.
"Not the look of," concludes Wynn. "Now what's not real is this rock wall on the side of the driveway . . . that's FGRC. Fiberglass-reinforced concrete."

But it looks real.

Wynn's reality is all illusion, and because he can differentiate between fiberglass-reinforced concrete and real rock, he believes he still knows the difference. Like a movie set, everything about the Bellagio Hotel Casino is real except the place itself. As architectural historian Ada Louise Huxtable notes in her book *The Unreal America: Architecture and Illusion*: "What concerns me. . . is the American state of mind, in which illusion is preferred over reality to the point where the replica is accepted as genuine and the simulacrum replaces the source. Surrogate experience and surrogate environments have become the American way of life."

Distinctions are no longer made, or deemed necessary, between the real and the false; the edge usually goes to the latter, as an improved version with defects corrected—accessible and user-friendly—although the resonance of history and art in the authentic artifact is conspicuously lacking." Like Huxtable, I agree that



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these manufactured contexts are "impoverished versions of the real thing" and that as they proliferate, our powers of discernment and discrimination atrophy.

Bellagio is the architectural equivalent of transgenic technology. The gardens, the architecture, the lake—everything about the Bellagio Hotel Casino is invasive of the indigenous natural environment. The lake and the botanical garden exist as discrete, unrelated objects; they do not function as ecosystems. They are robbed of meaningful purpose beyond providing observers with amusement and gratification. Reconstructing the environment to serve these ends reinforces the view that the natural world exists solely for our entertainment. Manufactured contexts like Bellagio sever people from direct experience of the natural world where they actually live and are thus slyly dislocating and confusing. As systems become objects in the service of consumerism and commerce, we, too, are affected. No longer participants in an evolving process, we are merely observers, watching the movie. Having lost our bearings, we succumb to the mediated, manipulated experience leading us where the designer wants us to go.

Mr. Jerde's self-described "experiential" architecture transforms experience from a verb into a noun. In turning Bellagio into what Wynn calls "a sort of universal symbol for the good life, of a place to get away," (*Vanity Fair*), he robs Bellagio, Italy, of its particularity. It becomes fungible; place becomes brand. Before Bellagio, Jerde redesigned Fremont Street, Las Vegas's downtown main street, into the "Fremont Street Experience," a covered "destination." The Fremont Street Experience is a thing, not a place. The Fremont Street Experience is something that you are definitely going to have if you go there; everybody who goes there is going to have it—you can count on it. It can be described before you have it and you can describe it to someone after we had it in precisely the same way. The experience and our behavior within it are completely predictable. Experience becomes quantitative, rather than qualitative—a thing to collect. And the collection, of course, costs money. When it is over we will buy the

T-shirt or the mouse ears.

In giving it a name, the unfolding mystery of any experience is diminished. But mystery is something for which Jerde and his peers have little regard. They reinforce the deep and disturbing belief held by many Americans that we live suspended between the poles of boredom and stimulation and that a context of entertainment must be manufactured to give us something to do. This assumption supports Jerde's motivating concept that "the consumption addiction is what will bring people out and together." As in Bellagio and The Fremont Street Experience, the value of experience is reduced to distraction, divertissement, rather than the opportunity to discover what it means to be human in a particular and unique place at a particular and unique time.

I recognize that Bellagio, the Fremont Street Experience, and Disneyland are vacation spots, places where we go to escape. And I confess that I, too, like to buy beautiful objects. I like to be entertained. I love to gamble. But I know that these diversions are not the purpose of my life. I know that "essence" is unlikely to be revealed to me at the Bellagio Hotel. If Bellagio were an isolated example, maybe it wouldn't matter. The problem is that Bellagio and its variations are fast becoming the dominant context—for some the primary world they know. And if Jerde has his way, such places could be the only world we know: As it turns out, Jerde's Las Vegas projects are "small-fry compared to his Big Idea: the remaking of cities with entertainment as the core." Mr. Jerde has projects underway in Kansas City, Missouri, and Salt Lake City, real "lulus," necessary in these cities, Mr. Jerde believes, "because they are the ones with the least to do."

These manufactured environments are invading our homes as well. "Americans are Being Branded Where They Sit." headlines a *New York Times* article (10/8/98) describing the trend in home furnishings toward "branding. . . attaching a name or trademark to a product

to give it an aura of value and a sales hook." The Cole Porter Memories collection offers reproductions of zebra cloth chairs from Porter's Paris apartment at \$1900 a chair and a \$142,000 replica of the Steinway he played at the Waldorf Astoria. There is also an Ernest Hemingway brand. Brands under review include Marilyn Monroe, Amelia Earhart, and Greta Garbo. The F. Scott Fitzgerald branding would offer "a line that would be a mix-from Art Deco to Ivy League... *The Great Gatsby* is America's favorite novel—and there's going to be a made-for-television movie next year." In a world of increasing corporate concentration, it is likely that the company that manufactures the furniture also owns the network that broadcasts the movie (which becomes a 90-minute advertisement for the furniture) as well as the corporation that publishes the book. As the natural environment gives way to the manufactured one, our reality is increasingly based on a self-referential feedback loop from which there is no escape.

If our environment shapes us, who do we become when we purchase the living room context of someone else? What is it that we are buying? The ethos and aura of a person other than who we are? A context other than our own? Are we to accept that by partially and imperfectly inhabiting a xeroxed copy of a room, by sitting in the counterfeit furniture of a celebrity, the experience of that celebrity (which itself is an artificial narrative manufactured by the media) will become our own? That our own original "inferior self" will morph into another and that we will be redefined into something better? The implication is that our individual lives, the ones that we are actually leading, are empty of value—just not good enough. But we are led to believe that we can remedy this void if we fill our lives with the flotsam and jetsam of lives of established value by buying things, by joining a brand club.

Although blurring the boundaries between oneself and Ernest Hemingway by purchasing replicas of his living room furniture may seem trivial, the implications of this kind of boundary confusion and violation are profound. At every turn we are being conditioned to accept this. Genetic engineering of plants and animals falls into the same category. Such boundary violations threaten the very conditions necessary for a thing to be itself: a strawberry, a flounder, a pig, a functioning ecosystem. A human. The permeable boundaries that define a thing—whether a gene or an ecosystem, are violated under the delusion that the consequences of our actions can be completely known and are completely predictable. No Surprises. But nature rarely works that way; it surprises us all the time.

"Symbols like brands have become a part of reality, a halo," says Dr. Richard Shweder, a cultural anthropologist at the University of Chicago, in the same *New York Times* article on branding. "In India, where I work," Dr. Shweder continues, "people believe water from the Ganges has a potent positive power." But this is hardly an apt analogy. The Ganges is not a generic brand—it is unique and its power is connected to the experience it evokes. To experience the Ganges in Varanasi or to hold a vial of its water is not to flatten life into a coun-



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terfeit reproduction of the experience of another; the experience of the Ganges is the experience of all life. The Ganges and its water are embedded in the natural environment—the Ganges derives its cultural significance from that fact. Ganges water comes from the mountains and flows to the sea: a drop of that water connects and contains them both. Its source in the Himalayas is part of its power and mythos. It is not about creating artificial, one-step-removed experience; it induces a wholly different kind of experience—the kind that expands rather than reduces what it means to be human.

Dr. Shweder's analogy minimizes the significance of the Ganges just as a John Jerde "Ganges Experience" would. The evolving experience of real life and real death would be replaced with a sanitized tableau of a pristine river. Fragrant flowers would replace the mingling smells of smoke and incense and the stench of rotting cow and dog carcasses floating by. Beautiful women in bright saris would obliterate the men and boys squatting as their hair is shorn to prepare them to tend to their fathers' cremation. Visitors would float in brand new boats with comfortable seats and hot chai rather than rickety wooden vessels rowed by toothless old men. We would emerge from the experience entertained but not more keenly aware of the brevity of our own lives and inevitability of death, or any more connected to the world in which we live, or with any deeper understanding of our kinship with people who live in another place on the other side of the earth. We would not be challenged to consider the meaning and purpose of our short, precious existence.

But the designers of our future are looking to shield us from such challenging and distasteful matters

through an even deeper invasion of our boundaries. Michael Saylor, CEO of the multibillion-dollar company MicroStrategy, is one of these designers, and he is counting on nanotechnology to make possible the implantation of devices that can predict our every experience and control our every move. He was profiled by Larissa MacFarquhar in *The New Yorker* (April 3, 2000): In the long term, Saylor envisions a world in which everyone will have a tiny device implanted in his [sic.] ear that will whisper advice to him as he needs it. If a crime is taking place near him (the device will know where he is), the voice in his ear will warn him. If he is on the way to the hospital, the voice will inform him of the success rate of each of its doctors. Saylor imagines that his customer of the future will travel through a world in which guess-work—and the inefficiencies and risk that accompany it—has been eliminated. He will save himself time and money and thus, as Saylor likes to think of it, life. No surprises.

Saylor's is a risk-free, solipsistic world, a world without relationship. A completely controlled and managed environment. It is a world without the unpleasantness of the unexpected, but also missing the delight of serendipity. In Saylor's world the unpredictable path of curiosity, the path of our own personal development and evolution, surrenders to the stagnant, but more comfortable path of undeviating certainty.

The article continues, "Saylor sees his services as insurance against unpleasant surprises. 'What are you afraid of? I'm afraid of missing my plane. I'm afraid I'll be outside when there's a crime in my neighborhood.'" In Saylor's fear-based life, he doesn't concern himself with helping the victim or discovering who is committing the crime or why. He just wants to make sure that he is not in that unpredictable "outside" place when it happens. And he wants to make sure that those of us who have not yet cultivated these fears do so: "Even if you're not afraid of these things, the beauty is, with proper marketing, we can make you afraid."

If Jerde, Wynn and Saylor prevail, we will soon find ourselves with a cacophony of voices in our head telling us what to do as we sit in our living rooms pretending to be someone else, like Jay Gatsby, who never existed in the first place. Or, we will be roaming the seasonally perfect gardens of Bellagio smelling cherry blossoms in the eastern Mojave. Or, we will be living in a world defined by anxiety and the tools manufactured for its relief. It is not an appealing world to me. This insulation from suffering and unpleasant experience comes at too high a price. I need—as I believe all humans do—to risk and cope with the particulars of all that is unknown. If we cannot take in the shock of icy Sierra water, an infinity of stars, or the fragrance of a wild rose, and if we cannot lose and find ourselves in the face of terror, how can any of us claim to be living our own brief life?

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Like all liquids,
it is sister to chaos and time:
wanting always
to lose itself in another,
visible only when held in embrace.

It is also like the auroch
of ancient Europe,
reentering the world with reluctance—
at the threshold, marks of the scoring horns,
their curls tip-blots, and scratchings

Some of its substances:

Carbon of lampblack.
Lapis well-powdered.
Rust flakes milled fine.

Certain inks grip their surface,
others soak in.
Still others, like potters' glazes,
require baking—
the paper arrives warm then with its words,
a fresh bread seeded with poppies.

The tulip magnolia
writes first in white ink, then in green.
Each new twig blossoms as ink to the reading mind.

As with the squid's dark cloud
or the writings on certain moth-wings,
some inks are meant to disguise—
the eye of the hawk stares fiercely,
but where is the hawk?

Some glossy, brilliant, expounding,
others darkly impenetrable as sleep,
all consist of pigment, binder, and carrier.

Each part must be compatible with the others.
And so the glueing binder—
shellac, gum arabic, plastic, or resin—
must enter seamlessly
into the carrier's solvent.
In this ink is like a metaphor well-made.

And like metaphor,
good ink has also its fragrance:
some smell of earth,
others are heady with spirits.

In itself ink is carrier, solvent,
and pigment to thought:
thought, entering ink,
equally transports, rushes, and stays.

Alcohol-based, oil-based, or water,
all inks must eventually dry,
releasing their words from the verb-tense
of present-resilient to that of perfected past,

They settle weightless, meaningful as dust.

Until the reader—
an aromatic organic carrier
not unlike any other,
not unlike, say, fresh turpentine meeting old varnish—
re-dissolves them,
adds back the moistened eye, the moistened mind

Then the drying and non-drying oils—
petroleum, soya—
unfasten their chemical binding.
The script-melisma unscrolls in the listening ear.

And again the impossible
happens with such ease it is almost unnoticed:

A radish once dipped
in salt and eaten is eaten once more.
A mountain walks in and out of its quantum fog.
A woman of ancient China paints on her eyebrows.

