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# The Coming Transformation: Values to Sustain Human and Natural Communities

Stephen R. Kellert

James Gustave Speth

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# THE COMING TRANSFORMATION

Values to Sustain Human  
and Natural Communities

STEPHEN R. KELLERT AND JAMES GUSTAVE SPETH  
EDITORS

# **THE COMING TRANSFORMATION**

## **Values to Sustain Human and Natural Communities**

**Stephen R. Kellert and James Gustave Speth**  
EDITORS

**YALE SCHOOL OF FORESTRY & ENVIRONMENTAL STUDIES**  
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*With thanks and appreciation*

*to*

*Albert P. Neilson*

*for his support in making  
this book possible*

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# Preface

*Stephen R. Kellert*

*James Gustave Speth*

This book emerged from a conference sponsored by the Yale School of Forestry & Environmental Studies with the ambitious title, “Toward a New Consciousness: Creating a Society in Harmony with Nature” (held in Aspen, late 2007). The event convened an extraordinary group of some 100 leaders in science, business, policy, the arts, philosophy, religion, and other walks of life to explore the necessity of a fundamental transformation in human values toward the natural world as a necessary and neglected component of arresting the linked environmental and social crises of our time. Based on Gus Speth’s more than thirty years of policy work and Steve Kellert’s equivalent period of scholarly and conservation activity, we had concluded that no degree of legal or regulatory requirement, technological advance, scientific insight, or shift in economic thinking could by itself achieve the needed remedial response to our environmental and social challenge. What was needed as well was a basic alteration in the perception of our place in the natural world.

We recognized that the underlying problem driving many of our environmental and economic problems was a contemporary humanity that had come to erroneously believe that its welfare and well-being relied on the conquest and conversion of nature, and that human progress and civilization was measured by its degree of separation from and even transcendence of the biological world. In the hearts and minds of many had lodged the deep-seated belief that humans could and should live apart from nature, subjecting it to our human will, and if successful, become in the process something altogether different from other species by escaping the constraints of our biology. We appeared to have forgotten that we are very much creatures of our biology and that we evolved for nearly all our evolutionary history in a natural, not an artificial or engineered, context. We had forgotten the unavoidable truth that our bodies,



minds, and even spirit remain inextricably dependent on the quality of our relationship to the natural world, writ large, to the rest of creation. So long as we believed we could live apart from rather than as part of nature, no law or treaty or technology could produce a compatible let alone harmonious relationship to the natural world, or over the long run a sustainable economy or society.

Human values ultimately drive human behavior and these in turn shape our institutions. Until a fundamental transformation in human consciousness occurs regarding our place in nature, the health and integrity of both our natural and human systems remain at risk. As Peter Senge and his colleagues have concluded: “When it is all said and done, the only change that will make a difference is the transformation of the human heart.” Or, as Aldo Leopold asserted more than 60 years ago, conservation will never be accomplished “without creating a new kind of people.” This book reflects the view that to be good stewards of the land, the air, the water, the biota, in effect, the earth, people must be motivated by the conviction that their physical, mental, and spiritual health and well-being remain invariably connected to the integrity of the natural systems of which they are a part.

The good news is that we are seeing the beginning signs of a profound shift in environmental consciousness and, thus, the potential timeliness and importance of this book. Various currents appear at work indicative of a great awakening and transformation of our attitudes toward the natural world. Some of these signs include:

- Expanding awareness of the ominous scale of our environmental impacts, most particularly our fundamentally altering the chemistry of the atmosphere and its associated potential for catastrophic climate change.
- Increasing recognition that economic and political security ultimately rely on the productivity of our natural systems.
- Growing realization that human health and maturation are tied to the quality of our experiential connection to the natural environment.
- Accelerating focus on how business and economy can co-exist, technologically advance, and prosper through adopting the goals of environmental sustainability.

The consequence is that in the U.S., our waters and air are cleaner, the proportion of our land in parks and protected areas greater than ever, fewer species are knowingly brought to the brink of extinction, a vigorous movement is emerging to green our buildings and cities, and the environmental business sector is becoming one of the most rapidly growing segments of our economy. Yet, as is often the case, for every inch forward, there appear two giant steps backward. The enormous emissions of carbon dioxide and other heat trapping gases continue at an ominous pace, many of our natural resources remain depleted, the destruction of natural habitats is at a scale that portends losing a large proportion of the earth's biological diversity, and people are more and more separated from ongoing contact with the natural world.

As suggested, these and other environmental insults will continue – and more importantly, not be reversed – until people are truly convinced in their hearts and minds that the quality of our human existence depends on our ongoing experience and connection to a healthy natural world. This will require not just denying but, more so, celebrating our place in nature, and how we become enriched and elevated by extolling our niche at the pinnacle of life. This book offers varying perspectives on how this challenge of transforming human environmental consciousness can be achieved.

The authors write from a diversity of disciplinary backgrounds and professional perspectives, including business, science, policy, economics, philosophy, religion, the arts, philanthropy, and more. Together, they offer hope, as well as solutions. Above all, they provide a welcoming optimism and sense that we may be at the cusp of a great awakening of respect and reverent appreciation for our role in the great chain of being.

Before beginning, we want to thank those who made the book and conference possible. We want to particularly extend our appreciation to those who funded this effort including the Geraldine R. Dodge Foundation, the Lewis Foundation, and the Yale School of Forestry & Environmental Studies. At Yale, we were assisted by our terrific and dedicated editor, Jane Coppock, and by those who organized the conference, including Tony Leiserowitz, Lisa Fernandez, Mary Evelyn Tucker, John Grim, and a bevy of wonderful, incredibly helpful, and always inspiring students.

# The Coming Transformation: Values to Sustain Human and Natural Communities

*James Gustave Speth*

*Sara Shallenberg Brown Professor in the Practice of Environmental Policy, Yale School of Forestry & Environmental Studies*

Profound changes will be needed to sustain natural and human communities – changes in public policy and changes in individual and social behavior. Most of these changes are difficult and far-reaching by today’s standards, and it is fair to ask what might make such changes possible.

Many of our deepest thinkers and many of those most familiar with the scale of the challenges we face have concluded that the transitions required can only be achieved in the context of what I will call the rise of a new consciousness. For some, it is a spiritual awakening – a transformation of the human heart. For others it is a more intellectual process of coming to see the world anew and deeply embracing the emerging ethic of the environment and the old ethic of what it means to love thy neighbor as thyself. But for all it involves major cultural change and a reorientation of what society values and prizes most highly.

## **JURISDICTIONAL GAP**

Vaclav Havel has stated beautifully the fundamental shift that is needed. “It’s fascinating to me,” he writes, “how preoccupied people are today with catastrophic prognoses, how books containing evidence of impending crises become bestsellers, but how very little account we take of these threats in our everyday activities.... What

could change the direction of today's civilization? It is my deep conviction that the only option is a change in the sphere of the spirit, in the sphere of human conscience. It's not enough to invent new machines, new regulations, new institutions. We must develop a new understanding of the true purpose of our existence on this Earth. Only by making such a fundamental shift will we be able to create new models of behavior and a new set of values for the (Havel, 1998). For Havel and many others, the environmental crisis is a crisis of the spirit. The father of the land ethic, Aldo Leopold, came to believe "that there is a basic antagonism between the philosophy of the industrial age and the philosophy of the conservationist." Remarkably, he wrote to a friend that he doubted anything could be done about conservation "without creating a new kind of people" (quoted in Klinkenborg, 2006).

Two leading scientists, Stanford's Paul Ehrlich and Donald Kennedy, note that "it is the collective actions of individuals that lie at the heart of the [environmental] dilemma," and that "analysis of individual motives and values should be critical to the solution." They call for a Millennium Assessment of Human Behavior "to conduct an ongoing examination and public airing of what is known about how human cultures (especially their ethics) evolve, and about what kinds of changes might permit transition to an ecologically sustainable, peaceful, and equitable global society.... What we are asking for is a cultural change; we know that cultures evolve, and our hope is that the very process of debate will speed that process and encourage change in a positive direction" (Ehrlich and Kennedy, 2005; Ehrlich, 2000).

Paul Raskin and his Global Scenario Group have developed many scenarios of world economic, social, and environmental conditions, including scenarios where there are no fundamental changes in consciousness and values. But without a change in values, all their scenarios run into big trouble. So they favor the "New Sustainability" worldview where society turns "to non-material dimensions of fulfillment...the quality of life, the quality of human solidarity and the quality of the earth.... Sustainability is the imperative that pushes the new agenda. Desire for a rich quality of life, strong human ties and a resonant connection to nature is the lure that pulls it toward the future" (Raskin et al., 2002). The revolution Raskin and his colleagues envision is primarily a revolution in values and consciousness.

Peter Senge and his colleagues in their book *Presence* say that “If the future is going to be different, we have to go far beyond these little piecemeal gestures and begin to see the systems in which we’re embedded.... What would it take to shift the whole?... When all is said and done, the only change that will make a difference is the transformation of the human heart” (Senge et al., 2005).

Two of the leading authorities on religion and ecology, Yale’s Mary Evelyn Tucker and John Grim, believe that to meet the environmental crisis, “we are called to a new intergenerational consciousness and conscience” and that “values and ethics, religion and spirituality” are important factors in “transforming human consciousness and behavior for a sustainable future”(Tucker and Grim, 2007).

Erich Fromm believed that the only hope was a “New Man” and called for “a radical change of the human heart.” “The need for profound human change emerges not only as an ethical or religious demand, not only as a psychological demand arising from the pathogenic nature of our present social character, but also as a condition for the sheer survival of the human race.... [O]nly a fundamental change in human character from a preponderance of the having mode to a predominantly being mode of existence can save us”(Fromm, 1976).

The cultural historian Thomas Berry has described forging a new consciousness as our “Great Work.” “The deepest cause of the present devastation is found in a mode of consciousness that has established a radical discontinuity between the human and other modes of being and the bestowal of all rights on the humans.... “Consistently we have difficulty in accepting the human as an integral part of the Earth community. We see ourselves as a transcendent mode of being. We don’t really belong here. But if we are here by some strange destiny then we are the source of all rights and all values. All other earthly beings are instruments to be used or resources to be exploited for human benefit.”

Berry believes what is required is “a profound reversal in our perspective on ourselves and on the universe about us.... What is demanded of us now is to change attitudes that are so deeply bound into our basic cultural patterns that they seem to us as an imperative of the very nature of our being”(Berry, 1999).

Many similar calls for profound reorientation of prevailing values and worldview could be cited, but I will conclude with Charles Reich’s

1970 *The Greening of America*. Reich coined the terms Consciousness I, II, and III. Consciousness I is “the traditional outlook of the American farmer, small businessman, or worker trying to get ahead.” Reich saw it as most appropriate for the disappearing America of small towns, face-to-face relationships, and individual economic enterprise. Consciousness II is consciousness that was “formed by technological and corporate society, far removed from the realities of human needs. [It] represents the values of an organizational society.”

In Reich’s view, the combination of Consciousness I and Consciousness II “has proved utterly unable to manage, guide, or control the immense apparatus of technology and organization that America has built. In consequence, this apparatus of power has become a mindless juggernaut, destroying the environment, obliterating human values, and assuming domination over the lives and minds of its subjects. Faced with this threat to their very existence, the inhabitants of America have begun...to develop a new consciousness, appropriate to today’s realities.... Consciousness III.... At the heart of everything is what must be called a change of consciousness. This means a new way of living – almost a new man. This is what the new generation has been searching for, and what it has started to achieve” (Reich, 1970).

What these authors and many others are saying is that today’s challenges require a rapid evolution to a new consciousness. That is a profound conclusion. It suggests that today’s problems cannot be solved with today’s mind. That should give us pause, for we know that changing minds can be slow and difficult. This entire area deserves much more investigation and research. Some psychologists contend that changing values is neither necessary nor sufficient for improved environmental behavior, but typically the behavioral changes they study do not extend to the deep and profound transformations sought by those quoted here (for an interesting journey into behavioral psychology, see, e.g., Stern, 2005; Kollmus and Agyeman, 2002; Dietz et al., 2005).

In the end, it is hard to doubt the need for the new consciousness sought by Havel, Raskin and others. Today’s dominant worldview is simply too biased toward anthropocentrism, materialism, egocentrism, contempocentrism, reductionism, rationalism, and nationalism to sustain the changes needed. That being the case, two important questions emerge. First, what are the dimensions of the

change in consciousness required by today's circumstance, and, second, what can be said about forces that can drive cultural and consciousness change of the type and on the scale needed?

## **A NEW WORLDVIEW**

One excellent summation of the dimensionality of the needed cultural change is provided by Paul Raskin in his work on the Great Transition Initiative ([www.gtinitiative.org](http://www.gtinitiative.org)). Raskin's device is to write from the vantage point of someone in the second half of this century looking back on the dominant value shifts that occurred earlier. His is a history of the future. Here is what he sees:

“The emergence of a new suite of values is the foundation of the entire edifice of our planetary society. Consumerism, individualism, and domination of nature – the dominant values of yesteryear – have given way to a new triad: quality of life, human solidarity, and ecological sensibility.”

“That the enhancement of the ‘quality of life’ should be the basis for development is now so self-evident, it must be remembered that, over the eons, the problem of scarcity and survival...dominated existence. Then, the industrial cornucopia, while unleashing an orgy of consumption among the privileged and desperation among the excluded, opened the historical possibility for our post-scarcity planetary civilization. People are as ambitious as ever. But fulfillment, not wealth, has become the primary measure of success and source of well-being.”

“The second value – ‘human solidarity’ – expresses a sense of connectedness with people who live in distant places and with the unborn who will live in a distant future. It is a manifestation of the capacity of reciprocity and empathy that lies deep in the human spirit and psyche, the ‘golden rule’ that is a common thread across many of the world’s great religious traditions. As a secular doctrine, it is the basis for the democratic ideal and the great social struggles for tolerance, respect, equality, and rights.”

“With their highly evolved ‘ecological sensibility’, people today are both mystified and horrified by the feckless indifference of earlier generations to the natural world. Where the right to dominate nature was once sacrosanct, people today hold a deep reverence for the natural world, finding in it endless wonder and enjoyment. Love of nature is complemented by a deep sense of humanity’s place in the web of life, and dependence on its bounty. Sustainability is a core part of the contemporary worldview, which would deem any compromise of the integrity of our planetary home both laughably idiotic and morally wrong” (Raskin, 2006).

In Raskin’s view, these “universal principles that underpin global society did not fall from the sky. They were shaped by our forebears in the great historical projects for human rights, peace, development, and environment.” Indeed, it is quite impossible to read together the Universal Declaration of Human Rights, the declarations of the major United Nations conferences of the 1990s, the U.N.’s Millennium Development Goals, the Earth Charter, the World Charter for Nature and other internationally agreed statements of humanity’s values and goals and not be tremendously impressed by the qualities of these aspirations (and also depressed by the depth of our failure to meet them).

Like Raskin, David Korten in *The Great Turning* sees humanity at a turning point, a pivot in history, and puts new values front and center: “The Great Turning begins with a cultural and spiritual awakening – a turning in cultural values from money and material excess to life and spiritual fulfillment, from a belief in our limitations to a belief in our possibilities, and from fearing our differences to rejoicing in our diversity. It requires reframing the cultural stories by which we define our human nature, purpose, and possibilities....”

“The values shift of the cultural turning leads us to redefine wealth – to measure it by the health of our families, communities, and natural environment. It leads us from policies that raise those at the top to policies that raise those at the bottom, from hoarding to sharing, from concentrated to distributed ownership, and from the rights of ownership to the responsibilities of stewardship (Korten, summer 2006 and 2006).”

The most serious and sustained effort to date to state a compelling ethical vision for the future is the Earth Charter, which is gaining wide



endorsement and support around the world. The Earth Charter is an eloquent statement of the ethical principles needed to “bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace.” By 2005, over 2,000 organizations representing tens of millions of people had endorsed the Earth Charter.

Another way of describing the values and worldview that are needed is to identify the transitions that are required to move successfully from today to tomorrow:

- from seeing humanity as something apart from nature, transcending and dominating it, to seeing ourselves as part of nature, offspring of its evolutionary process, close kin to wild things, and wholly dependent on its vitality and the finite services it provides;
- from seeing nature in strictly utilitarian terms, humanity’s resource to exploit as it sees fit for economic and other purposes, to seeing the natural world as having both intrinsic value independent of people and rights that create the duty of ecological stewardship;
- from discounting the future, focusing severely on the near term, to empowering future generations economically, politically and environmentally and recognizing duties to yet unborn human and natural communities well into the future;
- from hyper-individualism, narcissism, and social isolation to powerful community bonds reaching from the local to the cosmopolitan and to profound appreciation of interdependence both within and among countries;
- from parochialism, sexism, prejudice and ethnocentrism to tolerance, cultural diversity, and human rights;
- from materialism, consumerism, getting, the primacy of possessions, and limitless hedonism to personal and family relationships, leisure play, experiencing nature, spirituality, giving, and living within limits;
- from gross economic, social and political inequality to equity, social justice, and human solidarity. (See, e.g., Wei-ming (1994); Metzner

(1994); Max-Neef (1992); Berry (2006); Kellert and Farnham (2002); Merchant (1992); Mellor (1997); Kumar (2002); Appiah (2006); McKibben (2007); Callicott (1989) and (1994); and Ferkiss (1993)).

Overcoming human alienation from nature requires a re-enchantment with the natural world, making it again a place of wonder, a magnificent stage for life's daily unfolding before us. Max Weber noted, with regret I think, that science and intellectualization had disenchanting the world for us. Yet George Levine, in his delightful book *Darwin Loves You*, notes that even that ultimate disenchanter of nature, Charles Darwin, "with all his pains, illnesses, losses, loved the earth and the natural world he gave his life to describing; he found value and meaning in it; he argued that the human sense of value, which he regarded as the world's highest achievement, grew out of the earth, and this genealogy, he believed, did not degrade but ennobled" (Levine, 2006).

Poets and indigenous peoples are best at finding the human place in nature. Oren Lyons, Faithkeeper of the Onondaga Nation, addressed the delegates of the United Nations with these words: "I do not see a delegation for the four-footed. I see no seat for the eagles. We forget and we consider ourselves superior, but we are after all a mere part of the Creation. And we must continue to understand where we are. And we stand between the mountain and the ant, somewhere and there only, as part and parcel of the Creation. It is our responsibility since we have been given the minds to take care of these things" (Lyons, 1977).

## **FORCES FOR CHANGE**

The very practical and very difficult question is – what might spur human sensibilities in these directions? When one considers our world today, with its widespread ethnic hatreds, intra-state warfare and immense violence, militarism and terrorism, not to mention the dysfunctional values already addressed, the task can seem hopelessly idealistic. In truth, it is precisely because of these calamities, which are linked in many ways, that one must search for answers and hope desperately to find them.

There is a vast literature on cultural change and evolution. In what spirit, then, should we take up the question of spurring change? The goal must be forging cultural change, not waiting on it. Here, the insight of Daniel Patrick Moynihan is helpful: "The central

conservative truth is that culture, not politics, determines the success of a society. The central liberal truth is that politics can change a culture and save it from itself” (quoted in Harrison, 2006). Historian Harvey Nelsen has asked the right question: “How...can politics save a culture from itself?” “There is only one way,” he answers, “through the development of new consciousness.”(Nelson, undated). People have conversion experiences and epiphanies. Can an entire society have a conversion experience?

Unfortunately, the surest path to widespread cultural change is a cataclysmic event that profoundly affects shared values and delegitimizes the status quo and existing leadership. The Great Depression is a classic example. I believe that both 9/11 and Hurricane Katrina could have led to real cultural change in the United States, both for the better, but America lacked the inspired leadership needed.

The most thorough look at this issue from the perspective here is Thomas Homer-Dixon’s *The Upside of Down*. He argues

“that our circumstances today are surprisingly like Rome’s in key ways. Our societies are also becoming steadily more complex and often more rigid. This is happening partly because we’re trying to manage – often with limited success – stresses building inside our societies, including stresses arising from our gargantuan appetite for energy... Eventually, as occurred in Rome, the stresses may become too extreme, and our societies too inflexible to respond, and some kind of economic or political breakdown will occur...”

“People often use the words ‘breakdown’ and ‘collapse’ synonymously. But in my view, although both breakdown and collapse produce a radical simplification of a system, they differ in their long-term consequences. Breakdown may be serious, but it’s not catastrophic. Something can be salvaged after breakdown occurs and perhaps rebuilt better than before. Collapse, on the other hand, is far more harmful...”

“In coming years, I believe, foreshocks are likely to become larger and more frequent. Some could take the form of threshold events – like climate flips, large jumps in energy prices, boundary-crossing outbreaks of new infectious disease, or international financial crises (Homer-Dixon, 2006).”

Homer-Dixon argues that foreshocks and breakdowns can lead to positive change if the ground is prepared. “We need to prepare to turn breakdown to our advantage when it happens – because it will,” he says. Homer-Dixon’s point is critically important. Breakdowns, of course, do not necessarily lead to positive outcomes; authoritarian outcomes and Fortress World are also possibilities. Turning a breakdown to advantage will require both inspired leadership and a new story that articulates a positive vision grounded in what is best in the society’s values and history.

A Congressman is said to have told a citizens group, “If you will lead, your leaders will follow.” But it doesn’t have to be that way. Harvard’s Howard Gardner stresses this potential of true leadership in his book *Changing Minds*: “Whether they are heads of a nation or senior officials of the United Nations, leaders of large, disparate populations have enormous potential to change minds...and in the process they can change the course of history. I have suggested one way to capture the attention of a disparate population: by creating a compelling story, embodying that story in one’s own life, and presenting the story in many different formats so that it can eventually topple the counterstories in one’s culture.... [T]he story must be simple, easy to identify with, emotionally resonant, and evocative of positive experiences” (Gardner, 2006; see also Burns, 2003).

There is some evidence that Americans are ready for another story. As noted, large majorities of Americans, when polled, express disenchantment with today’s lifestyles and offer support for values similar to those discussed here. But these values are held along with other strongly felt and often conflicting values, and we are all pinned down by old habits, fears, insecurities, social pressures and in other ways. A new story that helps people find their way out of this confusion and dissonance could help lead to real change.

Gardner’s stress on story and narrative is thus important. Bill Moyers, a powerful force for good in our country, has written that “America needs a different story.... Everywhere you turn you’ll find people who believe they have been written out of the story. Everywhere you turn there’s a sense of insecurity grounded in a gnawing fear that freedom in America has come to mean the freedom of the rich to get richer even as millions of Americans are dumped from the Dream. So let me say what I think up front: The leaders and

thinkers and activists who honestly tell that story and speak passionately of the moral and religious values it puts in play will be the first political generation since the New Deal to win power back for the people.... Here, in the first decade of the 21<sup>st</sup> century, the story that becomes America's dominant narrative will shape our collective imagination and hence our politics" (Moyers, 2007).

If Moyers addresses the social aspects of our need for a new narrative, many other authors have begun to develop new stories of our relationship with nature – Thomas Berry in *The Dream of the Earth* (1988), Carolyn Merchant in *Reinventing Eden* (2003), Evan Eisenberg in *The Ecology of Eden* (1998), Bill McKibben in *Deep Economy* (2007), and others.

One story that needs to be told is about a people who set out on a journey – a journey through time – to build a better world for themselves and their children. High minded and full of hope as they began, they accomplished much in their quest. But they became so enamored of their successes, indeed captured by them, that they failed to see the signs that pointed in new directions, and they became lost. Now they must find their way back to the right path.

Another source of value change is social movements. Social movements are all about consciousness raising, and if they are successful they can usher in a new consciousness. We speak casually about the environmental movement. We need a real one. One can hear echoes of Reich in Curtis White's book, *The Spirit of Disobedience* (2007):

"Although the sixties counterculture has been much maligned and discredited, it attempted to provide what we still desperately need: a spirited culture of refusal, a counterlife to the reigning corporate culture of death. We don't need to return to that counterculture, but we do need to take up its challenge again. If the work we do produces mostly bad, ugly, and destructive things, those things in turn will tend to recreate us in their image."

"If we're concerned about the kind of human future we are creating, we must also be concerned with how we are living in the present. Unhappily, how we live is presently the near exclusive concern of corporations and media conglomerates which have, together, turned every Main Street into the same

street and made the inside of every American head echo with the same vacuous music and movie/TV scenarios. This is the arena in which a spiritualized disobedience means most.”

Another way forward to a new consciousness should lie in the world’s religions. Mary Evelyn Tucker has noted that “no other group of institutions can wield the particular moral authority of the religions,” and that “the environmental crisis calls the religions of the world to respond by finding their voice within the larger Earth community. In so doing, the religions are now entering their ecological phase and finding their planetary expression” (Tucker, 2003). The potential of faith communities is enormous. About 85 percent of the world’s people belong to one of the 10,000 or so religions, and about two-thirds of the global population are Christian, Muslim or Hindu. Religions played key roles in ending slavery, in the civil rights movement, and in overcoming apartheid in South Africa, and they are now turning attention with increasing strength to the environment. (See generally National Religious Partnership for the Environment, [www.nrpe.org](http://www.nrpe.org). See also Gardner (2006); Speth (Spring 2007); Edgar (2006); Rockefeller and Elder (1992); Wilson (2006); and Jones (2003)).

Finally, there is the great importance of sustained efforts at education (Orr, 2004; Rowe, 2007, and sources cited therein). Here one should include education in the largest sense as embracing not only formal education but also day-to-day and experiential education. It includes education we get from personally experiencing nature in all its richness and diversity. My colleague Steve Kellert has stressed that such exposure, especially for children, is important to well-being and human development (Kellert, 2005). Education in this broad sense also includes the fast-developing field of social marketing. Social marketing has had notable successes in moving people away from bad behaviors such as smoking and drunk driving, and its approaches could be applied to larger themes as well (Andreasen, 2006).

All of these forces for change are potentially complementary: a calamity or breakdown (or, ideally, the public anticipation of one brought on by many warnings and much evidence); occurring in the presence of wise leadership and a new narrative that helps make sense of it all and provides a positive vision; urged on by a demanding citizens’ movement that fuses social and environmental causes;

informed and broadened by well-conceived social marketing campaigns; joined by a contagious proliferation of real-world examples that point the way. It is not difficult to envision such circumstances coming together. Except for a real calamity, they are within the power of citizens to make happen.

There was a real calamity off Santa Barbara, California in 1969 – a huge oil leakage from the Union Oil Company’s offshore drilling operation that turned beaches black, destroyed fish and wildlife, and, more than any single event, catalyzed the remarkable environmental progress of the 1970s. Drawing on what had just happened to them, citizens in Santa Barbara found a new consciousness and were inspired to write the Santa Barbara Declaration of Environmental Rights: “We, therefore, resolve to act. We propose a revolution in conduct toward an environment which is rising in revolt against us. Granted that ideas and institutions long established are not easily changed; yet today is the first day of the rest of our life on this planet. We will begin anew.”

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# A Biocultural Basis for an Environmental Ethic

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The historian Lynn White in his seminal *Science* (1967) publication nearly a half century ago suggested that the roots of the contemporary environmental crisis lie in our values and our culture that largely support assumptions such as: 1) a fundamental difference separating humans from nature; 2) humans as inherently superior to the natural world; and, 3) people having the right to exercise control over the natural world relatively unrestrained by an ethical concern for the rights of natural objects, although bound by moral obligations to treat nature well to the extent that it affects ethical relations among people. White concluded that the resolution of the current scale of environmental destruction would necessitate a basic change in our values and ethics toward the natural world.

Many critics have taken exception to various White claims, citing more benign and conservation-oriented traditions in Western culture and in modern society (Dobel, 1977; Farley, 2002; Moncrief, 1970; Passmore, 1974). Still, I believe his thesis is mainly correct and an appropriate diagnosis of the current challenge – i.e., we will not effectively resolve the scale of our contemporary environmental crisis until we have fundamentally altered our values and ethical relations to the natural world. Clearly, important and progressive change has occurred in perceptions of nature during the past half-century, resulting in improved treatment and stewardship of aspects of the natural environment. I believe these changes, however, continue to be limited, selective, and insufficiently effective and comprehensive. Moreover, our society continues to rely mainly on expansion in scientific knowledge, new management technologies, and legal and

regulatory controls to address our environmental problems. The overall inadequacy of this approach is suggested by, despite impressive gains and improvements, few major environmental challenges having been resolved and, indeed, many appearing to be demonstrably worse. More than ever I would support White's diagnosis that a basic shift in values and ethical relations to the natural world will be required *not only* to mitigate and avoid various environmental woes but, *as importantly*, to enhance our physical and mental well-being, which is contingent upon the quality of our relational ties to the natural world. Less this vision seem hopelessly unrealistic, I would suggest that such a change is not only possible but practical, and can occur far more rapidly than generally assumed, as I hope to illustrate later in this chapter.

I want to suggest, however, that the emergence of values that give rise to and sustain a new ethic toward the natural world will need to be based on a greatly expanded understanding of human self-interest and biological dependence on the natural world, although recognizing the particular human capacity to exercise choice and free will in choosing our values and ethical relations. By contrast, I believe the articulation of an environmental ethic that relies on assumptions of a rigid biological and narrow utilitarian dependence on the natural world, or an infinite capacity to construct seemingly right relationships to nature, will ultimately be unsustainable, unconvincing, and worse, misguided. What is suggested here is a *biocultural* perspective, one that views human values and ethical relations toward the natural world as bounded by the biological requirements of our species but greatly shaped, influenced, and mediated by individual and cultural learning and experience.

To elucidate this position, I need to place this biocultural perspective within the context of two basic ethical arguments or positions, although since I am not trained as an environmental ethicist, you will need to be tolerant of my crude delineations of these positions. The biocultural perspective of environmental values and ethics advanced in this paper roughly falls within the so-called *utilitarian* or *instrumental* ethical viewpoint, although, as will be seen, in a somewhat new and greatly expanded sense. The utilitarian perspective roughly argues that an environmental action is morally just or right if it contributes to the greatest good for people now and

into the future. Thus, environmental objects or subjects rather than being a moral end in themselves are the means to a human end – e.g., just or ethical treatment advances human justice, goodness, fulfillment, happiness, physical and mental well-being, and so on. By contrast, a so-called *rights-based* or *biocentric* ethic suggests that environmental objects or subjects are a moral end in themselves, possessing intrinsic or inherent value independent of how they may or may not advance human interest, benefit, or well being. This position regards nature as morally valuable simply because it exists and is the recipient, for example, of our love and affection, appreciation of its beauty, or the spiritual qualities it may evoke independent of its utility.

A utilitarian or instrumental environmental ethic has often been associated with harm and injury to the natural world that diminishes human material security and physical well-being. For example, extinguishing a species or causing pollution is viewed as morally reprehensible because it damages the utility that might be derived from, for example, eventually exploiting the biogeochemistry inherent in any biotic form, or because it potentially inflicts injury to human health, often among the most vulnerable such as children and the poor.

I regard this depiction of utilitarianism as more precisely a *narrow utilitarianism* that may be useful but ultimately is an inadequate basis for advancing a meaningful, accurate, and relevant environmental ethic, for several reasons. One, most species and habitats don't currently yield and probably never will generate much material advantage, and environmental pollution (with the exception of global climate change) affects only a relatively small percentage of people and typically can be remedied through technical rather than ethical means. Second, people can in most circumstances advance an equally compelling narrow utilitarian ethic that argues for the elimination of a species or the occurrence of some form of pollution to protect the needs of people and society. Third, the seeds of destruction may be sown in any ethical calculus that promotes the value of only a fraction of the natural world, suggesting the expendability of the rest depending on compelling human circumstances. Fourth, a narrow utilitarian ethic offers only a partial and inadequate understanding of human biological dependence on the natural world for advancing human physical and mental well-being.

Before elucidating this last point, which is the basis for the ethic advocated in this paper, I want briefly to indicate why I believe an intrinsic rights or biocentric ethic is also equally flawed in generating a convincing and pragmatic environmental ethic. The basic problem of a biocentric position in extending moral worth and standing to the natural world is that it offers little practical guidance and convinces few. For example, how does one from this perspective choose between species or, more importantly, between human welfare and the well-being of species or nature more generally? A biocentric position offers limited assistance in situations where an ethic is most needed – i.e., not the choice between good versus bad but between competing and compelling goods. Additionally, a biocentric ethic, by being indifferent to the preferences and needs of most people, convinces few and is, therefore, politically unrealistic and untenable. I do not want to deny the possibility that in an ideal future an enlightened humanity could be swayed by a biocentric or rights-based environmental ethic. For the moment, I wish to defer its consideration for several reasons, including the following:

- 1) A biocentric ethic is difficult to demonstrate and prove.
- 2) This perspective possesses only a limited ability to convince the environmentally ambivalent and/or non-committed.
- 3) This ethical position is marginally practical or politically relevant in rendering difficult policy choices.
- 4) There is so much more to learn about the human tendency to value nature and how it contributes to human physical and mental well-being.

This last point brings us back to the biocultural position advanced in this paper, based on a greatly expanded understanding of human biological self-interest influenced and mediated by culture, learning, and experience. This perspective can be viewed as a sort of *environmental ethic of the middle way* lodged somewhere between a narrow utilitarianism and a rights-based biocentric position, although I recognize that in these matters one cannot be a little pregnant. Still, I want to suggest that a broad utilitarian-based ethic can encompass many of the arguments traditionally advanced to rationalize and support a biocentric environmental ethic such as

nature defended as a source of affection, love, beauty, and spiritual inspiration. I will, thus, offer an environmental ethic based on an understanding of human biology and culture that connects human physical and mental well-being not only to material and commodity advantage, but also to a host of equally compelling benefits people derive from their inclination to value nature for its aesthetic, emotional, intellectual, moral, and other qualities. This environmental ethic, in other words, marries a narrow instrumentalism with critical aspects of a rights-based or biocentric perspective. It represents a position occasionally articulated by others such as, for example, Edward O. Wilson (1993: 37), in making the ethical case for conserving biological diversity:

“What humanity is now doing [by the large-scale loss of biological diversity] will impoverish our descendants for all time to come. Yet critics often respond ‘so what’? The most frequent argument is one of material wealth at risk. This argument is demonstrably true but contains a dangerous flaw – if judged by potential value, species can be priced, traded off against other sources of wealth, and when the price is right, discarded.... The species-right argument...., like the materialist argument alone, is a dangerous play of cards.... The independent-rights argument, for all its directness and power, remains intuitive, aprioristic, and lacking in objective evidence.... A simplistic adjuration for the right of a species to live can be answered by a simplistic call for the right of people to live.... In the end, decisions concerning preservation and use of biodiversity will turn on our values and ways of moral reasoning. A sound ethic... will obviously take into account the immediate practical uses of species, but it must reach further and incorporate the very meaning of human existence.... *A robust, richly textured, anthropocentric ethic can instead be made based on the hereditary needs of our species, for the diversity of life based on aesthetic, emotional, and spiritual grounds.*” (emphasis added)

The case here for a greatly expanded instrumental environmental ethic hinges on relating values such as material utility, aesthetics, emotional connection, spirituality, and more to human biology as



well as to the particular capacity of people to exercise choice and free will in constructing personality, culture, and society. In making this ethical argument, I will invoke the concept of *biophilia* (Wilson, 1984; Kellert and Wilson, 1993; Kellert, 1997), which can be simply defined as a complex of *weak* biological tendencies to value nature that includes material, aesthetic, emotional, intellectual, spiritual, and other basic dependencies on the natural world that contribute to human physical and mental well-being. Because biophilia is viewed as an inherent tendency, it is fundamentally rooted in assumptions regarding human biology and evolution and, in effect, an argument for an ethic of care and conservation of nature based on long-term individual and collective self-interest. As the biophilic tendency to value nature is regarded as a *weak* inherent inclination, it assumes these affinities for the natural world must be learned, although as genetically encoded features, they can be taught relatively quickly. In other words, the biophilic values are highly shaped, mediated, and conditioned by experience and culture. Thus, biophilia is a bio-cultural construct where the inherent tendency to value nature is greatly influenced by human choice, creativity, and free will. Because the biophilic values depend on learning and experience, they are potentially expressed in both adaptive and maladaptive ways.

Nine biophilic values or inherent tendencies to impute worth and importance to the natural world have been identified (Kellert, 1996, 1997). Reflecting the influence of learning and culture, each value is highly variable among individuals and groups, but as expressions of human evolution, reflect a range of physical and mental benefits when adaptively revealed. All the biophilic values confer advantages, but being reliant on learning and social support can be potentially distorted and dysfunctionally expressed. The nine values, thus, reflect the richness of the human dependence on the natural world for fitness and security, and when collectively revealed, constitute a web of relational dependency so pronounced that an ethic of care and concern for nature may emerge from a profound realization of self-interest.

It would take far more space than available to detail all nine values and the various ways they may potentially contribute to human well being. For illustrative purposes, five of these values will be briefly described: specifically, a utilitarian value that most closely embraces

the narrow instrumental basis for an environmental ethic, as well as four others – the aesthetic, scientific, humanistic, and moralistic values – often associated with a rights-based or biocentric position because of their focus on appreciating nature as a source of knowledge, love, beauty, and spirituality. Before proceeding, one-sentence definitions of all nine values and frequently observed adaptive benefits are noted in the table below.

**Table 1 Typology of biophilic values of nature**

<i>Value</i>	<i>Definition</i>	<i>Function</i>
<b>Aesthetic</b>	Physical attraction and appeal of nature	Harmony, security, creativity
<b>Dominionistic</b>	Mastery and control over nature	Physical prowess, self-confidence, mastery skills
<b>Humanistic</b>	Emotional bonding with nature	Bonding, cooperation, companionship
<b>Naturalistic</b>	Exploration and discovery of nature	Order, meaning, connection
<b>Moralistic</b>	Moral and spiritual relation to nature	Curiosity, exploration, discovery
<b>Negativistic</b>	Fear and aversion of nature	Safety, protection, awe
<b>Scientific</b>	Systematic and empirical study of nature	Knowledge, understanding, critical thinking skills
<b>Symbolic</b>	Nature in language and expressive thought	Communication, mental development, analytical skills
<b>Utilitarian</b>	Material and physical exploration of nature	Physical sustenance, material productivity, survival skills

A *utilitarian* value reflects the human inclination to affiliate with nature for its material and commodity advantage. The term is somewhat misleading since all the biophilic values are viewed as advancing human welfare. People have always recognized the natural world as an indispensable source of physical sustenance and security. Despite this ancient reliance, modern society often views the domestication of the wild as a measure of progress reflected in industrial agriculture and related large food surpluses, an abundance of technically produced consumer goods, relative physical health achieved through suppressing other organisms, and the massive

transformation of natural into human-made buildings and landscapes integral to urbanization. This belief in progress as the measure of our material independence from nature is an illusion. People continue to depend largely on the natural world as an irreplaceable source of food production, medicines, building supplies, and other essential areas of commodity production. Moreover, this utilitarian reliance will expand greatly as a consequence of rapid advances in systematics, molecular biology, and bioengineering that all portend a revolution in new product development. Additionally, people rely even more basically on various ecosystem services such as decomposition, pollination, oxygen and water production, and others to sustain life. Apart from these obvious sources of material advantage, people obtain a host of physical and mental rewards from nurturing their physical dependence on nature in the absence of necessity. They pursue a variety of harvesting activities because these pursuits nourish their ability to extract with skill a portion of their needs from the land. Beyond the material gains, they also reap physical fitness, feelings of independence and self-sufficiency, and self-confidence.

A *scientific* value reflects the human desire to know the world with understanding and authority. This tendency occurs among all cultures because it has facilitated the development of intellectual and cognitive capacities through systematic study and observation. The natural world provides an extraordinary array of opportunities for sharpening critical thinking skills and problem-solving abilities. Empirically and methodically examining nature builds capacities for acquiring knowledge and understanding, as well as sharpens analytical and evaluative aptitudes. Other contexts exist, especially in modern society, for advancing these cognitive abilities, but contact with nature provides an especially stimulating and almost always accessible means for nurturing intellectual competence, especially in the young and developing person. Moreover, simply by chance, the knowledge gained from intellectual pursuits pursued independent of their immediate utility often yield tangible and practical gains over time. In exploring the mysteries of nature people expand their realization of how much they can benefit from comprehending even a fraction of the extraordinary complexity of the biophysical world.

An *aesthetic* value reflects the human appreciation of nature as a source of physical attraction and beauty. Few experiences in people's

lives exert as consistent and powerful an impact as the aesthetic appeal of certain features of the natural world. Even the most insensitive person would likely be unable to resist feelings of attraction to certain aesthetically compelling elements in nature no matter how fitfully expressed. Studies in various cultures have demonstrated a consistent and widespread inclination to respond to the attractiveness of certain landscapes, species, and other features of the natural world (Ulrich, 1993). Yet, a tendency exists to undervalue the significance of our aesthetics of nature. Even the well-known environmentalist, Norman Myers, has remarked (Myers, 1979: 46), “the aesthetic argument for [environmental conservation] is virtually a prerogative of affluent people with leisure to think about such questions.” Yet, it appears that an aesthetic value of nature occurs universally among humanity and is, thus, genetically encoded, reflecting a tendency that developed evolutionarily because it yielded a variety of functional benefits.

What might be some elements of this adaptive significance? Recognizing beauty in nature can engender an awareness and appreciation of balance, symmetry, harmony, and grace. Unity and order observed in natural features inspire and instruct, offering a kind of quasi-design model and template, where through mimetic adaptation, analogous qualities of excellence and refinement can be captured in human life. Aesthetic preference for certain natural features can also be linked to the enhanced likelihood of achieving safety, sustenance, and security. People across the globe typically favor landscapes with clean and flowing water, that enhance sight and mobility, that possess bright and flowering colors, and other features which over time have proven instrumental in human survival (Heerwagen and Orrians, 1993; Hildebrand, 2000; Ulrich, 1993). At a very basic level of experience, the aesthetic appeal of nature reflects being attracted or drawn to the most information-rich environment people will ever encounter (Wilson, 1984). Through this attraction, people engage their sense of wonder, curiosity, and imagination and, as a consequence, increase their capacity for exploration, discovery, and creativity, all adaptive capacities in the struggle to survive and thrive.

A *humanistic* value reflects the ability of the natural world to provoke human affection and emotional attachment. This occurs

through the companionship of other animals, but also through special fondness for certain plants and landscapes. These feelings of emotional attachment offer people opportunities for expressing and experiencing intimacy, relationship, connection, and sometimes a feeling of kinship. By contrast, isolation and aloneness represent heavy burdens for most people. With rare exceptions, people crave the companionship and affection of others, and affiliating with other species, even plants and landscapes, can provide an important source of trust and relationship. Bonding with others can be a significant pathway for cultivating the capacities for cooperation and sociability, especially functional for a largely social human species. People covet responsibility for others and gratefully receive their affection and allegiance. Caring and being cared for by another creature and, more generally, by nature provides opportunities for expressing affection and building a sense of affiliation and fondness. These feelings accrue under normal circumstances, but become especially pronounced during moments of crisis and disorder. The caring and intimacy of other life is often mentally and physically restorative, whether expressed in the giving and receiving of flowers, contact with companion animals, or the experience of gardens, seashores, and other habitats.