Then each grain of that salt
passes again through the world-gate,
returned to the black gates of ink, which silently close.

~ • ~

resonance, which assumes the listener has sufficient knowledge and understanding to recognize, sustain, and deepen the metaphor. Writers and speakers can immensely help their audience by providing context for the metaphor; according to studies in cognitive psychology, people can recognize figurative language as quickly as the literal, given sufficient context—that is, by setting-up images carefully, or by providing juxtapositions that almost force you to jump through their hoops. However, whatever their tail color, I know less than jack-squat about trogons. But I've observed ravens most of my life, and if you tell me love is a broken-winged raven hunched in the shadowed corner of your basement, a grain of scarlet ice melting under his tongue, I have a good sense what you're saying.

Four or five pennies
in the poor box:
evening rain.

—Issa

The lights are going out
in the doll shops—
spring rain.

--Buson

The hollyhocks
lean toward the sun
in the May rain.

7. THREE MASTERS, ALL WET

whip for that light S&M its mate enjoys. But reading on to find out more about the bird, I learn the poorwill is 'known for its night-cries in the arid hills.' Now we're getting somewhere.]

coppery-tailed trogon. [More on the trogon later.]

pileated woodpecker. [Indigenous to the northcoast and among my favorite birds—it's the model for Woody Woodpecker. If you've ever heard the call of a pileated woodpecker, you'll understand the spectacular goofiness that commonly accompanies falling in love. But I fear the pileated woodpecker is too allied with Woody to escape the distorting cartoonish connotations; there are, after all, important differences between spectacularly goofy and downright dumb.]

raven. [Brilliantly black, prominent in Native American story and mythology, the raven flies by alternately flapping and gliding, and is able to articulate an astonishing range of sounds, from caws to sharp clicks. In many mythologies the raven serves as a messenger between the living and the dead. If one lands on your window casement and starts quothing "Nevermore," just think of yourself as a participant in an archetypal exchange. Or, if you prefer, haul ass.]

yellow-rumped warbler. [I don't know about the yellow rump, but love for sure will make you warble.]

ruddy turnstone. [A squat, robust, orange-legged shore bird]

mute swan. ["Nuff said.]

Lucifer hummingbird [My first take was to change it slightly: "Love is Lucifer's hummingbird." Not only are such changes permitted, but the imaginative permissions, the fields of play, are endless: no law, no limit, no quarter, and no guarantees.]

nighthawk. [In one of the most splendid moments of my life, my seven year-old son and I, out or our daily evening walk in the Klamath Mountains, stopped to see if we could hit an old fir snag with some rocks, and thus occupied, we had a nighthawk swoop so close between us that its wingtip grazed my son's hair and I caught a whiff of the bird's fragrance—a honey musk, like the ground hive, torn up by a bear, that I'd found a few weeks earlier.]

I mention my own connexions and their personal connotations only to demonstrate that they're probably different than yours. For me, the love > nighthawk association is conditioned so deeply by my real experience that it's inextricably allied with particular feelings I possess for my son. The trinity intersection of memory, imagination, and dream is different for each of us, and we don't all know the same things the same way; yet, as metaphor proves, we hold enough in common—language; the structure and pattern of our nervous systems; a sensuous world of phenomena elementary to us all (sunlight, food, rain, other animals and plants)—that we manage to connect, often solidly, if seldom exactly.

And sometimes we draw blanks. For instance, I've never seen a coppery-tailed trogon, but I do know they are included in *Petersen's*; they appear to occupy about 80 acres of southern Arizona, evidently the northernmost range of this tropical fruitivore, and I know what they generally look like because I saw their picture in the book. Before reading about the bird, I might have guessed that a coppery-tailed trogon was a lizard. That doesn't necessarily make it a bad metaphorical vehicle,



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1 Metaphor, arguably the flower of figurative language, has its roots in the Greek: *meta*—across; *pherin*—to bear or to carry: to bear or carry something across. Specifically metaphor carries the meaning of one word into that of another. Love > bird. Metaphor (here used loosely for the entire figurative family, but especially for its close kin—image, simile, and symbol) is, at its core, an act of association, a connexion, the creation of a reciprocal equivalency, a psychic simultaneity, a voluntary incarnation, an alchemical marriage.

Webster's *New Twentieth Century Dictionary* defines metaphor accurately, if blandly, as "a figure of speech in which one thing is likened to another."

The *Princeton Encyclopedia of Poetry and Poetics* defines metaphor more precisely and more poetically, yet still mashes the miraculous marriage into a condensed verbal relationship... to enhance vividness, complexity, breadth of implication, and often used for adornment, liveliness, elucidation, or agreeable mystification."

Love is a bird.

2 Like most figurative constructions, metaphor often moves from the abstract to the concrete. To employ our crude model, 'love' is a word/name attached to a wide and wildly dynamic range of powerful and exquisitely nuanced feelings, and like most emotions they resist glib description. Adding categorical adjectives only narrows the abstraction: maternal love, sexual love, brotherly love, unrequited love (which, by the way, doesn't merely mean love that isn't returned, but here's the killer—love that isn't returned in measure or in kind: not loved equally, or in the same way). The movement of metaphor, like that of poetry itself, tends toward the real.

In the rhetoric of metaphor, the abstract, ineffable feeling one is trying to express, or the thing one is trying to describe, is called the tenor (love, in our example), while that which carries or bears it across into the real, sensory realm is called, aptly enough, the *vehicle* (the bird).

Here's an annotated visual aid:

TENOR	VEHICLE
abstract >>>>>>	concrete
ineffable >>>>>	embodied

THE BODY OF METAPHOR:

15 PROPOSITIONS ABOUT THE MECHANICS, MAGIC, AND MEANING OF FIGURATIVE LANGUAGE

subjective >>>>> objective
(Eliot's objective correlative)
idea/feeling >>>>> thing
(Williams' No ideas but in things)
interior force >>>>> exterior density
private >>>>>> shared
closed >>>>>>> open
unconscious >>>>> conscious

Love is a bird, and the poet is a bird dog.

3 Aristotle, the first commentator on metaphor, called it the "art of the likely impossible." He considered figurative language the "prerogative of poets and politicians" but "too misleading for philosophers and scientists." Put bluntly, metaphor is the province of practiced liars.

Metaphor clearly is not a vehicle of reason; the freight it carries is hauled from the heart and soul. Reason requires a logic of agreed upon meanings, while metaphor depends upon acts of intuition and imagination—and the imagination, according to Kenneth Rexroth, is the organ of communion. Unlike reason's logic of "fixed" meaning, meaning in metaphor is always emergent and dynamic, shaped through the accuracy and resonance of the association, the power of the connexion, the strength of the marriage. Finally, metaphors come from that centerless generative source that Yeats called Byzantium, where "flames begotten of flame/. . . and blood-begotten spirits come," a place where "Those images that yet/Fresh images beget,/That dolphin-torn, that gong-tormented sea." A place where love can be a bird.

4 Like most couplings, metaphor is innately creative and decidedly erotic, and thus earned the particular vitriol of our Puritan forbearers whose hatred of anything bodily—besides hard labor—did not favorably dispose them toward the imaginative embodiments of figurative language. To the Puritans, imagination was the Devil's Playground, for idle hands make idle minds, and the next thing you know you're rolling in your sweet baby's arms, for imagination is not only inventively sinful, it makes sin immeasurably more pleasurable. Given our Puritan progenitors' view of the flesh as a constant temptation for a transcendent soul, they considered embodied meaning a threat to the nebulous abstraction of God, and not surprisingly regarded metaphor—archetypal agent of embodiment—as frivolous and decorative at best, and decadently dangerous in its finer expressions. The Puritan view only prevailed to the early 1900s, coincidentally about the time American women were deemed worthy of the right to vote.

Love is a bird.

According to my wife and her female friends, the great mistake that young women make is their beautiful, if arrogant, delusion that the power of their love will change him.

So just to illustrate the exception that the vehicle can be abstract, love is also, if Mencken was right, "the triumph of imagination over intelligence."

5 Metaphor and other figurative language is necessary because the lexical (dictionary) definitions of love are simply inadequate to communicate the

heart/spirit experience, which my dictionary defines as "a strong, usually passionate, affection for, or an attachment and devotion to, a person of the opposite sex," (and though constantly assured there's no cultural bias against gays and lesbians, let's change that "opposite sex" to "another person"). Although this definition constitutes the denotative meaning of sexual love, it doesn't even come close to expressing the swirl of feelings attending love, much less its tastes and textures, fragrances, colors, shapes, and sounds. So to communicate what we're talking about when we're talking about love, our brains wisely seek something comparable, something equivalent or corresponding, to something similar and familiar, and then liken love to that. The mechanics of metaphor are so simple we hardly recognize what we're doing: we liken one thing to another, and if the tenor is an abstraction, we liken it to something in the real, sensuous world, something most listeners will hopefully recognize, for if our listeners don't know the vehicle, meaning is lost. Most people, for example, have seen a bird and attach common collateral cultural associations: flight; nest; eggs; softness; song; color—and those images fresh images beget: freedom; fertility; security; cuddling; and so on. This joining, with all its secondary ripples and trills of associations, is the real magic the mind makes in the presence of metaphor. And because metaphor seeks to embody, it tends to manifest. When you fall in love, you feel so much more than a strong, usually passionate, affection for, or an attachment and devotion to, another person that the definition seems pathetically silly. Falling in love is more like flying in love—your heart flies away, soars, loop-da-loops, pauses and trembles, sings with the sunrise, aches. Love is a becoming of bird. Becomes bird. Is bird-like. Bird love. Love bird. Love is a bird.

6 Of course, "love is a bird" is the crudest metaphor imaginable, one that even beginning poets would eschew, for the true power of metaphor resides in specificity, in making lucid, resonant connexions to the real.

"The art of the likely impossible" is most artful when the correspondence is both widely familiar and surpassingly exact.

For such reasons, obviously not all vehicles are equal.

To illustrate the point, I offer ten avian vehicles for the tenor of love, selected by matching randomly generated numbers to corresponding pages in *Petersen's Field Guide to Western Birds*, just like a real science experiment. While the resulting metaphors speak for themselves, I've appended occasional comments to illustrate some points about the nature of metaphorical embodiment, or metaphor's embodiment of nature.

LOVE IS A...

goatsucker. [The goatsucker is a member of the nightjar family, and whatever the origins or accuracy of its name, the conjured images seem inimical to the spirit of love—granting, of course, that sometimes love sucks, and that one can easily discern a certain goatishness among adolescent and mid-life males.]

poorwill. [So poor, evidently, it couldn't afford a

AN INTERVIEW FRANCISCO VARELA

Without the possibility of sensorimotor coupling activity in the world, our cognitive systems would in a very important sense become solipsistic ghosts. Which brings us precisely to the idea that cognitive structures are in fact the substance of experience. And that, furthermore, it is only this substance of experience that motivates—and also constrains—our conceptual understanding and rational thought."

Casey Walker: In Ethical Know-How: Action, Wisdom, and Cognition you write, "Ethics is closer to wisdom than to reason, closer to understanding what is good than to correctly adjudicating particular situations." Will you describe the difference in ethical expertise between wisdom as "know-how" and reason as "know-what," and how that difference is critical to evaluating engineering technologies?

Francisco Varela: The distinction between knowing how and knowing what is both ancient and new. It is ancient as it comes through two traditions in philosophy—one being Aristotelian practice, or *praxis*, and the other being Platonic ideals, or *theoria*. These traditions land us in the 20th and 21st centuries in a funny position, if you want, between the theoretical capacity to manipulate—to act on the world with some idea or conceptual pre-assumption—and the capacity to act in the world with attention to being, with knowing how to be or "being there" as the basic condition of life. Being there is precisely the Aristotelian tradition, which means turning our attention to being as the way of pre-eminent value, rather than focusing our attention on the conceptually idealized mental ideas that tend to dominate the world. Today we are playing out the same old tunes, with the exception that now we're playing with explosive technologies and weapons in our hands. The consequences of domination are definitely and critically amplified.

Yet there is no question that it would be silly to consider these two ways as contradictory, as exclusive, and as a question of either/or. There is no question that humans engage in everyday life by constantly mixing and alternating between the two. The key is to understand that *what we learn while attending to experience radically motivates and defines our actions*. In the more recent tradition in science, the controlling or idealized side of us wants to focus on observation toward manipulation rather than on insight toward being with, which is where the ethical part comes in. Ethics means here a recollection of the entire realm of life that is often obscured by the power acquired over it.

That said, I don't want to demonize the part of science that is also a brilliant part of being human. Also, in terms of moral behavior, one does need rules as well as know-how because otherwise we wouldn't have social norms under law. We cannot organize a society purely on the basis of know-how. But in an important way our

sense of know-how, which leads to wisdom, should be the basis for laws and reasoned decisions. Wisdom should lead to law—a law that is not wise is a bad law.

Human engineering, like every scientific technology (atomic energy and other equally dramatic examples), is bound exactly by the same problem of whether it is essentially grounded in the constant and ongoing rediscovery of being, or not. Today, of course, that grounding cannot be a moral cry or stance, because such a cry or stance does absolutely no service to anybody. The only way to be grounded in a living world is to actually do it: to cultivate the tools and practices from which any person can learn the wisdom to be found in living. This is the only way we will learn greater respect and tolerance for, and achieve greater participation in the world around us. It is not going to come otherwise, by some kind of exemplary contagion.

Which is why your arguments in Ethical Know-How for attention to the cognitive processes of learning "how to be" are extremely significant. But before we turn to those processes, will you describe how cognitive science evolved from its view of the mind as an information processing system to its view of the mind as a system of embodiment?

The discipline of the study of the human mind—cognitive science—was born after WW II. At that time, the dominant tradition in the West held that the human mind and its processes had to do with logic, with being, as Descartes would say, "clear and distinct." This tradition, from Descartes through the entire rationalist tradition—which is very strong in the Anglo-Saxon world—led early cognitive scientists to ask: How can we understand clear ideas chaining into one another to produce very coherent principles?

At roughly the same time, the computer was invented. The principle of a computer's logical "symbol manipulation" was just perfect—it seemed the perfect way of couching what the human mind was all about. Such was the origin of cognitive science, and it became known as the cognitive tradition. People picked it all up very intuitively. Remember how people used to say the mind was a computer? That the mind was software and the body was hardware? Ridiculous.

The problem is that such a view was in fact intuitive within the context of its moment in the history of the West. In particular, the moral tradition of principle, of "know what," was very strong in the United States, as derived from the British philosophy of mind. Even today, the tremendous power and influence of moral principles in the United States, as they are seen from outside and particularly from Europe, seem extraordinarily oversized. Not surprisingly, the entire continental philosophy in Europe, or at least most of it, is based on a non-normative basis in which the traditions of intuition and aesthetics and existentialism could be born.

Thus the dominant, scientific mind that formed in cognitive science shortly after the war, and particularly in the United States, took the next thirty years to crack under the weight of shortcomings in research. As people looked into cognitive neuroscience, they found that neither perception nor movement nor memory nor emotion could be addressed on a basis of logic. People were attempting to corner the human mind with basic principles of reasoning and categorization, which are, of course, rather poor. So people began to re-evaluate what had been done and began to tilt the balance more and more toward "embodied cognitive science," as it is now called, and was expressed in the book I co-authored with Evan Thompson and Eleanor Rosch, *The Embodied Mind*, and



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His interests have centered on the biological mechanisms of cognitive phenomena and human consciousness, and has contributed 200 articles on these matters in international scientific journals. He is the author of a dozen books and the editor of eight collections, many of them translated into several languages, such as *The Embodied Mind* (MIT Press, 1992), and more recently *Naturalizing Phenomenology: Contemporary Issues in Phenomenology and Cognitive Science* (Stanford University Press, 1999) and *The View from Within: First-person Methods in the Study of Consciousness*, (Imprint Academic, London, 1999).

by others, including Andy Clark in his recent book, *Being There: Putting Brain, Body, and World Together Again*.

We are just now becoming aware of the limitations of taking the mind at a purely abstract level, and we see all the difficulties that have to be coped with in the real, hardcore issues of human life—the emotional disturbances in a child, the violence in our lives, and so forth. It's always fascinating to me that there's a rightness of time for the return of these ideas. We have to remember that many of these ideas were present at the beginning of the twentieth century in America with William James. In fact, William James was completely forgotten until people recently began rediscovering the depths of what he said.

So many of the questions raised by human engineering force us to question our basis for understanding what a human being is, how the human mind and body actually work, and how a life can or cannot be engineered.

Yes. In fact, with genetic engineering we can see the exact same conceptual tension that we saw with early cognitivism. Cognitive science saw the mind as a collection of programs and symbol manipulations, just as genetic engineers see life as a collection of genes ready for programming and arranging. All life has come to be seen as programs that can be adjusted and conditioned to whatever we imagine we need.

Now we're beginning to learn—in parallel, as it so happens with the embodied mind—that life is wholly embodied. The principle of life is not in its genetic components and building blocks but the entire situatedness of an organism. An organism has genes in the same way brains have concepts, but neither has meaning as life. We must think of organisms as both integrated units and as beings within a tremendous network of historical, en-

Many heads before mine have waked
in the dark on that old pillow
and lain there, awake, wondering
at the strangeness within themselves
they had been part of, a moment ago.

She has ripped out the stitches
at one end and stands on the stone table
in the garden holding the pillow like a sack
and plunges her fingers in and extracts
a thick handful of breast feathers.

A few of them snow toward the ground,
and immediately tree swallows appear.
She raises the arm holding the down
straight up in the air, like a mom

at a school crossing, or a god
of seedtime about to release
a stream of bits of plenitude,
or herself, long ago at a pond, chumming
for sunfish with bread crumbs.

At the lift of a breeze, her fist
loosens and parcels out a slow
upward tumble of dozens of puffs
near zero on the scale of materiality.
More swallows loop and dive about her.

Now, with a flap, one picks up speed
and streaks in at a feather, misses, stops,
twists and streaks back and this time
snaps its beak shut on it, and soars,
and banks back to where its nest box is.

A few more flurries, and she ties off
the pillow, ending for today
the game they make of it when she's there,
the imperative to feather one's nest
come down from the Pliocene.

At the window, where I've been watching
through bird glasses, I can see
a graceful awkwardness in her walk,
as if she's tipsy, or not sure
where she's been, and yet is deeply happy.

Sometimes when we're out at dinner and a dim mood
from the day persists in me, she flies up and
disappears a moment, plucking out of the air
somewhere this or that amusement or comfort
and, back again, lays it in our dinner talk.

Once, when it was time to leave, she stood up
and, scanning about the restaurant for the restroom,
went up as if on tiptoe, like the upland plover.
In the taxi we kissed a mint from the desk
from my mouth to hers, like cedar waxwings.

Later, when I padded up to bed,
I found her dropped off, the bedside lamp
still on, an open book face down over her heart;
and though my plod felt quiet
as a cat's footfalls, her eyes at once opened.

And when I climbed into our bed and crept
toward the side of it lined with the down comforter
and the warmth and softness of herself,
she took me in her arms and sang to me
in high, soft, clear, wild notes.

~ • ~

vironmental relationships. Of that, we know virtually nothing yet.

This is where the principle of respect for life joins with a kind of scientific honesty concerning all that we don't know. It's exactly the same question of when, how, and whether we can achieve a re-understanding of molecular biology and genetic engineering in the same way that is happening quickly, thank God, with respect to mind; that is, the parallel rediscovery of the essential organism-centered understanding of life.

I recommend Steven Rose's book *Lifelines*, which is an impassioned defense of an organism-centered view of life as opposed to the selfish gene or genetic determination view of life. The organismic view is beginning to make sense. Twenty years ago, it was considered to be fluffy thinking, but Steven Rose is now regarded as one of the most brilliant biologists in England.

Will you explain how cognition occurs as an enactive process—how the embodied mind works?

Yes. This process is important to understand because it takes us away from the established idea that we perceive and act like computers, or that our cognitive system is simply an input/output system that processes information sitting entirely outside of ourselves. To the contrary, we find that there is a mutual engagement between any organism or person and the environment, an imbrication. It is very much the case that the structures of our cognition are called forth and established through processes of perception and action, or sensorimotor couplings.

In *Ethical Know-How* I wanted to emphasize the corporeal specificity of the enactive approach to cognition. For example, we see that a perceiver does not construct his or her reality, but that what counts to a perceiver is in fact inseparable from his or her cognitive structure. To make this easier to understand, we can refer to the classic perceptual experiment done by Held and Hein in which two groups of kittens were raised in the dark. One group of kittens was placed in a basket carriage and rode passively while the other group of kittens actively pulled them across the floor. Which kittens learned to "see" in the dark? When all the kittens were released after several weeks of training, the passively carried kittens stumbled around as if they were blind and the active ones walked about normally.

Similarly, in another experiment, blind persons learned to see images through video cameras that were designed to translate images onto their skin with prickling electronic sensations. After a few hours of directing the camera's "gaze" and receiving sensations, the blind persons who were actively "looking" were able to visualize those images projected out into space, but the blind persons who sat in passive receipt of the same stimuli could only feel those sensations on their skin. Here is the point: Subjects could only learn to "see" visual images projected into space when they were actively directing the camera *in the effort to see*—not when they remained passive and motionless. Here we can say that *whatever is encountered in the environment must be valued (or discounted) and interacted with (or ignored) if it is to be incorporated (or not) in our cognitive system.*

Another point is that our environment is like the neural music of our cognitive system and we could not live without our own constant coupling with it. In other words, without the possibility of sensorimotor coupling activity in the world, our cognitive systems would in a very important sense become solipsistic ghosts. Which

brings us precisely to the idea that cognitive structures are in fact the substance of experience. And that, furthermore, it is only this substance of experience that motivates—and also constrains—our conceptual understanding and rational thought.

This takes us a very long way from the idea that being there is simple or reflexive or passive or somehow coincidental to deliberation and analysis. It is only because our sense of being there is incorporated or embodied in ourselves that it is immediately transparent, stable, and grounded, that we can rely upon it instinctively or spontaneously—and that we can deliberate and analyze as we do. Even more obviously, the yield—the ability to act—from a sense of being there cannot be fabricated.

How would you respond to someone who says that we will become more perceptive and thus more conscious, if we heighten our sensory capacities with superhuman abilities to hear, see, smell, touch, or move? Isn't it wrong to think that sensory or perceptual capacities are located in a single place and can be outfitted for a superior or post-biological human?

Yes, that's the point. You can have all kinds of philosophical or moral objections to these ideas, but independent of those, there's still the basic scientific objection that we cannot afford to misunderstand: Simply amplifying a sense organ does not mean you are going to perceive more. Perception is a matter of how a certain harmony of coupling is created between certain structures—the eyes we have and what, exactly, the physical world can offer as possibilities. It's not the case that visual objects are simply sitting out there waiting to be discovered and that the new, super-outfitted eye is going to see more, or that with infrared seeing equipment engineered into the eye, we will suddenly see the infrared! There is a fundamental principle of co-creation of sense between an organism and the world.

Yes, you could manipulate and tinker with the constitution of a human being or an animal. That doesn't mean you know what it is you're going to come up with. You can change or build any shape you want. That is not to say it is going to work very well if you leave the network of traffic as it is. That's just a total fallacy. To use Whitehead's expression, it's a *fallacy of misplaced concreteness*. Somehow, the whole field of emergent properties and complex systems is just beginning to make a dent into this purely component approach, the approach of genetic engineering.

We have to be extremely careful because of the tremendous economic incentives—the huge profits to be made from getting genetically engineered products and services onto the market. It creates a kind of scientific and theoretical blindness in which one forgets the entire network of interrelated processes we're just beginning to understand. To jump the gun in the field of engineering life is just very, very blind. Hence, the morally questionable ground. I'm not speaking to a romantic idea and saying, "Let's leave nature as it is." I don't see why some things can't change. But change means that we take the whole phenomenon into account and not just the first little curlicues that we can get our fingers into in such an impossibly infantile way!

If we engineer ourselves, the biotic, and the abiotic world to manifest intents and purposes that are ignorant of the network of interrelated processes, might there be a point at which we violate the living context that calls life—and human cognition—forward? Is it possible to condemn the physical basis for ethical know-how?

The hundred most commonly spoken languages account for 90% of all people, with the remaining 6,600 confined to 10% of the world's most marginalized peoples, who have generally been on the retreat for several hundred years."

ple around the globe. Leading development economists like Amartya Sen see freedom of choice as both a principal means and end of development. We argue that the need to preserve languages and the need for economic development in the world's peripheral societies are not opposing ones, as widely supposed, but complementary aspects of the same problem.