A *moralistic* value reflects nature's ability to be a source of moral and spiritual inspiration. The philosopher Holmes Rolston remarked (Rolston, 1986: 88): "Nature is a philosophical resource, as well as a scientific, recreational, aesthetic, or economic one. We are programmed to ask why and the natural dialectic is the cradle of our spirituality." This spiritual insight is often derived from the perception of a seeming similarity that unites life despite its extraordinary diversity, reflected, for example, in some 1.4 million classified and an estimated 10 to 100 million extant species (Wilson, 1992). Despite this remarkable variability, most people recognize living creatures as often sharing analogous circulatory and reproductive features, parallel bodily parts, and common genetic structures. The perception of this unity and connection suggests an underlying order that often provides a cornerstone for spiritual and moral belief. Discerning universal patterns in creation intimates that at the core of human existence exists a fundamental logic, order, perhaps even harmony and goodness. Faith and confidence are nurtured by recognizing an

underlying unity that transcends and mutes our individual separation, isolation, and aloneness.

Five of nine biophilic values have been briefly described here. Each value reflects weak genetic tendencies or prepared learning rules to affiliate with the natural world that developed over evolutionary time because of their proven instrumental significance in advancing human physical and mental well-being. The nine values collectively reflect the richness of the human reliance on nature as a basis for adaptive fitness and security. Together, they provide the basis for an environmental ethic rooted in a greatly expanded realization of self-interest that encompasses a conventional utilitarian understanding of material and commodity advantage, but also the functional importance of nature as a source of beauty, love, intellect, spiritual inspiration, and more. When these values are functionally expressed, they comprise a web of relational dependency that rationalizes and supports an ethic of care and responsibility for the natural world. Yet, this is a difficult achievement. It requires the functional and adaptive expression of most if not all of the nine values, none so weakly evident as to be atrophied or so strongly evident as to be inordinately exaggerated. Each value represents one string of relationship to nature that need occur in a balanced and adaptive fashion; a powerful ethic toward the natural world depends on most if not all occurring in what can be called "*right relationality*." To add to this complexity, legitimate variation occurs among individuals and cultures as a consequence of developing these weak tendencies, although the adaptability of this variability is bounded by human biology, underscoring again the biophilic values as biocultural phenomena.

Before concluding, I would like to offer a brief illustration of how significant changes in the nine values can lead to profound shifts in ethical relationships and policies toward the natural world. This historic example supports three important points in this chapter. First, it suggests that an expanded appreciation for nature can foster equally radical changes in ethical and moral relations. Second, it reveals how changes in values and ethics can trigger pronounced shifts in legal and regulatory policies. Third, it suggests that such a transformation in values, ethics, and policies can occur in a shorter time period than often presumed, suggesting the practical significance of an ethical strategy as a basis for advancing significant environmental change.

This historic illustration involves profound changes in values, ethics, and policies toward large cetaceans during the latter half of the 20<sup>th</sup> century. Like all examples, there is danger in losing sight of the general point in examining the specific case. So, please keep in mind, it matters little if you are interested in whales or whether or not you agree or disagree with current policies toward this creature. This case is offered to illustrate the relationship between values, ethics, and policy, and how pronounced shifts in all three can occur in a surprisingly brief and relevant period of time.

This will be a cursory review unable to examine in detail the historic decline and recent uneven recovery of many cetacean species. The most obvious cause of the decline of the great whales was their excessive commercial exploitation with, as recently as 1960, whales comprising approximately 15 percent of the world's so-called *fish catch* (Kellert, 1996; Lavigne, Scheffer, and Kellert, 1999). The endangerment of most whale species was fueled by assumptions regarding their inexhaustibility and the relatively easy product substitution of one species with another. Additionally important factors in their decline were large capital equipment expenditures, large and reinvested surplus profits, absent property rights in the open ocean, a tendency to manage all species alike, ineffectual regulatory practices, the enormous efficiency of new harvesting and processing technologies and, of course, widespread scientific ignorance. Underlying and motivating all these factors were a narrow set of exaggerated values that rendered the excessive and often cruel exploitation of whales both morally justifiable and ethically acceptable. These creatures were, in effect, viewed and treated from the perspective of three values – an exaggerated utilitarianism, an inordinate desire to master and dominate them, and a tendency to see these animals as monstrous fish. Most people by the 20<sup>th</sup> century, of course, recognized that whales were not fish but they continued to treat them in this way.

Important attitudinal changes in values and perceptions toward large cetaceans mainly occurred following World War II. These changes, probably not coincidentally, happened in parallel with the rise of the modern conservation movement, prompting Gilbert Grosvenor, then head of The National Geographic Society, to observe (1976: 721), “The whale has become a symbol for a new way of

thinking about our planet.” A sense of impending catastrophe loomed as the world contemplated the largest creature the planet had ever known being knowingly eliminated. The marine biologist Kenneth Norris (1978: 320) proclaimed, “No other group of large animals has had so many of its members driven to the brink of extinction.” Significant advances in marine science following World War II also resulted in vastly expanded assumptions regarding the advanced intelligence, social behavior, and communication abilities of whales. These creatures suddenly seemed far less like fish and, indeed, more like people, this perceptual shift fostered by almost mythic depictions in popular music, literature, and film (Toles, 2003). Highly popular captive aquarium displays, and the development of a major whalewatching industry generating more than one billion dollars annually and involving more than three million participants, further reflected a change from consumptive to non-consumptive uses and values of whales. These changes in attitudes and behaviors fueled major shifts in policy, most particularly the passage of the revolutionary U.S. Marine Mammal Protection Act in 1972, and major regulatory shifts in the International Whaling Convention.

The motivation and political will behind these profound changes were fundamental shifts in values relating to whales which eventually rationalized a new ethic toward the welfare of these creatures. The post-war period witnessed the dramatic rise of aesthetic, humanistic, naturalistic, scientific, and moralistic values, and a corresponding decline in utilitarian, dominionistic, and negativistic perspectives on whales. Aesthetically, large cetaceans were viewed as creatures of wonder and beauty; naturalistically, as the focus of outdoor recreational interest for millions to enjoy in the wild or in captivity; humanistically, as the subjects of strong emotional attachments and feelings of kinship and personal identification; scientifically, as highly complex and important biological organisms; and, moralistically, as subjects of pronounced concern for their suffering and preservation. In effect, a profound shift occurred in what can be called *valuational chemistry*, especially in nations such as the United States, Great Britain, and Germany. That other nations and peoples still viewed these creatures with a different set of perceptual and ethical lenses can be seen in the views of the following Norwegian whaling advocate (Kalland, 1995: 152):



“Rational discussions of whaling, a *fishery* which remains important for social, economic, cultural, and dietary reasons in some societies, is emotionally clouded by the popular conception of whales as a special class of animals. *This presumed ‘special’ nature of whales derives from a widespread belief that whales are intelligent, endangered, killed by methods that are cruel, and the products they provide are no longer needed.*” (italics added)

This pejorative reference to the emotional and seemingly irrational thinking of those who regard whales as a ‘special class of animals’ fails to note the ubiquity and logic of such attributions given certain value assumptions. One might take, as another example, the reaction among most people in our society to the suggestion that rather than killing and incinerating millions of surplus cats and dogs we treat them instead as edible protein, sending the meat to hungry millions in countries like North Korea and Somalia.

Independent of personal interest and opinion about whales, this case illustrates how radical shifts in values toward a component of the natural world can foster pronounced changes in ethical regard and regulatory treatment. The seminal development by Sydney Holt and Lee Talbot (1978) of fundamental principles for the management of wild living resources provides another example of how shifts in values and ethics toward cetaceans helped drive basic public policy. This case also reveals how radical shifts in values, ethics, and policies can sometimes occur in a surprisingly short period of time by comparison, for example, with the pace of policy shifts involving global climate change, the management of fisheries and commercial forests, or ecosystem protection. Indeed, this case may indicate that altering people’s values and ethics toward nature rather than being impractical and idealistic is a highly relevant strategy for advancing significant change in environmental policy.

## **CONCLUSION**

This illustration and the theoretical framework that preceded it have sought to reveal how a bioculturally-based ethic rooted in inherent human tendencies to value the natural world can be both

demonstrated and related to major policy change. Limited information has been provided regarding how biophilia and associated values constitute varying strands of relationship between people and the natural world that may confer significant physical and mental benefits. Each value represents a vital thread of connection to an ethic of care and concern for the natural world based on a broad understanding of human self-interest. This environmental ethic relies less on feelings of charity, kindness, and altruism and more on a biocultural understanding of how individual and collective welfare can be advanced through a multiplicity of inherent ties to the natural world. People can see in their valuational connections to the natural world a moral posture of caring for the health and integrity of environmental systems that originates in a powerful realization of physical and mental well-being. Like Ishmael in *Moby Dick* (Melville, 1941: 294), they can recognize in their relation to nature: “The precise situation of every mortal that breathes; [how] he [or she], one way or other, has this Siamese connection with a plurality of other mortals.”

Our inherent values toward nature remain an unrivaled means for nourishing the human body, mind, and spirit. The values of biophilia represent the genetic substrate of an ancient evolutionary dependence, molded and shaped by human choice and free will, as individuals and groups through the agency of learning and culture engender the means for expressing their ties to the natural world in either adaptive or maladaptive ways. This biocultural complexity is suggested by the Pulitzer Prize winning biologist René Dubos when he remarked (1980: 126):

“Conservation of nature is based on human value systems that rather than being a luxury are a necessity for the preservation of mental health. Above and beyond the economic reasons for conservation there are aesthetic and moral ones which are even more compelling. We are shaped by the earth. The characteristics of our environment in which we develop condition our biological and mental health and the quality of our life. Were it only for selfish reasons, we must maintain variety and harmony in nature.”

More poetically, the writer Henry Beston (1971: vi) arrived at much the same conclusion when he suggested more than half a century ago:

“Nature is a part of our humanity, and without some awareness and experience of that divine mystery man ceases to be man. When the Pleiades and the wind in the grass are no longer a part of the human spirit, a part of very flesh and bone, man becomes, as it were, a kind of cosmic outlaw, having neither the completeness and integrity of the animal nor the birthright of a true humanity.”

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# Transcendancy Challenged

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The dominant narratives underlying modern forms of consciousness have humankind proceeding along a path of progress, where troubles along the way all work out for the better, and people gradually transcend their dependence on nature. In its Judeo-Christian form, people become more God-like as they transcend nature. The narrative of moral progress, the belief that people are a cut above other species in the first place, and the prospect of joining God in heaven go way back in Judeo-Christian thought. Francis Bacon augmented moral transcendence with knowledge transcendence, adding the narrative that through intentional advances in human understanding people could attain a God's-eye view of how the world worked, improve material well-being and, in essence, become more God-like ourselves. The American sense of manifest destiny and exceptionalism and their associated narratives of being on a course of progress have co-evolved with these transcendent forms of consciousness. Thus salvation stories, uplifting narratives of people pulling themselves from the depths of human misery to the good life, pervade popular literature, especially in America. More recently, economic progress, ever-advancing Gross Domestic Product, and the triumph of global markets and capitalism have become the most important carriers of transcendent messages feeding the modern consciousness in public discourse, while product advertising appeals to transcendence at a personal level.

The dominant, transcendent consciousness takes important alternative forms. For some people, nature continues to exist as people progress, for what would it mean to become more God-like without the grandeur of nature below? Or in what sense are we transcending to a mastery of nature if we are destroying nature? Others, however, give little or no thought to whether there is other life left behind on earth as humans transcend into an entirely new realm, heavenly or entirely "human"-made.

Transcendent narratives dominate and provide critically important foundations for modern public discourse. Yet, there has also long been a third (and counter) form of consciousness, found in many cultures historically, to which a significant, perhaps increasing, number of modern people fully hold. These alternative forms of consciousness build on a vision of God(s)-throughout rather than God-above. This form of consciousness also characterizes many who find wonder throughout or simply are humbled before the intricate beauty of nature. The defining feature of this alternative form of consciousness, or orientation wherein all life is sacred, is that it dramatically shifts people's aspirations with respect to their relation to nature while radically transforming the concept of transcendence.

Some people stay within one form of consciousness, solely and strongly. Many people move among the general forms with an element of indifference. Modern people may be in a transition toward a form of consciousness wherein all life is sacred, though this is by no means clear. Regardless, the focus on consciousness in this volume is exactly correct.

The lives we live as modern people are not supporting nature. The Millennium Ecosystem Assessment (2005) ([www.millenniumassessment.org](http://www.millenniumassessment.org)) and the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (2007) ([www.ipcc.ch](http://www.ipcc.ch)) document that we are dramatically and irreversibly transforming the environment and threatening the future of humanity. This is challenging the consciousness, the underlying narrative of who we are and why we are here, for all but those who are indifferent to a future world without life. This challenge, however, is not being openly addressed. Rather, it is being met with personal and collective denial, a frenzy of materialism, the exercise of power to especially short-run ends, both great hope and defiance among the poor, a rapid rise in religious fundamentalism, and a concomitant distrust in science and scientists delivering the bad news. Because modern economies have long co-evolved with the dominant transcendent consciousness, economism – the assortment of theory, private strategies, and public myths through which we try to make sense of economic life – is especially in disarray.

The social sciences are closely tied to the dominant belief in transcendence. Emerging out of a progressive moral philosophy in the

19<sup>th</sup> century, the social sciences also posited that the advances of the natural sciences and technology are inevitable and good. To a large extent the social sciences became established on the pretense that they would help speed people more smoothly along the path of moral and material progress. Indeed, natural scientists to this day largely see social scientists as relevant to the extent that they can bring the public along to right ways of thinking (Simon, 1991: 291-4). Yet from their beginnings, social scientists have also posed the strongest critiques of modernity. And some postmodernist social scientists are critiquing both the authority of natural scientists and the nature of their contributions to humanity.

In this chapter, I provide multiple interpretive vignettes that have roots in the social sciences. I draw on diverse perspectives from the social science literature. The vignettes are loosely linked. But I make no claims of completeness or even synthetic coherency. The ways in which the social sciences have contributed to the problems of modernity, as well as our understanding of these problems, are diverse and intertwined. Furthermore, modern society is too far from being in harmony with nature for a coherent analysis and prescriptions for precise corrections. And I am but one interpreter. I can merely help us to look back and ponder how we got here, and how, by doing so, we might better understand why the terrain we are in is so dangerous for our future.

## **A PERSONAL PRELUDE**

Let me begin by elaborating on my own experiences with an important aspect of consciousness that has helped me understand being in harmony with nature, perhaps even helped me understand transcendence. Without apology, I draw on my personal knowledge.

At rare times, always while far from civilization, I have awakened, or at least partially awakened, to an intense form of consciousness that can perhaps be described as oneness. Let me expeditiously draw on the description with which I opened my Preface to *Development Betrayed* (1994, xi):

“On special occasions, far from academe, I awake to both complete peace and unbounded comprehension. I am



watching the early sun descend a sandstone wall in a canyon of the southwestern United States, with my ear to the beach listening to boulders rumbling along the bed of an Alaskan river, awaking from a nap on a slab of talus high in the Colorado Rockies, or lying in a hammock and being soothed by the rush of water along the hull of a small Amazon River freighter. These beautiful moments on awaking come several days after I have ceased my academic efforts to understand and begin to comprehend directly. There are no objects perceived or questions answered, just oneness.”

The next 250 pages of my book elaborate on my personal and academic struggles during the 1980s to understand the whole, how everything – knowledge, values, technology, social organization, and nature – mirrors everything else through having co-evolved together. My life is a constant struggle to understand. I am fully aware that the culture I have inherited and the social environment in which I work and live mediates this struggle. Nevertheless, I have a sense, not only that some sort of direct comprehension is possible, but also that one can glimpse the coherence of all across space and time.

Certainly, as a postmodernist social scientist, or even a modern economist, direct understanding is apostasy. At the same time, as scholars we are constantly judging the reasonableness of the data we collect, the writings and science we draw on, our interpretive arguments and formal models, and the conclusions we reach. From what vantage do we do this judging? Similarly, I believe we still do have ways by which, as well as positions from which, we can sense how we are embedded in modern culture and institutions. It is these ways that allow us to glimpse our predicament, to sense the layers of co-evolved knowledge, values, and institutions, the very things that make our dominant consciousness modern and unsustainable. It is these ways of understanding that we must bring to bear to peel away our dominant consciousness in order to build a new consciousness in harmony with nature. Only a few secular philosophers such as Michael Polanyi (1946 and 1958) and George Steiner (1989) have treated personal knowledge, even transcendence, seriously in the philosophical literature. Both my personal knowledge of oneness and relative success at thinking about modernity nurture my hope.

## **DIVERGING CONSCIOUSNESS**

The dominant form of modern consciousness has long posited a world of progress through increasing control over nature. In this form, people transcend nature, becoming more God-like as they free themselves from worldly constraints. Varieties of this consciousness reverberate with people on many of the limbs branching from a Judeo-Christian trunk. Other strains of this consciousness resonate with some scientists proud to lead the ascent to a higher status, being a little closer to God first, through their discoveries of nature's secrets. God-like fantasies seem to drive those who promote applying the new genetic technologies to creating super people (see, for example, Silver, 1997). Ray Kurzweil has written a best selling futurist book on how humans are at the threshold of transcending biological destiny through a combination of genetic, nano, and robotic technologies (2005).

Entrepreneurs and capitalists are also in the vanguard as they provide us with ever increasing material abundance, evidence of natural constraints let loose. Material plenty, historically a reward for moral progress, has become a blessed end in itself. Prosperity gospel churches now abound, promising not simply nature providing a good harvest in the fall and abundant lambs in the spring but monetary rewards from the economies we have socially constructed around our uneven distributions of land, capital wealth, and schooling. Rich nations are referred to as being blessed by higher authority. For those who have lost track of their religious traditions, wealth carries the transcendent trait in the gross variants of the dominant consciousness.

Against this dominant awareness of history and sense of the meaning of life, an environmental consciousness appears to have steadily gained ground. Its adherents find God, spiritual fulfillment, or simply wonder entangled in nature. Being in community with the web of life, feeling the pulse of natural processes, simply being in tune with the phases of the moon, provide a direct path to deep understanding and inner peace. Those with an environmental consciousness feel no compulsion to ascend as they transcend. Rather transcendence entails becoming closer to nature. They see those with the dominant consciousness as ignorant of natural science and disrespectful of nature, whether it is understood as God's creation or millennia of random experiments and evolution through natural selection.

Variants of the dominant modern consciousness and of the environmental consciousness have hybridized with non-Western understandings of history and meaning. The remnants of other traditions provide insight into how we might build a new consciousness. Indeed, there are many hybrids between the dominant modern and environmental consciousnesses as well that may help in the transition. But to make more room for a shift toward environmental forms of consciousness, it may help to expose the problems with the dominant consciousness.

### **ONENESS AND SEPARATENESS**

Valuing and knowing are not separate. How we know nature and how we value, or discount, nature are tightly linked. Yet within modern culture there are separate pathways of knowing and valuing the personal and the public. Following one, and then the other, leads us in separate, incoherent ways. As individuals, our knowledge of nature and sense of nature's value are experiential. Of course our experiences are mediated by culture, but as individuals we can pick and choose what parts from our culture fit into a reasonable whole. Thus hunters, birders, rock climbers, car campers, ski mountaineers, fishermen, wilderness river runners, and desert trekkers find a sense of oneness and timelessness with nature in very different ways. Though they draw on different parts of our culture, a sense of connectedness with nature and through time is still a common need fulfilled. And the possibilities of having our individual but common sense of wholeness fulfilled allow us to work together at least at broad levels.

Yet as we strive to work together around our shared private senses, we find ourselves mired in the public realm of meaning and importance. Following public paths of reason and valuing, it is more difficult to construct and share any sense of oneness. Science is the official voice of public reason. Many of the ways science helps us understand nature, however, are through a process of reducing nature into specific characteristics. Common understanding is difficult because what constitutes a fact must be mediated through a contentious process of competing partial scientific perspectives. Organismal and integrative biologists are better at keeping the parts of nature together, compatible with an environmental consciousness,

while physical scientists and microbiologists tend to stress the parts and their separate potentials in the human future in ways compatible with the dominant consciousness. The competing perspectives and lack of coherence allow for what dominates in public discussions of nature to be largely filtered by economic power. Values in public discourse, meanwhile, are increasingly processed through what I will later define and elaborate on as economism.

Oneness has been set aside. Modernity encompasses centuries of diversity and change in the beliefs affecting individual lives and social orders, yet there is an overarching phenomenon that separates modernity from earlier times, perhaps future ones as well. The distinguishing feature is the rise, the seemingly inevitability from Marx to the end of the 20<sup>th</sup> century, of the idea that a rational social order can be constructed apart from moral beliefs that are largely, though not only, rooted in religious traditions. Of course, fundamentalists are now openly challenging this notion, even invoking divine will, but this is a relatively recent phenomenon. Stephen Toulmin (1990) and most recently Mark Lilla (2007), among others, argue that the “Great Separation” arose in response to the collective and personal chaos of competing religious beliefs and attending political theologies in Europe following the rise of Protestantism. Attaining public security and personal religious freedom required more than a separation between the personal and the public. Wholly new concepts of personal and public had to be created. Public institutions – church, state, and science – also had to be kept separate even while their realms necessarily overlapped. And ways of knowing had to be divided into facts and values through a combination of principles and myths about objective reality and subjective interpretations. Starting from a blank slate, the founders of the United States of America faced the challenges of designing such a separation quite explicitly (McGraw, 2003).

## **THE DEFERRAL OF COHERENCE**

There is more to the separation of church (values), science (public knowing), and state (collective action) than is typically woven into the narratives cloaking modernity. Mark Lilla argues that the desire for political theocracy stems from their potential to offer “a way of

thinking about the conduct of human affairs and connects those thoughts to loftier ones about the existence of God, the structure of the cosmos, the nature of the soul, the origin of all things, and the end of time” (2007b: 30). Separating personal and public ways of knowing; facts and values; and religion, science, and governance broke the comprehensiveness, the coherence between the parts making oneness. Religious and scientific explanations of the world broke apart, as did Judeo-Christian morality and secular rationalizations, starting with Adam Smith, of private greed as a public virtue. To a large extent, however, these gapping divides were accepted in exchange for greater coherence in the future. Initially accepting deferral in coherence relied on faith in religious progress, faith that in time, either through practice or divine revelation, God’s will and the nature of reality would become not only clear, but clear and whole. By the latter half of the 19th century, accepting deferral rested on beliefs in moral, organizational, and scientific progress marching in parallel. Progress would not simply improve the human material condition but also lead to minds and souls at peace.

Science indeed progressed, as natural philosophy broke into the disciplines of the natural sciences and, later, moral philosophy split into the multiple social sciences. Eventually, even specialization within disciplines became the norm. Coherence was deferred through proclaiming the eventual unity of science, the idea that once all of the pieces of reality were fully known, we would be able to how see they fit together as one. Of course the puzzle could not be put together until all the pieces were available and their shapes fully known. And so the deferral of coherence became institutionalized. Today, specialization without coherence is so accepted in academe that administrators, faculty, and students are completely unfazed by the contradiction between the first syllable of “university” and the actual institution.

Religion can be defined as a system of narratives, symbols, and rituals that situate individuals in a larger whole, providing a basis for understanding reality holistically while also supporting ethical norms (Bellah, 2001). In short, religions provide a sense of oneness. Many of the differences between religious systems are with respect to how they explain the nature of life, while there is relatively more homogeneity in the moral orders they espouse. This led modernists to argue that,

as science developed a unified view of nature and where people fit in the scheme of things, people would shed religious explanations of natural phenomena and descriptions of people's position in the larger world. The increase in informed rationality and systemic understanding would progressively reduce the scope of religion to simply a moral sphere. And this would provide the opportunity for religions to converge around their common moral teachings.

This modernist, secularist, explanation of the future of religion, of how it would adapt to progress, was widely accepted among the educated in the 19<sup>th</sup> century, including those who were religious. In response to this vision of the future, every major religious tradition has progressive branches that accept science, actively reinterpret historic texts to fit modern times, and promote ecumenical and interfaith efforts around common moral concerns. They also accept the separations between church, state, and science and hence only lightly engage in politics or raise questions about science (Almond et al., 2003; Smith, 1998). Religion and science are treated as separate "magisteria" with their own realities and values with individuals freely moving between them or even working within each at the same time (Gould, 1999).

Progressive governance was established around the beliefs that became myths that scientists could 1) simply inform policy makers and the public of the state of the world, 2) explain the technological possibilities for attaining other futures, and 3) manage forests, undertake water development projects, and build highway systems without the scientists themselves exercising their values and eroding democracy (Jasanoff, 1990). Resource management agencies were established, staffed by scientists who knew how to do things right. We can now see how they have failed because water cannot be separated from forests any more than values can be separated from technologies (Ophuls, 1997). The capitalist and socialist development agendas following World War II were largely driven by progressive agencies staffed with scientists, designed to transfer neutral capital, technologies, and social organization. Of course, nothing about development was neutral at all (Norgaard, 1994; Escobar, 1995).

While fostering some division and sustaining myths to complete the separation have long proved difficult, the idea of separation reigned as the hallmark of modernity. For several centuries, it facilitated tremendous advances, at least of particular sorts, in science

and technology, tremendous improvements in particular types of personal freedom, and incredible increases in material wealth in Europe, North America, later Japan, and in diverse pockets of wealth in poor countries around the world.

### **SPECIALIZATION**

Karl Polanyi (1944) documented how the advance of markets, in practice and in our conception of appropriate social order, commodified land and labor, disentangling them from complex social and ecological systems that were ultimately necessary to sustain them. Markets required disconnected parts: land use had to be separated from historic obligations of the landed class, labor use had to be separated from earlier obligations to family and community. Initially the disconnections brought new freedoms, yet ultimately freedoms were also lost, for earlier obligations assured opportunities for others. The transition to markets transformed society and our relation to land in ways that spell our demise. There is a complementary story to Polanyi's rich analysis that is easier to portray.

For the vast majority of 3 million years of hominid history, people lived in small groups and had shared experiences. While past people did not know nearly as much about the world as we collectively know now, what people knew was nearly common to all. Thus the available knowledge could readily inform collective action. During the last one half of one percent of human history, the last 15,000 years, agriculture arose, a surplus developed, and a few people began to assume specialized tasks. Modern science began some 500 years ago. Expectations for a shared enlightenment around modern science facilitated the rise of democracy over authoritarian rule in Europe and North America. About 150 years ago, a mere one two hundredth of one percent of human history, we began to formalize how science should inform democratic governance. Agricultural life was still widely shared at that time. Since then, however, the rise of industry and the coordination of production through markets have divided people into increasingly specialized occupations with expertise in particular things. With specialization, our collective practical knowledge became widely dispersed among individuals. We have no formal process by which this dispersed knowledge is assembled into an understanding

of the whole to inform collective action. Of course, science is now supposed to inform democratic decisions and bureaucratic action, to serve as our common enlightenment. But the same problems of specialization and dispersed knowledge simultaneously arose with the development of modern science. In short, while we are more closely packed together than ever before in history, modernity distances us from each other in ways which are critically important to comprehending and responding to complex problems (Giddens, 1990).

Environmental problems – the ways in which we relate to our environment that result in detrimental consequences for us, future generations, and other species – especially seem to challenge the way science works and how science informs democratic politics and governance. Technological innovations and social change have consistently had unexpected consequences for environmental systems, and thereby for people, that have been difficult to perceive and, hence predict, in advance. Thus environmental problems always have an element of surprise and disbelief. They also require that we identify critical dynamic interactions between environmental and social systems that scientists had not previously thought to be important. It typically takes some time before enough of the scientific community perceives the new interactions and looks upon them as a serious issue deserving study. Most importantly, these new interactions typically overlap existing scientific fields, the ways in which science has partitioned itself to work on existing problems.

Now we see specialized components of the modern university joining forces with the special interests of large corporations. Patents and corporate funding of research in the universities favor developing specialized technologies over developing systemic knowledge of nature. The net result is more rapid destruction of nature through the surprises of new technologies and further weakened ability to recognize and respond to the social and environmental consequences of technology.

Thus the modern human dilemma can be described as the challenge of collectively knowing and acting on the whole of our knowledge in a world in which our knowledge, both practical and scientific, is highly dispersed among people. This dilemma is greatly aggravated by our large and growing population, our ability to exploit resources and transform ecosystems, and the tight and multiple ways our actions interconnect with the environment through technologies



and markets. The consequences of making mistakes have risen apace with the increasing dispersion of knowledge among individuals.

Specialization isolates people from an understanding of the larger whole. I have argued that we are beginning to collectively see the whole through shared learning and collective judgment through global environmental assessments conducted by large numbers of scientists (Norgaard and Baer, 2005a and b; Norgaard, 2008). Surely, however, specialization from the perspective of the individual challenges the narrative of knowledge transcendence because as individuals we are moving away from a God-like view of nature. Our belief in markets and our beliefs in how science will someday cohere are critical to our acceptance of specialization.

### **POSTMODERNITY**

We now see the beliefs in and practices of separation between science, church, and state rapidly breaking down within modern cultures. In parallel with the internal collapse, cultures that never accepted separation are openly and aggressively challenging both this central tenet of modernity and its social consequences. The decline in this distinguishing feature of modern times makes up much of our daily newscasts and headlines.

The weakening of progressive religion, rise of evangelicalisms, and resurgence of fundamentalisms provide the biggest surprises for many observers of modernity. Fundamentalist believers of diverse religious traditions never went away, but their leaders and followers have long stayed out of active social discourse and politics, until recently. Within this widening gap between a shrinking progressive tradition and fundamentalism, a new movement steadily gained ground, starting largely in North America during the 1930s. Evangelicals read the bible literally, though selectively, and accepted modern technology and economic institutions, while actively engaging in social commentary about individual morality. Then, unlike either progressives or fundamentalists, many evangelicals began to actively engage in politics during the 1980s. Some also openly questioned the monopoly science holds on descriptions of natural phenomena in general and evolutionary accounts of “the descent of man” in particular.

In retrospect, we can see that science has not developed the coherent story that most people apparently need in order to feel comfortably situated in a larger order. So now we see educated people, even some scientists, reading religious texts literally, choosing religious explanations about life over scientific ones. In the process, religious differences have also become accentuated (Smith, 1998; Almond et al., 2003).

There is a strong interplay between the fragmentation, devaluing, and fall of science in the public sphere and the fragmentation and revaluing of religion, especially the rise of strict readings of religious texts, in the public sphere. Modern science has long been connected to a narrative of progress through control of nature. In practice, without having made a concerted effort to build toward shared public goals, modern science has proved remarkably incomplete, myopic, frequently disastrous in practice, and personally unfulfilling to non-scientists.

In all fairness, we have to trace some of the breakdown of the narrative of transcendence in modern consciousness to the convincing way that Rachel Carson (1962) pointed out the natural consequences of technologies built on separate sciences. The environmental movement gained ground through the 1970s by hiring scientists who identified how progressive natural resource management agencies were scientifically behind the times (Gottlieb, 1993). Thus the environmental movement, while informed by science and until recently mostly secular, has been instrumental in debunking the progressive narrative with respect to the control over nature and in showing how the fragmentation of scientific knowledge leads to unintended consequences. This worked very effectively for environmental interests until corporations used the same tactic, arguing that the science behind the regulations of the progressive agencies was inadequate. Regulations designed to maintain ecosystems were especially suspect given the diverse, incongruent ways ecologists understand ecosystem processes. At the same time, scientific environmental arguments began to dominate over historic value-based environmental narratives which, as narratives rather than particular arguments or basic legal points rooted in science, were more holistic and fulfilling (Gottlieb, 1993).

Another clear problem has arisen. Science's creation story and explanations of our place in the larger universe seem to be both too

rich and/or too humbling for many people. No modernists foresaw the current attack on evolution from an increasing number who are reading the Bible literally with respect to the natural order. A few theological scholars are synthesizing new narratives from selected scientific explanations of our place in the world that fit with selected religious traditions in a way that may provide more meaning, more oneness, for the many (Berry, 2006; Swimme, 1996; Tucker, 2003). They are deliberately rewriting the narrative of human progress through the control of nature while raising questions about economic justice within and across generations.

### **ECONOMISM**

I have argued that we are more divided than ever due to specialization in formal training and experiential knowledge. Each of us sees different aspects of reality more clearly, other aspects less clearly. Each of us has different interests due to specialization in education and through our different roles in the economy. Of course, there have long been differences between rich and poor, those with land or capital and those with neither, but now there are differences within classes marked by particular fragments of understanding and narrow conceptions of interest. None of us see the whole system or are in a position to develop a sense of care for all.

Nevertheless, people function together in amazing synchrony. So there is a “we” formed through our common acceptance of beliefs that allow us to interact together, indeed to be absolutely dependent on the actions of others, in a complex economic system. Thus we are one through the centrality of the economy in our daily lives and in our concern – or not – for the future. This commonality of shared myths that makes us a “we” is central to our difficulties in perceiving and responding to our environmental problems. It is also a part of the denial of the challenge to transcendency.

Let me, for the moment, artificially distinguish between an economy that is “out there” and the complex of myths we have developed to aid us in living within the economy. This distinction is exactly parallel to nature as a reality of its own and the complex of myths traditional peoples hold about nature and their relation to nature. Just as traditional myths provide explanations for natural

phenomena, facilitate individual and collective decisions, and give meaning and coherence to life, so do modern beliefs about economics and the economy. I refer to this complex of myths as economism. Of course, the economy that is “out there” and economism have been co-evolving, hence the distinction, except as a snapshot, is moot. Similarly, the environment has co-evolved with both our environmental myths and our environmental science, both good and bad. And our economy and environment have co-evolved. Nothing is separate at all. Hence the importance of deconstructing the economism we have and replacing it with more appropriate short cuts to understanding and living within the economy, an economism that will facilitate a just and sustainable future.

Economism is to the formal models of the discipline of economics as environmentalism is to ecology and environmental science more generally. Just as environmental science helps inform and justify environmentalism, the academic discipline of economics helps inform and rationalize economism. And just as environmentalism influences funding for environmental science and how environmental scientists choose between frameworks, the ways in which they interpret their results, and how they speak to the public, so economism affects academic economics. While distinctions between environmentalism and environmental science are commonly recognized, the term economism is relatively unknown. Yet economism is so pervasive in how we think and communicate that it is like water to fish. And while we can make fairly clear distinctions between environmentalism as a political movement and ecology and environmental science as a scholarly effort, the academic discipline of economics is so tightly bound with and infused by economism that distinctions are difficult. Indeed, it is best to understand economics as advocacy science.

This brew of popular, political, and academic philosophy and practical beliefs has an unusual property. Economism keeps modern times glued together while it greases the skids for particular types of change. Let me elaborate why economism is not only a good word to describe the role of economics in our lives but also provides a better way to think about the academic discipline of economics.

Economism consists of multiple interactive realms. First, there is academic economism: the apparently careful choice of equations, data,

methods, and words that appear in academic articles and the disciplinary dynamics that lead to a few articles and the economists who write them being important while most are not. Second, there is the acculturation of students, from the lessons about markets in grade school on to the training of those who graduate with doctoral degrees in economics. Acculturation also includes the general interest material about the economy appearing in the popular press and in books. Third, there is how economists work, interacting with those who need their services, in governmental policy and implementation processes, as well as in the corporate sector. Fourth, there is the popular political economic discourse on ends and means. And, fifth, there is people's everyday sense of reality that comes through living within a nearly global economy rather than, for example, on a nearly subsistence farm.

To some extent these are separate realms. What is taught as basic economics bears little relationship to the diversity of the historical explorations of economists. The texts say little or nothing about the small proportion of innovative economists, many at the best universities, who are opening up new paths (Colander, Holt, and Rosser, 2004). The ethereal abstractions of economic theory bear little relation to the common-sense understanding of laborers working in a globalized economy. And yet there are strong feedbacks between these different realms as well as selective processes affecting their evolution over time. The theory of exchange of goods, incorrectly used by capitalists, politicians, and academic economists to justify expanding capital mobility, has transformed everyday economic life. The variety and price of goods, as well as wages and employment opportunities in developing economies, as well as profits, wages, and employment security in developed economies, are all transformed by late 20<sup>th</sup> century developments in economism. The different realms of economism are not easily disentangled.

The importance of academic economics to economism and hence the ways it has become integral to our lives is especially critical. Our global economy is a symbiosis of highly selected, broadly interpreted economic reasoning with the power of economic interests. A great many individual decisions, some with deep moral implications, are now determined by income and prices. We perceive and understand "reality" from our particular positions in the economy and through the economy to the positions of others and a world of resources and

ecosystem services. Our hopes for the future are largely economic portrayals of material progress. Economism is our secular religion within which we engage in political discourse about values and through which we describe our relations to each other and our overall position in the world. In short, today economism plays a very similar role to that of religion throughout history.

Let me elaborate this with a particular example around which my broader argument will build. Over the past two decades, with the rise in concern with environmental sustainability, natural scientists, especially conservation biologists, have become increasingly engaged in debates over the course of development and the implementation of new development strategies. Within these debates, while defending biodiversity and ecosystem integrity, they found monetary valuation strategically very attractive. Describing the value of nature in monetary terms did not necessarily fit their personal values and relation to nature. However, for younger biologists who had been acculturated in economism since their youth, monetary valuation, with its emphasis on summing individual values, seems to present fewer conflicts than it does for older biologists with a stronger sense of moral discourse in politics before it was dominated by economism and also a stronger sense of a public good. But young and old feel they are driven to address biodiversity loss and ecosystem integrity through what they think is economics. Identifying the contradictions of this particular new interest in economic valuation provides a way of identifying why we cannot use purportedly objective economic techniques to get us out of a predicament that economism has been central to getting us into.

Conservation biologists share the objective of conserving biological diversity, and this objective defines their academic and professional careers. While they personally value biodiversity because they hold life sacred in some way or another, they also have come to believe that the majority of people will never appreciate the richness of life as they do. Nature films have vastly increased the public's awareness, but conservation biologists have concluded that to get through media barriers and engage in the rough and tumble of real politics, money talks louder than our attraction to the cute and fuzzy or our public sense of the complex, delicate dynamics of nature. Thus much as engineers in America a half century ago in the era of large

water projects were drawn to learn economics and contribute to the practice of cost-benefit analysis, biologists are drawn into learning some economics and contributing to its application today in the discourse on the value of ecosystem services.

Economics textbooks present the human predicament as largely a problem of imperfect markets. We misuse the environment because there are not markets for pollution or ecosystem services. As a consequence, the prices generated in imperfect markets lead people to make choices about interacting with the environment that are not in the public interest. Market prices need to be corrected by including all of nature's services. Cost-benefit analyses used in public decisions also need to include values that are not currently reflected in markets. So, to a large extent, the problem is portrayed as one of getting the prices right so that the right decisions are made. And getting the prices right is portrayed as a technical difficulty to be overcome by doing economics well. Hence conservation biologists are busily learning economic theory.

In fact, however, conservation biologists are simply learning economism. Economic theory is much more complicated and raises more interesting questions than it answers, especially with respect to questions of values.

In 1838, the French mathematician Augustin Cournot determined that markets could equilibrate at multiple efficient combinations of prices and quantities depending on demand (Cournot, English translation, 1897). A half century later, English economists connected demand to how rights to factors of production are initially assigned between people. The field of welfare economics flourished between the 1930s and 1960s as economists identified the conditions under which public values could be derived, more or less, from existing prices. Welfare economics was also instrumental in reaching a professional consensus around rationalizations for presuming that those conditions were reasonable approximations of reality for the purposes of doing cost-benefit analysis (Eckstein, 1958). The assumptions and rationales made some sense for considering the costs and benefits of individual public investments in an era when global environmental constraints were not yet of concern and the belief that progress would lead to a more equalitarian society was strong. And then the assumptions became established as practical working doctrine (Harberger, 1971). The assumptions and rationales

make little sense for thinking about global scale phenomena driven by climate change, biodiversity loss, or ecosystem transformation. They make no sense in an era when progress through the “control of nature” has so clearly failed and income inequality is increasing.

The sustainability debate is fundamentally about ethics, about whether our descendants have a right to an environment more or less like the one we have, or at least the right to an environment that is changing at a manageable speed. And when rights are reassigned, market prices, even interest rates change (Howarth and Norgaard, 1992). The key point is that value systems beyond economics must be tapped to ponder whether we want to give future generations more rights. At the height of interest in sustainability, economists reacted favorably to our work. But as economists moved on to the next hot topic of the day, receptivity was followed by a concerted, deceptive effort to show that the conventional way economics models the future and its related assumptions about valuing the future were quite adequate (Portney and Weyant, 1999). Economists go on debating about how to treat the future as before. We had no impact on economism, at least domestically.

The problems of distributional equity for environmental valuation, however, were very clear to the participants in the Millennium Ecosystem Assessment. Social scientists from developing countries repeatedly pointed out that the values of environmental services were heavily weighted by who had the income to pay for them and hence reflected the tastes and concerns of the rich more than the poor. The many dollars of the rich were counted alongside the few dollars of the poor. The dollars of the rich used to purchase international airfares to be ecotourists are weighted the same as the dollars of the poor spent on bus fare to get to work. Thus markets to save trees through carbon sequestration, for example, are being established in poor nations where the poor are “willing” to stop using forests because the rich can buy up the rights of the poor to use the forest for other uses. As a consequence, carbon sequestration is cheaper than it would be in a world with less income disparity. The rich can continue to drive their SUVs because the poor are willing to forego using their forests for little. Once they made this point clear, it was very difficult to use prices generated in markets with the current income inequalities we have as neutral values. The participatory



process of the Millennium Assessment exposed economism for what it is, a rationalization of the status quo.

In summary, the fact that there are many sets of efficient market prices depending on the distribution of rights to capital, land, and education and other factors affecting income has been known within economics for nearly two centuries. Yet, on the one hand, the profession ignores the fact that value choices about distribution affect the nature of value expressed in markets. On the other hand, economists quickly point out when challenged that they themselves have thoroughly identified this problem. No one is a greater expert than they are, usually expressed in a tone implying others have no right to give them grief over this issue. This whole sequence of denial and defensive silencing is an example of economism in action.

Another major contradiction of economic valuation, another aspect of economism, appeared in the Millennium Ecosystem Assessment. Several scientists noticed that for there to be any rationality to relying on stated preferences or behavior to derive values, one would have to assume that lay people were sufficiently informed of the very complexities the Millennium Assessment scientists were struggling to understand. This assumption contradicted the objective of the Assessment to provide much needed knowledge to the public and policy-makers. In short, monetary values and behavior are tightly embedded in the very socioeconomic system driving the problems of ecosystem degradation the Assessment sought to understand in order to design better socioeconomic policies (see also Norgaard, 1990). This contradiction showed up in some of the ways environmental economists' critiqued Costanza et al's (1997) analysis of the total value of ecosystem services and Wackernagel et al's (2002) ecological footprint. Wrapped in layers of economism embedded in a global economy, the idea that we cannot collectively rely on economic thinking and prices generated in today's economy to inform our economic decisions as a whole is difficult to grasp.

I have expanded at length on how academic economists shore up economism while I have not said enough about how other social scientists tolerate, and in many cases support, this intellectual sham. Nor have I elaborated enough on how the pervasiveness of economism throughout our lives makes it very difficult to even discuss how we could be more in harmony with nature. It is so

powerful that we basically have to argue how “going green is good for the economy.” My work as a participant observer embedded in the Millennium Ecosystem Assessment during its final 16 months provided excellent examples of the role of economism and how some people are beginning to see through it and fight back.