Both are about giving people real choice about what happens in the places where they live. Language maintenance is part of the promotion of sustainable, appropriate, empowering development. Good development involves local community involvement, control, and accountability. Indigenous peoples should be seen as essential allies, and not obstacles, in the struggle for conservation. The problem of language endangerment raises critical issues about the survival of knowledge that may be of strategic use in the conservation of the world's ecosystems. Yet traditional knowledge tends not to be valued as a human resource unless it makes an economic contribution to the West.

Pharmaceutical companies, for instance, have been scouring the rain forests for potential new drugs. More recently, the genetic material of indigenous peoples themselves has been appropriated for the potential benefit and advancement of western science and technology. Of the many similarities between threatened languages, endangered species, and diverse ecosystems, the most obvious one is their irreplaceability. To remove one language from the mix of languages existing today is to remove it from the world forever. Allowing languages and cultures to die directly reduces the sum total of our knowledge about the world, for it removes some of the voices articulating its richness and variety, just as the extinction of any species entails sacrificing some unique part of the environment.

The loss of most of the world's languages and cultures may be survivable, but the result will be a seriously reduced quality of life, if not the loss of the very meaning of life itself for some of the people whose unique voices will vanish. It is ultimately self-defeating and maladaptive to exploit the environment because it increases the likelihood of a deprived and diminished existence, not just materially (which is the main concern for economists who look primarily at short-term balance sheets and not at the long-term bottom line) but in intellectual, cultural, and emotional terms as well. With the passing of each voice, we lose a little more of who we were and are and what we may become. A varied natural system is inherently more stable than a monoculture. We should also preserve our linguistic diversity for moral, ethical, and aesthetic reasons. Variety is not just the proverbial spice of life, it is a prerequisite for life.

In your chapter "Lost Words/Lost Worlds" you wrote: "Thousands of languages have arrived at quite different, but equally valid, analyses of the world. . . . The most important revisions to current ways of thinking may lie in investigations of the very languages most remote in type from our own, but it is these languages which are most in danger of disappearing before our eyes." Will you speculate on the revisions both necessary and possible?

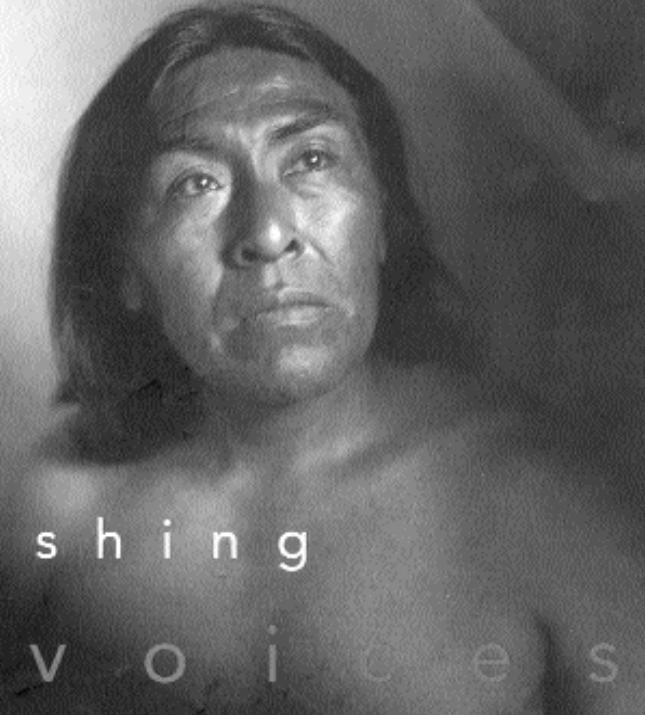
Western science (now conducted primarily in English to the exclusion of virtually all other languages) has no privileged position in the solution of critical problems faced in local ecosystem management. Almost all major scientific breakthroughs have been made not so much by accumulating new facts as by radical departures from ordinary and habitual ways of thinking about things.

Einstein once said that a problem cannot be solved by the same consciousness that created it. Indeed, most real advances in science are resisted at first precisely because they do not fit preconceived ways of thinking about things. So far, however, little serious effort has been made to tap indigenous knowledge about local ecosystems.

Western scientific knowledge about effective marine management, for instance, is still scarce. Strategic planning is particularly difficult in the tropics due to the greater diversity of the marine (and other forms of) life there. In Palau, for example, the number of fish species probably approaches 1,000. Using conventional methods of scientific research, it would take decades to accumulate enough information to manage the most important marine species as effectively as salmon or other species of temperate waters. At the same time, proper management of marine and other resources is critical. Coral reef communities cover around 230,000 square miles of shallow tropical sea bottom, which represents an enormous potential of six to seven million tons of fish per year. This would yield enough fish to feed the United States for about four years at its current rate of fish consumption. Traditional fishermen, particularly on small islands where the people still depend on the sea for most of their food, are still rich sources of information unknown to western scientists. Centuries before biologists existed, Palauans knew that certain types of vibrations could be used to attract sharks. Sea cucumbers, for instance, have been traditionally used in Oceania as a fish poison, but biologists established their toxicity only in the 1950s.

Furthermore, our own western calendar obscures a lunar patterning of life cycles with which islanders have long been familiar. Although marine organisms whose spawning patterns are tied to a lunar cycle lay their eggs during the same portion of the lunar month year after year, their spawning dates vary apparently by up to a month or more without any reason within the western calendar. A lunar month averages 29 1/2 days, so twelve lunar months adds up to only 354 days, or eleven days short of a solar year. The need to keep the lunar calendar in synchrony with the seasons meant that an extra month had to be inserted every so often. Palauans did this automatically and unconsciously. For them, the New Year starts only when the stars and moon are "right," no matter how many lunar months have passed since the last New Year.

Only a few cases of lunar spawning cycles are recorded in the western scientific literature, but learning and committing to memory the timing and location of the spawnings of various species was part of the fisherman's training. The names given to certain days of the lunar month on various Pacific Islands foretell the likelihood of



vanishing voices

successful fishing. On Namoluk Atoll in the Caroline Islands, the night before the new moon is called Otolol, which means "to swarm." In Kiribati (formerly the Gilbert Islands), the name of the day after the new moon also means "to swarm." The Trukese name for the night of the full moon is bonung aro, meaning "night of laying eggs." The tides are also timed in relation to lunar phases, and these, too, were committed to memory. Most Pacific Island languages and dialects have specific terms for the paired currents that form on either side of a given island, a region in which these currents converge downstream, and a back current flowing toward the island from this convergence point. The islanders have been using their knowledge of current patterns in both fishing and navigation long before such patterns were documented by oceanographers.

For many years the prevailing western theory of the colonization of the Pacific assumed that islanders discovered the islands by accident (by being blown off course, for instance, while out fishing), rather than by deliberate navigation. Instead, it was western navigational techniques that were primitive compared to those the islanders used based on the natural environment around them. Until the chronometer was invented, which made precise calculation of longitude possible, early European voyages of discovery were rather hit-or-miss affairs. Because a large part of any language is culture-specific, people feel that an important part of their traditional culture and identity is also lost when their language disappears. As one Native American, Darryl Babe Wilson, put it: "We must know the white man's language to survive in this world. But we must know our language to survive forever." Globalization on an unprecedented scale does not change the fact that most people everywhere still live their lives in local settings and feel the need to develop and express local identities to pass on to their children. Pick-up trucks, jeans, and pop music are not inherently incompatible with cultural continuity and indigenous identity any more than speaking English need be at odds with speaking Welsh or Navajo too.

We must think locally but act globally, using local languages to express local identities and global languages to communicate beyond local levels and to express our identities as citizens of the world. Far from being a divisive force that weakens the bonds of nationhood and political identity, cultural and linguistic pluralism can be a powerful source of a new humanity within a world of diversity. The active cultivation of stable multilingualism can provide a harmonious pathway through the clash of values inherent in today's struggle between the global and local, between uniformity and diversity.

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names can be seen as scientific markers for the effects of acid rain over that time period. During World War II an American fighter plane returned from New Guinea into northern Australia, where it crashed. The four survivors had no compasses or navigational equipment but proceeded to set out to try to find help. Three starved to death with food all around them. Unlike the Aborigines, the Americans had no idea what was edible and inedible. Many of the trees and vines have parts that can be made edible if treated in certain ways. None of this knowledge is written down but is passed on orally from generation to generation, much of it encoded in the classification systems of Aboriginal languages, which group all edible fruits and the plants that bear them into one category. This knowledge is always only one generation away from extinction.

How does the study of linguistics overturn commonly held assumptions about an inherently superior life made possible by the agricultural and industrial revolutions? What real choices existed for indigenous peoples against the “biological waves” imposed by new people, diseases, and livestock, or “economic waves”?

Reports about the existence of hundreds of names for fish or plants often surprise speakers of English and other European languages, many of whom have stereotypes about the languages spoken by small groups of people. I was shocked on returning from a field trip to Australia to be asked by a colleague at Oxford whether it was true that “the Aborigines’ language” had only a few hundred words. She was unaware not only of the existence of many Aboriginal languages but also of the rich knowledge contained in them.

The complexity found in some of these small languages spoken in remote places often comes as a surprise because non-linguists tend to take a society’s state of technological development as an index of linguistic development. In fact, it would appear that grammatically the most complicated and unusual languages of the world are often isolates (i.e., unrelated to any other languages) spoken by small tribes whose traditional way of life is under threat. Languages that are used only for in-group communication in small groups can afford complexity. The very processes that make a language more complex and more localized and specific to a small group

also make it ideally suited to marking a distinctive identity. The more different it is, the better it serves this function.

By contrast, the world’s major languages are becoming more like one another through the process of inter-translation and culture contact. Most languages, for example, have borrowed English terms for words in the field of science and technology. If some horrific catastrophe wiped out all the languages of western Europe tomorrow, we would lose relatively little of the world’s linguistic diversity. Europe has only about 3% of the world’s languages, and most of the largest European languages are also widely spoken outside Europe. More importantly, however, most of the languages of Europe are already structurally quite similar, because they are related historically. If we were to lose the same number of languages in Papua New Guinea or South America, the loss would be far more significant, because the divergence between languages there runs much deeper. Correspondingly, the same amount of habitat destruction in the tropics would lead to many more species extinctions than would occur in the higher latitudes. A lack of appreciation for linguistic diversity has led some to dismiss indigenous languages and cultures as primitive and backward-looking and to see their replacement by western languages and cultures as prerequisites to modernization and progress. They envision a future ideal world in which everyone speaks only one language (preferably their own!). The rise to dominance of a few Eurasian languages and the global spread of western technology and culture are not a case of survival of the fittest or a triumph of some innately superior civilization. Instead, they are the result of deeply complex structural conditions that obtained in Eurasian societies and not elsewhere.

Eurasia had by far the world’s most productive farming and livestock complex. This was no more than a fluke of biogeography, but it allowed Eurasians to boom in number and eventually expand beyond their shores. It also made them hosts to the great killer diseases, which, paradoxically, gave them an edge over other peoples when the continents collided. Finally, dense population and high agricultural productivity, in Europe at least, unleashed a process of diversification and specialization that set those economies on the path to industrialization.

The changing face of linguistic diversity in the modern world is really the story of how a few metropolitan languages expanded very rapidly at the expense of the rest, as smaller communities have been pulled into the orbit of more powerful ones. These power disparities have allowed a few metropolitan groups a virtual stranglehold upon global resources and global power. This power takes many forms, including controlling the flow of information through radio, television, and the internet. Hence the question of choice is a very important one.

The dictum that people make history, but not under conditions of their own choosing, applies very well to the kinds of choices people make that lead to language loss. People did choose English and other global languages repeatedly and consistently but did not themselves generate the conditions under which they had to choose. They were choosing within a framework defined and overcast by systematic political and cultural domination.

Aboriginal Australians or Native Americans, for example, can hardly be thought to have exercised free choice in coming to live in white society. They were dispossessed by groups exercising a greater power over the environment (because of their crops, diseases, and technology), such that the natives’ options were reduced, not increased. Language shift occurred not because of an increase in available choices, but because of a decrease in choices brought about by the exercise of undemocratic power. Such power is almost always wielded by denying access to resources from which communities make their living. The relative contributions of the pull of economic advancement on the one hand, and the push of political domination on the other, are often intertwined in complex ways.