### **COMPLEXITY, DISCURSIVE DEMOCRACY, AND ONENESS**

As an active participant in the final years of the Millennium Ecosystem Assessment, I experienced, more richly than on previous occasions, how scientists working together can put their disparate disciplinary knowledge and different concerns together through discursive democratic processes. The Millennium Assessment decisively demonstrated how incoherent ecological, economic, and other patterns of thinking are. Its scientists used multiple formal models, informal interpretive styles of thinking, and metaphors to think about socioecological systems. They switched between patterns of thinking as they shifted spatial and temporal scales. And different participants were more concerned about different objectives: ecosystem integrity or the preservation of particular species, social justice, health, or material well-being, etc. Nevertheless, through reasoned discussion, the scientists reached near consensus understandings (Norgaard, 2008). Ecological economists, already comfortable working between ecology and economics, were especially adept and constructive in these discussions (Norgaard, 2007). Participants experienced the rewards of “oneness” at various times as they deliberated. I suspect this was especially rich and palpable as the synthesis documents were being drafted. It was a powerful, inspiring process that exposed how we, society as a whole, might really understand whole problems by moving toward a much more discursive democracy.

### **A CONCLUDING THOUGHT**

Having participated in the Millennium Ecosystem Assessment, I have a newfound faith that dedicated, bright people working together – across scientific disciplines, historical and religious traditions, and economic class – can be profoundly wise. It takes time, including considerable face-to-face time, and financial backing. An assessment of

the role of economism in facilitating our unsustainable social organization and individual life styles could be a very productive project. It may prove an effective way to cut through our chaotic responses to the challenge of transcendence. Thinking through the nature of economism may clear a path toward a new consciousness and becoming a society in harmony with nature.

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## A Transformational Ecology

*Jonathan F. P. Rose*

*President, Jonathan Rose Companies LLC*

*The world is too much with us; late and soon,  
Getting and spending, we lay waste our powers:  
Little we see in Nature that is ours;  
We have given our hearts away, a sordid boon!  
The Sea that bares her bosom to the moon;  
The winds that will be howling at all hours,  
And are up-gathered now like sleeping flowers;  
For this, for everything, we are out of tune;  
It moves us not – Great God! I'd rather be  
A Pagan suckled in a creed outworn;  
So might I, standing on this pleasant lea,  
Have glimpses that would make me less forlorn;  
Have sight of Proteus rising from the sea;  
Or hear old Triton blow his wreathèd horn.*

William Wordsworth 1806

Getting and spending we lay waste our powers. And getting and spending, we lay waste the earth's ecology. How might we align the extraordinary powers of the human species with the health of the earth? To do so, we need to transform our relationship to the earth's ecology.

The ecological issues facing us are human-caused issues. Nature was doing quite well until humans came along. The direction of Time's arrow moved on the energetic level towards greater entropy, but on the ecological level, towards greater complexity and biodiversity. And yet the flow has not been continuous.

Since the Earth was born, five great extinctions have occurred in which there was a significant reduction of biodiversity. The last extinction took place 65 million years ago at the end of the Cretaceous period. We surmise that the driving cause of extinctions was climate change, often caused by astronomical events. We are now in the midst of the 6<sup>th</sup> great extinction, the first whose root cause is not physical,

but biological. This extinction is human-caused, and not just caused by modern western humans. In almost every case throughout human history, when humans have spread to a new ecological zone, the result has been a decline in biodiversity.

Our disharmony with nature is not nature's fault, except that nature evolved such a destructive species. Our disharmony comes from flaws in the way that we think. In essence, the ecological issues before us are ontological issues. Albert Einstein noted, "We can't solve problems by using the same kind of thinking we used when we created them." And yet we are trying to solve our ecological problems with the same kind of thinking that created them. To begin to heal our ecology, we need to transform the way that we apprehend our ecology.

In 1970, the United States Congress passed, and President Nixon signed, our nation's first major environmental legislation, NEPA, the National Environmental Policy Act. But the Act, drafted by environmental lawyers, proposed that environmental policy would essentially be established by the writing of environmental impact statements for "significant" projects, and would provide a framework for advocates to sue to stop those projects. Lawyers viewed our assault on the earth's ecology as a legal problem, and proposed a legal solution. In the ensuing years, NEPA has given rise to many individual legal victories, and yet, if one looks at the health of the overall environment, it is much worse off. If the purpose of NEPA was to make it easier for environmentalists to litigate, it was a huge success, but if the purpose of NEPA was to reduce the human impact on the environment, it has failed. Almost every indicator of national biodiversity and ecological health reveals a decline since the passage of NEPA.

Although legal and regulatory tools are essential pieces of an environmental protection movement, they are not sufficient. To solve our environmental issues, we need new ways of thinking, and from that thinking, new tools and approaches.

The human species is blessed with great intelligence, with access to both intuition and rationality. These powers have dramatically expanded the human impact on its environment. However, the human ability to directly perceive the consequences of its actions is not as finely attuned, and thus humans have often acted without fully understanding their impact on the environment.



Although many indigenous cultures have been sensitive to their environmental impacts, western culture has developed with a peculiar blindness for the degree to which we have poisoned our soils, water and air, and changed our climate. But now, with the tools of science, we have extended the range of our perception, and we now do apprehend the consequences of our actions. However, this apprehension is not direct; we do not feel it the way we feel our hand in a fire, and thus we are not responding with the intensity required.

We need to connect what we know with what we value. There seems to be a large scale disconnect between the things that every culture claims to deeply value, and the values we express in our economic structures and daily actions. The consequence of this disconnect is not conceptual, it is fatal.

The core driver of climate change is consumption. All species consume, it is the nature of life. The issue at hand is that many humans consume amounts that are out of balance with the earth's carrying capacity.

Michael Lerner, the founder of Commonweal (<http://www.commonweal.org>), notes that when people are dealing with life-threatening diseases, their pathway to health rarely takes them to materialism. Death brings us face to face with the preciousness of the extraordinary miracle of life. After a life-threatening disease, the overeater diets, the slouch exercises. Thus, a more deeply felt recognition of our ecological state could trigger a more appropriate response.

The core issue is that for many of us, information on the state of the earth's ecology is essentially second hand. To many who live in the global south, the droughts and floods, heat and sickness that come from climate change are real, are felt daily. But for the decision makers and consumers of the global north, the effects of climate change come as data, as news, rather than as directly experienced suffering.

Yet humans (and many other species) do have a remarkable ability to perceive the joy and suffering of others. We call this compassion. Wikipedia defines compassion as "a profound human emotion prompted by the pain of others. More vigorous than empathy, the feeling commonly gives rise to an active desire to alleviate another's suffering."

Compassion is most palpable when we deeply love another one. And this love moves us to deeply desire the well-being of the beloved.

We also have the capacity to love more than just one other. Most of the world's societies are organized around individuals' deep interconnections to extended families or tribes. And this love can be extended even more widely. Developing ecological compassion is one of the gateways to a transformational ecology.

There is an emerging view that personal and cultural altruism has evolutionary advantages. Charles Darwin himself proposed that altruism might provide a competitive evolutionary advantage. For example, he noted that a beehive can only function if all of the bees subsume their individual needs to the larger whole. A gene must also create cooperating cells or organs to survive and be passed on. A brain cell gene, for example, must not only function well, it must function collaboratively with the other organs of the body. It cannot survive or replicate without the health of the whole. A gene that makes cells that solely consume and replicate rather than cooperate forms a tumor, which kills its host organism. So altruism seems to be built into the very nature of our genes.

Wikipedia defines altruism as the selfless concern for the welfare of others and notes that altruism is a traditional virtue in many cultures and central to many religious traditions. Societies have always used culture to balance the drive of self with care for others. Perhaps there is a natural bell curve distribution of egoism and altruism in human populations, with the center of the curve influenced by culture and leaders. The successful culture provides a healthy balance. But in the last fifty years our culture messages have overwhelmingly been dominated by advertising that has only one goal: increased consumption, which is an antithesis of altruism.

Neurologically, "needs" and "wants" are experienced in different parts of the brain. The "need" section of the brain is tied to survival. The "want" section of the brain is also the location of addiction. Both are evolutionary structures. Consumer marketing is based on connecting the two, for example, taking a need (procreation represented by a sexual image) and tying it to want (a consumer product). This repositions the "want" as a "need" in the brain.

Most studies of happiness say that the best source of true happiness is altruism. And the science of neurology seems to back that up: so we are actually happier giving than consuming. The promotion of altruism is the key to a more environmentally sustainable culture.

We do have models of the power of altruism and compassion to bring about societal changes in the way that we think and act. Mohandas Karamchand Gandhi, known as “Mahatma” or “Great Soul” liberated India from colonial rule with his nonviolent, compassion-based Satyagraha movement. The lineage of nonviolent thought, which led up to Satyagraha, began in the Hindu tradition, in the *Bhagavad Gita*, but Gandhi also drew from the thinking of the 19<sup>th</sup> century environmentalists, Ralph Waldo Emerson and Henry David Thoreau. This lineage of thought, along with the work of Gandhi, also deeply influenced Martin Luther King, Jr.’s agape-based civil rights movement, as well as Dr. A. T. Ariyaratne’s contemporary *Sarvodaya* movement in Sri Lanka and Sulak Sivaraksa’s ecological peace movement in Thailand. They all share a foundation of clear perception of the issues, which arose from deep contemplation, and the moral courage to look at the underlying truth of those issues and to motivate large groups of people to act, not out of anger, but with deep love for all. The result is a firm resolve for change, communicated compassion for those who cause the need for change.

Gandhi named his movement of nonviolent struggle for social change *Satyagraha*. It means “the power of truth,” or literally, “truth force.” It focuses on two truths – the truth of the change that is needed, and the recognition that the way of action must be consonant with the way of being. One cannot achieve peaceful ends with violent means.

Gandhi read Thoreau and Emerson as a young man, and was influenced by them. Emerson’s writings make a case for nonviolence as a personal, individual, courageous realization of the powerful truth of non-separation (his phrase for interdependence). For example in his essay *The Heart*:

“Courage is grounded always in the identity of the nature of my enemy with my own; that he with whom you contend, is no more than you. . . . It will be found the mind is too much One to be any longer English or French, Indian or White; that for the same reason why a soldier can muster the spirit now to attack a soldier he will then feel that the blow aimed at his brother’s heart strikes his own.”

Thoreau’s 1849 essay “On the Duty of Civil Disobedience” also emphasized personal realization of moral truth as a motivating power for action:

“How much truth is stronger than error . . . how much more eloquently and effectively he can combat injustice who has experienced a little in his own person. Cast your whole vote, not a strip of paper merely, but your whole influence. . . . They who know of no purer sources of truth, who have traced up its stream no higher, stand, and wisely stand, by the Bible and the Constitution, and drink at it there with reverence and humanity; but they who behold where it comes trickling into this lake or that pool, gird up their loins once more, and continue their pilgrimage toward its fountainhead.”

*Sarvodaya* contains this sense of a personal realization of moral truth, which when applied with moral courage and love, becomes an irresistible force. Gandhi defined *Satyagraha* this way:

“Its root meaning is holding onto truth, hence truth-force. I have also called it love-force or soul-force. In the application of *Satyagraha* I discovered in the earliest stages that pursuit of truth did not admit of violence being inflicted on one’s opponent but that he must be weaned from error by patience and sympathy. For what appears to be truth to the one may appear to be error to the other. And patience means self-suffering. So the doctrine came to mean vindication of truth, not by infliction of suffering on the opponent, but on oneself.”

Martin Luther King, Jr., who was also influenced by Emerson, Thoreau and especially Gandhi, called this approach the way of love, or *agape*, redefining this ancient Greek term as, “. . . an overflowing love which is purely spontaneous, unmotivated, groundless, and creative. It is not set in motion by any quality or function of its object. It is the love of God operating in the human heart.”

For King, this love recognizes the unity of all in a “wider brotherhood.” His pathway to change was based on the conquest of one’s opponent with love and moral courage, and not by violence. In his final sermon a few days before his assassination, King articulated the practical application of this unity and the perilously high stakes of realizing it:

“Through our scientific and technological genius, we have made of this world a neighborhood and yet we have not had the ethical commitment to make of it a brotherhood. But

somehow, and in some way, we have got to do this. We must all learn to live together as brothers or we will all perish together as fools. We are tied together in the single garment of destiny, caught in an inescapable network of mutuality. And whatever affects one directly affects all indirectly. For some strange reason I can never be what I ought to be until you are what you ought to be. And you can never be what you ought to be until I am what I ought to be.”

Gandhi, King and their antecedents continue to inspire powerful, effective nonviolent change movements today. The Gandhian-Buddhist *Sarvodaya* movement in rural Sri Lanka, founded in 1958 and now Sri Lanka’s largest charity, takes its name from another term coined by Gandhi, meaning “universal uplift” or “the progress of all.” Harnessing the force of personal realization of the moral truth of non-separation, Sarvodaya is a powerful force for peace and environmental harmony working in over 15,000 rural villages in Sri Lanka. Its founder and leader Dr. A. T. Ariyaratne writes,

“Sarvodaya workers try to awaken themselves spiritually and thus transcend sectarian religious differences, to become one with all . . . several million Sarvodaya adherents in Sri Lanka have proved that they can transcend racial, religious, linguistic and ethnic barriers to accept a common state of ideals, principles, and constructive programs to build a new society as collectively envisioned by them.”

These successful movements of change, which liberated India, transformed American society and is rebuilding Sri Lanka have much to teach us about how we might build a successful ecological movement. In a speech before the Sierra Club Forum in 2007, Al Gore invoked the relevance of Gandhi and Satyagraha to mounting a morally courageous and effective response to climate change:

“We ought to have a mass movement around a carbon freeze; it's scalable from the individual level to the company, community, state, and national level. Gandhi used the word Satyagraha or “truth force.” In American politics, there have been soaring moments throughout our history when the truth has swept aside entrenched power. In the darkest hours of our Civil War, Abraham Lincoln said, ‘We must disentrall

ourselves, and then we shall save our country.' We need once again to disenthral ourselves."

Despite the recent attention to the climate change crisis, we have yet to "disenthral ourselves" and transcend entrenched ways of thinking about our environment. To make the shift needed to deal with climate change effectively, we need to rethink our fundamental approaches to environmental issues as part of its initiative on transformational ecology. In 2007, the Garrison Institute, in Garrison, New York, began to deeply explore the lessons of Gandhi and King to determine how these might be applied to the issues of climate change and biodiversity loss. This work integrates the latest thinking in the fields of ecology, neurology systems dynamics and systems change.

Our brains are wired with many extraordinary capacities, but two are particularly relevant – our reflective capacities and our reactive responses. The work of Emerson, through Gandhi, King, Ariyaratne, and Sivaraksa, all began with deep reflection. It is very difficult to perceive the interdependence of life on earth with the reactive qualities of the brain. The reactive aspects emerge from the oldest "reptilian" portion of our brain, and are deeply engaged in our response to specific threats. Specific threats need swift, specific instinctive reaction. However, these are not well suited to larger endemic or systemic problems. To deal with these effectively, we need to call on the more recently evolved integrated aspects of our brains. Neurological research with MRI brain scans indicate that these qualities are deeply called upon in reflective or contemplative states. Interestingly, reptilian portions of our brain call upon our "fight or flight" responses. Contemplative states not only enhance systems thinking, but simultaneously enhance our compassionate and altruistic capacities. So whole thinking and altruism are linked ecologically and neurologically.

In the past, environmentalists have posed their issues as "us" (those who care for the earth) against "them" (the despoilers). However, the cause of climate change cannot be pinned on any enemy, on the "other." Climate change is caused by the many ways that all of us think, act and consume. While many of us see the problem, we are also part of the mindset causing the problem. The enemy is not a specific leader or corporate sector, but the failure to clearly see the moral and ecological results of our actions. Regardless of what

government policies, market incentives or legal solutions we create, we cannot achieve ecologically sustainable ends with unsustainable means. Each of us is individually and collectively responsible for the means we employ, and their impact on others and the planet.

The American culture and patterns of consumption that emerged in the 20<sup>th</sup> century were based on cheap and plentiful electricity. The great American Depression was caused by both an economic crisis, which deeply affected urban America, and an ecological crisis which affected agricultural America. President Franklin Roosevelt's solution, in part, was to develop vast hydropower systems, which could provide cities and industry with ample and inexpensive electrical power and farmlands with ample and inexpensive irrigation water. The Federal government began by developing projects such as the Tennessee Valley Authority (1933), the Bonneville Dam (1937), and the Hoover Dam (1935), at the time the world's largest single power producer.

Why do we now burn so much coal for electricity? Because in 1979, at the peak of the energy crisis, President Jimmy Carter proposed that we convert our oil-fired electrical industry to a coal-fired industry to become energy independent. From Jimmy Carter's, July 15, 1979, Crisis of Confidence speech:

"I'm asking Congress to mandate, to require as a matter of law, that our nation's utility companies cut their massive use of oil by 50 percent within the next decade and switch to other fuels, especially coal, our most abundant energy source."

The driver for the use of coal is not the evilness of the power industry, it is the nature of our demand. If we want to stop the construction of new coal fired power plants, and to substitute the existing ones with renewable sources, every one of us must make different choices.

It turns out, those choices aren't very difficult – they just take a change in attitude. For example, since 2003 many colleges and universities have challenged their students to reduce their dormitory's energy use. By turning computers off when not used, unplugging unused cell phone chargers, and turning off lights, students at Emory University reduced their energy use by up to 40 percent. At Harvard, the average energy use in dorms was reduced by 12 percent. None of the students were asked to sacrifice, to live with less, to suffer. They were simply asked to eliminate unnecessary waste. If we simply "felt"

the coal-fired power plant at the end of our light switches, how many more of us would turn off lights when we left a room?

It appears that we could reduce our electrical demand by 10-12 percent simply by being more conscious of how we use it. We could reduce our electrical demand by 15 percent by choosing energy star appliances such as refrigerators. And we could reduce our overall home energy use (electricity, and oil/gas heat) by 30 percent in most cases simply by insulating our homes and pipes better. All of these choices make great economic and ecological sense. Any community, region or nation that collectively makes these choices will be more prosperous and more secure, giving up nothing but waste.

The environmental movement has often been referred to as the next “civil rights” movement in which individuals, with diverse political concerns, would come together and lead a “moral” movement for change. And yet, despite all that we know, this movement for ecological change has not reached our critical mass of influence. Perhaps the resistance has been because it has been phrased as a moral choice, inherently implying those who are right and those who are wrong. This division is often perceived as a class split, pitting the “wine and cheese” class of upper middle class urban environmentalists against the “bourbon and beer” class of lower middle class suburban/rural SUV drivers.

In fact, the paradigm isn't true – just pick up a solar magazine to see how many working class people are turning to solar to reduce their energy costs. But the way that we speak about these issues was framed in 1979, when Jimmy Carter sat in the White House in a Cardigan sweater and asked us to sacrifice, and then, in 1981, when Ronald Reagan tore the solar panels Carter had placed on the White House off.

Achieving the sweeping systemic and behavioral change needed to mitigate climate change requires a call, which will appeal to a broad base of citizens in the same way that the Satyagraha and Civil Rights movements called to all of us. Just as the Satyagraha and Civil Rights movements came out of religious traditions, we have many wonderful religious traditions that provide guidance on the altruism of a larger worldview. In Christianity, the practice of love is made manifest in the world through acts of generosity. The first epistle of Paul the Apostle to the Corinthians, in chapter 13 says: And now abideth <sup>a</sup>*faith*, <sup>b</sup>*hope*, <sup>c</sup>*charity*, these three; but the greatest of these is charity. St. John of the Cross called this work “Cautelus.” In Judaism,



the practice of love is made manifest in the world through Mitzvah, and Tikkun Olam, which means the repairing of the fabric of the world. To carry this work out skillfully is called “Etzroth” in Hebrew. In Mahayana Buddhism, the altruistic motivation is expressed by beginning one’s day with Boddicitta, the motivation to relieve the suffering of all sentient beings, and one carries it out with Upaya – skillful means.

We are seeing a rise in spirituality-based ecological movements, such as Reverend Sally Bingham’s Interfaith Power and Light, “Green power movement,” Reverend Fletcher Harper’s green faith movement, and green churches. As noted, interdependence is hard to perceive with our reactive mind, easier to perceive with our reflective mind. Synagogues and the Garrison Institute’s Hudson River Programs committed to greening not only local houses of worship, but also to adding green sources to their liturgy, and to reaching outside of their buildings, to green their lands and communities.

The benefits of altruism are now also backed by science. Scientific studies show that altruism gives rise to happiness, that generosity gives rise to happiness, that compassion is often an antidote to depression. And so love and altruism and compassion are not sacrifices, but satisfactions.

And so if our current pervasive, excessive materialism is a source of ecological destruction, generosity, altruism and compassion are pathways to its antidotes. This is not to obviate the power of industrial lobbyists, the failure of national leadership, need for new laws, carbon caps, new investment policies, and the many tools that are essential to changing our ecological foot print. But we will never have enough money to fight industrial lobbying with environmental lobbying. We need to change society’s worldview that leads to ecological destruction. To do so, we need a model of transformation. And the environmental movement does not have a clear model of transformation.

Reducing our energy use by ten percent, and insulating our buildings and engaging with faith communities, are essential first steps, but they are incremental, intermediate steps. The issues before us are so great, that they cannot be dealt with incrementally. Incremental thinking simply does not address the scale or the speed of the change that is needed.

Our essential western social/cultural flaw is that we function from a worldview that does not see the interdependence of every action.

And yet interdependence is like gravity, it is an essential quality of the universe. We just fail to see it. As noted, interdependence is hard to perceive with our reactive mind, easier to perceive with our reflective mind.

Worldviews frame the way that we think. In fact, the story of the expulsion from the Garden of Eden is a story of a change in worldview. The emerging field of neuroplasticity explains that the way we view the world is neurologically based, but not fixed. We can actually change the way we think. The phrase “worldview” comes from the German word *Weltanschauung*. *Welt* is the German word for “world,” and *Anschauung* is the German word for “view” or “outlook.” It refers to the framework of ideas and beliefs through which an individual interprets the world and interacts in it. (Wikipedia)

The extraordinary range of worldviews amongst cultures indicates that worldviews are mental constructions, they have no true inherent existence. And yet they deeply affect the way that we apprehend the world, interpret it, and make decisions. Gravity, on the other hand, seems to be an inherent quality of the universe, one that is consistent regardless of our view of it.

Political systems, such as democracy and communism, come from worldviews. Dr. Ashraf Ghani, the former finance minister of Afghanistan, notes that Western economics itself is a worldview, a mental construction, that proves to be a very powerful way of organizing the flow of money, a worldview that a great many people have accepted as real, but that has no true inherent existence. At the very least, it is incomplete. Under its view, the highest value for a forest, for example, is to clear cut it, and then to sell every remnant, the land, the water in the streams, even the equipment used for the cutting. And yet this view, carried out to perfection, would leave the world barren, lifeless, with one very well stocked bank account somewhere.

Where do these worldviews come from, and why do they have so much power to organize the way that we function? The Sapir-Whorf hypothesis says that our worldview is deeply related to our language.

*“Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society. It is quite an*

illusion to imagine that one adjusts to reality essentially without the use of language and that language is merely an incidental means of solving specific problems of communication or reflection. The fact of the matter is that the ‘real world’ is to a large extent unconsciously built upon the language habits of the group. No two languages are ever sufficiently similar to be considered as representing the same social reality. The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached . . . *We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation.*” (Sapir 1929)

Whorf then goes on to examine the effect of worldviews on our relationship to nature.

*“We dissect nature along lines laid down by our native languages. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds—and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way – an agreement that holds throughout our speech community and is codified in the patterns of our language. The agreement is, of course, an implicit and unstated one, but its terms are absolutely obligatory; we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees.”* (Carroll 1997)

Leo Apostel, a Flemish scientist, has proposed that a worldview should comprise seven elements (CLEA; Broekaert 1998):

- An ontology, a descriptive model of the world.
- An explanation of the world.
- A futurology, answering the question “Where are we heading?”

- Values, answers to ethical questions: “What should we do?”
- A praxeology, or methodology, or theory of action: “How should we attain our goals?”
- An epistemology, or theory of knowledge. “What is true and false?”
- An etiology. A constructed world-view should contain an account of its own “building blocks,” its origins and construction.

We are now called to understand the world on three levels, local, regional and global. For much of human existence, we only needed to understand our place in the local ecology, and, if we migrated, then the ecologies of the regions in which we migrated. We evolved views, cultures and practices that helped us fit into the ecosystems in which we lived.

Once we developed political and energy systems, then the source of our support and the reach of our impacts became larger. The *Washington Post* writer, Neal Pierce, suggests that the appropriate unit of political management is the city-state. Bruce Katz, of the Brookings Institute calls this the metropolitan region, and notes that it is the most effective political unit for managing solutions to the economy, environment and infrastructure.

With the advent of industrialization, the human impact has become global. Our transformation of the climate, our spewing of chemicals and wastes into the air, water and soils effect the global ecology that sustains us. And thus, although humans evolved with the perceptual apparatus and worldviews to live in harmony with local ecosystems, we now must develop ways of perceiving regionally and globally, and we must develop worldviews that function at these levels.

Until recently, the predominant western worldview has been based on our independence. Americans were often described as “rugged individualists.” For the last thousand years, Europeans engaged in endless wars with each other, families, and states seeking to dominate others. We know from ecology that interdependence, and evolution, which is the flow of interdependence through time, is an intrinsic aspect of the nature of reality. But although interdependence is a deep

quality of our universe, we do not easily see it, and therefore we don't act from an interdependent point of view. Environmental destruction comes from actions that fail to take into account that every aspect of the earth is connected to every other aspect. As Dr. Martin Luther King put it "We are caught in an inescapable network of mutuality, tied in a single garment of destiny."

If, as Einstein noted, "We can't solve problems by using the same kind of thinking we used when we created them." Then we must change not only the way that we think about ecological issues, but also the way that we communicate about ecological issues. And that change in thinking is from an independent worldview to an interdependent world view.

The general public views the environmentalist message as calling for hard choices, for surrender of individualism, for a reduced quality of life. In fact, "business as usual" offers hard choices, suffering, and loss. Environmentalists should frame their message a pathway out of the potential suffering and the desolation that is to come from the human assault on the environment. We need to pose our solutions as pathways to place based joy, to healthier deeper lives. But we have never framed a worldview that clearly communicates that. In part, this is because we ourselves have not developed a coherent view of the world that we want. And the partial views that we do communicate seem to focus more on the suffering of polar bears than humans, and fail to take into account the concerns of the poor in the north and the global south.

To be successful, the environmental movement needs to communicate:

- *An ontology*, a descriptive model of the world we seek that is a better alternative to business as usual. Visit the websites of NRDC, EDF, The Sierra Club and Greenpeace, and you will find excellent descriptions of environmental problems, and solutions, but no clearly stated vision of the world that we seek.
- *An explanation of the world*. Environmentalists tend to explain the world in ways which only reinforce independent world views, when stating "doing X can fix Y." We need to base all of our explanation based on the ecological (and economic) principle of interdependence.

- *A futurology*, answering the question “where are we heading?” Al Gore’s *Inconvenient Truth* began to describe where we are going under business as usual, but the environmental community needs to describe where we want an ecological worldview to take us.
- *Values, answers to ethical questions*: “What should we do?” The evangelical Christians have begun to deeply engage in the ethics of climate change, noting the impacts of western consumption on the poorest amongst us. Every environmental communication should draw on ethics and values.
- *A praxeology, or methodology, or theory of action*: “How should we attain our goals?” The causes of ecological destruction are great, so the solutions are complex. We need to figure out simple clear ways of communicating solutions. One way is by describing duplicatable examples.
- *An epistemology or theory of knowledge*. “What is true and false?” To know what is true and what is false at the global scale, we need to have trustworthy systems that measure and report at the global scale, and to communicate those measurements widely.
- *An etiology*. A constructed world-view should contain an account of its own “building blocks,” its origins and construction.

Transformation begins with changing worldviews. And transformations often begin as conservative efforts.

Think of the advent of irrigation. The first known irrigation systems arose in Mesopotamia and Egypt, dating from the 6th Millennium BCE. It is believed that in times of droughts, the wild barley crops that were a key source of human calories failed. Irrigation was developed to bring water to the barley. The initial goal of irrigation was conservative, to continue an existing way of life. But irrigation had an unexpected consequence, it gave rise to a dramatic increase in humans’ ability to produce crops, and thus calories, or energy, which lead to a rapid expansion of society, social differentiation, and to urbanism. Urbanism could not have happened without irrigation. So the conservative effort became transformative.

Irrigation is essentially the application of water flowing through ditches powered by gravity to increase agricultural production. And

water essentially flowed through irrigation ditches for 7,000 years before someone noted that the water could give rise to not only caloric energy, but also kinetic energy. And so we had the falling water turn water wheels, which gave rise to the industrial revolution. The kinetic energy had always been there, we just didn't see it or think about capturing it until our worldview of the energy within the flowing water changed.

The change in worldview in part was stimulated by Sir Isaac Newton, who in 1687 wrote the *Principia Mathematica*, and developed a calculus, which enabled the development of the laws of thermodynamics, which further propelled the industrial revolution (and which gave rise to the burning of coal as a source of not just heat, but power) All of this came from a very powerful, very accurate, but very incomplete, and thus flawed worldview. Calculus and thermodynamics described the performance of objects rather than the performance of systems. This unleashed an economy based on improving the performance of individual entities, without at all recognizing their interdependence.

But worldviews change. In 1866, when industrialization was roaring forth, the German biologist Ernst Haeckel developed the term *Ecologia* and defined it as "the comprehensive science of the relationship of the organism to the environment." In 1905, Albert Einstein published a series of papers, including the *Special Theory of Relativity*, which postulated the complete interdependence of space and time, energy and matter. And in 1923 Martin Buber published *I and Thou*. "I," he noted, reflected a view of "it-ness," in which each object and self is separate, and "Thou" is a view of relationship without bounds. It is a relationship suffused with love.

Just as it took time for the conceptual frameworks of Newton and others to lead to a mass transformation of worldview, so it has taken time for the ecological/ relativistic/interdependent/I-thou worldview to take hold.

Cultural transformation requires inspirational leadership, personal reflection and mass movements. Thus, a transformational ecology needs all three. Imagine if Al Gore had become our president in 2000, how much more our culture would be conversant with interdependence. Leadership can help bring about rapid transformation. The deeply polarizing approach of President George Bush was based on an independent worldview, deeply misperceiving the inter-

dependent global economy, energy flows, political relationships and ecology. But we also need to stand back to open our minds and hearts, contemplatively, compassionately, and finally we need to act as a community not as individuals communally.

Let us look at the transformative power of clear leadership and ideas. Muhammad was born on the edge of Mecca in the year 570. In 622, financed by his wife, who was the businesswoman of the family, he made his journey with a small band of followers to Mecca. Ten years later, when he died in 632, he had united the entire Arabian peninsula under Islam. In 636 Islam conquered the eastern Byzantine empire, in 637 it conquered Iran and Iraq. By 640 Islam had conquered Rome, Syria and Palestine, and in 642 Roman Egypt, Armenia and Chinese Turkestan. And let us look at a more contemporary example. After 27 years of imprisonment on Robben Island, Nelson Mandela could have returned bitter, seeking retribution. But instead he sought to create a society based on peace and reconciliation, and with that he birthed the peaceful transformation of a violent society.

Although Mohamad and Mandala led great movements, the transformations they inspired were carried out by many leaders at many levels. We need local, regional, national and global leaders.

Ed Mazria was a fine Santa Fe-based architect, and early leader in the solar home movement of the 1970s. He had a small practice, local, a good one. In the early 2000s he had his own revelation, that buildings use 40 percent of all energy consumed in America, and thus the greening of buildings had a tremendous potential to help solve the climate change crisis. There is now much data to support this view, but when Ed first proposed it, his view was not generally accepted. Ed started a movement, Architecture 2030. Its goal is to inspire architects to design all new buildings to reduce their energy use by 50 percent by 2010, and to be climate neutral by 2030, and to inspire schools of architecture to teach energy efficient design. The architecture 2030 website states its objective very clearly: "Our goal is straightforward: to achieve a dramatic reduction in the global-warming-causing greenhouse gas (GHG) emissions of the Building Sector by changing the way buildings and developments are planned, designed and constructed."

The 2030 Challenge was issued in January 2006, and since that time, it has been adopted by the American Institute of Architects, the



U.S. Council of Mayors, the U.S. Green Building Council, U.S. EPA, the World Business Council for Sustainable Development and many others. In January 2007, Ed closed his architecture business, hired his first employee, and started a movement to get all architecture schools to integrate climate reduction into their curriculums. And now his goal is to stop the development of new coal fired power plants.

This is an example of leadership that transforms the way that we think and act.

“A (transformative) leader not only speaks to immediate wants but elevates people by vesting in them a sense of possibility, a belief that changes can be made and that they can make them” (Burns, 1978).

Motivation, according to Burns, is what powers leadership. Creative Integration is another key element of transformational leadership. Transforming leaders have the ability to see possibility and innovation and to share that vision with others:

“Scenarios with positive visions are quite different from projections of environmental disaster. Doom-and-gloom predictions are sometimes needed, and they might sell newspapers, but they do little to inspire people or to evoke proactive forward-looking steps toward a better world. Transformation requires evocative visions of better worlds to compare and evaluate the diverse alternatives available to us . . . Although we cannot predict the future, we have much to decide. Better decisions start from better visions, and such visions need ecological perspectives.” (Burns 1978)

We also need models of change that we can experience, to understand that lower consumption can lead to more satisfaction.

In 1989, the Audubon Society purchased a building in the NoHo area of New York City, to serve as its national headquarters. Known as Audubon House, at the time of the building’s renovation (1990-92) there were very few green office buildings or spaces in the United States. Examining every aspect of the building’s environmental impact, Audubon, and its architects and engineers helped define the realm of green building solutions. Amongst its many attributes, the building used 62% less energy than conventional buildings of the time.

(<http://www.cleanaircounts.org/Resource%20Package/A%20Book/EStar%20Buildings/Audubon%20Audubon%20House.htm>) The Society received much recognition for advancing the field with its project.

In 2006, the Audubon Society's President, John Flicker, CFO Bob Perciasepe and the board asked a very probing set of questions: Is the building that we designed 15 years ago green enough today? Is the ownership of an office building in New York City the best programmatic use of our capital today, or should we sell it and rent space? Which will advance our mission the most? Which will create the greenest office model? The Audubon Society engaged Jonathan Rose Companies to help answer these questions.

The key to answering these questions was to rethink how the Audubon Society worked. It chose to move from closed offices to open offices, and from a highly centralized operation to a more localized one. The result was a reduction in New York City office space needs from 40,000 sq. ft. to 27,000 sq. ft.

The solution that emerged was for Audubon to sell its building at the top of the real estate sales market, rent smaller office space in a less "hip" location at a reasonable rent, and to lock that rent in for twenty years. The sale proceeds were large enough that, when placed in the endowment, would not only cover the rent of new office space, but also support the growth of new urban Audubon Centers around the country. The new space was renovated to meet LEED Platinum standards, dramatically reducing the environmental impact of the Society's office space. By reducing the size of the office space, the Society dramatically reduced its consumption of energy and materials.

The ecological, economic and operational advantages of this move all stemmed from the Society's leadership's willingness to ask questions, and to change its worldview. Audubon had a great deal of its identity tied Audubon House, it had credit for having been an early green leader, and it had very comfortable offices. It was willing to adopt an entirely new worldview – one that focused on current environmental best practices rather than past reputation, which focused on a more horizontal, open organizational hierarchy and way of working, one that dedicated more of the organizations assets to its program, less to its overhead.

The result of this change in worldview was a larger endowment, more funds for program, happier people, and less consumption.

Changing our worldview can transform our environmental impact, without sacrifice.

A transformation of our relationship to ecology will draw strength from a reflective process to enable us to see the interdependence of life on earth, inspired leadership to spark large-scale movements, the moral force of religions in society to help connect congregants inner spiritual lives with outer action, and the propagation of successful models of change to give us a sense of what is possible. Together these will help develop a transformative ecological movement, based on moving us from an “I”-oriented motivation and worldview to a more altruistic “thou”-oriented motivation and worldview.

This leads to a change in our worldview, which leads to a transformation of the ways that we think, that we act, and how we communicate with others. We are just at the beginning of framing what this transformational ecology might be. But it is clear, it has a tremendous potential to make the human impact on life on earth a bit more environmentally responsible.

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# God Shed His Grace on Thee: Obstacles and Opportunities for a Polity Respectful of Nature in the United States and Beyond

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## **FOUR QUESTIONS**

In this paper I write about instilling and implementing environmental values in American society from a policy perspective. I address the obstacles and opportunities for achieving this objective by way of four subordinate questions. *First*, why, given America's record, does the question need to be asked: Isn't the United States already a leader? I suggest that looking at the environmental impact of the United States in a global context is far from heartening. *Second*, what would it mean to have suitable environmental values consistent with scientific conceptions of nature as fundamentally dynamic? I propose that Aldo Leopold provides an initial grounding for such an ethic and that scientific developments in the second half of the 20<sup>th</sup> century further support his point of view. *Third*, what barriers are there to adopting these values? I argue that, from a Leopoldian perspective, American society is misconceived from the beginning, though it is not without its countercurrents. This argument refers to four roughly chronological, but overlapping, factors: the beliefs of the Colonists; the founding documents of government; the rise of moral relativism and a misunderstanding of tolerance; and the establishment of a materialist/consumer society. And, *fourth*, how might these barriers be overcome or reduced? I show how each of the factors that are obstacles are also opportunities.

It is my view that the main directions of American society are unfriendly to these values. Consequently substantial changes in the desired direction will require fundamental re-envisioning and re-grounding. Yet as the momentum of global climate change and general ecological decline accelerate it is apparent that time is very short. At the very best there is no easy fix.

## **WHY ARE WE ASKING THESE QUESTIONS?**

### **Out in front**

The U.S. is a leader in thinking about the questions of conservation and environmental ethics, and a leader in acting on them. Bartram, Marsh, Thoreau, Muir, Pinchot, Beston, Leopold, Carson and others are, by any estimation, leaders in thinking about these questions. Countless Americans from Abee to Whitman, from the Romantic painters to the Illuminists, celebrate the beauty and grandeur of their country. It was a land fabled for its open spaces: "In the United States there is more space where nobody is than where anybody is. That is what makes America what it is." (Stein, 1936) The U.S. is a leader in land conserved through the Wilderness Act, and by private groups such as land trusts, especially in places like northern New England, and other regions. The U.S. Forest Service is a model emulated in many other nations. Its National Parks and Wildlife Sanctuaries stand out as exemplary when compared with the actions of many, but not all, other nations. Many portions of the United States have become either intentionally or de facto reforested. In some places alternative, environment friendly, agriculture has deep roots (Rodale Institute, etc) and is growing in quantity and becoming more important ideologically among some groups. The Clean Air, Clean Water, and Endangered Species Acts have been notable successes.

### **Falling back**

There are, of course, parallel stories to tell, from land use to climate change. There are overused and rundown national parks, wildlife sanctuaries with poisoned water, or, in some seasons, little or no water at all. Land preserved by private trusts is sometimes surrounded by the very sprawl and devastation they were designed to prevent. Outside protected areas, the transformation of the landscape over the

last two centuries is often almost complete in states like Iowa, and Bureau of Land Management holdings are often overused and degraded. Today the loss of farmland and natural areas continues even in states with stable populations. Management practices by the United States Forest Service often degrade the very resources meant to be conserved (Langston, 1995). Industrial “organic” farms meet the chemical definitions of organic, but neglect altogether the ideas of the integrated, holistic “land friendly” character of farming that lay behind the philosophy of the movement when it was formulated by Ebenezer Howard and others (Pollan, 2006). Some areas are reforested with scrub trees, infested with invasive species, or are monocultures. Improvements in reducing automobile pollution per mile are substantially offset by vast increases in miles driven. The Clean Air Act itself has been weakened. Local water quality improvements should be set against the backdrop of the massive growing dead zone in the Gulf of Mexico and in many estuaries. Entire mountain tops are removed in Appalachia and dumped in hundreds of miles of streams in the quest for cheap coal whose burning assaults us all evermore. Climate change drives emerging desiccation of increasing regions, particularly in the burgeoning Southwest, thus threatening to extinguish species not previously imperiled.

### **Out of sight – out of mind**

So the picture is mixed even when we focus on the national success stories. But when we turn away from these elements and look at the global picture the situation is grim indeed. What virtue we keep at home we pay for with vice abroad. Of course, a major international effect is

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<sup>1</sup>Leopold’s work helps illuminate an age-old question: how do we go about justifying one ethic over another? What processes of reflection will allow us to assent to one view, and will fail to affirm another? A way to begin answering this question is: we should accept those ethical views that most accord with our other considered and well grounded beliefs. This can be broken down into four parts (Daniels 1979): 1) what is the ethical principle or disposition in question? 2) how does it accord with other concepts such as our theoretical views about the nature of the person, society, evolution, God, the state, the family and the like? 3) how does it accord with our moral intuitions about fairness, duty, and liberty, etc? 4) are all these ideas taken together feasible? Can we do what they suggest? In a mature, or rather maturing, person this is not a one time event, but rather an open ended process of adjustment, insight and expansion. The connection between ethics and science is both integral and extensive, particularly in reference to #2 and #4. Science influences our views about the nature of the universe, the divine, the characteristics of the person, the earth, and the like. It also helps us understand what can and cannot be done; what resources there are and how long they are likely to last, what medical interventions are likely to work, how to design an airplane, and the like.

from per capita emissions of GHG *in* the United States. Reforestation has not been achieved by drastically reducing wood product consumption, but by harvesting those products from other countries – often countries with little or no forest protection, and frequently where outright corruption is rampant. Heating with wood has been displaced by the use of fossil fuels. To support their consumption, Americans have exported manufacturing and its attendant air pollution (and lots of GHG emissions) to regions such as China and India which now suffer from life destroying clouds of pollution that not only chokes their cities, but cover vast multi-national regions with brown clouds that substantially reduce sunlight reaching the surface of the earth. The overuse and degradation of water is so severe that many rivers have simply dried up, or are so degraded that they can longer support the life that used to live there. The thirst for cheap oil drives morally and ecologically disastrous wars – notably, but not exclusively, in the Middle East – and regrettable extraction processes, in places as disparate as Nigeria and Canada. *The de-industrialization of America's production has not been matched by a de-industrialization of its consumption. From the scientific and ethical point of view summarized in the next section, as the American Dream becomes a global aspiration it is becoming a rapidly, multi-nodal, metastasizing cancer.*

### **WHAT WOULD AN ADEQUATE ETHIC BE?**

A fundamental issue of our era is – what is the relationship between ethics and evolution? Yet, it is one that is seldom addressed head on and is often thought to be too incendiary to tackle (E. O. Wilson's Sociobiology is an exception to this, though it is unfortunately very reductionist). Yet it is hard to know where we should be going without recognizing where we have come from. Along with Albert Schweitzer, who wrote on ethics in the second, third and fourth decades of the 20<sup>th</sup> century, Aldo Leopold was one of the leading figures in the first half of the 20<sup>th</sup> century to try to systematically address this question.' Both rejected the mainstream utilitarian and Kantian traditions of their upbringing – Leopold setting aside Gifford Pinchot's human-centered utilitarianism and Schweitzer the German traditions that tried to rest ethics on the idea of the rational person (Schweitzer 1949). Since they wrote, much has



happened, particularly regarding Leopold's beliefs, to ratify and extend their thinking.

### **Forging a link between ethics and evolutionary biology**

I propose using Leopold as the principal reference point for an adequate environmental ethic. For many years he was an employee of the United States Forest Service, and was the founder of the field of wildlife management – a way of managing “wild” populations principally for human benefit, such as hunting. Toward the end of his career he was a professor at the University of Wisconsin. While there, he bought and began the restoration of a rundown farm. It was that farm that inspired what is most likely the most influential work in the 20th century in English concerning the human relationship to the rest of nature. It is *A Sand County Almanac*, published shortly after Leopold's death in 1948. In that work he wrote:

“Conservation is getting nowhere because it is incompatible with our Abrahamic concept of the land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the esthetic harvest it is capable, under science, of contributing to culture. That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics. That land yields a cultural harvest is a fact long known, but latterly often forgotten. These essays attempt to weld these three concepts.”

For Leopold the fundamental principle of ethics is summarized as follows:

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”

### **Forging a link between ethics, evolutionary biology, chemistry and physics**

Since Leopold wrote, many scientific developments have helped put his scientific and ethical insights into larger contexts by

connecting them to chemistry and physics, thus providing them with important, but not conclusive, support.

One dogging question of the middle part of the 20th century was how evolution, in which complexity increases, is compatible with the 2<sup>nd</sup> law of thermodynamics, which stresses a universal tendency to disorganization and thermal equilibrium. In *What is Life?*, which is based on lectures given in Dublin in 1944, Edwin Schrodinger formulated an answer to this question that was to have monumental implications for both science and society. In that work he states that “life continuously sucks order from all around it” – as when we eat a sandwich. We maintain our own order, and our own body temperature, by degrading the order in the sandwich. This harvesting of order is how we living organisms avoid disorganization and thermal equilibrium – in other words *death*. Living things are temporary far-from-equilibrium systems programmed to be self organizing. Schrodinger asked two questions about this: 1) what does the self organizing? and 2) how does this order give rise to another order in our offspring? His work in the 1940s foreshadowed, in the 1950s, the development of the DNA model by Watson and Crick and the subsequent explosion of molecular biology. It is the DNA molecule that does the programming *and* passes on the order. This has allowed us to understand far better than Leopold could have how life and its reproductive processes – *where order gives rise to order* – connect to thermodynamics.

In *What is Life?* Schrodinger asked another fundamental question, but one that he did not answer: *how does order arise from disorder?* Why isn't everything in the universe the same as everything else? Why are there complex organisms like you and me? And why are there complex ecosystems such as those revered by Leopold? In the last twenty years or so there has been considerable progress in understanding the origins of these far-from-equilibrium systems. The answer is surprisingly short. In a paraphrase of Aristotle's “nature abhors a vacuum,” the answer given by modern students of physics, biology, and ecology is “nature abhors a gradient” (Schneider and Sagan, 2006). Here is how it works.

On earth, winds are caused by ceaseless attempts to equalize the temperature and pressure of air masses. Ocean currents seek a uniform temperature of the water. Both are attempts to dissipate the heat from the tropics to the poles. But because of the way the sun

strikes the earth they are doomed to perpetual failure and hence persistence. Storms such as hurricanes are massive dissipative structures. Living organisms are also dissipative structures. They are one mechanism among many that allows for the dissipation of heat gradients. Biological evolution provides pathways that are the *best available* for equalizing the heat gradient between the intense energy received from the sun and the much cooler earth. Complex ecosystems such as rain forests are the best paths that we have, or sadly, had, to find a path into the cool (Schneider and Sagan, 2006). Since the deployment of the Hubble Space Telescope there have been substantial developments in cosmology and astrophysics that have enhanced our understanding that evolution is a characteristic of the universe made possible by the 2<sup>nd</sup> law of thermodynamics (Chaisson, 2005). Biological evolution is thus a special case (we don't know if it is the only one) of a general, *literally universal*, phenomena of equilibrium-seeking processes. As Schneider and Sagan state it, the universe is trying to be as cool *as it can be* (Schneider and Sagan, 2006).

### **Can we find a “fuller” dome of scientific and ethical knowledge?**

As noted above, science is not the sole determinant of our ethical beliefs, but it is not irrelevant either. The significance of the developments in physics, chemistry, and molecular and evolutionary biology since the 1940s when Leopold wrote is that they “fill in” much of the background needed to support, understand, and operationalize Leopold’s “land ethic.” A wonderful, and to me beautiful, coherence appears on the horizon, in which our moral, scientific, political, and theological views, like a geodesic (Buckminster) Fuller dome, support and strengthen each other. *The ethical and policy implications of these discoveries are fundamental but nearly wholly unexplored.* A very preliminary discussion of a few of their consequences is begun below.

### **WHY THE U.S. CANNOT OR DOES NOT INTERNALIZE A LEOPOLDIAN ETHIC**

The answer to this question is deeply rooted in American religious, moral and political traditions. As noted, there are numerous sources of respect for nature in American life, but like Leopold they have not served to provide the framework for policy. From a Leopoldian

perspective America is misconceived from the ground up: it is a house built upon the sands. These dysfunctional elements begin with the religious origins of America; are further, but differently, expressed in the founding documents of the Constitution and the Bill of Rights; go further astray in the burgeoning moral relativism that replaces the ethics derived from Judeo-Christian sources; and reach a Dionysian frenzy in the 20<sup>th</sup> century. Here is how it happened.

### **A faith of our fathers**

The founding of the United States by European Christians meant that the fundamental conceptions of that tradition, many of them pre-analytic, became part of the conceptual foundations of America. Here are some of its features:

#### *The need to take back Eden*

As Carolyn Merchant has argued in *Reinventing Eden*, American culture is embarked upon a vast project of returning to the previously lost state; and this quest requires and legitimates an ethic of transformation and “reclamation” of the biosphere in the quest for paradise. There is, of course, within the Judeo-Christian tradition a less dominant ethic of stewardship found in the Book of Genesis and elsewhere, but alteration and subordination rule the landscape of these peoples. This contrasts sharply with the narratives and behaviors of widely dispersed native cultures, described by Hugh Brody (2002) in *The Other Side of Eden*, by Marshall Sahlins (1972) in “The Original Affluent Society,” and others (Gowdy, 1998).

#### *The wilderness is something to be overcome*

The natural world is, as in the typical but not exclusive characterization in the Old Testament, something that is to be feared and in need of being tamed or even removed. Again there is a subordinate counter narrative of wilderness as the place of clarification and redemption. Yet, quantitatively the landscape reflects relatively little of this attractive, but nevertheless instrumental, value.

#### *Exceptionalism*

America was to be a “beacon on the hill” for humanity. “We the people . . .” have special duties and special *privileges*, even entitlements. Hence the first President Bush was able to assert in Rio,

*without justification*, that the American way of life was not “on the table.”

### *Founding documents*

The founding documents of American government also set things off in a direction that makes internalization of a Leopold-type ethics difficult. Here are some of the factors:

### *The idea of the good*

A fundamental problem is the idea of rights without duties. The Bill of Rights is a list of freedoms without a corresponding account of obligations. For a balance between rights and obligations there should be perhaps more amendments to the Constitution. For example, the right to property should be paired with duties of stewardship; the right of free speech tempered by the obligation not to incite panic, or hatred of members of disadvantaged groups.

Liberal theory, such as that found in Rawls’ *A Theory of Justice*, clearly states that the liberty of one person is limited by a similar liberty for others. The theory of rights, for reasons at least in part discussed here, is not in any way embedded in an empirical account of nature. As a consequence, the connections between the liberty to drive cars using fossil fuel, thus causing climate change and the loss of life and livelihood by those living in areas prone to coastal flooding in Asia, for example, simply seldom comes up. Yet the unnoticed connection has very profound, foundational, implications for liberal theory and the day to day lives of every American. For the notion that we choose a way of life and then live it according to our own lights is radically circumscribed, from a practical point of view *altered altogether*, by the recognition of our embeddedness in complex ecological and social systems subject to the laws of thermodynamics.

### *Is a constitution an unqualified good?*

The picture drawn by modern science from quantum physics, evolutionary biology, current cosmology and other sources is of a world that Heraclitean – subject to constant change. But constitutions, particularly when they are very detailed and/or subject to “strict construction,” are non-adaptive. For example, American land use practice and law continue to be mostly uninformed by decades of work

in ecology stressing the interconnectedness of natural processes (Freyfogle, 2003). At best a constitution should be a frame of reference for constructive evolution.

### *This land is their land*

If you wanted a constitution, it is not clear that you should want the one Americans have. It is profoundly and stealthfully anti-democratic in that it weights the control of the powers of government toward the wealthy. Americans have not come to terms with the implications of Charles Beard's *An Economic Interpretation of the Constitution*, now nearly a century old. Beard argues, correctly I think, that the Constitution is basically designed to allow the United States to be run by the propertied classes – with only occasional democratic “moments,” usually triggered by crises. This highly regrettable feature of the basic document of American political life is now severely aggravated by the emergence of mass media, the privatization of the radio frequencies, and the refusal of the Supreme Court to limit the flow of vast sums into the political processes. If the government is run in the interests of property then a Leopold ethic will not be internalized at the policy level unless it is done by that class – which *has* given rise to *conservationists* like Pinchot and Theodore Roosevelt, but *no* Leopoldians. The main direction is, and shall be, in the service of capital, much of it accumulated historically by the rampant privatization of what is now, highly regrettably, called “natural” capital.

### **An ethical free-for-all**

It is widely believed that in America one can believe and espouse whatever one thinks, and there is a corollary right to do whatever one wants with one's property. These ideas also need critical reflection and reappraisal. Here are three reasons why:

#### *The dangers of misunderstanding tolerance*

The foundational underpinnings of American politics and culture are in trouble in another dimension as well: the idea of tolerance. There are strong theoretical and practical reasons for making tolerance *a* virtue. This is especially true in a culture such as that in the United States that is an amalgamation of many diverse peoples. Yet it is not without its dangers. It must not be confused with indifference, and lead

us away from challenging each other's beliefs. If it does, grounding *any* public philosophy will be difficult. In particular, views such as those espoused by Leopold, that will give new meaning and direction to society, will not enjoy wide spread consideration, much less adoption.

### *Misunderstanding freedom*

In contemporary America there is a widespread, but not universal, misunderstanding of *its own* core moral value. Many see freedom as the absence of law as opposed to connecting it to membership in a community governed by self and community given law (see Fischer, 2005 for the understanding of the idea of freedom.). This way of thinking has led to such unfortunate outcomes as the “wise use” and property tax movements, and the general and largely successful war against America's domestic public sector which began in earnest in the early 1980s with the election of President Reagan. (This understanding was not Jefferson's intention when he used the word “liberty” in the phrase “life, liberty, and the pursuit of happiness” – but the more complex notion of liberty embedded in his thinking has been attenuated (Berman, 1981). At this point in its history America has no coherent conception of what government is for.

### *Ethics without science*

Partly, but only partly, due to the uneasy and unstable severance of religion from public life in America, we have not been confronted with the problem of reconciling our moral, religious, and scientific beliefs. Indeed, most of our moral beliefs are *ascientific*. Whether primarily from Judeo-Christian, Greek or nonwestern roots, the fundamental parameters of the vast majority of these belief systems were laid down well before the scientific revolutions of the last several centuries. As a result our moral systems have not internalized what we know about the world from a scientific point of view. For this reason we lack a common empirical reference point with which to anchor our beliefs about how we live and its relationship to the natural world. Our “ethical maps” of the world are, for the vast majority, *not* maps of where we are.

### **Materialism: A leaning tower of pizza**

The materialistic dimension to American culture has been there from the beginning. The early European explorers and settlers wrote

often and eloquently about the riches to be found in the new land. This dimension became a stream after the Civil War, a river in the early part of the 20<sup>th</sup> century with the rise of merchandizing, and a cataract in our time. Looked at from the perspective of Leopold, it is the adding of additional stories to a building already profoundly, and increasingly dangerously, askew.

### *Mass marketing*

As the population grew and the means of communication improved in the early decades of the last century, it became possible, and highly rewarding financially, to reach large numbers of people with commercial messages – facilitating both consumption and wealth accumulation. The idea that the American dream was synonymous with consumption became popular and was to become a defining feature of U.S., and to a lesser degree, Canadian culture.

### *The Keynesian era; the cataract*

Keynes wrote *The General Theory of Employment, Interest and Money* in the interwar period to head off World War II. He was too late. But his basic idea – that we can prevent large-scale unemployment by prudent use of monetary and fiscal policy – became widely, now almost universally, accepted. By the 1960s his prescriptions for achieving a lasting peace had become the gospel of how to run an economy. Yet, the countercyclical features of Keynes' theory faded into the background as a new prescription for perpetual growth became the universal liturgy of the faithful. The materialistic feature of American life that began with the letters home in the 17<sup>th</sup> century has become a cataract in our time; a cascade of goods, and a *blindness* to their and our consequences for life's prospects. It has come to define who we are and who we wish to be.

## **CAN YOU GET THERE FROM HERE?**

So far, I have principally discussed the barriers that exist in American life and culture to internalizing a well-grounded Leopoldian ethic. Of course, there are many countercurrents and it is to these that we owe the successes discussed at the outset of the chapter. Obviously we should build on these trends and welcome



allies when we find them. E. O. Wilson's (2007) strategy in his book *Creation*, where he defends a scientific cosmology but points to the overlap in prescriptions with fundamentalists, is exemplary.

But this is not likely to get us as far as we need to go. We need to rebuild from the ground up. Like Jason and the Argonauts, we have the task of reconstructing the ship while it is at sea. Here are some suggestions for how to do so, roughly in inverse order of diagnosis.

### **Turning the tables on materialism**

#### *Re-ground macroeconomics on principles of stewardship*

Keynes attempted to formulate a *general* theory of economics. But Keynes' theories and their progeny are themselves *special* theories of how a subset of the *earth's* economy works, written in an era when ethics was in disarray. The evidence that this paradigm is in the process of breaking down has been accumulating for decades (Meadows et al., 1974, 2004; Daly, 1996; Constanza et al., 2007). To exit this tragedy we need to rebuild a more general theory that is based on how the biophysical systems of the earth work, as the science-based branch of ecological economics has made clear, and inform and constrain economic policy by a Leopoldian ethic. I have proposed that we call this "stewardship economics" (Brown, 2008).

#### *Re-conceptualize budgeting*

The life support budgets on earth are the flows and stocks of sunlight and the ability of the biophysical systems on earth to assimilate waste. There should be a single global institution which analyzes these budgets and their fair shares between persons, nations, and species by reference to a Leopoldian ethic. New charters and new personnel educated very differently from those who now dominate the national central banks will obviously be needed. There would be very grave danger in turning the job over to the architects of the current debacle. This institution is further discussed below.

#### *Learn from the marketers*

Most of what people do who are concerned with conservation and environmental ethics is trapped in a model of human response and responsibility that is too partial – too based on rationality. We need to learn from the marketers what works in getting response, and to use

what we learn. Yet, there is a dilemma here. Marketers create wants by playing on people's fears and desires – thus creating the need for the products they wish to sell. This is a dishonest manipulation unworthy of emulation.

### **Recasting the terms of the debates: Shrinking the ethical free-for-all**

#### *There is no ethical ethics without science*

While it is true that scientific knowledge is not determinative of ethical beliefs, it is equally absurd to suppose that we can have adequate ethical systems that are not cognizant of and modified by what we know empirically. What we know about our motivation and cognition, for example, is different from the Enlightenment understandings on which much of our public discourse relies (see, for example, Lakoff and Johnson, 1999). Let's draw some maps of where we are!

#### *Tolerance after Darwin*

We need to reconstruct and redeploy the idea of tolerance, which like many of our other ethical ideas has to be rethought in light of evolutionary biology. For example, Leopold's ethic is itself a plea for tolerance of the diversity of life and its expressions, and intolerance for tearing it up. From a Leopoldian perspective the whole "debate" about abortion as a deliberation between "life" and "choice" is miscast, and needs to be expanded. Regrettably, access to abortion is a necessary means of population limitation. More humans are *taking* life, sometimes all of it, from other species.

#### *Getting "rights" right*

The rhetoric of "rights" is deep and pervasive in American society. It is regrettably grounded in Jefferson's *deus ex machina* "endowed by their Creator." We need to begin again. Embedding the idea of rights in ecological knowledge and responsibility retains the idea but *radically* alters its operational significance. Particularly as it relates to consumption, such a perspective is a fulcrum for essential re-conceptualization of the American way of life, and a strong antidote to the pretensions of exceptionalism. Such a re-envisioning should be an objective of marketing efforts: place an SUV in an ad next to a village awash in the South Pacific.

### The end of the Westphalian Era

The framers of the government of the United States thought, with good reason at the time, that the problems of governance could be solved by the founding of a nation. But there are at least three reasons for thinking we must examine this idea afresh.

First, and ironically, is the behavior of the United States itself. It is not the only rogue state, but it is the principal one at this time. Despite much rhetoric to the contrary, the United States is, and has been for at least a century, a source of anti-democratic overt and clandestine military actions and subversive activity (Johnson, 2004). This problem has substantially intensified in the post World War II period with the emergence of the national security state (Dorrel, 2005 and Robert DeNiro – *The Good Shepherd*). The emerging climate catastrophe, one of many examples, is the result of free rider behavior on the part of the U.S. and many other governments – including Canada – and their peoples.

Second, it is evident, as is the case with all empires, that the American one will come to an end. Its demise will simply be one in a long line of temporary hegemonies that have failed. A good candidate for the next round is China – a disquieting thought to those of liberal temperament. There is every reason to want to escape this cycle.

Third, in the post World War II period there has been vast growth in production and consumption associated with economic globalization, coupled with a near tripling of the human population. The simple truth is that our institutions of governance do not match the problems generated by these developments. Among the unacceptable consequences of the current “order” are the radical marginalization and pauperization of hundreds of millions; the steep and accelerating decline of over half of the world’s ecosystems (Millennium Ecosystem Assessment, 2005); the instability and unregulatability of financial markets, and the like. Worse still is that it is the policy of all, or virtually all, governments to expand economic activity, while doing little or nothing (some governments are actually pro-natalist, or as in the U.S. pro illegal immigration as an easier way to get cheap labor) to bring about the orderly reduction in population in advance of nature’s inevitable, but indiscriminate, pruning hook.

Here are some suggestions for thinking outside the nation state box. Four interlocking institutions are likely needed.

The first is an *Earth Parliament*, governing a global federation modeled, in part, on the European Union (Frankman, 2004). Its primary mission would be the enhancement of the commonwealth of all life. Within this overall mandate, it is to be charged with the maintenance of global peace, and the governance of economic activity under a Leopold ethic. This *federal* form of government facilitates subsidiarity, transparency, and accountability. Properly designed, it can sustain and enable those things that give our life meaning in particular places and ways: these are the things that define our cultures and hence, in significant part, ourselves. The parliament should establish at least three subordinate global institutions.

Second, is an *Earth Reserve* which, within the context of these new institutions, will design and guide an economy based on the biophysical laws that govern our planet, and an integrated theory of earth's economic/ecological household. While using prices to allocate resources in the interest of efficiency, a Leopoldian ethic must be served by physical quotas on the aggregate scale of intervention in basic earth processes such as the atmosphere, the oceans, and the carbon, nitrogen, and phosphorous cycles (Daly, 1997).

Third, to accomplish the goals of living justly and respectfully on earth we need institutions which are structured to take the long view in ensuring life's prospects. To this end we need *Trusteeships of Earth's Commons* to protect the systems such as the ozone layer, the atmosphere, the oceans, and the other systems necessary for life's flourishing.

Fourth, all these institutions, including the parliament itself, should be counter- balanced by and held to their charters by an *Earth Court*.

### **Celebrate the *really* good news: The universe is creative not created**

The dysfunctional metaphysical pretensions that accompanied the Europeans to the (absurdly named) "new world" can be cast aside in favor of a new self, world, and cosmological understanding. The Old Testament God, so unflatteringly depicted in *The Book of Job*, has been

replaced in current cosmology by a weakly benign but unintentional universe improbably favorable to us and other life forms. Though many do not agree, to me there is little here to lament. We should view ourselves as celebrants in a creative *universe that learns* through adaptation. It has direction, but no destination.

#### *Escaping the Eden narrative*

Having never been expelled from Eden there is no need to reclaim our place in it by transforming the entire earth to reclaim our God-given place. We are the agents of “paradise lost” – the rampant degradation of the Earth’s splendor.

#### *Honor thy father and thy mother*

The earth’s complex ecological systems are not enemies to be eliminated or produce to be fed into the maw of a runaway economic system, but a functional part of the cosmic order essential to the prosperity of humans and all other earthly life forms.

#### *Reconstruct policy discourse*

The sad truth is that we have no systematic framework for thinking about environmental policy. Much of the legislation that we do have rests on human health concerns – but in general our relationship with life and the world is haphazard at best and generally neglectful.

#### *When all you have is a hammer . . .*

In the salad days of the public policy movement in the 1960s and 70s it was supposed that micro-economics, its conception of the welfare-maximizing individual, and the attendant theory of market failures was the *lingua franca* of the public sector. Among the shortcomings of this framework is that it slights (at best) the natural world. Its primary point of contact is the idea of externalities, which simply recycles the issue of our relationship with nature as one of human preference maximization subject to constraints. In fact microeconomics rests on multiple metaphysical conceits that are incompatible with what we know about the universe and our place in it (Nelson, 2001; Nadeau, 2006).

There is now a vast literature on the mistaken and unjustified assumptions of economics. Some of the problems are: taking preferences as given; seeing individuals as isolated; assuming the

world is made for humanity; complete neglect of thermodynamics; its roots in the (failed) moral philosophies of Bentham and Mill, etc, etc. The *mainly* fruitless attempt to treat all or most environmental problems as issues of full cost internalization (Pigou, 2006) confuses problems of efficient allocation with those of appropriate scale (Daly, 1997), among numerous other problems (Brown, 2007). This is just one more example of thinking that the world *must be a nail*. This is not to say that prices don't have a role to play in limiting the scale of the human impact on nature; of course they do. But it is to say that economics does not provide any, let alone a robust, normative framework for analysis of the human impact on the earth and its voyagers. We need something like the framework provided by Leopold, for example, as is discussed next.

#### *Who we are and where we came from*

We must begin afresh. A new beginning will incorporate what we know about the origins and evolution of the cosmos, the place of the earth in this epic, life's emergence on earth, the biophysical functioning of the planet, and human origins, capacities, and institutions. A policy framework will be incomplete without including an ethic of atonement and reconciliation which have deep roots in the Judeo-Christian-Islamic tradition and which fit well into a Leopoldian framework.

One approach to taking Leopold seriously is to use the framework  $I = PAT$  suggested in the 1970s by Paul Ehrlich and John Holdren. In this "formula" "I" stands for impact, "P" for population, "A" for affluence, and "T" for technology. Of course, we should add one variable "E" to recognize the ethical dimension as one element in our overall impact on nature. The  $I = PATE$  frame of reference brings to the fore a number of very uncomfortable issues. Are there too many of us? Are we too rich? Is the rush for innovation far too uncritical? (The answer to all these questions seems to be an emphatic yes.) *PATE defines the policy space* we have to work in if we are to take our duties to walk lightly on the earth seriously. It can be objected that adding the E variable destroys the multiplicative feature of the formula because it cannot be represented by a single number. However, it will not work anyway since the relationship between the variables depends on complex issues of description and definition – wind energy has

very low carbon emissions while operating, but may kill many bats and birds). Nevertheless, using I = PATE as a framework for thinking brings us closer to the actual choices before us.

*But what about “I=Impact?”*

How do we conceptualize it? There are many measures – for water, dissolved oxygen counts; for forests, biodiversity; for ecosystems, general resilience; for air, nitrous oxide and particulate matter. There are environmental impact assessments, etc. There are analytical frameworks like cost/benefit and risk analysis. Is there a resting place, a foundation, on which to ground understanding? A place to begin is with the laws of thermodynamics and how they help us understand some of the basic features of life’s situation and prospects (Soddy, 1924; Georgescu-Roegen, 1999; Daly, 1997; Faber, 1996); Costanza, 2007; Brown, 2007). *For all practical purposes earth is a system of systems closed to matter, and open to energy – sunlight* (Daly, 1997). Let’s look at the implications of these two features of earth from the perspective of Leopold’s ethic.

*Closed to matter – what goes around stays around*

Judged by mass and frequency, hardly anything arrives here and *very little* ever leaves – a rocket now and again. According to the first law of thermodynamics – the conservation of energy and matter – this means that whatever is done here stays here in one form or another. There is no such thing as production – as orthodox economics would lead us to believe – *only* transformation (Faber, 2001). If we had an economics connected to thermodynamics, climate change would not be seen as *An Inconvenient Truth* (Gore, 2006), but as a necessary and fully foreseeable consequence of a carbon-based economy. *The really inconvenient truth*, apparently too ungraspable or too horrible to contemplate, is that we have an economic system that is without ethical or scientific foundation – a metaphysical omelet, and not a very savory one at that.

Destabilized climate is just the beginning. The vast dead zones in coastal waters, fish loaded with mercury, flame retardants in our flesh, PCBs in the breast milk of women living in the Arctic are the *fully predictable* consequences of the systems *we* have designed. From a Leopoldian point of view we should favor those chemical and physical

transformations that are respectful of ecosystems, and avoid those that impede their functioning and resilience. *Assimilation capacities*, budgets for understanding how much waste can be absorbed if you like, of the earth's systems are one dimension of the "I" variable. But there is another.

*Open to energy – Walk Even with the Builder of the Universe (Thoreau)*

The earth's being open to energy is also critical in understanding and enhancing life's prospects. It is here that the 2<sup>nd</sup> law of thermodynamics comes into play, that which makes *complexity anywhere in the universe possible*. It is sometimes called *the law of laws*, for without it there would be no difference and hence no other laws (Schneider and Sagan, 2006). On earth there is substantial negative entropy – the capacity to enhance complexity due to free energy from the sun. Put in its simplest form, almost all of earth's complex life is made possible by photosynthesis' attempt to reduce the earth's temperature gradient. The current levels of the human population and consumption are simply taking the natural world apart faster, and increasingly far faster, than sunlight and photosynthesis can put it back together again. Humans now appropriate about 50 percent of the earth's terrestrial life support budget (Vitousek, et al., 1986). From a Leopoldian perspective this trend is a (likely *the*) paramount injustice – the confiscation of more and more of the earth's life support budget for our use alone. This is why we must re-conceptualize what it means to budget. Understanding, metering, and carefully regulating (by reference to physical quantities, not prices alone) the earth's complexity support budget is more fundamental than doing the same things for the money supply. It is the fount of wealth on which all other wealth depends.

*The gift of membership*

How freeing not to be the chosen species, the chosen people, the exceptional nation! Humility offers the opportunity to live "with grace and self command" (Rawls, 2005) with a view to the flourishing of life in its myriad forms (Berry, 2000). Here is a gift beyond measure: we liturgists are finite players in an infinite game (Carse, 1997, Bateman, undated); custodians of a tiny bit of eternity. This is



our place, minuscule as it *and we* may be, in the cosmic drama. Recognizing this place is what it means to have, and keep, the faith with the rest of life with which we share heritage and destiny. It is not too difficult to imagine that Jefferson would, knowing what we know, join us in celebrating *this* brotherhood. Is this akin to the faith of which our fathers spoke with its “ethic of love widened into universality” (Schweitzer 1933)? Can *we* emerge from our ethical free-for-all and the darkness of our materialism and see *it* face to face?

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# Planetary Praxis:

## On Rhyming Hope and History

*Paul D. Raskin*  
*President, Tellus Institute*

*History says, Don't hope  
 On this side of the grave.  
 But then, once in a lifetime  
 The longed-for tidal wave  
 Of justice can rise up,  
 And hope and history rhyme.*

Seamus Heaney, *The Cure at Troy*

### **OUR COMMON PREDICAMENT**

These days, when thoughts turn to the state of the world, one need not be a Cassandra to fear for the future. It is enough to be alert to the reports of new blows to our wounded biosphere; of a globalization juggernaut transforming the economic order and unsettling billions of lives; and of a crowded planet cleaved by widening cultural, social, and political fissures. As this drumbeat of disquieting news stirs apprehension, the feeble response of the world community saps hope. A *Zeitgeist* of despair, nourished by its twin ingredients of fear and powerlessness, spreads in a public growing more attuned to our global predicament.

In the world of development policy, the expectation gradient has sloped downward as well. A mere two decades ago, when the Brundtland Commission injected the notion of sustainable development into the mainstream of policy discourse, optimism buoyed the atmosphere (WCED, 1987). The title of the Commission's seminal treatise – *Our Common Future* – caught the then idealistic mood: we can align economic growth – the dominant aim of conventional strategies – with the equally important goals of

protecting the earth we share and alleviating the poverty of those with whom we share it. The ringing moral imperative at the heart of sustainability – our responsibility to pass to future generations a world undiminished by our hand – struck a resonant chord in many, inspiring the work of a rising wave of young professionals and activists.

Of course, sober minds understood that the journey to sustainability would be no cakewalk. Formidable barriers blocked the way to “our common future:” vested interests, timid politicians, fractious geopolitics, myopic mindsets, and a culture of greed. Even as the Brundtland Commission was conducting its work and holding its public hearings in the mid-1980s, a decidedly unsustainable form of market-led globalization gained momentum. While the paradigm of sustainability advanced at the cutting edge of development theory, a growth-oriented political philosophy consolidated at the core of development practice. Placing rights over duties and individual entrepreneurship over our common future, the neo-liberal agenda of deregulation, privatization, and free trade unleashed a blizzard of economic growth unfettered by the competing priorities of environmental preservation and poverty alleviation.

Still, the cogency of the case for sustainable development, and the patent risks of inaction, seemed reasons enough to look forward with a sense of possibility. Preparation began for a major international meeting to galvanize international political momentum for the new paradigm. The 1992 United Nations Conference on Environment and Development in Rio de Janeiro – the Earth Summit – combined two watershed meetings in one: an official assembly of world leaders and a huge coming out party for global civil society. The Summit produced Agenda 21, its nonbinding international plan of action, and two formal treaties: the Framework Convention on Climate Change and the Convention on Biodiversity. In failing to attain firm international commitments on social and environmental goals, the meeting disappointed the bolder aims of its organizers. On the other hand, it did succeed in bestowing legitimacy on sustainable development as a policy framework for the debates that lay ahead and launching high-level negotiating processes on critical issues.

In the wake of the great event, though, fealty to sustainable development principles tended to be honored more in rhetoric than in practice. Instruments of good intentions proliferated – a long

series of international meetings, a United Nations Commission for Sustainable Development, countless national commissions – and the literature on sustainability burgeoned. The world was awash in action plans but bereft of action. Scientific reports could clarify the challenges, policy studies could offer strategies, local Agenda 21 efforts could make their communities greener, and civil society could win this or that battle, but together they could not deflect global development from its unsustainable path. The dream of sustainable development seemed no match for the reality of unsustainable growth.

The ambient mood in the world of environment and development grew more cautious and skeptical. A decade after Brundtland, a blue ribbon panel convened by the U.S. National Academy of Sciences published a report on sustainable development (BSD, 1998). The title, *Our Common Journey*, suggested its thesis that sustainability was best understood as a tentative process of adaptation and social learning, rather than a “common future” that we could specify and head for. By the time of the World Summit on Sustainable Development in 2002 (“Rio plus 10”), the sense of lost opportunity and lost ground was palpable, more like “Rio minus 10” in a memorable phrase of environmental critics.

Now, with another decade taking its toll on the health of the earth and the psyches of its inhabitants, appraisals of the future have turned apocalyptic: *Our Final Hour*, *The Revenge of Gaia*, *The Coming Plague*, *The End of Food*, and *Countdown to Apocalypse* to name a few recent books. While some contemporary authors are excitable prophets of doom, others are circumspect scholars who have weighed the evidence carefully before putting pen to paper, sounding the alarm only reluctantly. When they speak the language of catastrophe, the world best listen.

Indeed, the tasks before us are immense: muting the risks that threaten social and ecological continuity; adjusting our values, behaviors, and institutions for a world growing more connected and fragile; mobilizing cultural and political resources for fundamental social change. We live in an extraordinary time, a turbulent interregnum between the familiar world of the past and a very different one in the making. So far, though, we seem to be flying nearly blind toward a dubious future without benefit of roadmap or clarity of destination.

Shaping world civilization in this century will test our mettle as individuals, as nations, and as a species. Where great transformations of the past have tended to unfold gradually, our planetary transformation is compressed into mere decades: our grandparents were present at its birth and our grandchildren will witness its outcome. Where earlier episodes were circumscribed geographically, this one spans the whole earth; where immediate human interests have spurred action in the past, we are called to respond to the needs of distant people, generations, and species.

The distressing chasm between an emerging reality of staggering risk and our collective ability to change course, between the global “is” and “ought,” is a breeding ground for pessimism about the future. Yet, pessimism misses a critical point: in deepening relationships of global interdependence, history is unraveling old verities, norms, and mindsets. It is thereby laying down the warp and weft of a new foundation for cultural reinvention and collective hope: humanity and the earth are becoming a single community of fate.

This historical circumstance is the *sine qua non* for transcending the fragmentary ideology of the Modern Era, its fractious political arrangements, and its truncated vision of civilization. The ethos of modernity – individualism, consumerism, nationalism, domination of nature – once was well-suited to the exigencies of emergent capitalism, an emancipatory challenge to a stifling traditionalism. Progressive no more, the modernist mindset clashes with the imperatives of an ascendant global reality, hobbling the evolution of modes of thought and association attuned to the potential of this emerging reality.

Although still nascent, a new ethos is brewing, one that is rooted in the extended interdependencies now becoming more palpable. Our linked fates – North and South, rich and poor, people and planet, living and unborn – opens space for a correlated enlargement of human consciousness and political culture. An alternative suite of values – ecological awareness, human solidarity, quality-of-life, global citizenship – is spreading among an expanding global subculture, along with new forms of transboundary association and action.

These developments adumbrate a possibility latent in emerging historical conditions: a tolerant, just, and ecological global civilization could emerge from the existential uncertainty we now face. But possibility is not probability. A salutary transition is feasible only if



human thought and action rise to embrace one human family on one integral planet. Hope rests with a tenable response to the question of historical agency – what social actors can carry forward such a transformation? The search is on for a compelling planetary praxis, an evolving theory and practice to guide the journey and forge the path to our common future.

## **SYSTEMIC CHALLENGE**

Immersed in a rapidly changing world, it is difficult to discern the larger pattern that unifies and gives meaning to the extraordinary changes unfolding around us, much like creatures of the sea, who cannot perceive the vast and roiling ocean in which they swim. Fortunately, we are not fish (if unfortunately for them). We can exercise our intellect and imagination to broaden our panorama and extend our vision. Exploring the contemporary global predicament takes an integrated perspective and a far-reaching outlook.

### **The planetary phase**

Since the 1980s, the threads of global connectivity have been lengthening, strengthening, and thickening in every domain of human activity (Anderson, 2001). Yet, discussion of planet-scale phenomena has proceeded in largely parallel discourses, all introduced by the modifier “global”: economy, corporations, finance, environment, communication, governance, civil society, culture, terrorism. As the literature balloons in each of these arenas, there has been insufficient emphasis on their interactions and the common processes that underlie and connect them.

This is not to belittle focusing on the separate dimensions of globalization. Indeed, each deserves its own spotlight, for each is rife with novel challenges for the analyst, the policy-maker, and the citizen. Transnational corporations have created far-flung webs of production nodes and distribution channels. International finance has generated a bewildering array of instruments for speculative investment. The human transformation of nature has reached the level of the biosphere, the thin planetary mantle that supports all life. The revolution in information and communication technology has compressed cultural and physical distance, penetrated remote

societies, and enabled cross-border networks and communities to proliferate. Governments have created new international structures of governance, their number and diversity synchronized to the appearance of new challenges. Global-scale non-governmental associations, cultural influences, and fissures roil identities, at once dissolving difference and amplifying antagonism.

Yet, viewed through narrow academic or journalistic apertures each of these macro-developments can appear as a largely independent phenomenon. Looking instead through a wide conceptual lens brings their interdependence and interactions into focus; taking a long historical view reveals their common genesis. They are best perceived as separate manifestations of a larger world-historic process: the emergence of an integral global social-ecological system. The many forms of “globalization” are rising like the saplings of a young forest rooted in a common substratum, their crowns tangling as they grow.

We are at the cusp of a new era, the planetary phase of civilization. As traditional geographic and cultural boundaries erode, people and places entwine across one global system with one shared destiny. In the intangible space of human consciousness, this expanding nexus of connectivity enlarges our awareness and identities. The global arena is emerging as a supranational layer of social evolution, political struggle, and contending forms of consciousness. The planetary phase is transforming both the earth and we who live on it.

From the perspective of systems theory, the defining feature of the planetary phase is that the causal dynamics operating at global scales increasingly influence the dynamics of subsystems. Heretofore, the world could be reasonably approximated as a set of separate entities – independent states, autonomous ecosystems, and distinct cultures – subject to external interactions. Such disaggregation into quasi-independent parts is becoming less useful: the global system is irreducible both ontologically and epistemologically. The system and its components shape one another in a complex and reciprocal dialectic that changes the planet and its parts. In this dynamic of planetary transition, the catchphrase “the whole is more than the sum of its parts” takes on fresh meaning: the emerging global system cannot be reduced to its components. The global social-ecological system is something new on the face of the earth.

## Historic roots

The planetary phase of civilization did not appear unannounced. In a sense, our progenitors started down the road to globalization when they journeyed out of Africa some 50,000 years ago on humankind's long march to the four corners of the planet (Chanda, 2007). Over the millennia, human interchange reached across continents and oceans. Ancient trade routes carried people, products, and ideas over great distances; conquering empires encompassed much of the then known world; and the great voyages of exploration wove the early strands of a web that would come to embrace the planet. Then, as people and their production filled the world at an accelerating pace in the last century, the harbingers of the planetary phase arrived with greater frequency. These included the spike in international trade before the Great War, the establishment of the United Nations, the Universal Declaration of Human Rights, and shared cultural symbols such as the images of Earth from space, the modern Olympics, and celebrity personalities. Threats to human security also became global: the two world wars, the risk of nuclear annihilation, AIDS, oil crises, the ozone hole, criminal and terrorist rings, and climate change. By the closing decades of the second millennium, the planetary phase had become a discernable historical development.

The planetary phase is the culmination of the Modern Era. Since the first flickering of humanism in the early Renaissance, modernity has challenged the authority of received wisdom and the stasis of traditionalism. Propelled by the intellectual upheaval of the scientific revolution and the ferment of capitalist expansion, vast human potential for knowledge, freedom, and progress was liberated. In the roar of the Industrial Revolution, the new market economy unleashed a previously unimaginable frenzy of acquisition and accumulation. By any tangible gauge – number of people, scale of production and consumption, pace of innovation – industrialization marked a sharp, upward swerve in the curve of human development: the era of exponential growth had arrived. The world of thought exploded as well, around such concepts as progress, reason, democracy, and the rule of law. In its ceaseless hunger for new markets and resources, industrial capitalism marched toward a world system.

For all the wealth it created and the ignorance it defeated, this era of “creative destruction” brought a degree of human suffering and

environmental abuse without precedent. Capitalism's ineluctable self-expansion either absorbed traditional societies into a web of market relations or subdued them as colonies in empires of commerce. As the revolutions in science, religion, and society spread and gathered momentum, they encountered hard resistance at the moving frontier between modernist and traditionalist mindsets – a jagged fissure that today has become a huge swath across the global field. All the while, modern society's insatiable hunger for resources has been cashing out nature's bounty.

Powerful movements for justice and preservation arose, but they could tame only the most egregious insults to people and nature on the road to globalization. The Soviet Union and kindred experiments elsewhere, asphyxiated by bureaucracy and the Gulag, squandered the twentieth century's dreams of socialist alternatives to capitalism. The industrial era rolled on, posing the question of global society but unable to answer it.

### **Perils of passage**

The Modern Era leaves us with a paradoxical heritage: interdependence and conflict, immense wealth and crippling destitution, technological prowess and a compromised planet. On the one hand, we are endowed with a rich institutional and scientific foundation for building the House of Earth; at last we can defeat the ancient scourges of destitution and war. But on the other, we bear a legacy of violence and greed, which, if not tempered by a culture of peace and a spirit of cooperation, threatens to derail the modern project itself. We have entered the planetary age like callow adolescents with uncertain prospects, heirs to an ambiguous estate, facing a troubled passage to maturity. If the world were a single country it would have all the characteristics of a failed state: rampant poverty, immense inequality, degraded natural resources, conflict between hostile factions, and no legitimate constitutional authority. Each set of environmental, social, and economic problems festering in the contemporary world is a challenge in its own right; together, acting synergistically, they could pose grave dangers to the continuity of development and the possibility of a just and sustainable transition. In the planetary phase, peace and stability must rest on adequate global governance supported by a popular political culture. This is a foundation not yet laid.

Of all the manifestations of the planetary phase, the most vivid is the transformation of the earth itself by human action. We have become a powerful geological force, modifying the texture of the land, the chemistry of the sea, and the composition of the air (Crutzen, 2002). We are altering the titanic flows of water, energy, and matter that course through the ecosphere, knitting together land, sea, and atmosphere. The emblematic issue embodying the enormity of the stakes is climate change, with its several “inconvenient truths”: the dangers posed to the planet and its creatures, the scale of the required action, and the unprecedented diplomatic challenge of devising an international solution to this complex problem. A second urgent environmental challenge is the impoverishment of the planet’s biological resources – the degradation of ecosystems, the loss of habitats, the endangerment of species, and loss of diversity – victims of the mismanagement of land and water, of pollution, and, increasingly, of climate change. Another major threat is toxification – the injection of an expanding brew of chemical pollutants into the environment and food chain.

As the world economy has grown, so have social inequity and cultural polarization. Assaults on the tendrils of global amity are many. The pressure of immigration feeds xenophobia, eroding, in many places, social cohesion. To our collective shame, billions of people suffer destitution in a world of unprecedented aggregate wealth. The tentacles of Hollywood, the Internet, and Madison Avenue touch remote villages, linking and changing the world’s archipelago of cultures. A struggle for world oil looms on the near horizon as we deplete reserves while demand soars, driven by the growing economies of China, India, and other formerly have-not nations.

Unconstrained by coherent regulatory control, economic globalization generates new pathways for crises to ripple through the entire system. The potential risks and interactions of historically novel phenomena – far-flung production chains, huge hedge funds, titanic currency transactions, climate change, chronic oil shortage – are poorly understood (Raskin, 2008). Disruption in any of these domains could trigger a destabilizing chain reaction. Despite this, international governance mechanisms for reducing volatility and responding to problems remain piecemeal and anodyne.

The overarching danger is that multiple stresses will feed off one another and meld into a systemic planetary crisis. Environmental

impoverishment exacerbates poverty, incites conflict, and threatens economic stability; economic failure weakens the efforts to protect nature and reduce poverty; the global underclass, desperate to survive or relocate to wealthier countries, erodes environmental resources and the amity needed for geo-economic cooperation. With so many feedbacks and linkages, different events might ignite a cascading, planet-wide disaster. The more prominent candidates for activating a systemic blow include an abrupt change in the climate, a pandemic, a massive terrorist attack, a sustained oil shortage, and a collapse of the international financial system.