It is far from clear that language loss would have been inevitable under a more equitable political system. Those who control particular linguistic resources are in a position of power over others. The power is economic as well as symbolic. Linguistic capital, like all other forms of capital, is unequally distributed in society. The higher the profit to be achieved through knowledge of a particular language, the more it will be viewed as worthy of acquisition. The language of the global village (or McWorld, as some have called it) is English: not to use it is to risk ostracism from the benefits of the global economy. It is at least partly for this reason that many newly independent countries opted to use the language of their former colonizers rather than try to develop their own language(s).

Moreover, the elite in these countries had acquired these languages through schooling and could use this knowledge to retain their positions of power over the majority of citizens who did not know them. True development of a political, economic, or social nature cannot take place unless there is also development of a linguistic nature. Democracy is severely limited where people cannot use their own languages. Note that we are not arguing against either the spread or usefulness of global languages such as English, or modern technology, but against the loss that results when more and more people acquire international languages at the expense of their own, rather than simply add them to their linguistic repertoires as second languages. People should not have to lose their mother tongues if they choose not to do so. Ironically, the same forces of cultural and linguistic homogenization we document are now being pressed into service on behalf of indigenous peoples, and so it should be. Many native peoples and their organizations have websites in English capable of reaching millions of people.

*M*uch contemporary moral philosophy ...has tended to focus on what is right to do rather than on what it is good to be, on defining the content of obligation rather than the nature of good life; and it has no conceptual place left for a notion of the good as the object of our love or allegiance or as the privileged focus of attention or will."

— CHARLES TAYLOR

SOURCES OF THE SELF



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That's a tough one. I'm not so sure, because I don't particularly believe in an ultimate anything. I do believe in the fact that actuality is very, very deep indeed. When the constitutions of two beings are tremendously interrelated, I am violating their interdependency by acting on any single being in a one-sided manner. Now, whether that is forever and unchanging, I am not sure. After all, we have changed at a very slow pace and in ways in which such constraints have been taken into account by evolution itself.

The problem is acting in an ignorant way by being in a hurry and by being very blind to the consequences of what we are doing. In the end, I'm not particularly a defender of some kind of inviolability in the sense that things have some kind of primordial quality or original purpose or principle. I'm much more of a Buddhist. In the end, everything is quite empty of quality, and manifestations are infinite. There is nothing to hold onto, but we must respect complexity itself: the depth of actuality rather than the holiness of origin.

Yet in the depth of actuality lies the kind of essential being referred to in Ethical Know-How—the ethical unconscious. If the practice of wisdom is the practice of essential being, and essential being is discovered in the substance of experience, couldn't we imagine a biological or physical violability? Isn't it possible or even likely that we may engineer the world in ways that radically shape or undercut the possibilities of experience?

That is definitely a good point. However, let me do a counterpoint. Since the very beginning, both animals and humans have had the drive to survive and have transformed their environments in order to do so. We build houses, learn agriculture, transform mountains into mines, build artifacts—so you can say the act of transforming nature to harmonize and coordinate life for everybody is a perfectly concrete and existential thing. Now, it's true that technology amplifies that—but only amplifies it, it doesn't invent it. Where are we going to draw the line?

I imagine there are critical thresholds.

Yes.

I came across an article written for the Waldorf schools in England that summarizes studies out of the Gesellschaft für Psychologie and the University of Turbingen showing "adaptive

changes" in contemporary human brains. In urban and highly mediated environments, there appears to be less and less time for brains to synthesize dissonance, which appears to cause less and less consciousness of what is being perceived. For example, the article says: "Fifteen years ago, Germans could distinguish 300,000 sounds. Today, on average, they only make it to 180,000. Many children stagnate at 100,000. That is enough for hip hop and rap music, but it is insufficient for the subtleties of a classical symphony." Does this kind of adaptation and constriction of perception ring true to you—does it cause you to question the kind of cognition and know-how made possible by some environments?

I'm not at all familiar with these studies, but it seems very difficult to believe that no major adaptations in the human organism have occurred given the kind of urban context in which many of us—indeed most of us—end up living. We can also bring data concerning emotional adaptation to this same argument. It is quite clear that a change has occurred in the way emotions are handled by urban people as opposed to how they are handled by people who are not highly urbanized. It is known to ethologists that mammals become increasingly aggressive when living in crowded conditions. Surely such studies cannot be directly transposed to humans, but they are indicative.

We are just beginning to appreciate how incredibly plastic we human beings are in our ability to change. Recent studies showing that the human frontal lobe constantly receives new neurons had all of us sitting on the edge of our chairs! This means that the frontal lobe, with its capacity for abstract reasoning, for planning, for seeing one's own life in a longer time frame, and so on, is developing all the time. Since human beings change constantly, how could we not change if we go from a rural to an urban environment? And if so, the kind of daily life we lead will significantly shape who we are even at the structural level.

It seems obvious that there could be a threshold at which we so unwittingly manipulate our biology or the biology around us that we could extinguish the difference between ourselves and our environment to the point that we create a world of "solipsistic ghosts."

I think that's absolutely the point. That's why I say we should really always make the cultivation of wisdom the basis of our being here. If we start with the apprecia-

tion of being as it is, then practical action—how we act in the world with our theoretical knowledge—will have the kind of prudence that it needs to have.

We have a very clear example of this every day in medicine. Without doubt, we need medicine to address human concerns. Yet, for example, in the domain of transplants, some would say that exchanging organs violates the sacred integrity of life. Well, transplants are violations only if they are done in the belief that simply keeping the person alive is all that counts. If there is a more empathic and wisdom-based practice, on the other hand, then transplantation will exist only as one possible remedy that will not dominate all criteria by which a person's life, death, and medical treatment is evaluated. Similarly for genetic engineering. We're back to that absolutely essential need to continue to understand and produce wisdom, to create human action based on prudence instead of hubris—but without falling into the temptation of saying that nothing should be touched.

And yet, if we are going to be able to grow any bodily tissue, cure any disease, fix the damages of any accident, or eliminate any effects of aging, as some scientists in the United States claim, and if we understand know-how as the incorporation of experience, wouldn't our sense of "being there" be forever changed?

I think the question has to be asked the other way around. A sense of being/not being is based precisely on a kind of projection of knowing—which is critical when we talk about exchanging organs or securing an infinite supply of parts to keep a body alive. It is something done from the experience of already knowing what it is to be alive, not the other way around.

We don't walk around the world finding livers and hearts and embryos with the expectation of being more alive than we already are. We pay attention to the livers and hearts because we ourselves are mortal beings, and because we have the experience of mortality. Now, that experience of mortality and fragility is not going to go away.

The only antidote to misuse of technologies is to cultivate understanding and trust that, in the end, the essential meaning of mortality, which is what motivates people to develop transplants and other techniques, will be sufficiently present. This understanding will put

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these techniques at the service of discovering being as opposed to the literal, infantile wish for a liver. A liver doesn't have any existence in itself. It is only because I am alive and I have a mind that I find a liver, and not a chair or a stump. In a sense, we always come back to the same loop.

Yet I wonder if we do sufficiently regard our mortality, or what Ernest Becker calls the "lived truth of creation," when we're culturally predisposed to dominating creation—to devoting our science, technologies, and medical services to transcending the fragility of our bodies in the pursuit of immortality. We see an exaggerated form of this in Extropians and other transhumanists working toward "ultrahumans," and a "postbiological" era for humanity. What makes you think people will become more, not less, conscious of the lived truth of being alive?

Well, it's funny. I have a much more—I wouldn't say optimistic—but a more gripping sense that our basic, human nature strives toward a realization of being. Who we are, and the experience of being who we are, is so impossible to set down into a quality that it is also a kind of luminous non-being. Each of us is thirsty for a kind of return home—that funny non-home—and it is that thirst that I trust in our nature. Human beings don't have to be forced into realization, they yearn for it. Given the chance, they wake up and say, *That's good. That's interesting.* Which directs us to the work of propagating access, propagating examples, propagating the multiple doors of being here.

We place our trust not in the goodness or the badness of people, but in something much more pragmatic—in our capacity to actualize being the moment we touch it. To me, that's the real "golden touch" of King Midas: We can turn to anything, and if we touch it, it turns to gold. This can happen to the worst genetic engineer or the blindest of the ecological transgressors.

*Which brings us to your current work—how to study first-person consciousness. Will you speak to challenges addressed in your book *The View From Within* and in your current research?*

One of the main projects of the book I co-edited with Jonathan Shear, *The View From Within: First-Person Approaches to the Study of Consciousness*, was to see how ethical know-how evokes the practice of human learning as it concerns one's own experience. What is the work to be done in first person? What is it to have a practice of experience? If we can understand this, it will open us up to the pragmatics of how transformation, or the discovery of being, actually occurs.

Here the practice of meditation is instructive because it enables us to cultivate the most basic processes of perception. Instead of trying to get to some mental state, the Buddhist tradition tells us to pay attention to what our bodies do: when we chop wood, we just chop wood; when we drink, we just drink; and when we sleep, we just sleep. The gesture is to liberate or let go of the mental chitchat and hyperactivity of concepts, presuppositions, judgments, and so on that fill our minds and obstruct our experience of being. When we suspend our minds and focus on being, we experience a certain open-

ing, and it is here in this opening that ethical know-how becomes seamlessly transparent. Right action manifests out of that opening because there is much more of a grounded sense of being right on the dot of any situation. Right action is embodied; it is situated. It requires, of course, the capacity to be reflective, so it is not just the sensorimotor coupling that any animal can do. Only human beings can turn back and say, Let me reflect on my own activity and engage in the gesture of letting go. Let me attend to the actual situation. Let me be open to all the other sentient beings here and to the whole network of my environment. We can see quite clearly that talk, or books, or rules alone will not engender non-egocentric concerns and ethically developed persons.

Will you speak to the difficulty of developing a science for this process?

Let me say first that while studying right action is an important goal, the very center of renewed interest in the scientific study of consciousness is simply to understand how the mind can work altogether and how consciousness works, which is before the mind engages in any sort of ethical training. To get to the conclusion that one's own description can come only from the experience side of cognition is an intrinsic part of the work. But that doesn't necessarily imply that scientists will first study how changes are made when one practices meditation. We start with simple things, such as how to study the capacity to attend, or the capacity to observe emotions rising and subsiding in particular situations. We are at the stage of having to look at very basic things—first-order things.

In *The View From Within*, the spiritual traditions actually help us because they provide us with evidence that the tools of phenomenological description are possible and available. Right now, I am working to develop these tools and descriptions so that we can actually show them in complete instances with case studies.

To do this, we are bringing together third- and first-person accounts that offer enormous insight into particular mental capacities. For example, in one area of research we're asking subjects to do a very simple thing—a perceptual task of seeing in three dimensions with a 3-D random dots game. In the past, when we worked with subjects and studied their brains for perceptual processes, we typically had only the conclusions we could draw from our own empirical observations of the brain's activity. Now, most of our subjects are very highly trained to do phenomenological descriptions. In fact, one is a very advanced Buddhist practitioner. One thing we see is that trained people have very good strategies, including the ability to put their minds at rest in a particular position that enables them to perform and to observe. This ability to rest, this stability of mind, is in sharp contrast to the constantly wobbling mind of ordinary people. We exploit our subjects' capacity to put their minds at rest by asking exactly how any particular perception occurred during each presentation of the 3-D stimulus. We get extraordinary descriptions. At the end, we use each subject's description to classify our own observations of empirical data. We discover we have entirely different

brain responses, depending upon what the subject's experience is. And yet it is only the subject's report that allows us to actually say which particular measure should go in which particular class. This is an example of really bootstrapping our understanding of consciousness—that we can read third-person brain data as it is completely modified by phenomenological experience, and, in turn, that the third-person data allows us to understand the specifics of what a mental state can possibly be. That, to me, is a very modest enterprise, but one that needs to be established through many good case studies before the scientific community can go through it. That is my strategy—to open this field—and all my effort is geared to it.

As much as I'd like to think people will have lasting epiphanies about "being there" and spontaneously apply ethical know-how in relation to deep technologies, it's also obvious that this hasn't and won't happen passively. There is an important question here of competency.