The world is rushing toward its rendezvous with global instability. The extent of the danger will depend on two decisive unknowns: the types and magnitude of forthcoming shocks, on the one hand, and the vulnerability of geophysical and institutional systems, on the other. International efforts, if pursued wisely and vigorously, could moderate the initial jolts while strengthening the ability of institutions to cope with subsequent disturbances. The interplay between these great uncertainties – the form of future crises and the pace of institutional adaptation – will condition the fate of global society in the course of this century.

### **Branching futures**

To whatever has animated speculation about humanity's fate in the past – curiosity, advantage, anxiety, a search for meaning – must be added a very contemporary concern: passing on a resilient world to posterity. Sustainable development has brought the study of the long-range future from the margins of respectable inquiry to the core of research and policy agendas.

Looking through cloudy crystal balls into the future, we can envision many possibilities, each a unique unfolding of objective causes and subjective intentions. The geography of the future is a terra incognita beyond the ken of scientific projection and social prophesy. Indeterminacy is woven deep in the fabric of reality: all complex entities come to points of bifurcation, forks in the road where the outcome is inherently uncertain and sensitive to small deflections. The critical junctures of life punctuate each of our biographies, and there, the directions we take, whether by choice or fortuity, make all the difference. Correspondingly, our collective life-line forms a jagged arc through a branching tree of possibilities. Depending on

serendipity and human choice, fundamentally different worlds could crystallize out of the turbulence of transition.

We cannot predict the planetary future, but we can sketch plausible possibilities. We explore the terrain of the future not to forecast what will be, but to envision what could be. Well-designed scenarios serve as prostheses for the imagination, giving breadth and specificity to our longer-term outlooks. They are thought experiments for identifying critical uncertainties, examining the dangers ahead and inspiring corrective action. Rather than prediction, the point is to enrich the visionary imagination and sharpen debate about the world we want and ways to get there.

A simple taxonomy helps organize the bewildering menagerie of possibilities (Raskin et al., 2002). At the highest level, three broad channels radiate from the present into the imagined future: worlds of incremental adjustment, worlds of catastrophic discontinuity, and worlds of progressive transformation. This archetypal triad – evolution, decline, and progression – recurs throughout the futurist literature. In discussing divergent directions for the future, we shall refer to them as Conventional Worlds, Barbarization, and Great Transitions.

The first group of narratives, Conventional Worlds, describes scenarios that address global problems through a gradual process of technical innovation and social learning. Episodic setbacks notwithstanding, major tendencies persist in these visions: economic interdependence deepens, dominant values spread, and developing regions converge toward rich-country patterns of production and consumption. In the neo-liberal Market Forces variant of Conventional Worlds, powerful global actors advance the priority of free markets and economic expansion, relying heavily on technological innovation to reconcile growth with ecological limits. In the Policy Reform variant, governments respond to nagging global problems with a strong and comprehensive portfolio of initiatives to align the economy with the social goal of reducing poverty and the environmental goal of sustainability.

Although Conventional Worlds are variations and extrapolations of present patterns carried forward, they may be based on unrealistic expectations; they may also proffer undesirable underpinnings for the future. Undoubtedly, market and policy instruments for sustainability are urgently needed. However, strategies relying mainly on a series of

technical adjustments and policy adaptations are unlikely to be adequate to the growing challenges – they would be akin to going up the down escalator. To choose incremental approaches makes a dangerous wager in a world where abrupt and fundamental shifts may lie ahead. Finally, it is unclear what the source would be for the necessary political will for a program of extraordinary reform while consumerist values dominate the globe and while economic growth is equated with progress. Nevertheless, Conventional Worlds thinking continues to frame the discourse on policy, the discussion in the media, and even efforts on sustainability.

The second group of narratives, *Barbarization*, explores the deep risk posed by the Conventional Worlds course: the rejection of the need for deep change. In these scenarios, problems race out of control, the world drifts toward general crisis, and civilization erodes. In *Fortress Worlds* variants, powerful international forces impose order in an authoritarian global apartheid with elites in protected enclaves and an impoverished majority outside. In *Breakdown* variants, by contrast, such forces cannot counter or even inhibit chaos and conflict. Crises become uncontrollable, waves of disorder ensue, and institutions collapse.

The third group of narratives, *Great Transitions*, examines worlds that transcend reform to embrace new values and revise the aims of global development. One variant, *Eco-communalism*, encompasses the small-is-beautiful visions favored by some environmental and anarchist subcultures. However, it is difficult to envision a patchwork of self-sustaining communities emerging in our increasingly connected world, except perhaps in recovery from collapse. A more promising variant, *New Sustainability Paradigm*, sees globalization not only as a threat but also as an opportunity to construct new categories of consciousness – global citizenship, humanity-as-whole, the wider web of life, and the well-being of future generations – alongside a global institutional architecture for balancing pluralism with unity.

## **FRAGMENTARY RESPONSES**

We return from our brief exploration of twenty-first century futures with a basic finding: the destination is inseparable from the journey. The decisions we make and the actions we take in the coming years, before catastrophes erupt, and before new institutions solidify



while others crumble, are pivotal in setting our course. In the birth throes of a new order, all constituents of society must adapt and respond. All major social arenas – labor, education, media, religions, professional groups – will shape and be shaped by global change. Three social actors now operating on the global stage will be key: governments, corporations, and civil society.

### **Social actors in a global drama**

Each of our tales of the future has leading protagonists. Market Forces will dominate to the extent that powerful players such as multinational corporations and the World Trade Organization can build the institutions for an integrated global economy, spreading an ethos of consumerism and growth. The Policy Reform shift would be led by governments acting in cooperation to constrain and redirect global markets toward sustainability, and empowering the United Nations as a coordinative body.

An international coalition of powerful forces would impose the harsh order of Fortress World, perhaps evolving from such entities as NATO and the G-8 as they adjust and respond to a world heaving with crises. In Breakdown, these authoritarian forces are overwhelmed by the mounting chaos, while divisive legions – jingoistic nationalists, militant fundamentalists, criminal networks, local warlords – bring down the curtain on the long-running drama of civilization, at least for a time.

The central focus of this inquiry is on the prospects for a deep shift in the mode of global development – what we have called Great Transition – and the social actors who might carry it forward. The remainder of this section critically assesses the potential of contemporary social actors for the task of such a transformation. Finding them too fragmented and myopic, our search for historical agents then turns in the following sections to other social forces now latent in the cultural field.

### **Multilateral institutions**

A great number of intergovernmental initiatives have responded to the explosion of trans-boundary environmental, social, and economic issues (Held et al., 1999). Efforts at multilateral cooperation are underway in all of the world's regions, focusing at first, for the most

part, on mutual economic interests: common markets, harmonized trade policy, and shared infrastructure. As trust develops, the mandate of regional authorities can expand to include such issues as peace-keeping, security, protection of the environment, and the control of disease. The European Union remains the most ambitious and advanced of the experiments in regional governance; its further development will serve as an instructive case study for gauging the prospects for transcending the state system. The flowering of a continental consciousness in Europe as a complement to national identities would be a model for other regions and an inspiration to the larger project of global governance – or if it suffers a reversal, a warning on the unreadiness of identity to ascend to larger territorial scales.

The hub of global multilateralism is, of course, the United Nations, that vast system of specialized agencies and affiliated organizations. In the wake of the Second World War, the UN's aim was to secure the global peace while assuring human rights and spreading prosperity. But from the beginning its identity has remained ambiguous. Many of its founders envisioned the UN as a new supranational level of governance that would represent the interests of “we the world's people,” in the inspiring words of its preamble, its staff a true global civil service with loyalty to the greater good. Instead, it soon became an arena for nationalist and ideological struggle, its ideals compromised during the long Cold War and beyond (Hazzard, 1990).

Although enfeebled, the UN speaks with the only legitimate, collective voice of the world's governments. That voice varies from future scenario to future scenario. As power consolidates around the private sector in Market Forces, the UN becomes primarily a platform for regulating and extending the global economy. In Policy Reform, the UN's mandate and authority expands as it assumes a catalytic, coordinating role in a global action plan to meet environmental and social goals. Under Barbarization, the UN remains relevant only as a venue for the world's elites to organize an authoritarian program of imposed security and environmental damage control. In a Great Transition, the dominance of states gives way in two directions: to global decision-making where necessary, to local democratic processes where possible. The UN – reorganized, restructured, and probably renamed – becomes the fulcrum for global governance, at

last fulfilling its founding vision of a supranational body for deliberating world affairs (Falk, 1998).

For the moment, the task of building an institutional architecture adequate to the challenges of the planetary phase rests with reluctant nations, ardent defenders of their own narrowly defined interests. Their response thus far to the surging need for global cooperation, which they can no longer ignore, has been irresolute. In particular, the United States, which bears so much responsibility for the global predicament and has so much to lose in a nightmare scenario, has undermined essential initiatives for global sustainability and exacerbated geopolitical tensions. In the future, the remaining superpower must lead by example, rather than impede: for another world to be possible, a changed U.S. is needed. Meanwhile, the larger dream of a supranational UN remains hostage to disjointed state interests, a subordinate factor in the calculus of geopolitics.

### **Transnational corporations**

With revenues greater than the economies of many countries, large corporations are powerful players, driving and shaping globalization (Gabel and Bruner, 2003). The rise of the transnational corporation has gone hand-in-hand with the growth of the borderless economy. Conditions were optimal for this synergy: the revolution in information technology, the end of the Cold War, and the dominance of deregulatory, pro-business policies, especially in the United States and the United Kingdom. Footloose companies responded to the rocketing potential of globalizing product, service, capital and labor markets by building a supranational structure of rapidly evolving complexity (Dicken, 2007; Taylor, 2004).

In the absence of a blueprint or regulatory framework, the global economy propagates through the aggregation of individual corporate actions – one is tempted to say, rather like the way an ant colony's intricate tunnel system arises from the separate actions of a multitude of ants. But this analogy understates the major political role of the private sector, which applies vast resources to influence public perceptions and political decision-making. Despite the unease among some business leaders that feckless globalization compromises the stability of the international market system itself, corporations promote their bottom-line interests with little regard to competing

environmental and social concerns. In Market Forces scenarios, this power continues to grow, while regulatory mechanisms remain weak. By contrast, in Policy Reform scenarios, the implementation of tough social and environmental policies and regulations requires the support, or at least the acquiescence, of the most powerful actors in the private sector. A turn toward a Fortress World would entail a tight collaboration between big business and authoritarian governments, while Breakdown witnesses the collapse of large-scale corporate operations.

Today, only a handful of forward-looking corporations work in partnership with government and non-governmental organizations to establish high standards for socially and environmentally responsible businesses. Under growing pressure, it is likely that more will become allies for a progressive transformation of the global economy (Vogel, 2005). Still, the potential for big businesses to undertake fundamental self-reform will be limited as long as creating profits for shareholders remains their overriding purpose. A Great Transition requires initiatives to redesign the corporation down to its roots (White, 2006). Business charters and governance structures will need to align corporate practices with the larger goals of social justice and environmental stewardship. Meanwhile, efforts to encourage “corporate responsibility” can be expected to continue to deliver only modest adjustments to conventional development.

### **Civil society**

Over recent decades, a third force has joined government and business on the international stage. Widely referred to as “global civil society,” this polyglot includes many tens of thousands of nonprofit organizations, social movements, and informal associations (Glasius et al., 2006). Active across the spectrum of struggles for peace, justice, development, and the environment, they have changed the dynamics of global politics. They participate in intergovernmental deliberations, mobilize boycotts against socially irresponsible corporate practices, and undertake campaigns for human rights. In the streets, protestors have disrupted meetings of the World Trade Organization and other symbols of corporate-driven globalization. More quietly, and perhaps most profoundly, their educational campaigns have increased public awareness of global issues.

Civil society has released tremendous energy for a more just and sustainable world, offering to many a source of hope and an opportunity to contribute. If its momentum and vitality continue to strengthen, civil society will become an essential force behind a turn from Market Forces toward a Policy Reform world. But its possibilities are limited by organizational fragmentation that slices the global challenge into a thousand separate issues and turfs. Its dispersed victories do not scale up to an alternative path of development as painstaking progress achieved here and there is overwhelmed by the far more powerful forces of deterioration. Some disagree, asserting that somehow the aggregate of disjointed efforts will be sufficient (Hawken, 2007), a proposition that appears more rooted in a normative faith in radically decentralized forms of organization than flowing from a rigorous consideration of the complex political challenges of global transformation.

Most basically, civil society lacks philosophical coherence: a shared understanding of the challenge and a coordinated vision of planetary solutions. A broad movement needs to mature, beyond civil society's politics of opposition, to make "another world is possible" more than a slogan. To gain the confidence and then the participation of the world's billions, such a movement would need to put forward a rigorous and inclusive global alternative as well as an integrated program for fundamental change. A systemic global citizens movement would be the critical historical agent for a Great Transition. The increase of citizen activism over the past two decades has both made such a development possible and highlighted its necessity.

### **Centripetal forces**

The actors in our spotlight – international governance institutions, transnational corporations, and global civil society – are all creatures of the planetary phase, manifestations of the integrating forces that are generating a single global system. Paradoxically, the centrifugal forces drawing the world together also generate counteracting forces pulling it apart. Newton's third law – for every action there is an equal and opposite reaction – now seems to be operating at a global level: the action of integration triggers the reaction of fragmentation, geo-political activism provokes national isolationism, and economic globalization stimulates localist backlash.

This backlash comes in many forms. An anti-globalization movement resists the predations of unregulated world capitalism. A host of nationally-based interests – businesses, unions, cultural preservationists, anti-immigration forces – promote protectionist policies. Religious fundamentalists, recoiling from the materialism and decadence of the global mall, spread their atavistic ideologies. In the chaos of transition, criminal networks, drug traffickers, and arms dealers ply the global bazaar. Meanwhile, terrorists advance their own dark vision of “another world,” countering the intrusions and injustices of a westernized modernity with murderous activity.

The conjoint tendencies toward both connectivity and fragmentation manifest at the level of the individual, as well. As centrifugal historical forces have pulled us outward, many have been turning inward, seeking meaning, healing, and peace of mind through a large variety of psychological, spiritual, and metaphysical practices. The surge of the “personal transformation” and “New Age” movements has been synchronous with the surge of globalization. Perhaps the draw toward personal answers has become particularly attractive in this period of stress, uncertainty, and anomie, or the pull may be simply a correlated phenomenon of the planetary phase. In either case, the effect is to emphasize the search for individual rather than collective solutions. Recognizing that, in a troubled world, the private quest for psychic solace may be elusive, influential figures have begun to make explicit the link between personal transformation and the encompassing pursuit of social transformation (ANH, 2008). In turn, environmental advocates increasingly underscore the link between reducing our ecological footprint and turning toward lifestyles that are sufficient materially and rich in other dimensions of well-being: relationships, community, fulfillment, and spirituality (Speth, 2008).

Such encouraging convergences remain more potential than actual. Meanwhile, the fissure between those for and against globalization is creating a false, unhealthy divide. The drift toward the ideological poles of hyper-globalization and fragmentation hollows out the middle ground. Those who would reject both extremes have no clear voice and direction. Yet the open space between celebration of corporate globalization and anti-corporate reaction is fertile ground for a new popular politics and culture. Such a yield awaits

perspectives and movements that can embrace unity and diversity, one world and many places, the personal and the political, changes in both values and institutions. With such a planetary praxis, we can navigate between dueling utopias and false dichotomies to a more enlightened and desirable future.

### **SEARCHING FOR A LEADING CHARACTER**

The global transformation now unfolding on the world stage brings to mind an absurdist play. Like the abandoned and unrealized characters in Pirandello's *Six Characters in Search of an Author*, the players must improvise without author to finish the script or director to guide the action. The dramatis personae muddle higgledy-piggledy toward an indeterminate outcome. Is the global drama – call it *Six Scenarios in Search of a Character* – a tragedy in the making? Perhaps not, if the citizens of the world, now milling in the wings, move toward center stage and tilt the narrative arc toward a gentler denouement.

#### **On human agency**

Marx famously observed: “Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past. The tradition of all dead generations weighs like a nightmare on the brains of the living” (Marx, 1852).

Indeed, we have entered this global century haunted by inherited myths, ideologies, and values. This stubborn legacy dims the prospects for deep change in our ways of thinking, feeling, and acting. Still, the past is prelude, not destiny. Although their memories may long linger, nightmares do fade when the brains of the living awaken to a new day. We are not predestined to carry forward the modernist mindset, nor succumb to its reactionary negation, a collective retreat into pre-modern dreams and mythologies.

Earlier great transformations were self-generating whirlwinds of structural and cultural change (Polanyi, 1944). Changes in the institutional configurations of social organization went hand-in-hand with changes in ideational patterns of interpretation. In these periods of restructuring, possibilities opened for new modes of understanding and behavior in closer harmony with emerging

conditions of material and social existence. People could act individually and collectively with greater freedom than in static times, more as independent, rather than dependent, variables in the dynamics of social evolution.

People are active agents who interpret events, give cultural meaning to social reality, and construct order, norms, and authority. Social change is about subjective interactions, negotiations, and struggles over meaning, legitimacy, and symbolic interpretation, as well as objective processes. Although some theorists may fixate on either structure or agency as more primary, they are more usefully understood as mutually constitutive in a reciprocal process of influence and interaction (Archer, 2000). Human agency can shape society's structures, but only within the limited range afforded by the historical conditions of that society. The range is widest in periods of structural transformation when regnant patterns weaken and new hegemonic institutions have yet to solidify.

The capacity to adapt is an essential feature for the persistence of any social system (Sanderson, 1990). Like homeostatic systems in general, societies are inherently conservative, seeking to accommodate novelty without major structural or ideational readjustment. They resist change by managing disturbances through counterbalancing responses or new features that mute disruption. Social continuity depends on the coherence and alignment of ideas and institutional structures in a process of gradual systemic adaptation with incremental adjustments in norms, values, and institutions (Chirot, 1994).

Development proceeds in an adaptive mode so long as endogenous or exogenous disturbances remain within certain tolerance levels, and tensions between subjective and objective conditions are manageable. However, when severe and prolonged strains overwhelm compensatory mechanisms, coping capacity is compromised. When system elements become unsynchronized, structures destabilized, and behavior turbulent, a relatively rapid break may occur as institutional, cultural, and environmental patterns crack.

This is the revolutionary moment when conditions are in place for transformation. In the midst of systemic crisis, conventional institutions and ideas lose their sway, and political authorities lose their legitimacy, enlarging cultural and political arenas for oppositional



concepts and new allegiances. The determinative power of once dominate structures and ideologies weakens, opening space for the indeterminism of human choice, intentionality and elective behavior.

Structural processes carry forward patterns etched in the momentum of history. By contrast, human agents, when acting to realize normative visions, bring a teleological aspect to the dynamic of social change. Past structures drive the present into an uncertain future; human vision and action pull the present toward imagined futures. Through the interaction between determination and choice, humanity changes history and itself. At critical thresholds, complex systems can bifurcate into distinctly different states, and the path taken is highly sensitive to very small perturbations. Similarly, our planetary system can branch discontinuously into alternative global trajectories. In these decades of transition, we have amplified influence on the kind of world that consolidates out of the turbulence of change. We will squander this moral responsibility and pragmatic opportunity if collectively we are too complacent, too cynical, and too timid. We can seize it with a richness of vision and boldness of action that realizes the subjective and objective potential of the planetary phase.

### **Stretching identity and citizenship**

The principal social actors now on the global scene are unlikely to lead the way. Our survey here of the transformative potential of government, business, and civil society revealed interests too narrow and outlooks too myopic for the task. In the end, we must return to that irreducible subject: the citizen who has the capacity for moral discernment and action. The weakening of social strictures in our transformative global moment opens doors to revisions of culture and identity, and the sense of collective possibility (van Steenburgen, 1994; Dower and Williams, 2002).

Over eons of cultural innovation and social adaptation, the sphere of community has expanded to include families, clans and tribes, then villages, cities, and nations. Societies of increasing complexity elongated the radius of interdependence, bringing enhanced social resilience and security. These dynamic institutional connections also extended the emotional fabric of identity and loyalty, forging commitments so strong that individuals were willing to sacrifice even their lives for the welfare of the group. A shared cultural heritage

secured the allegiance of members to the community. It was the soft power of social conventions that constrained their behavior, and not, generally, the coercive authority of the powerful. The great power of the collective “we” was instilled in the psyches of new generations through the veneration of idols, myths, flags, and leaders.

Of course, outside the walls of the community dwelt the oft demonized “other,” not worthy of equal moral concern. The contending themes of solidarity and conflict have brightened and darkened the human story from time immemorial as antagonism between communities opposed the forces enlarging the commonwealth of sympathy and cooperation. Eventually, by assimilating their weaker contemporaries, or annihilating them, dominant societies expanded their domains, opening the possibility, if not the certainty, for social forms of greater complexity and larger moral identities to emerge.

Philosophers and prophets have long envisioned a time when the ring of community would encircle the entire human family (Heater, 2002). The key premise of the present inquiry is that the planetary phase brings this abstract dream down to earth, embedding the ethos of human solidarity in the conditions for our survival. Being part of a global “we” challenges the identification of community with a specific place; or, put differently, the world-as-a-whole has become a “place” in its own right. Meanwhile, the proliferating networks of cyberspace reinforce this sense of community beyond territory. Most profound is the visceral awareness, now spreading, of the dependence of our own well-being on the well-being of the earth. As human connectivity and consciousness globalize, so might the human heart.

What, then, does it mean to be a global citizen? Citizenship is complex, even in the familiar guise of state citizenship. In a broad sense, we can say that a citizen is a member of a wider community that grants rights and entitlements to the individual while requiring that the individual fulfill responsibilities and obligations in return. A citizen in the fullest sense also embraces a relationship of loyalty to the larger community. But the condition of citizenship cannot be defined abstractly, for it has changed, and continues to change, as a constituent of evolving societies.

The layers of modern citizenship were formed in three historical waves that extended entitlements to individuals (or at least those

enfranchised as citizens) in the arenas of economic opportunity, political rights, and social guarantees (Marshall, 1950). In the eighteenth century, civil citizenship conferred individual freedoms and property rights. In the nineteenth, political citizenship spread democracy and the right to vote. In the twentieth, social citizenship brought entitlement to minimum standards of welfare and economic security. These rights were the fruit of corresponding waves of social mobilization against traditional privilege: civil citizenship codified the triumph of entrepreneurial classes over feudal interests; political citizenship assigned sovereignty to ordinary people, nullifying the divine rights of monarchs; and social citizenship protections were won by associated workers in their long struggle with *laissez faire* capitalism.

Of course, it has taken many decades to extend these rights, once they were established in principle, to women and excluded subgroups, a process not yet universally complete. Economic, civil, and social rights remains a matter of negotiation and contention as the borderless economy, immigration, and terrorism re-open old fissures within nations. In particular, the viability of national welfare states is undercut by economic globalization as increased competition and the threat of capital flight puts downward pressure on production costs, wages, and benefits.

The planetary phase will continue to reconfigure the forms of citizenship that were forged over the last several hundred years. In this new century, a fourth wave is adding a new layer, however nascent it may be: global citizenship. This broadest conception of citizenship has both emotional and institutional dimensions. In one sense, people become “citizens of the world” when their concerns, awareness, and actions extend to the whole human family and beyond, to the ecosphere that sustains us all. This perspective is spreading. A growing band of “citizen pilgrims,” in the apt phrase of political philosopher Richard Falk (1992), are like early voyagers to an imagined global future. The spread of such a widespread affective orientation is surely a precondition for global citizenship. Ultimately, though, a fuller expression would be expressed practically through prosaic instruments of collective and democratic institutions for decision-making and governance. Although this prospect may seem far off, precursors of global governance are multiplying within the current order: international agreements on human rights, the environment, and the economy; supranational

bodies; and civil society networks. If these scattered experiments succeed, they could become the foundation for a more mature form of global governance, one beholden to the body politic as a whole rather than merely balancing the interests of competing states.

How plausible is this? It is worth remembering that nation-states themselves were welded out of the fractured identities of city-state, fiefdom, and tribe. A few hundred years ago, there were states and nations, that is, political territories and cultural groups, but no nation-states to make the two congruent. Looking forward from that vantage point, a world map of more than two hundred nation-states might have seemed dubious, and the incipient ethos of nationalism rather dreamy. Nonetheless, the once arbitrary boundaries of nations are now considered inviolate, and, with hindsight, the nationalists of yesteryear seem prescient.

In our deeply divided world, envisioning an ascendant global consciousness with a capacious sense and view of community may challenge credulity. Yet, the integral earth, as the natural boundary for human affairs, offers a basis for an imagined global community more grounded in emerging social and ecological realities than the changeable boundaries of national communities. Just as national citizenship once dissolved barriers within states, global citizenship may reduce divisions among them.

### **Imagine all the people**

In the years ahead, globalization and its discontents are bound to further expand consciousness and trouble consciences. A rising tide of cosmopolitanism, though by no means inevitable, is at least now conceivable. Likely or not, an ethic of global citizenship is basic to bridging the dangerous chasm between obsolete twentieth-century institutions and twenty-first century realities. Still, the great struggles of the past show that good intentions do not suffice for social change.

For that, it takes a popular movement to convert grievance and longing into practical action of sufficient effectiveness and tenacity to overcome the inertia of culture and the resistance of entrenched interests. The contemporary world stage is missing that critical actor: a global citizens movement capable of redirecting governments, taming corporations, and unifying civil society. The social agent for a systemic global transition needs itself to be systemic in outlook and globally

inclusive in composition. More than the simple aggregation of disjoint campaigns and policies, a viable global movement, like the global system that spawns it, would need to be more than the sum of its parts.

Without a systemic movement to unify and inspire, some activists remain stalled in a politics of opposition, confronting symptoms rather than underlying causes, while others retreat in frustration and exhaustion. Many people fall prey to despair, or its first cousin apathy, never finding a meaningful way to engage a global crisis so overwhelming and vaporous. A global movement, were it to form, would speak especially to this growing band of concerned and as yet disempowered citizens: to their minds with a unifying perspective, to their hearts with a vision of a better world, and to their feet with an organizational context for action. The global citizens movement would be a fitting answer to the poignant question heard everywhere: "What can I do?"

Episodes of ordinary people mobilizing for fundamental social change punctuate modern history. In triumph and failure, the oppressed, disenfranchised, patriotic, and visionary have risen in movements for rights, justice, independence, peace, and dreams of a better world. The purpose and form of social movements have been as varied as the disparate types of grievances and frictions social evolution has created. Some particularistic movements have advanced narrow ethnic, religious, and ideological interests, often with coercion. By contrast, other movements have struggled to enlarge the spheres of human rights, social justice and collective environmental responsibility.

It is this latter progressive tradition that engages our attention as we consider a theory and practice for a planet-wide movement for sustainability and justice. Of course, a global citizens movement would be unprecedented, an emergent form of collective action in response to the crises and opportunities of the planetary phase. Nevertheless, we can glean important lessons from the successes and failures of the past. What conditions have set the stage for progressive social movements? What strategies have galvanized diffuse dissent into collective action? How do successful movements attract and sustain the commitment of new adherents?

The 1960s began a Cambrian explosion in the evolution of social movements, a process of proliferation and diversification still in progress. Where class struggle was the singular focus of the Old Left,

the so-called “new movements” were animated by the full variety of concern and longing that marked those watershed years: environment, peace, rights, race, ethnicity, and gender. Correspondingly, the scholarship on social movements began moving beyond its classic focus on class conflict and Marxian analysis to a more eclectic appreciation of the multiple bases for collective action (Goldstone, 2001). Not surprisingly, the protean diversity of contemporary movements defies neat theoretical generalization, or easy consensus, on the core factors governing their creation and dynamics. Some analysts underscore destabilizing macro-historical forces, others the psycho-cultural conditions that predispose individuals to commit to collective action, and still others the tactics and strategies of specific movement experiences (MacAdam et al., 1996).

To make sense of this theoretical heterogeneity, it is useful to map explanatory factors into three broad clusters: system vulnerability, organizational capability, and cultural solidarity. Notably, this triad has an antecedent in the classical movement literature: Marx’s emphasis on structural crisis, Lenin’s on vanguard leadership, and Gramsci’s on oppositional culture (Tarrow, 1998). They correspond to three enduring dimensions of social movements – grievance, action, and identity – that will be at play in the efforts ahead to generate a global citizens movement.

A social system enjoys the allegiance of its citizens when most believe that authorities govern fairly and effectively, but becomes vulnerable when widely perceived to be unjust and ineffective (Habermas, 1975). When the powers that be lose the trust of the public, the thrall of its legitimacy dissolves; the political and psychological conditions are in place for diffuse discontent to flow into the formation of a contentious social movement. Of course, governments become unwilling or unable to satisfy popular concerns for various reasons – deepening conflict between social groups, shifting public expectations, clashes among the elite, venal leaders. The details vary with time and place, but the consequence is universal: allowing grievances to fester and spread puts the possibility of an organized opposition on the public agenda.

System vulnerability is the precondition for the consolidation of a social movement, not its guarantor. Though widespread and deeply felt, popular discontent will eventually wane or persist in isolation

unless reinforced and harnessed through effective organization. The nascent social movement must mobilize networks of adherents, provide leadership, and assemble the financial and human resources necessary to endure and grow, often in the face of state repression. It needs to generate a repertoire of efficacious tactics that spreads its message and shows its strength, the types of actions employed dependent on the political opportunities that are available (Tarrow, 1998). These might include political marches, sit-ins, and political lobbying in relatively open political systems, such as the United States, and covert actions in more closed ones, such as the former Soviet Union.

If system vulnerability gives a social movement its *raison d'être* and organizational capability its means, cultural solidarity, our third analytic category, binds a political movement as a human community. To galvanize masses of ordinary people and hold their allegiance, movements must offer a rich and attractive alternative to the hegemonic culture. More than a practical arena for expressing grievances and engaging in contentious politics, a flourishing movement becomes a realm of the heart as well. It is a nexus of association whose participants shape a community and reshape their identity. Commitments to a cause or a dream are reinforced by the emotive solidarity renewed through common symbols, myths, and rituals. A consequential movement also becomes a locus for generating a shared intellectual culture: concepts for understanding the ways of the world and visions of a path to a different world.

Turning to the contemporary scene, our three conditioning factors – system vulnerability, organizational capacity, and cultural solidarity – help clarify the prospects and challenges for our imagined global citizens movement. On the first score, the emerging global system certainly is vulnerable, its governance mechanisms widely perceived as incapable of addressing the burning problems of sustainability, peace, development, and justice. Weak and visionless, it can seem hostage to powerful states and corporations that unabashedly advance partial interests impervious to the common good.

On the global ship of state, now drifting off course with no legitimate captain at the helm, the passengers are growing restive. Thousands of transnational civil society organizations have entered the fray on scores of separate issues, but the larger political and cultural mobilization that can integrate concerns into a coherent new

global paradigm has yet to gel. In the coming years, if the crisis of legitimacy of global governance continues to deepen, the foundation of a global citizens movement will strengthen. The historical conditions thus are ripening for a systemic movement, informed by a transformative vision of global society, to coalesce.

The development of the other key dimensions – organizational capacity and cultural solidarity – is far less mature. The challenge is no less than evolving the instrumental and affective bases for collective action across the great cultural and spatial distances that a global movement must circumscribe (McCarthy, 1997). The great complexity and dispersion of a nascent movement suggests an open and exploratory process of collective learning and adjustment, the forms of association harmonized with the multiple issues and diverse traditions it would seek to bring together.

There can be no credible blueprint for this project, no formulaic design for organizational structure, strategy, or culture. Indeed, any temptation to pre-specify the details is almost sure to be counterproductive, and should be resisted. The top-down structure of earlier oppositional movements will not suffice in a post-modern world suspicious of authority and leadership; nor will its converse, namely, faith that political coherence will arise spontaneously from below. A viable movement must navigate between the polar pitfalls of rigidity and disorder. Its vitality would flow from an organic and democratic process of self-creation, an unfolding of its immanent adaptive logic that cannot be rigidly controlled or foretold with any precision.

Nevertheless, we can imagine the broad contours and principals of a living global citizens movement: a growing network of networks attracting new adherents through local, national, and global nodes. It would enlarge the arena of public participation and cultural ferment, and involve people throughout the world, across cultures, class, and place. It would retain diversity, but under the umbrella of an integrated framework for addressing all the important issues. It would be an organic process evolving in phases with structures of internal governance and external action fashioned by participants in a process of adaptation to one another and to changing circumstance. Each widening circle would prepare the ground for a broader effort.

Building and maintaining normative solidarity in a movement of such diversity would be its great challenge. The pull toward unity is



sure to be strong as awareness spreads of our shared global destiny and communications technologies further shrink psychic distance. At the same time, the fragmentation of different languages and traditions, and intransigent suspicions and resentments will no doubt continue as powerful centripetal forces. It would face the great hurdle of building unity in an era of strong identity politics and widespread skepticism about leadership.

To thrive and to prefigure a desired future society, the global citizens movement would cultivate a politics of trust. Such a politics would announce a predisposition toward seeking common ground and tolerating proximate differences in order to nurture the ultimate basis for solidarity. A movement up to the task of global transformation would need to discover ways of balancing the twin desiderata of coherence and pluralism. It cannot eliminate ideological conflict, regional antagonism, and organizational turf battles. Indeed, the movement's diversity would be a source of richness and energy. But to find common purpose nonetheless will take a global vision and movement culture that understands different perspectives and initiatives as different expressions of a common project.

All social change movements are pulled in contrary directions. They must both reach out and resist, expanding participation and forging alliances, on the one hand, and identifying and challenging entrenched forces, on the other. The emphasis on trust does not discount the realities of power and interest, or assume away the conflicts that are sure to lie on the path of global change. Rather, it suggests that the reconciliation of pluralism, unity, and vision will be a fundamental concern for the birth and growth of an authentic movement.

To imagine a Great Transition is to imagine a future based on values and principles of planetary solidarity. By embodying these goals in their pursuit, we nurture their realization. A global citizens movement would be the natural voice for expressing the collective imperative to dampen dangers and pursue the common dream of a civilization worthy of the name.

## **THE HOPE HYPOTHESIS**

With its provenance in the twentieth century, the planetary transition arcs toward its providence in the twenty-first. The many

developments and upheavals we now face are the birth pangs of some form of global society. We can observe its embryonic shape, speculate about its possible form and temperament, and give it various names, but we cannot know what kind of creature is being born. We stand at a singular branching point. What we do, or do not do, in the coming years will have an amplified influence on the basic anatomy of the planetary phase. Unless one is a true believer, confident in free-market solutions for this world or redemption in the next, the comforts of certitude are unavailable. In counterpoise to such sanguine convictions are fearful, and contradictory, warnings: the world is becoming homogenized into a Westernized monoculture (Mander and Goldsmith, 1997) or the world is descending into a clash of civilizations (Huntington, 1997). The truth is that disparate and contending forces are driving the world into the future (Barber, 1996), some toward MacWorld, others toward Jihad, still others toward more nuanced possibilities.

The perils of global development and the lure of “another world” have catalyzed new efforts to understand its complexities and influence its direction. The emerging discipline of sustainability science is starting to illuminate the dynamics of co-evolving human and environmental systems that lie nested together from local to world scales (Kates et al., 2001). Social scientists are providing fresh insight on the determinants of human behavior and the psychology underlying notions of human well-being (Jackson, 2008). The humanities are exploring the value and esthetic dimensions of a new human consciousness for the planetary phase. Civil society is erupting with countless endeavors to tame the hydra of environmental degradation and social conflict.

The outline for a revised strategy is coming into focus: green technology, poverty alleviation, non-materialistic life-styles, effective global governance, a culture of peace and tolerance, a socially and environmentally responsible business sector. Although we can celebrate some progress on all these fronts, realizing this as an integrated framework for global development remains beyond the grasp of the world’s fragmented practice at present. Viscous institutions, tenacious norms, and entrenched interests resist the winds of change with the inertia of any dying regime. All the while, technological innovation, market growth, and cultural diffusion hasten the world’s helter-skelter gallop to a dubious future.

The gap between the stubborn “is” of conventional development and the elusive “ought” of deep change is dangerous and dispiriting. Pessimists can mount considerable evidence to indict the future. It takes little more than a gloomy disposition and an analytic bent to construct cogent scenarios of a world fraught with crisis, breakdown, and misery. With a growing segment of the public attuned to global perils, the perception spreads that the world is traveling rapidly toward a dark future. To many, the “business-as-usual” scenario is looking less like the comforting projections from computer models and more like a Fortress World.

Certainly, any clear-eyed consideration of plausible long range futures must include dystopian visions for they loom as possibilities all too real. Still, no prognosticator, however knowledgeable and astute, can foresee the events and innovations sure to buffet the trajectory of the future. Historians of the twenty-first century some day can identify them and ponder their significance with an acuity granted only to hindsight, but denied to foresight. Most importantly, bleak prophecies underestimate a key source of cultural surprise: human reflexivity.

When we think critically about why we think and act the way we do, and then think and act differently, we can transform ourselves and our destiny. Impersonal forces do not carry us inexorably to a predetermined destination: the future is a journey we are constructing, not a place we are going. Imagining what could be, reflecting on how to get there, and acting as if it mattered, gives soul and sight to the blind march of history. When vision shapes action, causality becomes two-way: a push from the past and a pull toward the future. Social images act like magnets, drawing the present toward attractive futures and away from repulsive ones.

Foresight and intention – the essence of free will – when exercised collectively broaden the frontier of social possibility. Now more than ever we need people who imagine other worlds and, in so doing, make them attainable. Then, planetary development can turn toward far greater comity among people and environmental sustainability. The same historical forces generating the global emergency are preparing the basis for transcending it. In the coming decades, the old dream of one world and one human family will become more than a distant vision. It will be anchored in the basic condition of the planetary phase: the deepening interdependence of people and all living things.

Can new visions, values and actions for a sustainable and livable world develop with sufficient speed and coherence? Normally, societies change gradually within resilient boundaries of law, governance, and values. However, when historical continuity is disrupted, old social structures weaken and cultural strictures loosen. In these transformative moments, the scope for human choice and freedom expands. That is the power of Margaret Mead's dictum: "Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has." In times such as ours, small actions could have large consequences. The efforts of an active minority, rippling through the cultural field, may release latent forms of consciousness and political association. When such actions are resonant with opportunities offered by historical circumstance, they can amplify rapidly, challenging conventional ideology and broadening the public perceptions of the possible. Social movements have influenced the trajectory of social evolution before, and could again in the planetary phase.

The precursors to a cultural and political movement for a Great Transition are visible today in the eruption of efforts to understand and guide global change. But the pace of adjustment remains slow and the effort fragmented. The popular force for accelerating fundamental and coherent change may well be immanent in emerging conditions. The immediate priority for building our planetary praxis is to tap into this potential by engaging in social experiments with modalities of association for expressing the unity, vision, and trust that can lead to a wider cultural and political crystallization. Bringing a global citizens movement to life stands as a preeminent opportunity and challenge for those committed to a sustainable and just transition.

A vision of world community has captivated the philosophical and social imagination at least since the fifth century BC when Socrates proclaimed, "I am a citizen, not of Athens, or Greece, but of the world," and Aristophanes importuned, "Mingle the kindred of the nations in the alchemy of Love." Two centuries later, the Stoics developed an ethical philosophy centered on the notion of cosmopolis – a world polity in harmony with reason and the universe – that was the foundation for twenty-three hundred years of thought on the prospects for an integrated world civilization.

As scholars pondered its meaning and world-changers pursued its promise, the cosmopolitan idea of a humane and rational world mutated and evolved through the centuries. Along the way, it met resistance from philosophical and ideological skeptics, who questioned both the possibility and desirability of cosmopolitanism. Some dismissed the vision as a pipedream, pointing to the sorry saga of our disputatious species trying to live together. But the search persisted for a political and cultural basis for universality, reaching its quintessence in the eighteenth century, in the humanism of the Enlightenment.

After a lull in the nineteenth century, cosmopolitan thinking appeared again in the middle decades of the twentieth (Wagar, 1967). At a time of world war, genocide, and the threat of nuclear destruction, a group of writers of great erudition and passion – Mumford, Toynbee, Tielhard de Chardin, and others – re-imagined world civilization: “The Age of Nations is past. The task before us now . . . is to build the earth.” These were voices in the wilderness of the final decades of the twentieth century, a time unsympathetic to ideas of cosmopolis.

In the crucible of the planetary phase, a new wave of cosmopolitanism can rise. As globalization erodes borders both on maps and within minds, the cosmopolitan sensibility takes unprecedented form and urgency. The global system interweaves the fates of all: rich and poor, human and non-human, living and unborn. The reality of greater interconnectedness will encourage a corresponding enlargement of our identity as global citizens. If this takes hold, the cosmopolitan dream will finally have found its historical moment.

Global society today carries forward all the inherited layers of affiliation and structure: we are members of families, neighborhoods, and nations, as well as geographically dispersed affinity groups of shared beliefs and interests. Each of us stands at the center of concentric circles of community. The scaling up to the global level of institutional and environmental interconnection – the tangible manifestation of the planetary phase – also plays out in the subjective space of human consciousness. The enlargement of the human project presses for a corresponding expansion of human identity that weaves together the destinies of all.

In the planetary phase, the once quixotic dream of an organic world civilization becomes an objective possibility, even a necessity

for human survival. We urgently need a synthesis of theory, values, and practice that blends an understanding of the historic moment, a commitment to planetary solidarity, and a true global citizens movement. We cannot assume that such a planetary praxis will develop: that will depend on a felicitous interplay of objective and subjective conditions in the coming years. Yet, if we can awaken to its promise, the planetary phase carries a hopeful opening for the project of civilization. Shaping that world – making hope and history rhyme – will take the world’s citizens acting together in a timely way for a future of social justice and enriched life on a revitalized planet.

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## In Pursuit of “Sustainability”

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As a former English teacher, I like words. I believe in them and their ability to help us resolve confusion and decide what to do – or not to do. But during the last year, I have found myself tested by the word “sustainability.”

The word has been around for a long time, but suddenly it was everywhere. As my colleagues at the Dodge Foundation and I read through scores of proposals seeking environment grants, we encountered it constantly, either as the adjective “sustainable” in front of a range of nouns like “development” or “agriculture” or “society,” or as its own high-concept noun. We were part of the chorus, having named a funding initiative in our hometown *Sustainable Morristown*. As construction started on our new “green” office building, we found ourselves champions of “sustainable design.” And when I attended the national environmental conference titled *Toward a New Consciousness: Creating a Society in Harmony with Nature* on which this book is based, I was surrounded by people who invoked various notions of sustainability as practically synonymous with that new consciousness.

Yet I heard pushback, too – people finding the word too abstract, too conceptual to be useful, even trendy, however long it has been invoked in environmental circles. So I was not surprised to find Michael Pollan writing in *The New York Times Magazine* (12/16/07): “The word ‘sustainability’ has gotten such a workout lately that the whole concept is in danger of floating away on a sea of inoffensiveness. Everybody, it seems, is for it – whatever “it” means.”

Exactly – not only the ubiquity of the word but also the danger of losing whatever people – including ourselves and our grantees – are trying to get at when we use it. This seemed worth pursuing to me. I started to explore the question of definition in the manner any desk-

bound person in the early 21<sup>st</sup> century would – I googled “sustainability.” There were 13.5 million different links to web pages. Then, to see if the noun or the adjective had been getting the greater workout, I tried “sustainable:” 38.2 million links.

I began clicking. Most websites cited the popular definition from the World Commission on Environment and Development, commonly known as the Bruntland Commission (1987): “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Scattered throughout other sites were other definitions, but they all had the same essential elements: a desire for a good and meaningful life; a concern for future generations (“the Golden Rule over time,” one said); and a respect for the environment and the ecological systems that underpin our social and economic activities. So far, so good.

It didn’t take too long, though, to find “sustainability’s” critics, too. In *The Sustainability Sham*, published in *Orion* magazine (May-June 2006), Eric T. Freyfogle cites some of the word’s shortcomings in his view, such as “vagueness and confusion,” “its troublesome policy implications,” and “its deceptive appearance of consensus and forward motion.” Then he delivers the ultimate blow in this age of special effects and short attention spans: “Along with these deficiencies, and no less important, is a rather practical shortcoming: sustainability is just plain dull.”

My sense of irony began to perk up. When the people I know, including my closest colleagues, use the word “sustainable,” they are describing their highest aspirations for the future – for human beings and for the earth. Yet is most of the world yawning? And if so, are those aspirations themselves in danger of “floating away?”

There were other criticisms as well. Those with an eye on the long-run remind us that humans haven’t been around that long and the clock of our species, not to mention our planet and our sun, is ticking. Thus talk of sustainability is, in the end, meaningless. Well, OK – but somehow, nevertheless, we seem to care about this word – and this world.

A deeper criticism is that it is a smokescreen – a “feel good” word that allows us to avoid facing the *unsustainable* nature of global capitalism by recycling our cardboard and driving a Prius. This hit

closer to home, as I looked out my office window at my own Prius parked among the ten other hybrid vehicles owned by Dodge staff members.

It seemed to me that this debate mattered, and it was worth exploring what the concept of sustainability might mean to any foundation trying to make smart social investments with limited resources. And since philanthropic goals and values are brought to life primarily through the work of grantees, what better way to begin, I thought, than to visit with some of them and see what I could learn from them? What were they thinking about sustainability, and what actions were *they* taking in its name?

### **EDISON WETLANDS**

I started with the “green rabbit” man – Bob Spiegel of Edison Wetlands Association. If you pick up a copy of Molly Ivins’ *Bushwhacked*, you will read the story Bob summarized in his testimony before the United States Senate Subcommittee on Superfund, Toxics, Risk, and Waste Management (April 10, 2002):

“In the spring of 1991, a friend asked if I wanted to see ‘green’ rabbits. Armed with a video camera, we took a short ride to the Chemical Insecticide Superfund Site (in Edison, New Jersey). The first thing that struck me was the smell – the smell of death and decay. Nothing grew on the property except a strange florescent green moss. Small animal carcasses littered the area, and there were, indeed, “green” rabbits living there. The rabbits had developed an abnormal greenish yellow undercoat that I would later discover was the result of Dinoseb, a pesticide disposed of in large quantities throughout the site.”

“We followed a trail of yellow liquid draining from the back of the site downstream past a neighboring industrial bakery and into the Edison Glen and Edison Woods residential developments. There we video-taped a child playing in the poisoned stream who told us it was a good place to hang out and look for frogs and turtles. I subsequently found out that the vacant CIC lot was a playground for local children, the

chemical lagoons were their wading pools, and adults routinely scavenged materials from the site.”

Bob called the Environmental Protection Agency, and when their response seemed to be limited to posting a few warning signs, he and his friend rented a movie theatre and showed their videotapes to increasingly agitated crowds. “We scared the hell out of everybody,” Spiegel says. The EPA immediately scheduled a public meeting.

You get the picture. What began as pure grass-roots activism has taken on significant scope. Today, under Bob’s leadership, the Edison Wetlands Association advocates for the cleanup of over 60 toxic waste sites in central New Jersey, pursues the preservation of what open space remains in Middlesex County, and offers hands-on educational programs for young people and community groups at its own nature preserve, the Triple-C Ranch. I asked Bob if he used the word sustainability. He answered:

“Yes, but it means different things to different people. You ask a hundred different people, you’re going to get a hundred different responses. It’s not one of the things people really think about . . . It’s not what people practice. Why? Because that’s how we’re wired – we’re wired like cavemen. You know: here comes the big dinosaur; I’ve got to defend my family; I’ve got to get food; I’ve got to have shelter. Everybody thinks, ‘What do we have for us today?’ and not, ‘What’s going to be here for my grandchildren 50 years, 75 years, 100 years down.’”

But much of Bob’s life is devoted to having a livable New Jersey 100 years from now, and he is very effective at “re-wiring” everyone he meets. How? “You can’t have them changing actions without having them change their thoughts first.” He went on:

“In a nutshell, sustainability is about long-term thinking. Long-term, everybody’s going to have to start caring about where their food comes from, where their resources come from, where clean water comes from. We start very small: “Hey, could we talk about cleaning up toxic waste sites next to your house? Did you know that this might be affecting your health?” And people respond to that. If you say, “Look, this is in your self interest to get involved in this issue and do this

small thing,” they’ll do it – most people will do it. And then you can come back to them later on and ask them for bigger things. That’s how we develop sustainability – with small changes, small discussions at first.”

Another of his methods is to avoid the “doom and gloom” perspective one might associate with his line of work. “When we focus too much on the negatives of what’s already been lost and destroyed,” he said, “we can devalue what still remains – and even in the most populated parts of New Jersey, there’s plenty to experience outdoors.” He warmed up to this theme, and practically leapt over the desk:

“People need to reconnect with the outdoors and stop living in artificial environments that we’ve created for ourselves! People go from their homes to their work, or homes to school, to the gym, to the bar, to the club, back home again, and they’re not really in touch with the natural world. Their fears of being in touch with the natural world are made worse by constant reminders of the risks of getting bit by a mosquito or a tick, or stepping in poison ivy. But the untidiness and unpredictability of being outdoors is what makes it so fascinating.”

Hence all the hours Bob spends at the Triple-C Ranch:

“When you’re out and on a farm and you’re walking around and you have people out in the open air and their kids are having a great time running around with goats and chickens and ducks and turkeys and pigs, then all of a sudden people are much more receptive to talking about things like sustainability and green and what it means to be involved.”

It’s almost impossible to capture the dynamism of Bob Spiegel, his energy and sense of humor, on the printed page – although Molly Ivins gave it a good shot when she wrote: “Combining plodding research and investigation with gonzo activism, he is part Ralph Nader and part Abbie Hoffman.” I’ll offer one last insight into his methods here, in Bob’s words:

“We talk to the people. It’s been our experience that when people lead, the leaders follow. They may not go initially, but

they will follow what the voters will say. They will follow if there are enough people who say, “We want this cleaned up or “We want a park here,” or “We don’t want a toxic waste site.” Then you let the officials follow suit. That’s the model we use for municipalities where they have less than cooperative governments.”

It was an idea that would be central to my next interview.

### **MUNICIPAL LAND USE CENTER**

Donna Drewes works at the center of New Jersey’s struggle to create and maintain livable communities in the face of multiple pressures: changing demographics; high housing costs; fiscal distress at all levels of government; over-scheduled personal lives; traffic congestion; and the environmental threats that accompany a growth-oriented, disposable economy.

New Jersey has a laudable framework for action – a state plan that is envied in other parts of the country – but for all the reasons above, making decisions about land use at the local level that support the goals of that plan is extremely difficult. Enter the Municipal Land Use Center at The College of New Jersey, and enter its community planner, Donna Drewes.

The Center’s mission is to provide technical assistance to municipalities to enhance local decision-making about land use. This means education on a range of issues, it means helping local groups access state, federal, and private money, and it means organizing and moderating a civil, civic discussion about open space, about development and re-development, about transportation and affordable housing – in short, about the future livability of a shared place, for all its citizens.

I asked Donna about her use of “sustainability.” “I love the word,” she said, “because it makes me think about all the parts together. But I know I think of it that way because I’ve thought about the *practice* of sustainability and what it means for communities.” What *does* it mean? I asked.

“Generally we talk about environment, societal equity issues, and economics as being the three legs of the stool of

sustainability. I find people grasp onto the environmental side of it very easily, and economics, too, but they struggle as individuals to think about the societal parts of sustainability. You have to make sure through questioning and probing that they're hearing the full robust nature of the word."

Here was a way of framing and understanding sustainability that has been succinctly articulated by The World Business Council regarding growth and development; it is commonly known as "the three E's."

"Sustainable development involves the simultaneous pursuit of economic prosperity, environmental quality and social equity. Companies aiming for sustainability need to perform not against a single, financial bottom line but against the triple bottom line."

Donna introduces communities to their own "triple bottom line" as they imagine their futures and define success. Do people understand that? Not right away.

"Even within communities we're working in now, they feel uncomfortable going outside of the green part of sustainability, the environmental part. I don't think that's my job to berate them for not wanting to incorporate the other two legs of the stool. But if they don't, they WILL not be sustainable."

I asked Donna for an example of two or three legs of the stool working together. She cited the Northeast Organic Farming Association's (NOFA) model for agricultural production that addresses organic practices, access to food, health of local communities, food security issues, and land preservation. A complementary initiative of the NJ Audubon Society helps encourage farmers to protect the wildlife habitat on their agricultural land. She explained:

"New Jersey Audubon wants to create a more collaborative model that can address the issues of food production, wildlife habitat and water quality, as well as provide economically viable opportunities for the farmers. If we don't infuse that



economic part of what a sustainable operation would be, we're going to continue to come up with these plans that meet the needs of the environment, that meet the needs of food production, but may put the farmer out of business."

One of the most important insights I gained from Donna was about the importance of shared language. She told me a story of being on vacation in Vancouver, British Columbia:

"I got into a taxi cab with a Middle Eastern taxi driver, and he started articulating the concepts of sustainability and the policies of the community. He didn't know I was a planner or had interest in this. I just said, "So how do you like living in Vancouver?" And he talked about how they've made housing more affordable, how they've improved the schools, how they have access to jobs here. It made me want to go back and see: what kind of media and marketing and messaging campaign did this community do so this guy in the taxi could articulate these concepts? Sustainability to me is about as big a change process as we're going to ask our communities to go through, and we have to create that common knowledge, common vision, and common language."

I asked her why, if the vision of sustainability is so positive, it was so hard for it to get traction in some places. She said from her point of view, doing work on the community level as she does, the problem was structural: "Communities plan and govern themselves in silos. The environment stuff is dealt with over here, and you don't talk about housing and social justice issues; the infrastructure needs are talked about over there – we deal with things in little safe secure pockets."

Here, it seemed to me, was a crucial insight into both the promise and the peril of how we understand sustainability. It is a concept rooted in systems, and therefore systems thinking. Sustainability is about connections, not silos. Donna went on:

"The challenge of sustainability is to create that systems linkage. In one town, when we brought up the issue of the Latino community using bicycles to travel up and down a state highway to get to work, the traffic engineers had never thought about it. It's hard, because we're not used to reaching

outside of our circle of expertise and our circle of planning knowledge.”

What can we do about this? Like Bob Spiegel, Donna says we can't wait for government. “While I think local government can be leaders and should be leaders,” she said, “we don't have to use the lack of their leadership as an excuse not to move forward.”

Instead, like Bob, she believes those interested in the path towards sustainability must emphasize relationships – and start small. “Change happens when people trust each other, when they build a collective vision of the future that they buy into. We need to figure out how to create actionable items and small successes that build trust, a working knowledge of each other, and excitement and enthusiasm about our work.”

## **GREENFAITH**

Excitement and enthusiasm – these were the perfect words to propel me towards my next visit. I knew that excitement and enthusiasm could be means as well as ends, because for years I had admired the work of the Reverend Fletcher Harper.

If you visit the website of GreenFaith, New Jersey's interfaith coalition for the environment, the first words you encounter are “a powerful mission,” and that mission speaks directly to the issues at hand: “We inspire, educate and mobilize people of diverse spiritual backgrounds to rediscover their relationship with the sacred in nature and to restore the earth for future generations.”

I asked Fletcher what that looks like in action. He gave three quick examples:

- A synagogue in Livingston that had a formal dedication of a new solar installation, and then another dedication, then another, because they wanted to keep on celebrating and share their excitement with other people.
- A church in Highland Park that did a waste audit with their youth group and adult volunteers. They poured out a week's worth of trash, sorted through it with their latex gloves and figured out how to reduce the amount of solid waste they produce by 50 percent.

- A Unitarian Fellowship in Plainfield that went on a GreenFaith-sponsored Environmental Health and Justice tour in Newark and then produced over 100 letters from their congregation to the governor supporting legislation to reduce diesel emissions.

Does he invoke the word “sustainability?” Yes, but with caution and always with follow-up, “because it’s a rich word, and without support people won’t grasp the different dimensions of what it means.” He went on, “There’s a challenge for the word – if we don’t look out it’ll be colored by people’s perception of the environmental movement as people who are anti-consumption and anti-pleasure. We remind people of the nurturing, thriving dimension of sustainability.” He went on:

“We look at the root of the word ‘sustain,’ which has a quality of nurturance connected to it, and which also invokes a sense of thriving. We’re not just trying to sustain something at a bare minimum level – there’s joy involved in it. I think that one of the things that accelerates change most dramatically is celebration. I think that for the most part, people need a little more juice in their batteries, so to speak, if they’re going to become effective change agents. And to my mind, one of the ways to give people the strength to do that, is to celebrate when they take good, even SMALL steps in the right direction.”

Just as Bob and Donna do, Fletcher emphasizes the importance of translating the concept of sustainability into easily actionable steps:

“We’re at the stage now where I think the DESIRE for sustainability has successfully been embedded in many parts of American society. What’s needed now are the sort of people and organizations who are able to tee it up and make it possible for more people to get involved. Sometimes I think of us being a little bit like translators for foreign language novels. We take the material that leaders within the environmental community have developed, then we imbue, interpret, or draw out from it the moral and religious dimensions. We frame it, and try to structure it in a way that’s very easily actionable.”

GreenFaith builds its programs around three core values: spirit, justice, and stewardship. Here, I thought, were two of the three “E’s” Donna spoke about. For GreenFaith, justice means equity: “Everyone has the right to live in a clean, safe environment.” And environmental stewardship is a deeply shared responsibility: “People of faith have a vital role to play in restoring healthy ecosystems around the world.” Fletcher speaks directly and eloquently about what embracing values like stewardship and justice can do for the human spirit:

“Our social context, in this country, is deeply shaped by consumerism and advertising. That’s how we define what a ‘good life’ looks and feels like – material consumption. But we remind people that just about all the time the most deeply meaningful, important aspects of people’s lives occur within the context of their most important relationships. They happen in community.”

He and GreenFaith are not afraid of confronting those who are not listening. Indeed, one of the most impressive aspects of GreenFaith’s work is what Fletcher calls its “repertoire of behaviors.” He says, “We teach little kids, we do sermons, we do religious education, we do legislative advocacy, we partner with businesses, but we’ve also been involved with two lawsuits.” He believes we have to confront the “bad actors” out there, the “companies whose business is deeply harmful to the well-being of the environment.” In an echo of Bob and Donna’s “go directly to the people” strategy, he says we – all of us – have to “talk about the best ways to put pressure on them.”

Before I left, I asked Fletcher if there were anything else we should all be doing.

“There’s a global networking piece that’s missing. There’s an awful lot going on around sustainability in different parts of the world, and the NGO community in the United States is not as connected as we might be to enhance what we do.”

Sorting through trash, installing solar panels, writing letters, suing bad guys, reaching out to like-minded people around the world – Fletcher had added a lot to my picture of sustainability in action. What struck me most, though, was the motivating spirit behind it all: “We try to offer a vision of sustainability which is compellingly

beautiful, and which gives people a sense that here they will find their life's deepest fulfillment.”

Sustainability was seeming pretty good to me at this point – certainly not “dull.” But my quest for the definition of the word had not taken me beyond environmental leaders. I knew, to use Pollans’ phrase, the word was getting a broader workout than that. So I went to visit organizations from the Dodge Foundation’s two other major areas of giving: arts and education.

## **ALJIRA**

Aljira is a contemporary arts center on Broad Street in Newark. In addition to mounting exhibitions, it administers highly-regarded programs for emerging professional artists and for young people. It is, in short, one of those small-to-mid-sized arts organizations that are vital to the cultural lives of their communities. I sat down with Aljira’s executive director and co-founder Victor Davson and asked him if he and his colleagues used the word sustainability. “Yes we do,” he said, “most often in connection with Aljira. When we say sustainability, we’re talking about issues of governance, of management, of systems and resources – that sort of stuff.”

If our conversation began in the realm of organizational development, it quickly took on environmental language, as Victor described the difficulties small organizations face to survive in the ecosystem of cultural institutions in a given city and in the larger system of the non-profit sector.

“I had lunch with a foundation program person who was very concerned about how all these not-for-profit organizations were going to sustain themselves going forward, because they are so reliant on foundation grants. There are more organizations, foundations are getting more requests, and the pot of money is not expanding. So there is real concern.”

And in a city like Newark, with several large institutions needing and receiving significant annual support from foundations, corporations and government, Victor feels it is crucial not to minimize the importance of mid-sized organizations like Aljira:

“The group within the arts ecosystem that has the weakest infrastructure is the small to mid-sized group. But those groups are often overlooked because they are less able to demonstrate their value. There’s a kind of texture that small groups bring to bear that really tells you something more about the community. They’re on the ground. They work hand in hand with artists to develop their craft. This is where talent is discovered.”

I thought to myself that Victor was describing a system, much as Donna had. And he was not only describing the “E” of equity from his point of view but also the critical “A” of access that characterizes sustainable systems. Indeed, the impetus behind Aljira’s *Emerge* program for artists stems from Victor’s own experience coming out of the Pratt Institute in 1980. “It started as an issue of access. There were no programs in place to help me as a young artist starting out. Initially, I thought the issue was one of race. It’s not.” The *Emerge* program addresses this void directly, having helped over 200 artists not only develop their craft but also learn how to market their work, write business plans and network to advance their careers.

But back to his point – I asked him what is it funders don’t understand about this? First, he said, they don’t see that small organizations need support for infrastructure: “I have a letter right now that says, ‘We’re going to fund you for this program, but sorry, we’re backing out the administrative expenses.’” This is a good point, I thought, though, happily, I believe more and more foundations understand the relationship between general operating support and the sustainability of non-profit organizations. But beyond that – and this seemed the heart of the matter to me – he said it’s about what we measure:

“I think there’s a kind of rubric that is designed to measure things in terms of quantities. I’ve actually had funders say to me, ‘Victor, at some point you’ve got to get those numbers of students up.’ Well, I’m not working to get numbers up. I’m working because of what I learned from my father – that if you can make an impact on a few dozen kids – I mean really make an impact – then you’ve done something substantive.”

Talking with Victor, particularly about his program with young people, called *Culture Creators*, reminded me how personal the work is to so many leaders in the not-for-profit world. My questions about sustainability took him back to his own youth:

“I’ll tell you what I imagine – an image of my peers growing up in Guyana. There were Native Guyanese and African Guyanese, and there were Indians and Chinese and Europeans. All of those people I went to school with, and my whole generation knew a poem by Tagore called *Gitanjali* by rote. That’s my snapshot – kids that had a tremendous sense of hopefulness; here they were *smartly* dressed in their little ties and starched blue shirts, and they BELIEVED Tagore: “Where the mind is without fear and the head is held high; where knowledge is free . . . my Father, let my country awake.” This was my first vision of sustainability, and it’s what Aljira is all about.”

This sense of hopefulness about the future that his multi-cultural generation felt is what Victor wants to bring to the young people of Newark, the idea that there is a future beyond what they know:

“We take them to the Newark Museum. We take them to the Brooklyn Museum. They’re being exposed to culture, and not in the narrow sense of culture on the streets they live on. They are seeing Caribbean artists; they get a chance to see African sculpture. It’s the entry point into something much larger than living on a block on 15th Avenue – it’s something that tells you that life is not just this little block.”

## **TEAM ACADEMY**

I was curious to hear how one of our education grantees would respond to these same questions, so I drove towards the Weequahic Park neighborhood in the South Ward of Newark, to talk with another founder: Ryan Hill of TEAM Academy.

TEAM is a public charter school, one of the national network of KIPP (Knowledge is Power Program) schools that have been widely recognized for putting underserved students on the path to college.

Ryan and four other young teachers founded TEAM five years ago, along with 80 Newark fifth graders, most of whom were performing well below grade level at the time. Today, those 80 students are sophomores at leading independent schools like Exeter and Deerfield, or they are excelling at local public and parochial schools. TEAM has expanded to serve 360 students in grades 5 through 8, and there are plans underway to serve more than 2,300 students in grades K-12 across five schools.

If KIPP represents one large-scale effort to affect the system of public education, Ryan comes from another – Teach for America. After graduation from college, he taught in the Washington Heights area of New York City. “I loved living there. I loved working there. But I didn’t love what was happening to kids in this terrible, huge middle school.” Ryan and several other Teach for America teachers tried to help their students by tutoring them after school, but “we were constantly hiding where we were having tutoring and getting into trouble for it. The principal would make the assistant principals run through the school and get all the kids out the door by 3:05.” But desperation spawned creativity, according to Ryan:

“Finally, I started a basketball program; for the best athletes, this was an incentive to come to school. We also had Teach for America teachers in the locker rooms and on the sidelines tutoring kids, because the basketball court was the one place we were allowed to be after school. The principal would never come into the gym, so we had all this tutoring going on covertly under the cover of basketball. It was a pretty insane environment.”

Ryan had learned about schools “that did great things with kids just like the ones that were in our school” and began to investigate KIPP. “I had heard all these misconceptions about KIPP, about turning the kids into trained seals and things like that. But then I saw that KIPP was really just about caring for the kids enough to work really hard and get good educators in a building where they could actually have the keys to it. Now I have three teachers from that school in Washington Heights in here, and the teachers have the keys.”

I was not surprised that Ryan, like Victor, reacted to the word “sustainability” in the context of his organization. “We went through



a strategic planning process last summer, and two of our five long-term imperatives were fiscal sustainability and human sustainability.” Human sustainability is an appropriate concern for charter school teachers putting in 80-100 hour weeks. In this regard, TEAM Academy struck me as a dramatic example of a concern faced by most non-profit organizations. Ryan’s version went like this:

“What this means is that we can’t just be an organization staffed completely by 25-year olds with no life, no kids, or anything like that. And we’re not – we’re starting to mature as an organization. It’s kind of like at a law firm; if you are a new lawyer, you don’t know what you’re doing, you go in, you put in tremendous hours until you prove yourself and learn the ropes. Then you can become a partner and you’re still working hard, but your hours can be less if that’s what you choose. That’s how we see it, too. Our veteran teachers have got their lesson plans now; they don’t have to spend as much time figuring out the curriculum, so there’s that sustainability built in; it’s just a natural evolution.”

In this age of standardized testing and No Child Left Behind legislation, I was struck by Ryan’s description of what TEAM classes look like at their best. “We have a class called Liberation Arts,” he said, “as in liberate your mind. It’s where 6<sup>th</sup> graders discuss current events and tough issues like Megan’s Law. They weigh the interests of kids versus the privacy rights of those convicted of sex crimes. They discuss gay marriage, they discuss racial profiling – and they examine their own biases.” In the end it was how the students learned to conduct themselves that Ryan most valued:

“In that class you don’t raise your hand. There are 33 kids in the class, and they discuss these difficult topics without laughing at each other, without saying mean things, without snickering when someone says ‘gay’ without rolling their eyes and without interrupting. They are not only displaying that they know how to interact, but that they can understand the perspective of others. You can see them learning the social skills and argumentation skills that are going to make them successful in high school and college – and you can see them becoming open-minded good adults who are interested in justice.”

This was not the first time I had thought that the three “E’s” of a sustainable community cannot exist without a fourth “E,” education. What if our public schools consistently offered an education that fostered communitarian values, and different definitions of a successful life than those dominant in our consumer-oriented, celebrity-obsessed society? Ryan spoke directly about that task:

“Growing up, going to college, making a ton of money, then being a jerk and a bad father is not success by our definition. Growing up, going to college – even if they don’t go to college – and being a great parent, a great friend and someone who’s hell-bent on changing the world – that’s what we value.”

I thought of Donna Drewes’ story about the taxi driver in Vancouver when Ryan spoke of the importance of common language in building common values:

“Like any strong internal culture we have our own slogans and sayings that all the kids know, like “Be the Change,” “Work Hard, Be Nice,” and “Team Always Beats Individual.” At first the kids hear it as jargon – but then they begin to internalize it as truth as well.”

“Work Hard, Be Nice” – TEAM kids wear the phrase on their T-shirts. I thought of a line from Ralph Waldo Emerson that I used to present earnestly to my own students: “As to methods there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble.”

The principles TEAM hopes to help its students internalize echoed those I had found on my Google-led search for definitions of sustainable communities. This makes sense, for in its own way, TEAM has its eye not only on the future of its students but also on the quality of the civic life they will inhabit and help shape. I was particularly reminded of a definition, really a directive, offered by Paul Hawken in *The Ecology of Commerce*: “Leave the world better than you found it, take no more than you need, try not to harm life or the environment, make amends if you do.” As I finished my discussion with Ryan Hill, I thought those principles would ring true to graduates of TEAM Academy.

## MAKING PEACE WITH THE WORD

While I was making these visits, the barrage of references to sustainability continued. I drove to work listening to reports “from the Sustainability Desk” on National Public Radio (NPR). The annual Worldwatch *State of the World* report arrived in the mail: the 2008 title is *Innovations for a Sustainable Economy*. My alma mater announced the beginning of a new Capital Campaign to support – you guessed it – a sustainable campus.

Meanwhile, our grantees were telling us their organizations were, or were not, sustainable. We were asking groups if support from other foundations for a new initiative was sustainable. And in this busy part of the country, I found myself asking friends, and myself, if our lives were sustainable. Was this the sort of watering-down of a word that renders it meaningless? Or was it something else? I believe it is something else. It struck me that the ubiquity of the word outside of environmental circles makes sense if we see it as trying to get at two basic ideas implicit in the way we use it: the idea of *getting it right*, whatever it is, and the idea of *making it last*.

I remembered a definition of “sustainability” I had heard from John Ehrenfeld, former Director of the Technology, Business and Environment Program at MIT. He said, “Sustainability is the possibility that human and other life will flourish on the planet forever.” My first reaction had been to linger over the word “forever.” Now I think the even more important concepts – and the key to my own pursuit of the definition of sustainability – are “possibility” and “flourishing.”

If sustainability is about possibility, which is to say about an idea, then our relationship to it changes. When people say “I have an idea” we don’t say “Well that’s vague” or “That’s trendy” or “Stop talking jargon.” We say “Tell me about it.” And “flourishing!” Can there be a more inviting word to unpack than that one? Maybe the best follow-up question to people invoking sustainability is not “What does *that* mean” but rather, “What do you mean?”

I think that the answers would be personal and varied, and they would all have the two parts noted above – a vision of quality and a dimension of time. In short, I believe we should understand and embrace the concept of sustainability as an invitation rather than a

destination. It asks us to ponder what it means to get something right and then to help make it last as long as it is still right. I recalled that when I first read Michael Pollan's statement about "sustainability" in *The New York Times Magazine* – "Everybody is for it – whatever it means" – I took it as criticism of the way we use the word so widely. Now I think he's on to something.

### **PURSUING THE IDEA**

One of my favorite books is Paul Hawken's *Blessed Unrest*. The subtitle is revealing: *How the Largest Movement in the World Came into Being and Why No One Saw It Coming*. He describes a "global humanitarian movement arising from the bottom up," consisting of "one – maybe even two – million organizations working towards ecological sustainability and social justice." These organizations are responding, he believes, to the lack of sustainability we see all around us, from climate change to "gross violations of human rights," from "theft of local resources by government and corporations" to lack of land, water, health care and/or education for those who need it. "Global conditions are changing dramatically and becoming more demanding," Hawken writes, and he suggests that civil society – the non-profit, non-governmental world – is reacting the way antibodies do to combat illness in a human body, as an "instinctive, collective response to threat."

Hawken's metaphor certainly helps explain why we keep bumping into the word "sustainability," and if the idea of sustainability involves forging connections, the metaphor achieves that with breathtaking scope. He argues that if you see social and environmental problems as interrelated – part of that big system Donna Drewes described – then "the coming together of different organizations to address an array of issues can effectively become a systemic approach."

As a member of the foundation world, I love the implications of Hawken's metaphor for our field. What if we viewed the groups we support as constituting a systemic response from their end, and a systemic approach from ours? The grants and initiatives from any one of our foundations may be viewed as a very small slice of the huge system Hawken writes about, but we can hope and trust that slice has its own coherence of purpose, and that viewed in combination with

other efforts, it can have an impact far beyond that achieved by isolated efforts. Thinking this way forces us to consider how to connect the work of our grantees with one another's – and our own work with each other's. This systems view also begs the question of which part of the system to address first, singly and together, with limited dollars to invest in ambitious social missions.

At the “Toward a New Consciousness” conference on which this book is based, where “sustainability” was center stage, the group in attendance, drawn from universities, business, government, and non-profit organizations, including foundations, was asked, “What should we do next?” Two systemic imperatives emerged: creating a public education system that educates for sustainability; and working towards a redefinition of “success” in our country. Recalling these imperatives, I decided to check in with two more Dodge grantees, leaders in these essential efforts.

### **THE CLOUD INSTITUTE FOR SUSTAINABILITY EDUCATION**

I called Jaimie Cloud, founder and President of The Cloud Institute for Sustainability Education. It was clear from her organization's title and mission that she had no trouble putting the word “sustainability” front and center: The institute's mission is “to ensure the viability of sustainable communities by leveraging changes in K-12 school systems to prepare young people for the shift towards a sustainable future.”

Whatever group she is working with, Jaimie often starts with The Fish Game. Here's how it is played. There are multiple players trying to catch fish to feed their families. The carrying capacity of the lake is known, the reproductive rate of the fish is known, and the object is for each player to have as many fish as possible at the end of the game. The game is a miniature version of humankind's challenge in managing resources and a classic illustration of what happens when there is open access to limited resources we hold in common. Again and again, individuals acting in their own reasonable (to them) self-interest make decisions that deplete and eventually destroy those resources. Not surprisingly, in one classroom after another, people trying to “win” the Fish Game are left with an empty lake.

To win the fish game requires long-term thinking, cooperation with others and individual restraint. It requires concern for *the health of the whole system*. I asked Jaimie why this game, or something like it, isn't played in every school in the country.

“For one thing, leaders of the sustainability movement don't look to schools as the answer. They all went to school, and most don't want to go back there or even think about it. They don't see schools as centers of innovation, leadership and organizational learning and change, and they don't think the system is capable of changing.”

But what about people in schools already? What keeps them from embracing education for sustainability?

“Many career teachers/administrators have always been in school – so it is sometimes difficult for them to imagine a different paradigm for schools than the industrial model. Plus they are crazy busy concentrating on tests and test prep, and in general being isolated and overwhelmed by bearing the brunt of failing communities, bad parenting and an unsustainable society. The indicators of unsustainability are showing up in the health, behavior and learning abilities of our children.”

I asked Jaimie how she would describe the new paradigm we need in schools – and her answer described her vision in a nutshell: *We need learner centered, transformative, constructivist education in learning organizations*. It's a compelling vision, but it takes time – at least 3 to 5 years, according to Jaimie. In the end, the schools she works with will have: involved their entire community, including government officials and business people; developed a new shared understanding of the purpose of education; made the link between education for sustainability and moving towards sustainability; and embraced the idea that young people can play leadership roles in the pursuit of sustainability. How much of our challenge in achieving this vision is cultural? “It's not so much our cultural values we need to change,” Jaimie said. “We believe in common sense; we believe in fairness – it's our cultural *behavior* that needs to change. We live with behaviors that contradict our own values.” She went on:

“The other gap we need to close is the one between our individual rights and our responsibilities as citizens of the community. I’m always struck with how kids handle a classmate who takes too many fish in *The Fish Game*. Kids know that greed is intolerable, and they don’t allow it. They simply take your right to fish away if you are not responsible to the group.”

In her presentations, Jaimie describes how many of the “mental models” we are currently operating with hold us back from behavior that would foster sustainability. These models include such paradigms or frames as: “Things are the way they are and there’s nothing we can do about it” and “We are in a zero-sum game and the only choice is to win or lose” and “There isn’t enough to go around, so we may as well go first class.” “What are the most powerful of the paradigms?” I asked her.

“We think we are in control. It’s as if people read the “dominion” part of the Bible and forgot to read the “stewardship” part. We think technology will save us, or the market will take care of it. We think if we need something, we can make it ourselves. I think this is the cultural shift we need most – to renegotiate our relationship with the natural world.”

I asked Jaimie, if these are some of the mental models that could take us out, what are some that could save us? Her answer struck me as exactly what people had been calling for and a powerful summary of what education for sustainability would look like:

“For a sustainable future, we have to understand that the structure and design of our planet require that we operate within natural “laws” and principles, rather than attempt to overcome them. We have to see that “it’s all connected,” and that systems thinking requires us to think about our choices and actions over time. We need to understand that the pursuit of self-interest is best served through the development of mutually beneficial relationships. And we have to believe we are all responsible, and that intergenerational leadership and collective action are required. Everything we do and everything we don’t do makes a difference.”

Imagine if every student in America began to think about their world and their relationship to it in a new way. Imagine if they believed, because they had *learned from experience*, that “everything we do and everything we don’t do makes a difference.” This kind of education would be good for all of us, but I was struck by Jaimie’s commitment to focusing on young people first.

“You have to start with the children and with the schools. We have them there for 13 years! But the payback starts right away. There are some who believe that the effect of education on young people requires a 20-year return on investment. That’s crazy. Anyone who works with kids knows that within five minutes they are applying what they have learned. They go home and tell their parents what they’ve learned. They design new technologies and inspire innovation. They lead campaigns and encourage us to be better human beings.”

“And what about those of us who are not in schools?” I asked. “I would look at the arts and media,” she said. “The arts and media need to help us tell a new story. You know the saying: the Stone Age didn’t end because we ran out of stones; it ended because we were told a different story. We’re writing that new narrative right now.”

## **CENTER FOR WHOLE COMMUNITIES**

Telling stories comes naturally to Peter Forbes. In fact, over the years working for the Trust for Public Land and Center for Whole Communities, he has published several volumes of stories that collectively convey the power that healthy relationships between people and the land have to heal and nourish both. He has also become a champion for “measuring what matters” as a way to galvanize community action around shared values.

In his speeches and workshops, Peter frequently refers to a specific passage written by Robert F. Kennedy in the mid-sixties. In it, Kennedy reminds us that one of our most frequently cited measurements, the Gross National Product (GNP) of a country, “counts air pollution and cigarette advertising and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for those who break them. It counts the destruction of



our redwoods and the loss of our natural wonder in chaotic sprawl.” Kennedy continues:

“Yet the Gross National Product does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country; it measures everything, in short, except that which makes life worthwhile.”

In this spirit, Peter and his colleagues at Center for Whole Communities have offered conservation organizations around the country a new tool, an assessment rubric called “Whole Measures.” Now, in addition to looking at the traditional measures of success (dollars and acres), land trusts around the country are gauging their success against other criteria as well – criteria such as justice and fairness, healthy habitat for people, and community-building. The rubric demonstrates a powerful premise of qualitative assessment – *if you can describe it, you can measure it.*

I drove up to Knoll Farm in the Green Mountains of Vermont to visit Peter. By this time, I was so comfortable with the word “sustainability” that I assumed he would be a fan of it – but no. I asked him if he used the word, and he said, “We ban it.” Oh, brother, I thought. Was I going to have to go back to the beginning? Was his objection the same as Freyfogle’s in *Orion* magazine, who said the word was “long on aspiration but short on meaning” – an objection powerful enough for him to subtitle his article “It’s Time to Give a Favorite Conservation Idea the Heave-Ho”? Actually, for Peter, the word was hardly long on aspiration:

“I think it means “barely acceptable.” To environmentalists, the word “sustainable” means durable, even successful, but to the average American it means barely livable, as in ‘my marriage or my job is sustainable.’ It doesn’t translate.”

Now this was interesting. Here I was sitting with someone whom I considered a leading spokesperson for sustainability, and he had given

the word the heave-ho. Peter may have agreed with me that sustainability was an idea, but to him, it was obviously not an inviting one. Suddenly I remembered a gathering where I had heard a noted environmentalist say, “Never use the word ‘environmental’; talk about mountains and wolves.” And the cloud lifted. I felt as if, at long last, I had arrived at an understanding of why I had felt so tested by “sustainability.” It seems obvious in retrospect. As an idea, the word is intellectual. But we want it to be emotional. We want it to be a rallying-cry. It can’t be. It needs more and different words to convey the aspirations and visions we have in mind.

I asked Peter what words he uses instead of “sustainability.” He said, “The words I use are ‘healthy,’ ‘whole,’ and ‘resilient.’” He lit up when he said this. Fair enough, I thought. We were definitely back in the same territory I had been mining in my other conversations. I asked him what his work looked like at its best, and he responded:

“I feel like the work of all of us, whether we call ourselves an environmentalist, or a sustainability-ist, or whatever, is no longer about trying to prove what’s wrong – it’s about revealing the connections and the relationships and the patterns of life that are still whole. What we do at Center for Whole Communities is reveal those relationships – between people, between issues, between sectors – that’s the core of it.”

Not surprisingly, Knoll Farm itself plays a key role in the work of Center for Whole Communities, for here, every week all summer long, people come and gather to live simply, eat local food, and explore those relationships. Peter went on: “That’s the core part of our work – bringing people here. It’s the simple act of giving these leaders the taste of what wholeness is. And then they have the ability in their own way, in their own lives, to not go back to a fractured, isolated, disconnected world.” I asked Peter what happens at these retreats. He answered:

“Something incredible happens when I tell you who I am and you tell me who you are. Always. All of a sudden the regional director of The Nature Conservancy, who feels like he has a fabulous mission, realizes he cannot win without the support of the guy sitting next to him, who is the regional director of the Community Food Security Coalition. And then it goes one

step further – he realizes that he is not going to be completely successful unless that person is successful, too. That’s wholeness.”

I knew Peter and his colleagues did not shy away from issues of race, of power and of privilege, the thorny obstacles to achieving that third “E” of a sustainable community, social equity. I asked him about it. “It’s those three things,” he said, “even more than the specialization that keeps organizations separated from each other, it’s race, power and privilege that keep us separated from one another as individuals.” He described what happens on the first afternoon of the Whole Thinking Retreats at Knoll Farm:

“We always have a diverse group, and at 4:00 pm that first day, everyone lines up in a straight line, holding hands, and we ask them 60 questions about the way they were raised, such as: “If your parents were professionals – doctors, lawyers, etc. – take one step forward.” “If your family ever had to move because they couldn’t afford the rent, take one step back.” “If you lived in an area where you were able to play safely outside unsupervised when growing up, take one step forward.” “If you were ever discouraged from academics or jobs because of your race, class, ethnicity, gender or sexual orientation, take one step back.”

By the seventh question, most of the white folks are edging forward. By the 55<sup>th</sup> question, all of the white men are at the very front and all of the people of color are at the very back. We say, “Look up, see our relative position.” The white people look behind them and say, “I never knew there was this kind of difference.” The black people who are looking forward say, “I see this every day.” This is very painful for a lot of people. But then we say, “Every question that was asked of you is about things you had no control over. What are we going to do about it?” What that does is make it possible for the rest of the week to talk about the things that are almost never talked about in gatherings like this – and figure out how we really want to be. That’s when people begin to really hear each other.”

“Who learns the most?” I asked him. “The white people,” he replied. “They begin to see the reciprocal nature of success – that no matter how much money their organization has, how much political clout, they are really not going to be successful without that other person. The people of color come with that information fully.”

It was easy for me to imagine the power of a week-long retreat at Knoll Farm, but what about all the people who would never have that experience?

“That’s where the Whole Measures rubric comes in. What we hear is that when organizations use that tool, they talk about issues they haven’t talked about before, and there is this great boost in morale. They get a sense of really being able to address problems, and there is a joy that comes from working with people who you were afraid to talk to or you thought had no respect for you. All of a sudden you’re on the same page together, and there’s a huge amount of energy that comes from that.”

I said that the tool must make perfect sense for people who have the values it is built around. But how does it work with people who are afraid that even engaging in a conversation like that might mean they will have to give something up? Peter reflected, “I guess one of our theories of change is that those values that are in Whole Measures are actually in most Americans, and all we’re doing is helping to reveal them.”

There it was again, just as Fletcher Harper had believed, just as Jaimie Cloud had said, just as Paul Hawken had written about – the idea that the keys to sustainability were already part of us. They just need the right encouragement for them to come out.

## **COMING HOME**

After my visits with all these non-profit leaders, it made sense to me why the adjective “sustainable” gets even more of a workout than the noun “sustainability” – it takes a lot of sustainable parts to make a whole. I thought, not for the first time, that if the missions of scores of organizations like theirs could be combined and achieved, we would have a different culture and a different world than we do now. I also felt better to answer the questions I posed at the start regarding

what is on our minds at the Dodge Foundation when we invoke “sustainability.” Every foundation will have its own beliefs that guide its approach to grantmaking. Here are some of ours:

*We believe a sustainable society is championed and advanced by a thriving non-profit sector.* That is why we offer an array of technical assistance workshops to help strengthen non-profit organizations, and offer general operating support grants whenever we can. We need these groups, their values, and their multiple ideas of a better world to exist together.

*We believe sustainability can be understood on multiple levels – personal, institutional, and societal.* That is why we offer fellowships to teachers and principals that allow them to renew themselves as learners through experiences that take them all over the world, why we work with the Nonprofit Finance Fund to help keep nonprofits financially sound, and why we help protect open space in our densely-populated part of the world.

*We believe one moves towards sustainability by making connections.* This is why we make small grants to groups who reach across disciplines and across sectors to collaborate on projects of mutual interest, why we support inclusive community visioning processes in municipalities, and why we are working with other foundations in our regional association to create a cross-sector collaborative, *New Jersey Together*.

*We believe a culture moves towards sustainability by serving and engaging youth.* That is why so many of our grants are about providing young people with access to experiences that help them become critical and creative thinkers, and help them know and love the natural world. The choices they will make as future consumers and citizens are critical.

*We believe a world we would want to call sustainable would be joyful.* That is why we remain a champion of music, theatre, dance and the visual arts in our state, and of arts education in and out of our schools.

*We believe we cannot move towards sustainability without re-defining words like success and progress.* That is why we have engaged with hundreds of the organizations we support, in all our giving areas, in an Assessment Initiative that encourages us all to measure what matters.

## **EPILOGUE: FOUNDATIONS AS ACTORS**

In my Google search for “sustainability,” I ran across some rather dry language in a report from a United Nations Council. It said: “A risk exists that Education for Sustainable Development may lose ground in the continuing debate on its meaning among scholars and policymakers, as the focus tends to be on interpretation rather than implementation of the concept. Both the implementation and specific meaning of educating for sustainability are enhanced by actual execution of concrete activities.”