Yes. Furthermore, unless there is a practice—and a repetitive, recurrent practice—the ability to achieve a stable mind does not develop. Achieving that competence is not an immediate given. It is astounding, really, that people don't understand that, since they understand it for all kinds of other competencies, such as sports. If we don't practice sports, everybody knows we cannot perform the kinds of feats performed by skilled athletes. We're all given bodies and minds that can do so many, many things, but if they're not trained, they're not trained. There is no reason to expect that the kind of mental precision and understanding we are talking about will simply happen spontaneously. It just doesn't.

Again, my position is not to attack technology per se but to go back to the source of why technology can turn sour or destructive, which is a lack of understanding on the part of the people who use it. One of the great discoveries in the Buddhist tradition is that if, through a process of self-examination, we are able to suspend habitual patterns and judgments, we reach an openness that makes us much more responsive to what is around us and allows us to be touched, to care, and to act with compassion. That, to me, is the only answer to the negative consequences of technology. The use of technology must be informed first by the rediscovery of being and the values that accompany *praxis*, or transformation. The real solution, therefore, is going to come from introducing all that can be known about human transformation at all levels—at schools, at businesses, in public services, and so on. Out of that, right action will come forth in its proper context.

Again, we see that right action cannot come from beliefs in ultimate foundations or out of received wisdom. To grasp the process of transformation and its pragmatics, I believe the western mind have to have a strong interface with science. When we have meetings with the Dalai Lama, he is totally convinced of that too. An ambitious undertaking!

*O*f the many similarities between threatened languages, endangered species, and diverse ecosystems, the most obvious one is their irreplaceability. To remove one language from the mix of languages existing today is to remove it from the world forever. Allowing languages and cultures to die directly reduces the sum total of our knowledge about the world, for it removes some of the voices articulating its richness and variety, just as the extinction of any species entails sacrificing some unique part of the environment.

graphic distribution between areas of greatest biodiversity and areas of highest linguistic diversity, which allows us to talk about a common repository of what we will call “biolinguistic diversity”: the rich spectrum of life encompassing all the Earth’s species of plants and animals along with human cultures and their languages.

The highest concentration of biolinguistic diversity occurs in the tropics and semi-tropics. As an example, consider Papua New Guinea, perhaps the most biolinguistically diverse country in the world. With over 800 languages (13.2% of the world’s languages), but only 0.1% of the world’s population and 0.4% of the world’s land area, it is an outstanding hotbed within an ocean of diversity. Over 80% per cent of Papua New Guinea’s land area is covered by forests and is home to one of four significant rain forest wildernesses remaining on the planet. There is also an incredible wealth of some 22,000 plant species, 90% of which are found nowhere else in the world. The forests are home to over 200 species of mammals, 1,500 species of trees, and 780 varieties of birds, including 90% of the world’s spectacular Birds of Paradise, the country’s national emblem. There are 252 different varieties of reptiles and amphibians, including huge saltwater crocodiles. The greatest diversity of corals in the world is found off the south coast at Port Moresby.

Not only are the world’s biodiversity and linguistic diversity concentrated in similar places but both are also threatened with potentially catastrophic consequences, of the destabilizing activities of a few powerful groups. Much of the world is now being covered by a few agricultural species of Eurasian origin—wheat, barley, cattle, and rice. These monocultures are replacing a profusion of endemic diversity whose functions we are only now beginning to understand and appreciate. The linguistic situation is uncannily similar, but the spreading varieties are English, Spanish, Chinese, and so forth.

Moreover, the underlying causes, and even the rates of spread, are extremely similar in both cases. Languages can exist only where there is a community to speak and transmit them. A community of people can exist only where there is a viable environment for them to live in and a means of making a living. Where communities cannot thrive, their languages are in danger. When lan-



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guages lose their speakers, they die. Cultural, linguistic, and biological diversity are thus not only related but often inseparable, connected through coevolution in specific habitats. The similar dire fate facing indigenous peoples, their languages, and cultures as well as the Earth’s remaining biodiversity is, therefore, not coincidental. Where there are indigenous peoples with a homeland, there are still biologically rich environments. Where people have lost their traditional authority over their land or been forced from it, large scale transformations of the environment have occurred, accompanied by cultural and linguistic decimation. The dangers facing these small communities are greater than ever.

Will you describe the various ways languages become moribund or die?

There are many reasons why languages can become moribund or die. Many instances of extinction are due to conquest and genocide. A man named Ishi was the last survivor of the Yahi Indians, murdered or driven into exile by white settlers in California in the 1860s and 1870s. Similarly, the extinction of Ubykh with the death of its last speaker, Tefvik Esenc, in 1992, is the final result of a genocide of the Ubykh people, who until 1864 lived along the eastern shore of the Black Sea in the area of Sochi (northwest of Abkhazia). The entire Ubykh population left its homeland when Russia conquered the Muslim northern Caucasus in the 1860s. Tens (and possibly hundreds) of thousands of people were expelled and had to flee to Turkey, with heavy loss of life, and the survivors were scattered over Turkey. Russian conquest of the Caucasus continues to this day, threatening the lives, lifestyles, and languages of people such as the Chechens. Meanwhile Turkey itself is a country with a long history of human rights abuses directed against the Kurds and their language, which is banned from public use. The Turkish census does not even count Kurds because the government denies their very existence. Kurds have been sent to prison even for saying they were Kurds and are not allowed to claim that their mother tongue is Kurdish. Many indigenous people today, such as the Kurds, Welsh, Hawaiians, and Basques, find themselves living in nations they had no say in creating and find themselves controlled by groups who not only fail to rep-

resent their interests, but, in some cases, actively seek to exterminate or assimilate them.

Another related factor is environmental destruction, particularly where indigenous peoples reside. In the late 1970s the Electricity Generating Authority of Thailand built two hydroelectric dams on the two branches of the River Kwai. These dams flooded the locations of two Ugong villages, and the inhabitants were relocated elsewhere. With the unity of the villages destroyed and their speakers scattered, the older speakers who still preserve the language have few, if any, people to speak to in Ugong. Ugong has literally been swamped and the speakers immersed in Thai villages.

Still another factor is globalization, which has spread a few international languages on a scale never before possible. The corporations and financial institutions of the English-speaking countries have dominated world trade and made English the international language of business. Books in the English language have dominated the publishing business. English has become the lingua franca of the internet because the technology facilitating developments in mass communications originated largely in the English-speaking world. Language loss is symptomatic of much larger social processes that have brought about the global village phenomenon, affecting people everywhere, even in the remotest regions of the Amazon.

Here are a few examples of what is being or has been lost. Some of the last speakers of dying languages are treasure houses of detailed local knowledge passed down orally for generations. One Palauan traditional fisherman born in 1894, for example, had names for more than 300 different species of fish and knew the lunar spawning cycles of several times as many species of fish as have been described in the scientific literature for the entire world. In the Native American language Mi'kmaq, trees are named for the sound the autumn wind makes when it blows through the branches about an hour after sunset when the wind always comes from a certain direction. Moreover, these names are not fixed but change as the sound changes. If an elder remembers, for example, that a stand of trees over there used to be called by a particular name 75 years ago but is now called by another, both

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AN INTERVIEW SUZANNE ROMAINE

ing activities; for example, *Aia a kau ka i'a i ka wa'a, man-a'o ke ola*, or, "one can think of life after the fish is in the canoe." Palauans call a person who is hard to wake up *bad el wel*, or "sleeps like a turtle.". Many such expressions have little or no meaning to today's younger generation, who have grown up eating canned fish bought from supermarkets.

In Tahiti, hooks for catching tuna were traditionally fashioned from numerous varieties of pearl shell, with each shell distinctive to a particular stretch of coast of an island. A good fisherman would know the names of every kind of shell from every district of every island. In particular, hooks with a strongly inward-curving (rather than straight) point, or hooks without barbs, are more efficient for catching many varieties of fish than imported metal fish hooks that have to be purchased with cash. Even Captain Cook commented of the native Hawaiian fish hooks he found in use that they were a "triumph of stone age technology. . . . Their strength and neatness are really astonishing; and in fact, we found them, upon trial, much superior to our own." Traditional fish hooks were fashioned in many different ways, often seemingly ineffective to outsiders, but their manufacture was based on centuries of knowledge of local fishing conditions. The advantage of modern western hooks now used by many Pacific fishermen lies only in their availability, providing one has the cash to buy them.

Will you give a historical survey of the world's languages in numbers, periods of equilibrium, and recently accelerated extinction rates?

The rapid loss of linguistic diversity has really only occurred in the last thousand years or so. For much of human history, the number of languages was roughly constant. That is because there were no massive, enduring differences between the expansionary potential of different peoples of the kind that might cause the sustained expansion of a single, dominant language.

This equilibrium has been punctured forever, first by the invention and spread of agriculture, then by the rise of colonialism and the Industrial Revolution, and today by globalization, electronic technology, and so forth. These forces have propelled some few languages—all Eurasian in origin—to spread over the earth during the last few centuries.

No one knows for sure how many languages there are on earth today, but we estimate that there are around 6,700. However, huge disparities exist among them in terms of numbers of speakers. Speakers of the ten most commonly spoken languages—Mandarin Chinese, English, Spanish, Bengali, Hindi, Portuguese, Russian, Japanese, German, and Wu Chinese—make up half the world's population, and this figure is increasing. The hundred most commonly spoken languages account for 90% of all people, with the remaining 6,600 confined to 10% of the world's most marginalized peoples, who have generally been on the retreat for several hundred years. The majority of these less commonly spoken languages may be at risk.

Why is this problem ignored or misunderstood?

There are many reasons why language extinction has been ignored. One reflects a common, but mistaken, belief that the existence of many languages poses a barrier to communication, to economic development, and modernization more generally. Yet it is easy to find examples where the sharing of a common language has not gone hand in hand with political or indeed any other kind of

unity. Northern Ireland is one such example from the English-speaking world. The attempt at Russification of the member states of the former Soviet Union did not ensure unity in that part of the world either. Moreover, many modern countries (such as Singapore) function multilingually. Monolingual English speakers usually are unaware of the fact that their circumstances are *not* the norm in a world that has long been and is still predominantly multilingual. It is hard for most English speakers to imagine how it would feel to be the last speaker of English on Earth. Another reason the problem is ignored is that linguistic extinction, like the biodiversity crisis, is seen as largely a Third World problem.

However, extinction rates are also high in developed countries, such as the United States, Australia, and Europe. The worst country, in fact, is Australia, with 90% of its estimated 250 Aboriginal languages near extinction. Only some fifty languages are widely spoken today, and of these only eighteen have at least 500 speakers. These eighteen account for roughly 25,000 of the remaining 30,000 speakers of Aboriginal languages today. There is no Aboriginal language that is used in all spheres of everyday life by members of a sizeable community. The situation is not a lot better in North America. Of an estimated 300 languages spoken in the area of the present-day United States when Columbus arrived in 1492, only 175 are spoken today. Most, however, are barely hanging on, possibly only a generation away from extinction. Only a handful of the native languages spoken in what is now the United States have as many as 10,000 to 20,000 speakers. No children are learning any of the remaining Native American languages in California.

Another reason the problem is ignored is that it is very difficult to capture visually the pain and distress underlying language loss. Language is not a tangible object. Photographs can movingly portray the bleak scenes left in the wake of environmental disasters such as oil spills, the clear-cutting of the rain forest, or the death of coral reefs and marine life from water pollution. Campaign posters of beautiful wildlife such as the panda, whale, and tiger can arouse sympathy for endangered species. Despite the increasing attention given to endangered species and the environment, there has been little awareness that peoples, cultures, and languages can also be endangered. At stake is the right of peoples all over the world to survive and to maintain their distinctive cultural and linguistic identity. One reason we put photos in our book of some of the last speakers of languages like Yahi, Eyak, and Ubykh was to bring out the human dimension of the tragedy of language loss.

Still another reason for neglect of the problem of language endangerment is that people are not used to thinking of languages as natural resources in need of conservation because they have not seen the link between the loss of biodiversity and linguistic diversity. We cannot ignore such extinctions any more than we can ignore the passing of dinosaurs and spotted owls and the destruction of the rain forest. They are part of the history of the Earth, of our human species, and of life on this planet.

How did it become obvious that the extinction of languages could be seen as inextricably linked with biodiversity losses and worldwide ecosystem collapse?

We were led to the connection between linguistic diversity and biodiversity by a number of striking correlations. The most important of these is an overlap in geo-

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Casey Walker: In *Vanishing Voices: The Extinction of the World's Languages*, you and your co-author Daniel Nettle wrote: "In our languages lies a rich source of the accumulated wisdom of all humans. While one technology may be substituted for another, this is not true of languages. Each language has its own window on the world." Will you begin by describing the complexities of those windows?

Suzanne Romaine: Linguistic diversity gives us unique perspectives into the human mind because it reveals the many creative ways in which humans organize and categorize their experience. Anyone who has learned another language can appreciate the uniqueness of expression that is lost in any translation.

The vocabulary of a language is an inventory of the items a culture talks about and has categorized in order to make sense of the world and to survive in a local ecosystem. For example, the economic and cultural importance of fish is reflected in the Oceanic languages of the Pacific. Centuries before there were marine biologists and scientific methods of classifying fish and other marine life, Pacific Islanders were passing on orally their accumulated knowledge about the behavior of each of hundreds of varieties of fish. The species of fish most heavily relied upon for food often have more than one name, depending on the stage the fish has reached in its life cycle. Names may also refer to different habitats, behavioral patterns, or characteristic colors, or to different fishing techniques used in catching the fish. Hawaiians probably knew more about the fish of their islands when Captain Cook first arrived in 1778 than scientists know today. Indeed, many Hawaiians have now forgotten more of that local knowledge accumulated and handed down orally over the past 2,000 years than western scientists will ever learn.

Like many people living intimately with the sea and dependent on it for their living, islanders' languages are rich in words, a variety of proverbs, and metaphorical expressions relating to marine life. Tahitians, for instance, called a restless person *a tunahaavaro* (a species of eel). A person who is difficult to find is termed an *ohua* (a species of fish that hides under a rock). Long forgotten fish names are still preserved in stories, myths, and proverbs. In Hawaiian, for instance, one of the largest categories of proverbs concern fish, fishermen, and fish-

Red

*T*wenty years ago a child or young person was able to differentiate 360 shades of red, and today are down to something like 130 shades, which means the subtleties are lost to the pure, heavy impact of red. . . ."

—An Interview with Joseph Chilton Pearce
Wild Duck Review, Vol. IV, No.2

Shades of red. Shades of sandstone. A stratigraphy of geologic layers. Entrada. Kayenta. Wingate. All shades of red. Even the Rio Colorado. Red rocks. Red sand. Red water. Red eyes in the desert. Headlights. Flashlights. On a full moon, with indigo light, there is such a thing as blue sandstone, call it midnight red.

The subtleties of our own perceptions are being lost to time. No time to enter the deep color of time. No time to contemplate how "colours appear in the neighborhood of others." There are colored shadows in the desert. Goethe gives us the formula in his classic, *Theory of Colour*:

One of the most beautiful instances of coloured shadows may be observed during the full moon. The candle-light and moon-light may be contrived to be exactly equal in force; both shadows may be exhibited with equal strength and clearness, so that both colours balance each other perfectly. A white surface being placed opposite the full moon, and the candle being placed a little on one side at a due distance, an opaque body is held before the white plane. A double shadow will then be seen: that cast by the moon and illuminated by the candel-light will be a powerful re-yellow; and contrariwise, that cast by the candle and illuminated by the moon will appear of the most beautiful blue.

With a piece of white paper, a burning candle, and my back to the moon, I watched the magic of primary colors throbbing in the shadows of a feather.

There is magic in the world. Call it Science. Call it Religion. Call it God. It could be called Color.

When I worked at the American Museum of Natural History in New York, I discovered the *Naturalist's Color Guide* written by Frank B. Smith. The text and color chips (similar to those one collects at a paint store) enthralled me, enveloped me in a world beyond the dualities of black and white. The motivation behind the guide was to give ornithologists and other biologists an accurate description of the color of birds, specific plumages, a gorget of a hummingbird, the speculum on a duck's wing. It is based on the pioneering work of Robert Ridgeway who wrote *Nomenclature of Colors...for Ornithologists*, published in 1886.

Other books followed. In 1912, Ridgeway published a more ambitious book entitled, *Color Standards*, listing 1,115 named colors. New colors were added. Others were discarded. And in time, more sophisticated color systems have been advanced, such as the Munsell Color System, specifically designed to define a color precisely with its own notations and formulae. It divides a color into three parts: *the spectral color called hue, the degree of lightness or darkness called value, and the intensity or saturation called chroma*.

A language of color has emerged.

Consider the range of red as described in the *Naturalist's Guide* with its species citations: *Magenta* (a reddish color with a strong cast of purple), associate it with Lucifer Hummingbird; Costa Rican Wood-star; Costa's Hummingbird; Heloise Hummingbird; *Vinaceous*, *Deep Vinaceous* (the color includes hues ranging from

purplish reds through orange and tones from pale to dark, forty-five varieties according to Ridgeway), locate the color on Verreaux's Dove; Martinique Dove; ruddy Pigeon; Pale-vented Peacock; Scorched Horned Lark; *Carmine* (described as rich crimson, bluish red of the organic pigment produced from cochineal), see Red-breasted Sapsucker; Pileated Woodpecker; Ruby-and-Topaz Hummingbird; Yellow-lored Parrot; White-ringed Crossbill, to name just a few.

And the list goes on and on. *Poppy Red*: Red-faced Warbler; Red-winged Blackbird; summer Tanager; *Rose Red*: Rose-breasted Grosbeak; *Geranium*: Quetzal; *Scarlet*: Cardinal; *Flame Scarlet*: Baltimore Oriole.

What do we see in the spectrum of red?

Where I live, the open space of desire is red. The desert before me is red is rose is saffron is magenta is salmon the colors are swimming in light as it changes constantly changes with cloud cover with rain with wind with light, delectable light, delicious light, the palette of erosion is red is running red water, red river, my own blood flowing downriver, my desire is red, this landscape can be read. A flight of birds. A flight of words. Red-winged blackbirds are flocking the river in spring. In cat-tails, they sing and sing, on the riverbank, they glisten.

Can we learn to speak the language of red?

On a white concrete floor in a white room in Barcelona is an array of tongues, tongues made from the various soils of Spain. These tongues create a landscape, a conversation of ochre, yellow, white, red, black, grey, lavender, pink, brown, and beige. These earth-based tongues are extended, reclining, curled, twisted, erect, folded, waved, vertical, horizontal, bent.

Bent women, erect men, lips, penises, horns, waves, bears, monks prostrating before bears, eggs, birds, alligators, crescent moons, and nuns praying before tombstones.

In the background there is talk. A man speaking verbs: *comer*; *buscar*; *ser*; *hacer*. A woman speaking adjectives and nouns: *caliente*; *luz*; *sol*; *tranquilo*; *soleado*; *cantada*; *latima*; *suelo*. A man and woman asking questions: *Por que?* *Como?* *Sabe?*

Painted on the front wall are profiles of people in speech.

Painted on the back wall are the names where these native tongues were found: Zaragoza; Montserrat; Caceres; Rio Ebro; Cadaques; Bolca del Croscat; Olot; Burgos; Figueres; Tarazona.

I contemplate the relationship between language and landscape standing in the midst of these native tongues. It is a marriage of sound and form, an oral geography, a sensual topography, what draws us to a place and keeps us there. I stand inside my own diction of desire and play. To stick out one's tongue. To kiss with one's tongue. To bite one's tongue. To speak with forked tongue. Tongue-tied. Tongue-twisted. Ah, let me see your tongue. Open-wide. I see our geographic tongues.

This is the installation of artist Jackie Brookner. She says that the first substance in her work is the soil, the raw matter of organic life. She has been traveling through Spain collecting soils from Central Spain and Catalonia focusing on different color, textures, and appearance. The organic nature of speech is the confluence of earth and sound.

WHAT IS THE UNION BETWEEN
THEM JACKIE BROOKNER?



TERRY TEMPEST WILLIAMS lives in Castle Valley, Utah. Her book *Leap*, published this spring, is about her seven year obsession with Hieronymus Bosch's medieval triptych, *El jardín de las delicias*. She is the author of *Refuge*, *An Unspoken Hunger* and *Desert Quartet*; and is the recipient of a Lannan Literary Fellowship and a Guggenheim Fellowship. Of *Leap*, Mark Doty writes: "Leap does what we hope literature can do—rinse the reader's gaze, refreshing our sight and making the world new again."

FIGUERES OCHRE, CADAQUES MARRO

TARAZONA Y ESCATRON CANELA

Does the mountain feel

SARINENA VIOLETA, RIO EBRO TOFFEE-MAR-
RON

As it unravels and crumbles

MANRESA VERDA, OLOT TEULA VERMELLA

And is eaten into soils?

MONTSERRAT SIENA, BESALU GRIS

Hard yielding

LAVA XIL.LE, FOSCA I NEGRA DEL CROSCAT

To softer ground

SALAMANCA NARANJA, AGREDA ROJO PRO-
FUNDO

The soil fleshing itself

QUEIXAS CALDERA, SALAS DE LOS INFANTES
MOSTAZA

Into poppies, olives, lizards

SORIA PURPURA, MEQUINENZA ARENOSA

And us-our tongues rooted

SEVILLA AMARILLA, FRAGA I ROSES CAFE

In more tones and textures

AZAILA RASADA, BURGO DE OSMA COLOR PIEL

Than they can ever name

HORTEZUELA COCO, CERVERA GRIS

But we can lick away our edges

LA GALLEGIA BIOLETA

Which such astounding grace?

BURGOS NEGRO

A D O P T E D
T O N G U E S

N A T I V E
T O N G U E S

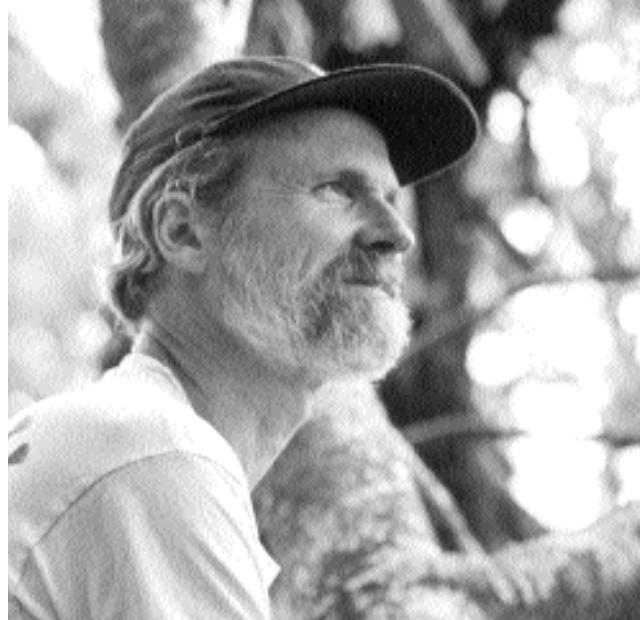
What do we hear?

What do we see?

Can we learn to speak the language of red?

The colored shadows that fall from a full moon in the desert is music contained in the feather of a red-shafted flicker. Motion. Emotion. A fire is burning. My native tongue aches and swells, touches the roof of my mouth. I begin clicking my tongue like the sound black-birds make when they fear they are alone on the river.

~ • ~



NELSON FOSTER has spent most of his life between Hawai'i and California. He has worked as a high school teacher, activist, editor, writer, and Zen teacher and has published poems, calendars, essays, and books. His writing has centered chiefly on the natural and cultural history of Hawai'i or on Buddhist subjects, his most recent book being *The Roaring Stream: A New Zen Reader* (with Jack Shoemaker). Nelson is a founder of the nationwide Buddhist Peace Fellowship and the Pacific Campaign for Disarmament and Security, a regional activist network; and he served for a decade as staff member or volunteer with the American Friends Service Committee, a Quaker-based organization. A student of Zen for nearly thirty years, he is now teaching at Diamond Sangha centers in both California and Hawai'i.

A few months ago, in the hip Mendocino town of Garberville, I sat down with friends for a celebratory meal after a week on the trail. We'd been getting our news through the soles of our boots as we hiked from one drainage to another along a stretch of California shoreline known-because cars can't get there-as the Lost Coast. Awaiting our lunch, we picked up a newspaper to learn what, by its account, we'd missed during our hike among the redwoods, ferns, and purple irises. Ten years ago, ending a similar walk in the canyonlands of Death Valley, we got word this way of Edward Abbey's death, and the news seemed fitting, right. This time, it felt utterly wrong: a front-page story on the latest success in cloning jubilantly predicted a day not far off when human body parts would be "replaced as easily as brake shoes."