Dry, but right on target, I would say, because prolonged talk about ideas often leaves one hungry for action. I would suggest to my colleague in the world of organized philanthropy that though our primary function is to support the actions of others, we too are part of that massive social movement Hawken describes, and we should always be asking ourselves what else we can do to help create a more livable world.

I will close with two actions Dodge is taking which may serve as an indication of the range available to our field. For the past several years, we have worked with the Morristown Parking Authority to design and build an office building and parking garage in downtown Morristown which has become one of New Jersey’s greenest buildings.

Our goal has been to create an educational building, one that instructs and inspires those who enter it to learn more about green design. Recycled and renewable materials are used throughout. A beautiful wooden backdrop to the reception area is made from beams removed prior to the demolition of Epstein’s Department Store in the same block. There will be features such as: geothermal wells, which will supply the building with water at a constant 56-degrees for heating in the dead of winter and cooling in the heat of summer; a green roof, which will eliminate stormwater run-off, insulate the building, and provide usable, park-like space on the top of the building; photovoltaic panels on the roof of the garage, which will supply electricity to both the garage and the office building; light shelves, which will bounce natural daylight deep into interior space; and sun shades, which will protect the building from overheating.

While these features are not yet common in buildings in the Northeast, certainly not all together, there is nothing particularly

experimental about them. They have all been tested and proven effective elsewhere. There is one area of the building, though, where we are stepping out onto the frontier of green building design – our Biowall.

It will be a three-story interior wall of living plants, running alongside an open stairwell in the center of the building – and it will filter the air for the entire building. It will be one of only a handful of Biowalls in the United States, following the lead of Canadian inventor Alan Darlington.

We had told our interior architects that we wanted something immediately thought-provoking for people entering our offices, something that would symbolize what green buildings have to teach us. Here it was in a living wall: a connection between human health and the natural world, and an illustration of the beauty and efficiency of natural design. For those of us who come to work every day, we will have a core principle of sustainability literally right before our eyes – we will tend to the plants, and they will tend to us.

My final example of philanthropic action to foster sustainability may seem incongruous at first. It is about being, or becoming, champions of poetry. Poetry fosters the imagination we will need to create the future we desire. Poetry simultaneously celebrates diverse voices and a common humanity, and make one hopeful about the human dimension of John Ehrenfeld's definition of "sustainability": the possibility that humans will flourish on the planet forever.

The conversations I have described in this essay all suggest that people committed to a healthier, more equitable world should think big and start small. I think of Wendell Berry's poem *February 2, 1968*:

*In the dark of the moon, in flying snow, in the dead of winter,  
war spreading, families dying, the world in danger,  
I walk the rocky hillside, sowing clover*

Berry juxtaposes the sobering realities of the larger world with the deeply hopeful and committed act of planting. We sense, I believe, that however long human beings are around, we will thrive not just because of our aspirations, but because of the simple actions that are ours to make. Poetry helps us see this.

I offer one last picture of right action, drawn from the 2006 Geraldine R. Dodge Poetry Festival, the work of a poet from a war-

torn land. Taha Muhammed Ali, a man in his 70s, a Palestinian who lives in Nazareth, read his then-unpublished poem *Revenge* in the main concert tent.

### **Revenge**

*At times . . . I wish  
I could meet in a duel  
the man who killed my father  
and razed our home,  
expelling me  
into  
a narrow country.  
And if he killed me,  
I'd rest at last,  
and if I were ready –  
I would take my revenge!*

\*

*But if it came to light,  
when my rival appeared,  
that he had a mother  
waiting for him,  
or a father who'd put  
his right hand over  
the heart's place in his chest  
whenever his son was late  
even by just a quarter-hour  
for a meeting they'd set –  
then I would not kill him,  
even if I could.*

\*

*Likewise . . . I  
would not murder him  
if it were soon made clear  
that he had a brother or sisters  
who loved him and constantly longed to see him.  
Or if he had a wife to greet him*



*and children who  
 couldn't bear his absence  
 and whom his gifts would thrill.  
 Or if he had  
 friends or companions,  
 neighbors he knew  
 or allies from prison  
 or a hospital room,  
 or classmates from his school . . .  
 asking about him  
 and sending their regards.*

\*

*But if he turned  
 out to be on his own –  
 cut off like a branch from a tree –  
 without a mother or father,  
 with neither a brother nor sister,  
 wifeless, without a child,  
 and without kin or neighbors or friends,  
 colleagues or companions,  
 then I'd add not a thing to his pain  
 within that aloneness –  
 not the torment of death,  
 and not the sorrow of passing away.  
 Instead I'd be content  
 to ignore him when I passed him by  
 on the street – as I  
 convinced myself  
 that paying him no attention  
 in itself was a kind of revenge.*

When Taha re-defined his title word in the last line of the poem, over 2,000 of us instantly rose as one to our feet, inspired and connected by an idea of what is possible.

**David Grant** has been the President and CEO of the Geraldine R. Dodge Foundation since 1998. He is responsible for development and evaluation of programs in the Foundation's five areas of giving in New Jersey: education, environment, arts, welfare of animals, and local Morris County projects. He spent his professional career before Dodge as an educator. In 1983 he and his wife, Nancy Boyd Grant, co-founded The Mountain School of Milton Academy, a semester-long, interdisciplinary environmental studies program in Vermont for high school juniors. From 1994 to 1998 David was a national consultant to schools and leader of workshops on topics of curriculum and program design, professional development, assessment practices and school climate. His public service includes having been Town Moderator of Vershire, Vermont, and a Board Member of the Vermont Council for the Humanities. He is currently Chair of the Board of Trustees of the Council of New Jersey Grantmakers and a member of the Board of Directors of the Surdna Foundation in New York City. His avocation since 1976 has been performing as Mark Twain in a one-man theatrical show, including, in 1982, a performing/lecture tour around the world. He holds an M.A. in American Studies from the University of Michigan and was graduated magna cum laude from Princeton University with an A.B. in English.

# Values and Ecological Sustainability: Recent Research and Policy Possibilities

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At the same time that our species must confront the looming ecological crisis that threatens to render profound changes in our external habitat, we humans must also personally confront a deeply *internal* crisis. This internal crisis is not one that will be easily addressed by switching our light bulbs from incandescents to compact fluorescents or by driving hybrid automobiles, for it is a crisis of *values*.

Values are the psychological representations of what we believe to be important in life (Rokeach, 1973), and a quick glance at the state of our contemporary world makes it clear that over the last couple of hundred years, the human species has not believed that it is all that important to nurture and sustain our external habitat. Rather, it seems that the priority we have given to “developing,” and thus damaging, our habitat is partly the result of a set of values highly focused on maximizing economic growth, pursuing our own self-interested desires, and obtaining remarkably high levels of personal consumption.

That such self-interested, materialistic values are indeed important to many people has been documented by substantial cross-cultural psychological research. In these studies, individuals around the world have been presented with a long list of different aims they might value or goals they might have. Researchers have then classified these aims into smaller subsets that cluster together as coherent sets of values and goals. For example, the seminal work of Shalom Schwartz and his colleagues, conducted in dozens of nations

around the world, identifies ten types of basic priorities people typically hold in life (Schwartz, 1992, 2006). Two of these types of priorities cluster together as what Schwartz calls the “self-enhancement” values, for they concern the attempt to stand out from others through the acquisition of money, status, and the like. Specifically, the first self-enhancement value, *power*, concerns the desire to obtain resources and wealth, whereas the second, *achievement*, concerns the desire to stand out as particularly excellent and successful by the definitions of one’s society. The cross-cultural research my colleagues and I have conducted similarly yields an “extrinsic” or “materialistic” cluster consisting of three types of goals: *financial success*, which concerns the desire for money and possessions; *image*, which concerns the desire to have an appealing appearance; and *status*, which concerns the desire to be popular and admired by others (Grouzet et al., 2005; Kasser and Ryan, 1996; Ryan et al., 1999; Schmuck, Kasser, and Ryan, 2000).

In addition to documenting the existence of these self-enhancing, materialistic values, studies show that people who care more about these types of values and goals have less positive attitudes about the environment. Studies in Australia (Saunders and Munro, 2000) and the United States (Good, 2007) document that materialistic values and a strong consumer orientation are associated with lower biophilia (Kellert and Wilson, 1993) and worse environmental attitudes. The cross-cultural research of Schwartz (1992, 2006) similarly reveals that the self-enhancing values *power* and *achievement* are associated with caring less about values such as “protecting the environment,” “attaining unity with nature,” and having “a world of beauty.” Additionally, a study of almost 1,000 undergraduates from Brazil, the Czech Republic, Germany, India, New Zealand, and Russia showed that worse environmental attitudes were associated with high power values in five nations and with high achievement values in two nations (Schultz, Gouveia, Cameron, Tankha, Schmuck, and Franek, 2005).

Not only are self-enhancing, materialistic values associated with less beneficent environmental attitudes, but some research shows that they are associated with *behaving* in less ecologically sustainable ways. In samples of American adults, both Richins and Dawson (1992) and Brown and Kasser (2005) have found that materialistic values are

negatively correlated with how much people engage in ecologically-friendly behaviors such as riding one's bike, reusing paper, buying second-hand, recycling, etc. Other work has replicated these findings in samples of U.S. and U.K. adolescents, as middle and high school students with a stronger materialistic orientation report that they are less likely to turn off lights in unused rooms, recycle, reuse paper, etc. (Gatersleben, Meadows, Abrahamse, and Jackson, 2008; Kasser, 2005). Further, Brown and Kasser (2005) examined the ecological footprints of 400 North American adults, finding that those who cared more about extrinsic, materialistic values used significantly more of the Earth's resources in order to support their lifestyle choices around transportation, housing, and food.

Research using resource dilemma games provides further support for the claim that materialistic values play a role in ecological destruction. In the first study of its type, Sheldon and McGregor (2000) assessed college students' values and then, on the basis of the students' materialism scores, assigned them to play a "forest-management game" in one of three kinds of groups: a group with four subjects who all scored high in materialism, a group with four subjects who all scored low in materialism, or a group with two members who scored high and two who scored low in materialism. Once in their groups, subjects were asked to imagine that they were in charge of a company that would be bidding against three other companies to harvest timber from a state forest. Each of the subjects in a group then made an initial bid for how much they wanted to harvest; the total amount of the four bids was then subtracted from the existing forest acreage, another 10 percent was added back (to represent re-growth in the forest), and then a second year of bidding commenced. This process continued either until 25 "years" of bidding had passed or until no forest remained. As predicted, the groups composed of four materialistic individuals were significantly less likely to have a forest remaining at the 25<sup>th</sup> year of bidding. It is also worth noting that materialistic individuals reported being more motivated by "greed," or the desire to profit more than other companies. Such findings, which have been replicated in part by Kasser and Sheldon (2000) and Dechesne et al., (2003), provide clear evidence for how materialistic values may contribute to ecological destruction.

Recent research suggests that similar dynamics may be playing out on a national scale. Kasser (in press) obtained measures of the carbon emissions of 20 wealthy, capitalistic nations and correlated these with measures of how much the citizens in those nations cared about *mastery* values, which are aimed at manipulating the world to serve one's own interests. Even after controlling for a nation's Gross Domestic Product, the more mastery was valued by citizens of a nation, the more CO<sub>2</sub> that nation emitted.

### **TWO APPROACHES TO ABATE SELF-ENHANCING, MATERIALISTIC VALUES**

The body of literature just reviewed suggests that to the extent individuals value self-enhancing, materialistic goals, they are more likely to have negative attitudes about the environment, are less likely to engage in relatively simple behaviors that benefit the environment, and are more likely to make behavioral choices that contribute to environmental degradation. Further, preliminary evidence suggests that when nations strongly value self-enhancing, materialistic values, they emit more greenhouse gases. Of course, the bulk of this research is based on correlational studies, making it very difficult to confidently conclude that self-enhancing, materialistic values *cause* these problematic ecological outcomes. But the consistency with which these results occur across different samples and different operationalizations of ecological problems suggests that it nonetheless may be important to develop ways of reducing how much people care about self-enhancing, materialistic values and goals if we hope to increase humanity's chances of creating an ecologically sustainable world.

The research literature points toward two broad types of approaches that might guide efforts toward this end. The first approach would work to address and remedy the root causes of self-enhancing, materialistic values in order to decrease the likelihood that people take on and act out of such ecologically-damaging values. The second approach would attempt to encourage an alternative set of values that not only opposes the self-enhancing, materialistic values, but that also promotes ecological sustainability. Below I present a brief overview of each of these two approaches before I ultimately show how they might be applied in three different ways.

### **Addressing the causes of self-enhancing, materialistic values**

Kasser, Ryan, Couchman, and Sheldon (2004) integrated the literature on the causes of materialistic values by suggesting that there are two primary pathways by which such values are acquired. The first pathway is through the rather obvious influence of social modeling and the second is through the subtler, and perhaps more insidious, route of insecurity.

Social modeling involves the extent to which individuals are exposed to people or messages in their environment suggesting that money, power, achievement, image, and status are important aims to strive for in life. The empirical evidence clearly documents that people have higher levels of materialism to the extent that their parents, friends, and peers also espouse such values (Ahuvia and Wong, 2002; Banerjee and Dittmar, 2008; Kasser, Ryan, Zax, and Sameroff, 1995). Television, that font of advertising messages proclaiming the worth of “the goods life,” also plays a strong role in encouraging materialistic values, as documented by numerous studies (Cheung and Chan, 1996; Kasser and Ryan, 2001; Rahtz, Sirgy, and Meadow, 1989; Schor, 2004). Exposure to advertising in school has also been documented as promoting stronger materialistic concerns (Brand and Greenberg, 1994).

The second pathway toward materialism is through feelings of insecurity. That is, the empirical literature suggests that people tend to orient toward materialistic aims when they experience threats to their survival, their safety and security, and their perceived likelihood of getting their psychological needs met. For example, children are more likely to be materialistic when they grow up in a family with a cold, controlling mother, when their parents divorce, and/or when they experience poverty (Rindfleisch, Burroughs, and Denton, 1997; Cohen and Cohen, 1996; Kasser, Ryan, Zax, and Sameroff, 1995; Williams, Cox, Hedberg, and Deci, 2000). Some experiments even support a causal role for insecurity in creating materialistic concerns. Specifically, making people consider economic hardship, poor interpersonal relationships, and even their own death leads individuals to care more about materialistic aims and to act in more ecologically destructive ways (Dechesne et al., 2003; Kasser and Sheldon, 2000; Sheldon and Kasser, 2008). Thus, it seems that a typical human tendency is to become self-interested and concerned about acquisition in the face of situations that promote insecurity.

To summarize, then, this literature suggests that a first approach to decreasing ecological degradation is to address the features of our world that promote materialistic values. Substantial data suggest that to be effective, strategies must be developed to: a) decrease the extent to which such self-enhancing, materialistic values are modeled in society; and b) increase feelings of personal security among members of society.

### **Promoting an alternative set of values**

As noted earlier in this chapter, self-enhancing, materialistic values and goals exist within broader systems of personal goals and values. That is, most people have a variety of aims for which they are striving in life, some of which are materialistic and self-enhancing, and some of which concern other values and goals. A second promising approach is therefore to identify the types of values and goals that lie in opposition to the self-enhancing, materialistic values and goals, and then to develop strategies that increase the likelihood that people will internalize and act upon these alternative aims in life. By doing so, the power that self-enhancing, materialistic goals and values have over a person's motivational system is likely to be diminished.

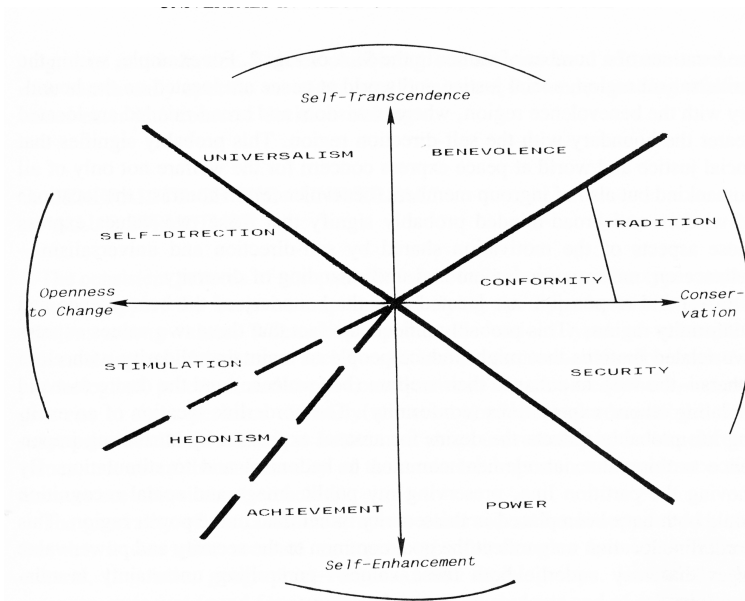
Cross-cultural research has provided a fairly consistent picture of how people's goals and values are organized in their minds. Specifically, this body of literature demonstrates that some values and goals are experienced by most people as psychologically consistent with each other, whereas other goals and values are experienced by most people as in opposition to each other. The extent of consistency or conflict among goal types can be statistically represented by a "circumplex" structure, in which psychologically consistent goals are placed next to each other in a circular arrangement, while psychologically conflictual goals are placed on opposite sides of the circumplex. Figures 1 and 2 present two well-validated circumplex models of values and goals. Schwartz's (1992, 2006) model, presented in Figure 1, shows that the self-enhancing values of *achievement* and *power* lie next to each other, representing their psychological compatibility; similarly Fred Grouzet and I have shown that the materialistic aims of financial success, image, and popularity cluster together as a consistent set of goals (Grouzet et al., 2005); see Figure 2.

Importantly, these circumplex models also reveal the values and goals that lie in opposition to the self-enhancing, materialistic values.



Figure 1 shows that the self-enhancing values are opposed by two “self-transcendent” values, *benevolence*, which concerns acting in ways that benefit the people with whom one is especially close, and *universalism*, which concerns acting in ways that benefit the broader world.

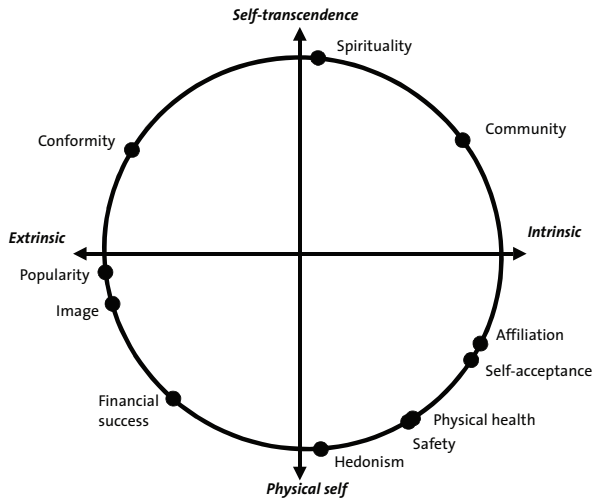
Figure 1 Circumplex model of values



Reprinted from *Advances in Experimental Social Psychology*, Volume 25, Shalom H. Schwartz, *Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries*, pp. 1-65, 1992, with permission from Elsevier.

Figure 2 similarly shows that materialistic goals are opposed by a set of three “intrinsic” goals: *self-acceptance* (or understanding one’s self and striving for freedom), *affiliation* (or having good relationships with family and friends) and *community feeling* (or trying to make the wider world a better place). These models, based on data from thousands of individuals across dozens of nations, thus suggest that another strategy for abating self-enhancing, materialistic values is to promote the self-transcendent, intrinsic aims in life.

**Figure 2 Circumplex model of aspirations**



Source: Grouzet et al. 2005

The potential benefits of this approach are further bolstered by the fact that empirical research demonstrates that the self-transcendent, intrinsic values are associated with more positive ecological outcomes. For example, Schultz et al.'s (2005) cross-cultural study documented that in each of the six nations studied, self-transcendent values were significant positive predictors of having engaged in a set of twelve environmentally-helpful behaviors (ranging from recycling to picking up litter to environmental political actions). Generosity (which is akin to the *universalism* and *community feeling* values) also predicts more positive environmental attitudes and behaviors in UK and U.S. adolescents (Gatersleben et al., 2008; Kasser, 2005). Further, the more people focus on intrinsic (relative to materialistic values), the more sustainable and less greedy their behaviors are in both resource dilemma games (Sheldon and McGregor, 2000) and in their own lives (Brown and Kasser, 2005). Finally, nations in which citizens place a strong importance on *harmony* values, to accept the world as it is, have significantly lower carbon emissions, even after controlling for GDP (Kasser, in press).

Two additional benefits of intrinsic goals are worth mentioning. First, as opposed to materialistic values, people who value intrinsic

goals consistently report higher personal well-being (e.g., more self-actualization and vitality) and lower personal distress (e.g., less depression and anxiety; see Kasser, 2002 for a review). Second, as opposed to materialistic values, people who value intrinsic goals consistently behave in more cooperative, pro-social ways, sharing more and being more empathic and less manipulative (see Kasser et al., 2004). Thus, not only do the self-transcendent, intrinsic values oppose self-enhancing, materialistic values, and not only do they support more positive ecological behaviors, but they also seem to provide greater personal well-being and to promote the kinds of cooperative, pro-social behaviors that will be necessary to solve the ecological crises we will face.

To summarize, then, a second fundamental approach to decreasing self-enhancing, materialistic values is to promote the kinds of values that oppose these ecologically-degrading values. Substantial data suggests that encouraging self-transcendent, intrinsic values would: a) undermine how much people care about the self-enhancing, materialistic values that damage the environment; and b) promote a set of values that supports more positive ecological behaviors, as well as greater personal well-being and more pro-social behavior.

### **THREE EXEMPLARY PATHWAYS TO CHANGE**

The values-based perspective on the ecological crisis that I have been describing in this chapter suggests that some significant portion of our present difficulties comes from the fact that many people have internalized a set of self-enhancing, materialistic values that are associated with ecologically-destructive attitudes and behaviors. Given this diagnosis, and given past research and theorizing, I have suggested two basic approaches to abating self-enhancing, materialistic values. First, I have suggested that it would be useful to remove the social models and diminish the feelings of insecurity that create and maintain self-enhancing, materialistic values. Second, I have suggested that it would be useful to promote the self-transcendent, intrinsic values that research shows both oppose self-enhancing, materialistic values and support ecologically-beneficial behaviors. In an attempt to demonstrate the applicability of these two

basic approaches, I next discuss their relevance to three promising avenues for societal change.

### **Voluntary simplicity**

While American history has been dominated by movements to “tame” (i.e., economically develop) a vast continent and by the American dream of material prosperity, Shi (1985) documented a countervailing trend in which some Americans have questioned the nation’s focus on economic growth, consumption, and material acquisition, and instead have tried to live a “simpler” life. Shi traces this simple living movement from the early Puritans and Quakers, through the American revolutionaries, into transcendentalism, and eventually to the hippie, counter-cultural movement of the 1960s. Today, those who strive for simplicity are known under various labels, including “downshifters,” “cultural creatives,” and, probably most widely, “voluntary simplifiers” (VSrs). Common across these labels is the decision to reject a life based on the cycle of work-spend-work-some-more and instead focus on “inner riches.” The qualitative interviews conducted by Elgin (1993) and Pierce (2000), for example, suggest that many who identify as VSrs choose to disengage from a life based around long work hours and high levels of consumption so that they may instead focus on their own personal growth, family, volunteer activity, and spirituality; many VSrs say that ecological concerns highly motivate them as well.

Brown and Kasser (2005) conducted one of the first quantitative scientific studies on VS by obtaining a sample of 200 self-identified voluntary simplifiers (through a variety of list-servs and publications) as well as a group of 200 mainstream Americans matched to the VSrs on gender, age, and zip code. Several interesting differences between the groups emerged. First, the VS group was much more likely than the mainstream group to report engaging in positive environmental behaviors and to be living in ways that decreased their ecological footprints. Second, compared to the mainstream group, the VS group reported significantly higher levels of life satisfaction and a preponderance of pleasant vs. unpleasant emotion in their daily lives; this finding is especially noteworthy given that the annual income of the VS group was about two-thirds that of the mainstream group.

Third, using a statistical technique called structural equation modeling, Brown and Kasser demonstrated that the facts that the VS group was happier and was living more sustainably than mainstream Americans could be partially explained by the value orientation of the VSrs. Specifically, the VS group was more strongly oriented toward intrinsic goals and less oriented toward materialistic goals than were the mainstream Americans.

These results suggest that VS practitioners have been able to put into practice the second of the two basic approaches described above as holding promise for abating materialistic values. That is, the evidence from Brown and Kasser (2005) strongly suggests that people who pursue a VS lifestyle are highly oriented toward the intrinsic goals known to both oppose materialistic values and to promote ecologically-responsible behavior. Thus, something about the VS lifestyle, or about the people who ultimately adopt a VS lifestyle, seems to encourage the kinds of values associated with ecological sustainability and with the rejection of materialism.

The broader literature on VS also suggests that some features of this lifestyle may help work against those factors known to promote materialistic values. For example, interviews by Elgin (1993) and by Pierce (2000), as well as first-person accounts related in Holst (2007), reveal that many VSrs attempt to limit their exposure to the social messages that model materialistic values by eliminating television and other sources of advertising from their families lives, by choosing friends who support their values, and by working with organizations that do not pressure them to prioritize financial profit and work excessively long hours. Other anecdotal data suggest that VSrs try to enhance their sense of personal security by learning how to be more self-sufficient, i.e., by making their own clothes, growing their own food, building their own homes, and repairing and re-using items in creative ways. What's more, some evidence suggests that VSrs are especially likely to engage in meditative and spiritual practices, to use journals to reflect on their lives, and to pursue personal growth through psychotherapy, all of which are effective ways of addressing one's own personal insecurities. The fact that Brown and Kasser (2005) found that the VS group was significantly happier than mainstream Americans suggests that such efforts may have met with some success. Future research might follow up on these qualitative,

anecdotal findings to more systematically determine the role of these factors both in sustaining the VS lifestyle and in promoting ecologically-responsible behavior.

Given the promise that VS might hold for promoting intrinsic values, happiness, and ecologically sustainable behavior, how might we increase the percentage of Americans practicing this lifestyle beyond the current estimates of 10 to 15 percent of the American population (Elgin, 1993; Ray, 1997)? Some of what I'll say in the next two sections of this chapter is relevant here, but let me share two thoughts at this point.

First, my conversations with people about VS suggest that one major roadblock some people have about adopting a VS lifestyle is their fear of living without health insurance if they only have a part-time job; interestingly, such anecdotes are consistent with the studies reviewed above showing that death anxiety shifts people away from intrinsic values and towards materialistic values (i.e., Sheldon and Kasser, 2008). It would be worth more formally studying whether concerns about access to health care are indeed a major reason some people do not pursue a more materially simple lifestyle. If so, this would be yet another argument for fundamentally reforming the U.S. health care system so that health insurance is not provided mainly through one's full-time employer.

A second issue that seems to stand in the way of widespread adoption of a VS lifestyle concerns current American social norms, which suggest that a happy, successful, meaningful, and even patriotic life entails working long hours and consuming at high levels. Not surprisingly, some VSrs report feeling ostracized by friends and families who do not understand their choices, and others even report having been called "subversive" for refusing to follow the standard American work-hard-and-consume lifestyle (Elgin, 1993; Pierce, 2000). I've also met people who say that while a simpler life appeals to them, they can't imagine "becoming Amish" or "living like the Unabomber." If these are their only conceptions of what it means to live more simply, and if they are viewed as "odd" by their neighbors and friends for thinking about such a lifestyle, it is no wonder that many people interested in VS end up following the culturally-sanctioned path of satisfying their desires through consumption, and decide instead to subscribe to *Simple Living* magazine so they may thumb through

advertisements and articles about products aimed at this “market segment.” Ultimately, and unfortunately, such a choice means that some who desire to live a simpler life end up channeled right back into the mainstream norms and do not make the kinds of fundamental lifestyle changes necessary to reach ecological sustainability.

In order to address these norms, a concerted public education effort designed to change social perceptions about what “the good life” is and what “simplicity” means may help encourage more people to pursue this lifestyle. If educational materials could be developed and distributed about the VS lifestyle, it seems likely that some reasonable percentage of individuals might be interested to know that VS is associated with greater ecological sustainability, higher levels of happiness and greater opportunities to pursue intrinsic values (all of which research shows are highly desired by most people). Another educational approach might be to create large numbers of community-sponsored “simplicity circles” (Andrews, 1998), which are small groups that meet frequently to provide members with information about and support for living in more materially-simple ways.

### **Restrictions on advertising**

Of course, a major limitation of such a proposal to educate the public about the personal and ecological benefits of living a simpler life is that, even if funding for it could be obtained, such educational messages would be only a drop of water amidst an ocean of messages that encourage materialistic values. We live in a culture dominated by commercial advertising, which should be understood as the best-funded, most sophisticated propaganda campaign ever employed in human history, with millions of dollars spent yearly to pay researchers to investigate how to “press the buy button” and billions of dollars more spent to pay for-profit media corporations to deliver these messages to children, adolescents, and adults. Advertising messages that inculcate the belief that people’s worth is dependent on what they own now appear in almost every possible media venue, and, through developments in stealth marketing, are even covertly placed in songs, books, and conversations people have with friends and strangers (Schor, 2004; Walker, 2004).

I have already reviewed evidence that exposure to commercial media is associated with stronger materialistic values, and it seems

likely that both known causes of materialistic values are relevant to explaining this association. That is, as Kasser et al. (2004) argued, advertisements are obviously social messages that model the importance of materialism and consumerism, but they also create the feelings of insecurity that are known to promote materialism. Consider, for example, the typical advertisement narratives in which a person without the advertised product is presented as socially-outcast, unhappy, unsuccessful, or otherwise an insufficient human, whereas a person with the product is loved, happy, beautiful, and successful. Such advertisements play on humans' tendency to compare themselves to others (Richins, 1991, 1995), leading many viewers to wonder "Am I insufficient too?" Of course, the advertisement provides a ready solution to assuage such feelings: Imitate the successful model and purchase the product or service advertised.

But this is only part of advertising's power, for its infiltration into more and more aspects of our world creates a set of social norms that make it acceptable and, indeed admirable, to pursue materialistic aims in life and to believe that "high levels of consumption are normal," that "everyone purchases a lot," and that "good people buy stuff." Further, advertisements probably contribute to what Miller (1999) calls "the norm of self-interest," or the belief that because everyone else is likely to act in a self-interested way, I should too. As such, advertisements create and frequently activate the self-enhancing values and extrinsic, materialistic goals reflected in the circumplex models presented in Figures 1 and 2. By doing so, advertisements not only increase the likelihood that people care about self-enhancing, materialistic aims in life and act in value-relevant ways (i.e., by consuming and working long hours), but they weaken the self-transcendent and intrinsic portions of people's motivational systems.

For these reasons, I propose that the most effective way to quickly decrease the extent to which people internalize and act out of materialistic values would be to pass five federal laws:

The *first law* would remove all outdoor advertisements (including billboards on highways and business signs over a certain size) and all advertising in public spaces (including subways, buses, and schools); by doing so, people would no longer be forced to view advertising as they went about their daily lives.



The *second law* would require that all forms of advertising messages be acknowledged as such; doing so would remove the power of marketing via stealth advertising and product placement, and would protect consumers from manipulation.

The *third law* would ban all forms of marketing to children under the age of 12; doing so would end the practice of preying on youth whose cognitive development makes it difficult for them to understand persuasive intent and whose identities are still in the process of formation.

The *fourth law* would repeal the current tax policies that allow businesses to deduct expenses for marketing and advertising, and would instead create a tax (perhaps 25 percent) on such business expenses; by doing so, businesses would have less incentive and more of a disincentive to advertise, which likely would decrease how much advertising people are exposed to.

The *fifth law* would use the proceeds from this tax to fund non-commercial media and educational projects that promote self-transcendent, intrinsically oriented-values, ecologically-sustainable activities, and a more materially simple lifestyle.

This package of five laws would thus attempt to reduce how likely people are to be exposed to advertising, thereby reducing the likelihood that they will take on and act out of self-enhancing, materialistic values. These laws would also ultimately help promote the self-transcendent, intrinsic values that support ecologically-sustainable behavior and attitudes. Finally, these laws would help weaken the cultural norms that encourage high levels of consumption and would instead promote a set of norms likely to lead to more ecologically-sustainable behavior.

### **Changing the economic system**

Of course, a major limitation of the proposals to encourage a VS lifestyle and to restrict and/or heavily tax advertising is that many governmental officials and corporations (and perhaps a good number of citizens) would argue that such policies and laws might dampen corporate profits and economic growth. Because the majority of the U.S. Gross National Product depends on consumer spending, and because consumption creates jobs for workers here and abroad, critics would worry that economic growth would falter if consumers were

encouraged to consume less and if the presence of advertising in our world was decreased.

Perhaps such criticisms are correct, but even so, let us recognize these criticisms for what they are, namely, reflections of the high importance placed on self-enhancing, materialistic values. Anytime a proposal to help the environment is met with criticisms that “it might interfere with economic growth” or “it might diminish corporate profits” or “it might create higher prices for consumers,” these counter-arguments must be seen as based in a set of values designed to maintain an economic system that strives to maximize corporate profit, economic growth, and high levels of consumption.

This economic system, of course, is capitalism. Like any system in any society, the smooth and efficient functioning of the capitalist economic system requires that the people living under it hold certain beliefs, act in certain ways, and support certain institutions that maintain the economic system (Kasser et al., 2007). For example, just as a religion needs its followers to believe in its tenets, to engage in the practices it prescribes, to attend its places of worship, and to listen to its ministers and priests, a capitalistic economic system also requires its followers to believe its tenets (i.e., economic growth, free market competition, and high levels of consumption are important), to engage in its practices (i.e., work long hours and consume a lot), to attend its places of worship (i.e., the mall and the couch in front of the television), and to listen to its leaders (i.e., the WTO, and the CEOs and politicians whose job it is to create economic growth and things to buy).

From my perspective, the particular form of liberal market corporate capitalism that has taken hold in the United States has succeeded in dominating our culture in part via the very pathways that research shows promote materialism. First, the worth of self-interested, materialistic values is propounded through multiple social models, including, for example, tax laws that create incentives to advertise, policies that allow for-profit companies to own most of the media airways (McChesney, 1997), laws that have given corporations rights associated with personhood (Kelly, 2003; Korten, 1995), international laws that elevate a corporation’s right to make a profit over the laws of a particular nation (Cavanagh, Welch, and Retallack, 2001; Mander, Barker, and Korten, 2001), and government policies that emphasize economic growth at most every turn.

American corporate capitalism also has features likely to engender the feelings of insecurity known to create materialistic values. For example, liberal market capitalism often undermines the extended family networks from which many people derive support, has increased levels of inequality around the world, and has created a competitive, winner-take-all mentality in which a few “winners” typically profit at the expense of a much larger group of “losers” (Kanner and Soule, 2004; Kasser et al., 2004). Add to these the fears that can come from worrying about losing one’s job and health insurance in a corporate takeover, losing one’s retirement fund in a stock-market downturn, or losing one’s habitat to global climate change, and we can see that the capitalist economic system is a model for promoting materialism.

One consequence of privileging the self-enhancing, materialistic values in liberal market capitalist economic systems is that aims associated with the self-transcendent, intrinsic values are likely to be undermined. Following on Kasser et al.’s (2007) review of theoretical, empirical, historical, and anecdotal evidence consistent with this claim, Schwartz (2007) examined how the values of citizens in 20 wealthy capitalistic nations were associated with a measure of the extent to which the institutions in those nations were oriented in a more liberal market fashion, e.g., the U.S. and the U.K., or in a more cooperative, strategic fashion, e.g., Germany and Austria (Hall and Gingerich, 2004). As predicted, citizens living under more liberal market economic organizations placed a higher value on self-enhancing aims (particularly achievement) and cared less about self-transcendent aims (particularly universalism). Such evidence powerfully suggests that the way a nation organizes its economic system bears important relations to the kinds of values its citizens hold.

Although it is no doubt daunting to confront the juggernaut of capitalism, these data and reflections suggest that doing so is ultimately necessary if we are to promote ecological sustainability (see also Speth, 2008). Although there are many directions and points of approach that could be discussed, at this juncture, I would like to discuss two that fall out from the ideas that I’ve been developing in this chapter.

The first concerns what some call the “re-localization” movement. Amongst environmentalists, local purchasing and local foods are often discussed as useful ways to reverse ecologically-damaging trends

toward globalization (Cavanagh and Mander, 2004; Helleiner, 2002), in part by reducing the distance products travel and therefore the amount of greenhouse gas emitted. Localization can also reduce the experience of “distancing” (Princen, 2002). Distancing occurs when people fail to see the environmentally degrading ways in which products are produced or thrown away because these acts occur outside of their community; the result, according to Princen, is that they often engage unknowingly in ecologically-degrading consumption.

I certainly agree that re-localization is useful for these reasons, but would like to suggest that re-localization also might have benefits in terms of affecting people’s values. First, localization is likely to promote feelings of security, for communities with more localized economies are less beholden to the dictates of corporate offices hundreds or thousands of miles away; as such, localized communities are better placed to have a bigger say in the economic decisions that affect them. Relatedly, when goods, particularly foodstuffs, are produced locally, communities and nations would seem to be less susceptible to the kinds of food shortages and increases in prices that caused food riots in Haiti, Bangladesh, Egypt, and elsewhere during the spring of 2008.

Second, re-localization naturally promotes the self-transcendent value of universalism and the intrinsic goal of community feeling. Myers (2007), for example, provides compelling case studies of businesspeople who were able to avoid the pressures and temptations to place profit at the forefront of their concerns, and who instead cared greatly about community concerns. All of these businessmen had grown up and lived their lives in the community where they now worked and employed others, and the fact of having “rubbed elbows” all their lives with members of the community must have encouraged the activation of these self-transcendent, intrinsic values (see also Whybrow, 2007). Although more empirical work is necessary to test these ideas, it seems that localization might build the “moral virtues” of community and neighborliness that Smith (1776/1976) believed were necessary to balance and contain the self-interested desires that he feared would otherwise run amok in highly competitive marketplaces.

A second approach worth pursuing involves the revision of national indicators of progress. Currently, the dominant indicators

used to demonstrate the success of a nation include how its stock market is doing, where consumer confidence is this month, and, primarily, the size of the Gross National Product of a nation. The problems with this definition of progress are many. First, they are primarily about materialistic values, and thus reinforce social norms that “what matters most is the economy.” Second, increases in GNP often translate into less social equality, as seen in the U.S., China, and elsewhere over the last decades; inequality, in turn, breeds the kinds of feelings of insecurity and invidious social comparison that research shows increase self-interested, materialistic values. Third, as is well-known, measures of GNP are calculations of all the economic activities that take place in a nation, including those directly in conflict with many self-transcendent, intrinsic values. To take an environmental example, a company may find that its profits are higher if it manufactures a product in a way that pollutes a nearby river than if it uses cleaner methods. If the pollution poisons the fish in the river, further increases in overall GNP may result when people get sick from eating fish in the river (i.e., hospital costs) and even if they die (i.e., funeral costs); the costs from needing to bring fish in from afar also could benefit GNP. If the company is eventually forced by the community to clean up the river and an environmental engineering firm is paid to do so, the GNP goes up further still.

In the recognition that GNP is a flawed measure of progress that is based solely on self-interested, materialistic values, a variety of alternative indicators have been proposed. These include Redefining Progress’ Genuine Progress Indicator, the country of Bhutan’s Gross National Happiness measures, and the new economic foundation’s Happy Planet Index. Others, like Diener and Seligman (2004) and Layard (2005) have suggested direct measurements of citizens’ subjective well-being. While each of these indicators has its own particular computational formulas and assumptions, common to them all is that materialistic aims are no longer privileged and other values (typically self-transcendent, intrinsic ones) are injected into the calculations. If nations were to adopt such measures alongside, or instead of GNP, and if such measures were then publicized with as much fervor as the Dow Jones Index and the GNP currently are, citizens and politicians alike might come to place less importance on self-enhancing, materialistic pursuits and instead care more about self-

transcendent, intrinsic values. Further, citizens might begin to insist that government officials begin developing policies and laws that maximize these alternative indicators. Ecological sustainability would likely improve with the adoption of such indicators because most of these alternative indicators shift damaging environmental behavior from the plus side to the minus side of national accounts, and because they also promote other aspects of self-transcendent, intrinsic values.

## CONCLUSION

I have suggested in this chapter that if we are to promote ecological sustainability, we must not focus solely on technological shifts and “buying green,” but instead must consider the kinds of values that people hold, for these values can either lead individuals and nations to act in ecologically-destructive or ecologically-sustainable ways. By approaching the ecological problem as a values problem, solid empirical research and psychological theorizing can be utilized in order to develop educational programs and policies that undermine the causes of the self-interested, materialistic values associated with ecological destruction. Further, a values-based approach can help in the formulation of programs and policies that promote the self-transcendent, intrinsic values and goals known to support ecologically-sustainable attitudes and behavior.

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# Reductionism and Its Cultural Fallout

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*To see the world in a grain of sand,  
and to see heaven in a wild flower,  
hold infinity in the palm of your hands,  
and eternity in an hour.*

– William Blake (date uncertain)

The focus of this chapter is on the Cartesian, reductionistic framing of science and technology and its relationship to the unsustainable state of the world. Modern consciousness rests substantially on concepts derived from this model of the world and the human mind. It influences our thinking processes and cultural activities, and it shapes our beliefs and individual and social values. If we are to replace the values and beliefs of modern consciousness in order to produce sustainability as a state of harmony with nature and humanity, we must begin to understand the forces that have created the present world-view and current unsustainable cultural practices. I do not claim to break substantially new philosophical or sociological ground here, but, rather, to sharpen the focus on those causal factors connected to our modern beliefs and norms that have retreated to the dark, hidden recesses of our modern culture. The story I will tell is rather disheartening. But the closing parts of this chapter point to sources for new beliefs and values that can anchor a transformative culture within which the possibility of sustainability can and may emerge.

The origin and refractoriness of unsustainability can be attributed to many causes, but two stand out as critical: the scientific mindset of modern cultures and the hegemony of technological and technocratic solutions to all individual and collective “problems.” I put problems in

quotes to indicate I am using it in a very general sense to include 1) normal, everyday interruptions to the flow of action; 2) perceptions that something is missing or needed; and 3) more onerous, persistent puzzles that occasionally stymie us. Since the time of Descartes and even back to the Greek era, we have viewed the world as having existence out there separate from the mind which stores and manipulates images of that external world. The basic existential model is a contemplative subject gazing on and thinking about an external, objective world. Our visions, images, reflections, and thoughts about this world form the foundation for what is frequently denoted as “objective reality:” objective in the sense of “objects” or things fixed in time and space, and also objective in the sense of pure or true representations of those things unfiltered through the subject’s misperceptions.

At the most general level, this view attempts to understand reality by separating the immediate perceived world into pieces, each of which can be described by fixed rules of behavior, whether the object at hand is part of the inanimate world or is a living organism. Our current practices are surprisingly close to those of René Descartes, who proposed them in 1637. Descartes was “. . . seeking the true method for arriving at the knowledge of everything of which my mind would be capable.” Two of his four methodological axioms are, “The second, to divide each of the difficulties I would examine into as many parts as possible and as was required in order better to resolve them. The third, to conduct my thoughts in an orderly fashion, by commencing with those objects that are simplest and easiest to know, in order to ascend little by little, as by degrees, to the knowledge of the most composite things, and by supposing an order even among those things that do not naturally precede one another”(Descartes, 1637).