I find it hard, in retrospect, to imagine a report more perfectly at odds with the message of the Lost Coast, of its glowworms and gray whales, Roosevelt elk and brown pelicans. The dense mists of the past week, the stinging nettles so tasty in the night's soup, the labor of carrying our food and gear a thousand feet up each day and down again to another seaside campsite—all of it threw this bio-medical novelty into sharp relief. Rarely has the bubble-dance of modernity seemed so obvious or so crass. My fellow Americans, now we can have it all: not only fresh fruit out of season, phones in our pockets, disposable cameras, royally luxurious "middle-class" homes, grossly oversized vehicles, movies on demand, pills that make us feel "better than well," erections to die for, babies by design, refrigerators that tell us when to buy milk, computers we can speak to, news tailored to our taste, and instantaneous worldwide communication but also new knees, lungs, and livers, as needed. Pain-free existence and immortality can't be far behind. Hey, why not?

I.

In 1800, with the industrial revolution still in the offing, thirty-four-year-old French writer Germaine de

Is There No Limit?

ON CULTIVATING CONTENTMENT

Staël foresaw our challenge: "Scientific progress makes moral progress a necessity," she wrote, "for if man's power is increased, the checks that restrain him from abusing it must be strengthened." Two centuries later, talk of moral progress sounds quaint, but Mme. de Staël's basic proposition is incontestable: new scientific and technological powers require a commensurate increase in human capacity to prevent their abuse—to use them wisely or not use them at all. Otherwise, they're bound to run away with us.

I'm reminded of the old European story of the Red Shoes, those glorious shoes that a little girl must have and wear and wear again, despite the horror they elicit in church and the scolding she receives from the village elders, despite the dancing fit that overcomes her the second time she straps them on, despite her mother's storing them out of reach and sternly prohibiting further use. Stealing them down, she puts the handmade beauties on again, and this time the compulsion to dance takes her in a ceaseless, joyless jig through town, fields, and forest, until at last she whirls past the executioner's hut and gets him to save her—by hacking off her feet.

Besides offering a chilling metaphor for the course civilization appears to be taking, this cautionary tale exemplifies the primary means societies long have used to instill the understanding that human appetites must be contained. Since our first ancestors began playing with fire, the precept of self-restraint has been inculcated through a system of formal and informal instruction extending from cradle to grave, from the family dinner table to the halls of government. The means of instruction have ranged from arched eyebrows to grand ethical systems, encompassing myths, sayings, customs, etiquettes, codes of conduct in the trades and professions, religious teachings, art, and literature. Geoffrey Galt Harpham regards this as the foundation of culture: "No matter how hedonistic, materialistic, self-indulgent, wicked, or atomistic they may be, all cultures impose on their members the essential ascetic discipline of 'self-denial'...." Acceptance of certain limits has been a condition of membership.

Since such prescriptive means sometimes fail, all societies have resorted to proscriptive measures as well—taboos, legal statutes, treaties—backed by the threat of force. I don't know if Mme. de Staël had measures of this sort in mind when she called for strengthened checks on human power, but their domain has expanded greatly in the two centuries since she wrote, and many people concerned about the state of the world consider still-wider proscription the best, or perhaps only, way to prevent us from blowing one another to smithereens, extirpating other creatures wholesale, rending the ozone layer beyond repair, and so forth.

Like prescription, unfortunately, proscription commits us to endless war against ourselves. While the first entails battling our own greedy, hateful, and foolish impulses, the second requires battling those same impulses in others, a far more dubious undertaking. There's much to admire in the prescriptive course—in teaching and practicing considerate self-restraint—but evidently it can't stand up to the seductions and shattering effects of modernity. All around the world, noble traditions of restraint have crumbled, and the United States, at the forefront of this trend, has drifted into a deep, future-

less dependence on prescriptive methods at home and abroad, accepting unmatched rates of incarceration here, playing "international policeman" over there. If this continues, the best possible outcome is an enlightened, worldwide, democratic regime of surveillance and punishment, and I see no reason to think such a regime—a "green" totalitarianism—would be happier or more successful than totalitarianism of any other shade.

I suggest a different course, much simpler, though certainly not easy: to practice contentment. In a nation consecrated to the pursuit of happiness, a nation that celebrates needless consumption as the engine of its devouring economy and makes brisk adoption of new technologies a measure of social worth, contentment has a strangely subversive aspect. To practice it is to risk more than falling behind the Joneses or being branded a Luddite and contrarian; it's to risk bringing down the economy and changing the course of civilization as we know it. Oh, well. At least it's free, legal, and fun.

II

Contentment, says the *O.E.D.*, is "Having one's desires bounded by what one has (though that may be less than one could have wished)"—an important qualification—or not being "disturbed by desire of anything more or of anything different." As this definition makes plain, contentment requires no war against one's worst impulses; it entails that acceptance of limits Harpham considers essential to culture but no hair-shirt asceticism. It allows us to wish, even desire, more and different things than we possess, so long as these wishes and desires don't *disturb us*. From this, it follows that contentment of any durable sort must flow from a deep peace of mind. More on this later.

Pleasure comes first: no pleasure, no chance of contentment. The seventeenth-century Anglican cleric Thomas Traherne made the connection smartly in a didactic poem titled, obviously, "Of Contentment."

Contentment is a sleepy thing
If it in death alone must die;
A quiet mind is worse than poverty,
Unless it from enjoyment spring!

This wouldn't be worth quoting except that elsewhere Traherne left ample testimony to his own gleeful contentment. His prose meditations express a pleasure in the world that verges on ecstasy and carries a hint of eros:

Your enjoyment of the world is never aright till every morning you awake in heaven; see yourself in your Father's palace; and look upon the skies and the earth and the air as celestial joys: having such a reverend esteem of all, as if you were among the angels. The bride of a monarch, in her husband's chamber, has no such causes of delight as you.

You never enjoy the world aright till the sea itself floweth in your veins, till you are clothed with the heavens, and crowned with the stars. . . . Till you can sing and rejoice and delight in God, as misers do in gold, and kings in sceptres, you never enjoy the world.

You may perhaps have some pleasant, thrilling, glorious hours, even in a poorhouse. The setting sun is reflected from the windows of the almshouse as brightly as from the rich man's abode; the snow melts before its door as early in the spring. I do not see but that a quiet mind may live as contentedly there, and have as cheering thoughts, as in a palace."

HD THOREAU



HANK MEALS

The prose may be too purple for your taste, but it certainly bespeaks a happy man, a man content to be where he finds himself. I imagine him as a man who would enjoy seeing the shiny, red shoes or a little girl wearing them but would never suppose he needed a pair himself.

For purposes of contrast, consider a passage from Baudelaire, poet maudit of the French Romantics: "Life is a hospital, in which every patient is possessed by the desire of changing his bed. One would prefer to suffer near the fire, and another is certain that he would get well if he were by the window. It seems to me," Baudelaire continues, "that I should always be happy if I were somewhere else, and this question of moving house is one that I am continually talking over with my soul." A century and a half ago, this statement might have seemed provocative, even outrageous, but it now seems an apt description of society at large. If discontentment was the dominant note in Baudelaire's short life, the intervening years have made it the dominant note in too many others'.

Across the Atlantic, Baudelaire's contemporary and opposite, Thoreau, not only laid a modest claim to contentment but elevated it to an ethic. In its opening chapter, he declares that *Walden* isn't intended for "those who find their encouragement and inspiration in precisely the present condition of things, and cherish it with the fondness and enthusiasm of lovers," but then adds, "to some extent, I reckon myself in this number." Given his profound dissatisfactions with society, I suppose he found it untenable to place himself among the fully contented, but it's no contradiction to say that he had chosen contentment as his way and knew it well himself. "Love your life, poor as it is," he urges in the book's final pages:

You may perhaps have some pleasant, thrilling, glorious hours, even in a poorhouse. The setting sun is reflected from the windows of the almshouse as brightly as from the rich man's abode; the snow melts before its door as early in the spring. I do not see but that a quiet mind may live as contentedly there, and have as cheering thoughts, as in a palace.

What Thoreau was working out, in his prose as in his life, was the distinction between contentment and complacency. Can't one live a life of contentment yet also feel critical of society? Can't one be content yet also study, seek, travel, experiment? His essay "Life without Principle" answers in the affirmative:

As for the comparative demand which men make on life, it is an important difference between two [people], that the one is satisfied with a level success, that his marks can all be hit by point-blank shots, but the other, however low and unsuccessful his life may be, constantly elevates his aim. . . . I should rather be the last man,-though, as the Orientals say, "Greatness doth not approach him who is forever looking down; and all those who are looking high are growing poor."

As an urge to raise one's sights, to excel in one's own terms, ambition poses no hazard to contentment, but contentment is beyond reach for those "forever looking down" or "looking high," for those locked into comparison and competition.

Here we return to that foundation of contentment I set aside earlier—peace of mind. Imbedded in Thoreau's evocation of poorhouse contentment is the very phrase Father Traherne used in his poem: "a quiet mind." Thoreau left too much evidence of his own disquiet to let anyone conclude that he enjoyed unruffled contentment, but obviously he experienced it often enough and deeply enough to see that it comes only to a mind at rest, not to a mind prone to perpetual disturbance like Baudelaire's: "this question of moving house is one that I am continually talking over with my soul."

The problem is preoccupation. The din of persistent mental debate is odious in itself and drowns out all except the sharpest stimuli, leaving no room for the delicate sounds, sights, tastes, aromas, and sensations—the nuances of perception—upon which beauty and pleasure usually depend. A mind need not be especially busy, need not be agitated or grossly lost in thought, to be too preoccupied to register the shimmering of light on a rain-wet street, to enjoy the heft and balance of a well-made hand tool, or to notice the extraordinary dexterity of the tongue working in the mouth, moving the toast around for chewing—and only getting bitten itself one time in a million. The world offers subliminal, visceral pleasures every day in numbers beyond counting, and the vast majority of them we squander. Again and again people wake to the splendor of it all only on their deathbeds.

It doesn't help that so many of us now spend virtually all of our time in cars or "climate-controlled" buildings, but sterile, denatured environments aren't our chief obstacle to enjoying the world. Even in Thoreau's day, when life outdoors and manual labor were far less exotic than they are now, his neighbors had difficulty fathoming the amusement (his word) that he found in daily tasks. In a journal entry of October, 1855, he re-

counts the pleasure he had derived from gathering driftwood for his fire from as far as three miles away, reading the history of each stick, studying its grain and the effects of its immersion, and so forth. "Some of my acquaintances have been wondering," he notes, "why I took all this pains" rather than ordering a load of wood from a farmer.

I tell them in despair of making them understand me that it is a profound secret—which it has proved—yet I did hint to them that one reason was that I wanted to get it. . . . The world will never find out why you don't love to have your bed tucked up for you—why you will be so perverse. I enjoy more drinking water at a clear spring than out of a goblet at a gentleman's table. I like best the bread which I have baked, the garment I have made, the shelter which I have constructed, the fuel which I have gathered. [emphasis added.]

Evidently Thoreau's neighbors valued ends over means, efficiency over satisfaction, and this is the bias, so widely shared, that cheats us of most pleasure. A fixation upon results confines pleasure chiefly to completions or consummations, while a practice of contentment locates pleasure in doing as well as having done.

III

Like Thoreau, I've found "the Orientals" my richest source of instruction in contentment. Among my favorite words on the subject are lines from the *Hsin hsin ming*, an ancient verse from the Ch'an school of Chinese Buddhism, forerunner of Zen: "The wise have nothing to do; / the foolish tie themselves in knots." It would be difficult to distinguish the content from the discontent more succinctly. This Ch'an understanding of contentment is rooted not only in classical Buddhist teachings but also in China's indigenous Taoist tradition. Consider Chuang-tzu's description of the sage, as translated by Burton Watson:

Such a man will leave the gold hidden in the mountains, the pearls hidden in the depths. He will see no profit in money and goods, no enticement in eminence and wealth, no joy in long life, no grief in early death, no honor in affluence, no shame in poverty. He will not snatch the profits of a whole generation and make them his private hoard; he will not lord it over the world and think that he dwells in glory. His glory is enlightenment. . . .