The consequences of adopting this way of discovering how the world works are profound. Out of Descartes’ musings come many of the beliefs and norms that drive action in modern cultures such as that of the United States. We can point to those particular characteristics that have an immediate and obvious connection to the present state of the world (this list of reductionist-related notions is derived, in part, from Gladwin, Newbury, and Reiskin, 1997). The first is that the world is considered to be a mechanical system, composed of many interacting, but separable parts. Further, we can

understand the whole system when we understand each of the pieces. Understanding can be expressed in mathematical terms or, if not so reducible, represented by nomological (law-like) statements.

The Cartesian model is predicated on an autonomous, thinking *subject* looking out at the world as an assemblage of *objects*. The scientific method that follows from this relationship places the observer apart from and outside of the system examined. Further, with roots going deep into history to Plato and the Eleatic school, the reality that is revealed by the method is timeless and acontextual; it exists outside of our mental processes and the place from which we observe. With this system in play, we eventually have come to see ourselves as disconnected from the natural world – as a separate and distinctive part of the planetary world. The method alone, apart from any other basis for placing humans apart from other species, creates anthropocentrism, putting us at the center of everything, much like pre-Galilean astronomers who placed the Earth at the center of the cosmos.

The material reality of objects in the world becomes attributed to “objects” of human construction such as beauty, love, sustainability, or health – all of which and other similar concepts are among the most important ends of human strivings. As I note below, the apparent materiality appears to us as something we can acquire and have. The absolute, unquestionable sense of this form of reality produces authoritarianism and domination. Humberto Maturana, whom I refer to further below, has argued that our reductionist, Cartesian view of reality is the most central question facing humanity. He argues that in the system of objective reality, “a claim of knowledge is a demand for obedience” (Maturana, 1988).

When focused on human beings, reductionism transmutes into individualism. Each human being becomes an atom embedded in a culture, but acting independently. Quantitative thinking dominates our analytic processes. Given the success of this framework in explaining so much, coupled perhaps with arrogance or hubris, we believe we can predict the future, that is, how the parts and large assemblies of these parts will behave over time, although often only within some (statistical) range. We say that the world is determinate.

Another consequence of Cartesian reductionism is the dominant economic view of humans as a bundle of insatiable needs operating a maximization calculus on a “computer” in the mind – another

manifestation of determinacy. Economists gloss over the source of these needs and invoke a mystical criterion – preference or utility. The notion of isolated economic agents whose values (utilities) are unchanged by the very transactional relationships they enter into can be traced back to Descartes’ model of self: autonomous and acontextual (placeless, timeless, isolated). The reductionist scientific method is inadequate and imperfect when we try to understand ourselves. It is ironic that neoclassical economics, the most “scientific” of humanist fields, rests on an unscientific foundation.

Mainstream economists have been criticized as suffering from the fallacy of misplaced concreteness. Closely related to reductionism, this fallacy involves the assumption that an abstraction derived from worldly observations is the same as the reality, leading thinkers to misplaced conclusions about the real world. The centrality of the fundamental abstraction, *Homo economicus*, of neoclassical economics, coupled with the hegemony of economics in the world of normative policy making, has produced a culture driven by consumption and largely unconscious of the critical role of nature as a life support system (Daly and Cobb, 1994).

But the poverty of this model of human Being has not gone unnoticed (I use upper case, Being, to distinguish the existential sense of what it is to be human from beings as things that we perceive in general. The eminent psychoanalyst Erich Fromm wrote almost 30 years ago in *To Have or To Be* that, “The first crucial step toward [a healthy economy] is that production shall be directed for the sake of ‘sane consumption’” (Fromm, 1976). Fromm comes to this notion from his psychological/therapist roots by observing the possibility of two modes of human existence – being and having – and claims that the “having” paradigm now dominating modern cultures has turned pathological. Only a shift to an alternate mode, “being,” can save both the human species and the natural world in which we live. Fromm says that, “having and being are two fundamental modes of experience, the respective strengths of which determine the differences between the characters of individuals and the various types of social structures.” At the extreme, the relationship of humans to each other and to the surrounding world collapses into a pathological equality, “*I am = what I have and what I consume*” (emphasis in the original).

Having is consistent with the economic, rational, that is, computer in the mind, model of what it is to be human. This mode is all about the need for objects that produce satisfaction but without any idea of what constitutes satisfaction. Values are reduced to a monetary or equivalent scale. Behavior, such as altruism, is explained by arguing that the actor values helping another in the moment more highly than any other choice available at the time. Other human beings become just another object to be assessed and selected on the basis of utility. One's self-worth is tied to what one owns. Roy de Souza, founder of the web site Zebo.com, which collects and displays lists of everyday possessions owned by mostly young users, told the *New York Times*, "For the youth, you are what you own." He notes further, "They list these things because it defines them" (Rosenbloom, 2006).

The last feature springing from reductionism that is relevant to the theme of sustainability, or better, to the origins of unsustainability, is the reliance on technology considered as the tools we use everyday to satisfy our needs. Modern technology can be thought of as scientific understanding embodied in artifacts. We also see evidence of our confidence in science in the predominance of technocratic processes that underlie the rules that shape cultural behavior. Policies are based on the technical knowledge of experts trained in discrete disciplines, that is, fields focused on discrete areas of human behavior, each built upon its own set of "scientific principles." Even philosophy for a while sought to discover a scientific and analytically-grounded set of moral principles, although this pursuit has been largely abandoned.

Francis Bacon, who lived about the same time as Descartes, saw the possibility of putting this newly discovered knowledge to work in the service of God and human beings – perfecting the species in the face of the rigors of the harsh world in which they lived. He invented the idea of scientific induction – reducing observations to the laws I spoke of above. Bacon saw this kind of knowledge, obtained through scientific thinking, as power, especially when transformed into new kinds of mechanical artifacts, things we now classify as technology. When put to work, knowledge would drive history in a progressive direction, a teleological future that would be ever and ever better than the present. With the enlightenment brought about by scientific understanding would come a better world. Our still-standing



optimistic stance about technological innovation springs from seeds planted some 350 years ago.

There is little question that science and technology have greatly improved the lot of our human species since Descartes' and Bacon's time, but not without the accumulation of undesired, unintended consequences. This book is focused on a positive theme – creating a society in harmony with nature – but has shown up at this moment out of deep-seated concerns that the present disharmonious world cannot continue to support life on the planet as it has for ages. The continuing unfolding of humanity foreseen by Bacon and others that created the notion of The Enlightenment is threatened by the very way of life they foresaw.

### **THE PERSISTENCE OF UNSUSTAINABILITY**

One of the features of (computer) technology I find useful is the ability to scan the world of data and glean every bit of information about selected subjects virtually the moment that they appear in cyberspace. I get daily notices of items mentioning “sustainability,” “sustainable development,” and a few other related terms. Without keeping an accurate scientific count of all this, I sense a big uptick in concern over global warming and a cornucopia of promises, mostly from businesses, to do something about it. At the same time, I perceive a lower level of concern about corporate social responsibility, accompanied by much less talk about why action is needed. The difference has a lot to do with the dominance of positive scientific methodologies over the social sciences.

It also has much to do with the place of self-interest in our society. Worries about the impact of climate change, only one symptom of the increasing environmental unsustainability of the planet, are largely rooted in personal fears that the planet will lose its capability to keep me healthy (and wealthy). But when it comes to thinking about the current state of people that are neither healthy or wealthy somehow the concerns fade substantially. Our culture has become very self-centered, but around a self that is existentially defined by a drive toward having and consuming.

Ecoefficiency and corporate social responsibility (CSR), the two principal strategies currently in vogue to deal with the ever more

obvious unsustainability of the planet and the state of human beings, are fundamentally remedial – trying to fix problems that have arisen out of the ordinary activities characteristic of our modern, technologically-based culture. Largely unspoken, the theory in this framing is that if we can reduce or remedy the bad symptoms by technological fixes (ecoefficiency) or technocratic solutions (CSR), the problematic situation will eventually disappear or become “manageable.” This approach itself is a fundamental feature of modern ways of thinking and action. For the past three or four centuries, modern science and technology have produced solutions to most of the problems confronting Western societies. It does not take much to guess what happens next. Systems dynamics has developed archetypes that describe this and other common behaviors.

The original problem frequently reoccurs. New problems related to the choice of solution can also appear. These so-called “side-effects” can grow, eventually surpassing the original problem being addressed. Side-effects is a misnomer because such outcomes are as much a response to the solutions being applied as are the intended results. Unintended consequences is a more accurate way of talking about these outcomes. Unsustainability is one of these unintended consequences. Driving our cars to work or elsewhere is the answer to the need for mobility in a modern urban setting, but at the same time it dumps lots of carbon dioxide and other pollutants into the atmosphere leading to unsustainable conditions. We can and do try to reduce such undesired results by building hybrids and raising CAFE (corporate average fleet economy) standards.

These and related efforts can reduce the immediate burden on the Earth and perhaps stop or reverse the pathological consequences, but are not real solutions. Sooner or later, growth in consumption, exacerbated by the rapidly growing economies of China, India, and elsewhere, will overtake the gains made by the more eco-efficient technologies. Efficiency measures the ratio of output to input. Any immediate improvements in output and its impacts will be lost to increases in input, that is, some measure of consumption or economic activity. Such is the case with auto emission standards in the United States, where the great gains in efficiency since the 1970s have been neutralized by the immense increase in vehicle miles driven each year.

Eco-efficient technology cannot begin to remedy the loss of habitat and natural resources now occurring at an accelerated pace as the world becomes more affluent and high levels of consumption are becoming a global feature. Technology cannot replace the natural processes that drive ecosystems.

With each apparently successful technological innovation, attention is drawn further and further away from the fundamental or root causes of the symptoms that raised concerns in the first place. The systems dynamics archetype for this pattern is called “shifting-the-burden,” meaning that those seeking to solve the problem move farther and farther away from discovering the path to uncovering the real causes and applying a fundamental remedy. This archetype can even become pathological, in which case it is called addiction if the “solution” produces new problems that transcend the old ones. Alcoholism is an epitome of this behavioral pattern. Alcohol consumption, which at first seems to make the unwanted symptoms, stress, for example, disappear begins to destroy the body and replaces the original symptoms as a new and more difficult problem to address.

To get out of this frustrating and ultimately futile pattern, we must expose and examine the root causes producing the unintended consequences. I believe that it is essential to uncover these roots if we are, first, to break out of the increasingly unsuccessful attempts to rid ourselves of unsustainability and, second, to be able to design new cultural and artifactual forms that begin to produce what I define below as sustainability. My critique rests on two main stems:

- The inadequacy of reductionism. Reductionism works well for many phenomena we observe and capture inside of our technology. But the world at large is technically complex and cannot be understood fully by applying reductionist methods. Indeed, such methods are leading us to the brink. Unsustainability is one consequence of this limitation. We keep applying Band-Aids to the superficial wounds, but fail to treat the system in the whole. Both new and old problems keep cropping up. The basic meaning of the word, sustainability, is the likelihood that a system will produce normatively desirable outcomes continually over time. Sustainability by itself tells you nothing about what is to be produced. It's a meta-property of a system. To have meaning for the actors concerned, that is, the stakeholders, some

specific set of outputs must be designated. With this preface, it is meaningless to talk about sustainability without specifying what is to be sustained. Even without a positive vision, unsustainability is likely to grow simply because we lack understanding of the whole system.

- The basic notion that animate things, even humans, are machines in the sense that their behavior can be reduced to the same kinds of laws that describe inanimate phenomena, like the way an apple falls from a tree. The notion of mystery and spirit suffer as a secondary result. Philosophers and theologians have proclaimed that God is dead. Max Weber wrote, “The fate of our times is characterized by rationalization and intellectualization and, above all, by the disenchantment of the world” (Weber, 1919). Cultural values, as I will show below, have come to reflect the lifeless, mechanistic implications of this world-view. Victor Frankl, in an essay on “Reductionism and Nihilism,” wrote, “Reductionism is more than just saying time and again that something is nothing but something else. It is an approach and procedure that deprives the human phenomena of their very humanness by reducing a human phenomenon in dynamic terms to some sub-human phenomenon, or deducing human phenomena, in genetic terms, from sub-human phenomena (Frankl, 1969).

Where reductionist science shapes our belief structure about the world, technology shapes our set of normal behavior patterns – those activities that an observer looking down on our culture would call routine. Beliefs and norms are two parts of the structure that creates the persistence of societal (or cultural) behavior. In the sociology of Anthony Giddens, these two categories, plus the distribution of power and the instrumental means (resources) available to the actors, circumscribe the activities within a society (Giddens, 1984). An observer looking down at a modern culture would see that the resources applied to produce results are virtually always technological or technocratic, embodying some set of scientific principles. The Internet is the source of relationships, although with largely unsatisfying results. Self-help books hold the answers to all life’s problems. This ubiquitousness of technology was epitomized in an advertisement I saw in the newspaper for a new personal game device, the Nintendo DS (Philadelphia

Inquirer, 2006). Picture two men waiting in a bus kiosk. One is slouched in a corner of the kiosk displaying what appears to be a frown or other unhappy look, simply gazing out at the world. The other, sitting upright with a smile on his face, is playing with his game. The text above the two reads, “The average wait for a city bus is 12.8 minutes. Do something with your nothing.” The implication seems clear. Any time taken merely to capture the world around oneself or to reflect for a moment is time wasted.

Part of the dominance of technological “solutions” goes back to Descartes and the notion that our species stands outside of nature. We are tinkerers reaching into our bag of technological tricks to solve all the problems within that external world. Every problem that shows up “in the world” is just another normal problem to be understood via science and fixed via technology. And as we follow this line of thinking and acting, this norm, that is, those technological strategies become more and more deeply embedded in our individual and collective memories.

Over the centuries since Descartes, Bacon, Newton, and others founded the Enlightenment with these ways of thinking and acting, the technological way of acting has created a mindset that the world is little more than a huge toolbox where all things out there are only potential instruments for getting our jobs done. Whatever value things have just being what they are has largely faded away. The environment is there only to provide services. Indeed that is partly true. The environment has extraordinary value expressed in normal economic terms (Daily, 1997). But its value to sustainability is priceless. We are at home in the world in much more than any instrumental or economic sense. Heidegger spoke of this reductionist view of the world as “enframing” and termed everything out there as merely “standing reserve” (Heidegger, 1977).

## **MOVING TOWARD A NEW CONSCIOUSNESS**

*Happiness is the absence of the striving for happiness.*  
– Zhuang Zhou

Living in harmony with nature and other human beings cannot replace the present unsustainable ways unless and until our current

basic cultural drivers are themselves replaced by a different set of beliefs and values. Einstein recognized the impossibility of bootstrapping ourselves out of intractable problems when he said we cannot solve our problems by using the same way of thinking [and acting] that got us there. Cultures are fundamentally conservative. Social activities are driven by structure deeply buried in the collective “consciousness,” which structure is reinforced by the very activities it produces (Giddens, 1984). Imprecations to change can be effective, but only rarely and then only in the face of a palpable threat. Victor Hugo’s famous reference to an idea whose time has come is true only in the context of a “time” when the society is ready to listen to and accept it. The modern world is still largely blind to the trajectory it is on and deaf to alternatives. But change is possible, albeit slowly.

Changing the modern set of beliefs and norms/values can be driven, first, by adopting a new vision of what we mean by sustainability beyond the formulaic standard definition of sustainable development. Then we have to find new sources of inspiration for beliefs and norms beyond those created by reductionism. After introducing such a new definition, I will argue that these new sources, at least in the sense that they exist outside of the normal conversation stream in our culture, start with one based on complexity and a holistic framework to replace the determinate, mechanistic model of the world. Second, as an alternative to the economic, psychologistic view of human Being as striving for happiness through a materialistic drive, I draw from the existential philosophy of Heidegger and others, which offers us a possibility to think of our “selves” fundamentally differently from the Cartesian ways.

Even as the world turns to what goes by sustainability in the press, corporate statements, and political speech, there is no vision of what the goal is other than to do less harm while producing more. The basic definition of sustainable development, popularized in the UN report, *Our Common Future*, the so-called Brundtland Report (1987), that “sustainable development is a form of development . . .” has no hint of a world fundamentally different from today. Indeed it rests on a modification, not transformation, of today’s basic market-oriented, technological, problem-solving mode of individual and collective action. There is nothing here than might invoke a new image of what sustainability is all about. Is it merely the absence of unsustainability?

Is health merely the absence of disease or peace merely the absence of war? I do not believe so. Without some positive vision of the future, remedial strategies – the essence of sustainable development – are bound to fail in the long run.

To recover the full meaning of sustainability, a radical stance is critical. I have developed and offer this distinctive definition of sustainability: *the possibility that human and other life will flourish on the planet forever* (Ehrenfeld, 2008). Possibility has no material existence in the world of the present; it is always only a word. But it is, perhaps, the most powerful word in our language because it enables humans to visualize and strive for a future that neither is available in the present nor may have existed in the past. It means bringing forth from nothingness something we desire to become present. Possibility is like a time warp, allowing one to escape from the limits of our past experience into an alternate future, unshackled from our flawed current concept of future. The modern way of thinking about time leads us to believe that we can create it like the next frame in a motion picture.

When one holds the idea of possibility as I have described it, future is a different concept. Future in this mode of living is a story of what one would want based on what has yet to be satisfied. Ortega y Gasset said, “Life is a series of collisions with the future; it is not the sum of what we have been, but what we yearn to be.” Flourishing is the key to a vision of a sustainable future, not the reified, meaningless, but hegemonic, economic notion of welfare. Flourishing does not collapse into a thing or numerical measure of well-being to be managed.

For living species other than humans, flourishing is about survival and maintenance of their species. But flourishing means more to human beings. Human flourishing goes beyond our sense of belonging to and thriving in the natural world. It also involves the attainment of a few very special qualities, for example, dignity, that have come to be recognized as constituting our species as different from these other life forms.

Adding “forever” to this definition lends it the timelessness that is found in virtually all conversations about sustainability. Sustainable development is based on the idea that our generation’s use of the resources left to us by our forebears will not compromise the ability

of future generations to meet their needs. Sustainability makes little sense except as an everlasting condition.

## **SOURCES OF INSPIRATION**

Models serve as sources of inspiration for new ideas and ways to address the concerns that confront us every day. Two such models are available as sources of an alternate set of beliefs and values. One, using the evolving understanding of complexity, is outward looking and encompasses systems of the natural world, even including humans within the system. It is important to distinguish complex from complicated. Complicated belongs to the reductionist world and describes a system of so many interacting pieces that it becomes difficult to do as Descartes would have done – unscramble the system in order to understand the behavior of all of the parts. The other model describing the unique human existence as Being looks inward.

First, let us examine complexity and see how far it can take us along the road to a new consciousness. Complex systems are assemblages of interrelated parts that cannot be described by the kinds of analytic rules that reductionistic thinking produces. Patterns of behavior inhere in the relationships of the parts, not the parts per se. The philosophical and methodological implications of complexity turn Cartesian reductionism on its head. The whole in complex systems is truly greater than the sum of the parts. Interesting properties emerge from these systems.

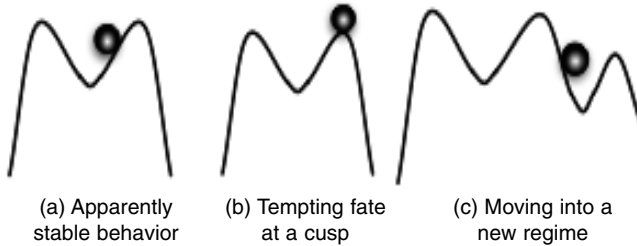
Consciousness and even life itself can be considered such an emergent property. Beauty is another example. A masterpiece like the Mona Lisa is complex in the sense that its beauty emerges from the whole painting. Da Vinci could hardly have produced the impact it has by painting-by-the-numbers. Sustainability as flourishing is such a property. The whole system needs to be working for flourishing to emerge. Conversely, unsustainability can be related to separate dysfunctional parts of the systems. Apply a Band-Aid here and there and everything will be all right.

Natural ecosystems, with or without the presence of humans, are complex in this sense (for further reading see Gunderson and Holling, 2002). Further, they are adaptive complex systems and maintain their viability by adjusting to changes coming from inside or



out. Complex living systems operate in regions of stability depicted as the valleys in Figure 1. Powered by energy coming into the system, the state rests somewhere within the valley but away from the bottom equilibrium point. Changes in the system move the state around and may even move it to a cusp (part b) from which it may return or may flip into a whole new region of behaviors (part c). Equilibrium, so important in classic ecology, chemical thermodynamics, or neoclassic economics, corresponds to stasis and death in living systems. Forests are an example worth looking at because understanding of how forests work and how we can manage them has shifted from a reductionistic model to a complexity model. Without developing the technical aspects of the complexity model, it is possible to point to several critical characteristics that can replace parallel notions in the reductionistic world-view.

**Figure 1 Behavior in complex systems**



To understand living systems like a forest, and by extrapolation human societies, which after all are also a type of ecosystem, one must abandon the reductionistic way of thinking. These systems make sense only when viewed as a holistic, organic, interdependent entity inexplicable as a mere collection of parts. It is a community, not simply a collection of individuals. Properties, like flourishing, emerge from the workings of the whole system but their trajectories cannot be predicted. It is not that the time-dependent behavior is subject to probabilistic uncertainty, the future states of complex systems cannot be predicted at all. They are indeterminate, that is, analytic laws cannot be developed that describe patterns of behavior. This should not be taken as a negation of governance systems. We do manage our natural resources, but increasingly rely on local, learned knowledge rather than some abstracted theory. In spite of the learning in this

domain, we still largely believe that we can manage our human societies by relying on technocratic theories as espoused by experts. Each of the characteristics named in this paragraph opposes one mentioned earlier as part of the dominant modern world-view (see Table 1). The last entry, biocentric, reflects a holistic view of our place in the universe: somewhere within a living system, but not at the center.

**Table 1 Unsustainability and sustainability concepts**

Unsustainability Ideas	Sustainability Ideas
Reductionistic	Holistic
Mechanical	Organic
Independent	Interdependent
Quantitative	Qualitative
Individualistic	Communitarian
Determinacy	Indeterminacy
Complicated	Complex
Anthropocentric	Biocentric

It should not take much effort to see that a world that runs with the second column of beliefs is consistent with the notion of sustainability as flourishing. Indeed the etymology of flourish derives from flower. These terms form a mindset that translates perceived phenomena into a meaningful world, one in which we act individually and collectively as a culture. The second set would certainly change the way we behave in that world. Precaution, grounded by the complex world model, not as a mere moral stance, would replace hubris as a criterion for acting in cases where the outcome is unpredictable. The imperfection of quantitative measures of human well-being such as GDP and wealth would give way to measures of our state and progress in holistic, qualitative terms.

Looking at the world through the lens of complexity leads us to a vastly different set of values and beliefs, but still overlooks a sense of who we are as human beings. We are certainly part of the complex world. But we are unique at the same time. We create meaning for ourselves and the world through our wonderful gift of language. Fromm carefully distinguishes the reductionist mode of Having from a richer organic mode of Being in which we exhibit, “aliveness and authentic relatedness to the world (Fromm, 1976).” Abraham Maslow,

who developed the notion of a hierarchy of needs, turned in his later works to a more positive description of Being. He saw Being as accompanied by some or all of the following list of characteristics: wholeness, perfection, completion, justice, aliveness, richness, simplicity, beauty, goodness, uniqueness, effortless, playfulness, truth/honesty, and self-sufficiency (Maslow, 1998). Taken together, this list connotes what human flourishing is all about.

The German philosopher Martin Heidegger spent his whole career asking what it is to be human, taking on Descartes directly. The central notions that drive his model of human Being are almost perfectly opposed to the reductionist model described so far. Heidegger believed that humans become what they are by immersion in the world, not in isolation from it. He argued that we are thrown into the world from the beginning and acquire our understanding of that world and how to live in it through our individual, historic experience. Whereas the reductionist view of human Being argues we are independent, autonomous subjects mysteriously formed at birth, Heidegger and many others argue that our “selves” are formed by our experience in the world, embodying competence in living through our interactions with others.

This “intersubjective” model was first created by Heidegger’s early teacher, Edmund Husserl (Fullbrook, 2004). I mentioned earlier that part of the persistence of unsustainability could be attributed to our self interest, but the self in that statement was the reductionist (insatiable need-driven) self of *Homo economicus*. The key feature of the intersubjective or “socially-constructed self” is that it reflects cultural values and norms. If those change, so can the self. Moreover, this model affords choice to the individual to shape the self within the vast cultural milieu. Fromm’s argument could be restated to say that we no longer exercise this choice and simply ride on top of the consumerist (having) wave so dominant of our and other modern cultures.

The most basic feature of Heidegger’s ontology is the idea of caring. Our humanness rests on caring. We are the only species that ever asks (cares about) what it means to be. Our language arose in the course of taking care (acting) within three (and only three) practical categories: ourselves, other humans, and everything else. Our caring is manifest through the actions we take in these three categories.

Caring is all about acting within relationships with others and the world. We also relate to ourselves in the way we care for our bodies. Being human is not something inherent in our species as in the reductionist model. It shows up through the care we take. If we lose that and become obsessed with our possessions and define ourselves accordingly, our neglect will surely produce many of the symptoms of unsustainability that plague us.

The absence of spirit in modern times is a critical factor in the sad state of the world and we need to bring it back into our cultural milieu. With a renewed consciousness of the spiritual would come new values or perhaps a resurgence of old values that would shift the present self-centered model of humanity and transform the important cultural consequences to behaviors that are based on care instead of need. The restoration of a sense of being that rests on values coming from the spiritual is critical to creating sustainability. Sustainability is a distinction perhaps as old as humanity and the emergence of human cultures. It springs from reflection on the awareness of the passage of time and consciousness of the mystery of birth and death. It undoubtedly has formed the cultural basis for the emergence of magic and religion, which serve both to illuminate sustainability and seek it as part of one's living experience. In our modern view of reality, the separation of mind from world hollows out the meaning of sustainability. But it will take more than a recovery of spirituality to reverse the present situation. We need more than care for the mysteries of life. We need to recover the care for ourselves, others, and the world that make us the human beings we are.

The reductionist model of humans leads us to a *need-for-things*. The caring model leads us to a *need-to-do-things*. Although both speak of "need," the difference is profound. This philosophical, ontological concept of caring shows up in our worldly practices as a set of concerns that form our "intentions." The complexity model of the world leads metaphorically to an alternative set of beliefs and norms to replace the modern, reductionist set (Table 1). What can we similarly derive by replacing the reductionist model of a human being with one based on the intersubjective model?

The primary change would be a recognition of the importance of relationships, and the realization that the self is, like sustainability itself, an emergent property of the cultural system inside of which one makes

his or her home in the world. Taking care means taking responsibility as well. I noted earlier that care can be characterized by referring to only three categories. Taking care of the world and others translates into flourishing for the self as well. Only with such a realization and consequent action is sustainability likely to present itself.

Undoing the reductionist mind set is no easy task, however. After considering several potential routes to transformation (Ehrenfeld, 2008), I settled on a subversive strategy based on encoding ethical and identity-producing messages in the everyday devices we all use. Industrial designers are learning to produce such behavior-steering tools (Jelsma, 2000). One example is the so-called two-button toilet, equipped with a smaller and a larger flushing button or lever. The user must make a conscious choice, reflecting on the impact on the environment and on his or her role being acted out at that moment. Such devices can improve our ability to reflect and learn to see the world through a non-reductionist, Being set of filters. The process of embodying new beliefs and norms and, consequently, different behavioral patterns always begins with some sort of reflective moment coming only after an interruption in the flow of action. Ultimately we would begin to act out of the second column of cultural drivers in Table 1. The disenchantment Weber speaks of might disappear and be replaced with a renewed appreciation of spiritual and natural values. But calls for such renewal even by powerful voices like Thomas Berry and others need to be complemented by more basic shifts in the cultural consciousness. It will be a long process.

New values can be introduced into the social milieu as well as that of the individual actor by replacing current practices with new ones that embody, just as does the equipment mentioned above, values coming from the second column in Table 1. The Precautionary Principle, formally embedded in directives of the European Community, is consistent with the complexity model of the world, and teaches us not to expect our actions to turn out the way we think a priori. It replaces the moral basis for this policy framework with a “scientific” rationale. The principle argues simply that we should not enter into new practices that carry any hint of serious potential consequences until we are confident, beyond the claims of reductionist scientific proof, that they will not cause harm. Current

doctrine in the United States is just the opposite.

Related to this are two other practices that would reflect the unpredictability of complex systems. Adaptive management of natural resources is slowly replacing deterministic systems that presume we can predict the outcomes of our schemes. Rather, these systems of governance (“management” of complex systems is a bit of an oxymoron) rely on continuous learning from small steps and on local knowledge rather than exclusively on expert judgment. Although less common in practice, similar approaches could be applied to socio-economic systems in place of current largely technocratic frameworks dominated by economics. Accepting that accidents in complex systems cannot be traced to any single actor or technical cause (Perrow, 1984), remedies could shift from the present tort system, based on the presumption that such a unitary cause can be found, to some sort of publicly-owned system. Such a shift would require some form of public acceptance of the system in question because the public would ultimately be responsible for remedying the consequences of accidents and other unintended consequences.

The substitution of equity or fairness for efficiency or other “standard” neoclassical economics macro-indicators as economic criteria would shift the underlying conceptual framework, driving social policy and subsequent cultural structuring towards the second column. The Harvard economist Steven Marglin has argued that the basic premises that drive neoclassical economics and motivate practicing economists have destroyed the cultural sense of community, and with this move, the real place of community in modern life (Marglin, 2008). Marglin’s arguments rest on a critique of four pillars of standard economics:

1. The self-interested individual (*homo economicus*). The self (actor) springs into being with a completed set of preferences with no connection to the actor’s social context.
2. The reductionist epistemology. Its formalism devalues learning (knowledge) coming from experience within a community.
3. The pursuit of insatiable, unlimited ends (needs) via scarce means. Health care, for example, become quantified and commodified.

4. The artificiality of the nation state as the only legitimate “community.” This belief diminishes the place and role of any other real community.

## **CONCLUSION**

Let me end with a short discussion of a critical, but largely misconstrued, feature of human Being, love. Love, in our objective world, has become something we get, have, possess. For a discussion of love that is consistent with the non-reductionist, intersubjective model of Being, I turn again to the work of Humberto Maturana, a Chilean biologist who has developed a theory of life and cognition that follows some of the same lines as the self-organizing principle of complex theory. Maturana argues that living systems are autopoietic, meaning self-reproducing. Further, he claims that life is sustained by altering the structure of an organism coherently with the changing conditions in its environment. As long as the coherence can be maintained, the autopoietic process can continue, but if the organism loses coherence, it dies as it loses structural integrity. In this model, life itself is an emergent property of a living complex system. As organisms evolve toward more and more complex structures, culminating with the human species, consciousness itself emerges as a system property. This model has profound implications for our modern way of thinking. He argues that our Cartesian model of transcendent reality is fundamentally dominating, as those who make claims of knowledge are demanding obedience and privilege from the listeners at the same time, hardly the way to sustainability in human terms (Maturana and Varela, 1988).

And finally, in his later work, Maturana has developed his theories to incorporate emotion as a fundamental mode of human behavior, with love and caring as the most basic emotional context for social life (Maturana and Bunnell, 1999). In his theory, love is not some thing that is present or not or some thing one possesses, but is a biological phenomenon resulting from the evolution of our species as social beings always relating to others. Love emerges as the acceptance of others as legitimate without qualifications and shows itself accordingly through caring behaviors. Maturana argues that love is so fundamental to human beings that when it is absent, we become sick.

In a world where love has become a mere thing to be acquired, even through the Internet, it is no wonder that flourishing, and thereby, sustainability, is so distant and unapproachable.

Love, defined in Maturana's way, and respect are mirror images. And respect emerges only in a community of shared values, one of which is caring. The apparent circularity here may appear confounding, but makes sense if one adopts the holistic, complexity view of the world. Relationships between and among individuals are merely holons, that is, parts that behave like the whole, nested in a larger system. When the larger system operates on a set of values and beliefs promoting harmony and caring, the enacted behaviors of individuals exhibit these properties. Sustainability can arise in the playing out of everyday activities.

We are far from this kind of world as this chapter has pointed out, but the same biological system that is now being stressed is also our strength and hope for the future. I close with a quote taken from a discussion of Maturana's work that says what I want to in words that are far more expressive than any I could muster (Fell and Russell, 1994).

"The constitutive nature of our biological process of living together is also our great possibility for the future because we all have the natural ability to participate with others in consensual domains (an attribute which Maturana calls intelligence). By the laborious, but rewarding, bootstrap process of our cognition, we will continue our structural dance together and make a history for human society, which will be synthetically determined, but analytically indeterminable. We cannot know what the future holds, but we can know that everything we do (or say) contributes significantly to it. This awesome responsibility is what we regard as the biological basis of our human ethics."

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June 2009, the International Society for Industrial Ecology awarded him its Society Prize. In October 1999, the World Resources Institute honored him with a lifetime achievement award. He received the Founders Award for Distinguished Service from the Academy of Management's Organization and Natural Environment Division in August 2000. He holds a B.S. and Sc. D. in Chemical Engineering from MIT, and is author or co-author of over 200 papers, and other publications.

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## Toward a New Relationship

*Peter Forbes*

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*As I went walking, I saw a sign there  
On the sign it said 'no trespassing'  
But on the other side it didn't say nothing  
That side was made for you and me.*

– Woody Guthrie, 1940

Greg Brown took aim, slowed his breath, and gently squeezed the trigger. It was clear, 42 degrees, light wind, a fine morning in October to be in Glacier Bay. The shot hit the seal in the back of the head, forcing its mouth shut instantly, keeping it from taking in water and sinking in the deep waters around Garforth Island. The preferred weapon for hunting seals is the .22 Hornet because it's light, accurate and can humanely kill a relatively small mammal, but Greg and his uncle were not there for sport. They were there to take a seal and to bring it back to Hoonah, a Tlingit community outside of the park, for a potlatch ceremony honoring Greg's cousin who had died. Greg, whose Tlingit name is Shaaa-yakw-nook, was doing in 1992 exactly what his ancestors had done since time immemorial, gathering seal, eggs, and berries from a land so critical to their survival that they called it their Ice-box (Goldschmidt and Haas, 1998).

John Muir was the first publicist of Glacier Bay, arriving there by canoe with a Presbyterian minister in 1879. Muir was awed by the vast forces at work in this sweeping landscape of mountain, glacier and water. Being in Glacier Bay made Muir feel fully alive, and he translated his experiences in a series of popular articles sent in installments to the *San Francisco Bulletin* even before he got back to California. Muir's writing led directly to the creation of Glacier Bay National Monument in 1925 and helped to establish the dominant theme of the early conservation movement: keep safe what you find valuable by removing people and other species that may threaten it. We have a large and inspiring national park system because of these

first efforts at forming a practice of conservation. No one, tourist or Tlingit, isn't grateful that Glacier Bay remains today a largely healthy and whole ecosystem. Muir had a powerful vision that served nature well, but his vision was incomplete: he saw the landscape and not the people.

On that first trip to Glacier Bay 125 years ago, as the story goes, Muir purposefully rocked the canoe so that his Tlingit guide would be unable to shoot and harvest a deer. Muir wrote this account to make clear his values, but today it seems a sad parable of two people unable to hear each other's stories about their different ways of being in relationship with a place they both needed and loved.

Greg Brown was arrested later that morning in 1992. His rifle and the hair seal were confiscated by park rangers and he was ordered to appear before a federal magistrate in Juneau on charges of taking a seal in a national park. The Hoonah Tribal Council quickly came to Brown's defense saying, "We were made criminals for our food."

## §

This is not an essay about hunting, nor about the management of our national parks, but about the essential purpose of conservation today, which is to understand the role of land, and our relationship to it, in creating a culture of care and attention in our country. To heal the land, as well as be healed by it, requires of all of us a deeper self-awareness and a willingness to honestly ask these questions: Is our current relationship to this place healthy? What about this land, and our relationship to it, might teach us about how to live differently today? Who do we allow – and not allow – to experience this land and why?

With a growing human population and appetite felt everywhere on this planet, it is now no longer possible to protect land and nature *from* people. No property boundary will survive a suffering, greedy humanity. Today's conservationists speak of protecting land through "landscape-scale conservation" but how do these bigger approaches "save" land from climate change or acid rain or a public that simply no longer cares? And when the human response to a park or wildlife refuge is to develop all the land around the "protected" land, what have we achieved? To be meaningful and enduring, the work of conservation must seek more than working on a larger scale or with tougher legal statutes; it must seek to engage the hearts, minds, and

everyday choices of diverse people. The massive, vital work of conservation today is to re-weave this still spectacular landscape with the human experience, relating land to everyday human choice and life.

Conservationists have been enormously successful in protecting land, marshalling the money and skills to purchase more than 14 million acres of land across America in the last decade, but Americans are no closer, by and large, to that land or to the values that the land teaches. Conservation continues to be swept aside by the homogenizing and insulating effects of technology, electronic media, urban sprawl, and a culture of fear that contributes to the divorce between people and the land. Today, the purpose of land conservation must be to create a balanced, healthy people who carry the land in their hearts, in their skills, and in their concerns.

An unintended result of the early efforts at conservation has been to exclude many Americans. Conservation must now be defined by the full awareness that our past efforts removed people from the land, primarily the rural poor, people of color, and native people. People have forever asserted their values over other people in politics, economics and, sadly, conservation too. At Yosemite, the Ahwahneechee were forced out of the valley but later brought back in to the park to change bed sheets, serve Coca-Cola, and dress up as the more recognizable Plains Indians. At Great Smokey Mountains National Park, almost 7,000 rural people were bought out through condemnation only to have their barns and cabins re-assembled in a Mountain Farm Museum where actors play at hill-country life. And more recently, to create the Yukon-Charley Rivers National Preserve in Alaska, a 100-year practice of homesteading was stopped and people removed from their land. (For a complete account of the Yukon-Charley National Preserve as well as other valuable ideas on the role of homesteading in wilderness, see O'Neill 2006.) Here's one result of such exclusion: Frank and Audrey Peterman could travel through 12 national parks in 3 months in 1995 and see only two other persons of color (Peterman, 2006). What have we lost as a nation and as a people when conservation has become a segregated movement?

The result, too, is that dispossessors are damaged along with the dispossessed. No conservationist will ever reach his or her goal without first gaining a broader sense of history and justice and

embracing Saint Augustine's wisdom that one should never fight evil as if it is something that arose totally outside oneself. If you're the one being taken from, it matters little if the taker is a robber-baron, a land speculator, or a conservationist. Today, we must acknowledge this dispossession of native people and others, such as black family farmers, without whom some significant portion of conservation would not have been possible, and that to heal this wrong – and to heal ourselves – requires not guilt but awareness, humility, and the courage to go forward differently.

Our conservation movement has been guided for more than one hundred years by this question: How do we produce a landscape that is worthy of our culture? But when we say “our” culture, who do we include or leave out? The language of conservation is filled with words about “preserving,” “protecting,” and “saving” places because we know deep down that we are fencing someone out. What we should be fencing out is unhealthy behavior, not whole classes and races of people.

## **OUR AGE OF BECOMING**

Today is the environmental movement's age of becoming. We may have started with a landscape-as-museum philosophy, and a focus on one set of cultural needs, but the truth today is that we have conserved vast expanses of land which hold the possibility of a return in a whole way, in a manner never achieved before. This isn't going back to the land, but going forward to the land in a new way. Writer and homesteader Hank Lentfer suggests that we need an entirely new relationship to the land at his home ground at Glacier Bay. “Looking at the clear-cut hillsides around Hoonah, I would be reluctant to return title to the Tlingit,” he writes. On the other hand, “watching the smoke billow from the cruise ships idling in Glacier Bay while 2,000 tourists snap pictures with disposable cameras I have to question the wisdom of the ‘current owners.’”

Let us consider the possibility that Wendell Berry was right when he wrote more than thirty years ago that “we and our country create one another...our land passes in and out of our bodies just as our bodies pass in and out of our land...therefore, our culture must be our response to our place.” Perhaps the motivating question is no

longer how do we produce a landscape that is worthy of our culture, but how do we produce a culture that is worthy of our landscape?

Most conservationists believe that the land heals people, yes, but only a fraction embrace the alternative possibility that people heal the land. Humans are tuned to relationship. We're healed by our love and our compassion. And one of the most influential relationships in our lives is with the land itself. We can make soil through composting as well as destroy it through over-grazing. Within some of us still are the skills of how to keep the land and ourselves healthy. This ancient knowledge lies in the daily traditions of the Popago Indians, of African farmers and hunters, and in the modern skills of range scientists, homesteaders, forest stewards and organic growers. What kind of new concept of the land might emerge if we could listen more carefully to one another's stories of the land?

### **THE EXTINCTION OF EXPERIENCE**

Day by day, the number of Americans with first hand experience of the land dwindles. This allows us, as a culture, to destroy more and more, drifting further away from the anchor that has sustained us physically and emotionally for eons. We see the results everywhere: we have a harder time talking with one another, we have more fears, our physical and emotional health diminishes, and we become more easily manipulated. And soon we find to our amazement that we have become a nation addicted to things, a nation that produces more prisoners than farmers and more shopping malls than high schools.

This divorce between people and the land can lead only to one place: a society in which it is no longer necessary for human beings to know who they are or where they live. And if no one knows where they live, then anyone with political power can control the land and the people. Barry Lopez tells us, "For as long as our records go back, we have held these two things dear, landscape and memory, each informing us with a different kind of life. The one feeds us figuratively and literally. The other protects us from lies and tyranny."

Our experience and memory of the land, arising from scientific knowledge as well as our human sense of touch, taste and smell, is the knowledge on which a country must ultimately stand. Our relationship and memory of land, therefore, is deeply connected to

our sense of patriotism, citizenship, egalitarianism and fairness, and our sense of limits. Our healthy relationship to land is the means by which humans generate, re-create, and renew transcendent values such as community, meaning, beauty, love and the sacred, on which both ethics and morality depend.

The powerfully corrupting force of disconnection has become business as usual in America, and it is no wonder that conservationists have been afraid to confront it directly. The fact that there are now nearly 7 billion people makes any talk of healthy human relationship to the earth a challenge. As population levels increase and technology amplifies our impact, our capacity for destruction increases. But increasingly the land is without intimates, people for whom the land remains alive, those who have indispensable, practical knowledge. Our cultural understanding of land has shifted largely from personal and physical (farmers, hunters) to industrial and recreational. This is fine except in its extreme, where land simply becomes a form of commerce or entertainment, something to be consumed.

Twenty years ago, the scientist and writer Robert Michael Pyle coined the phrase “extinction of experience” in his important book *The Thunder Tree*. He writes:

“People who care conserve; people who don’t know don’t care. What is the extinction of the condor to a child who has never known the wren?”

The extinction of the condor is the slow, unspoken diminishment of ourselves. It is the damage that occurs when a part of our own capacity to think, feel and understand is lost because the world around us – the world that shapes us – is also lost. We lose the condor and we lose some of our capacity to be in relationship with anything other than ourselves and our kind. And the child who doesn’t know the wren is the child who is afraid of walking to school, who has already begun to feel boundaries surround her. How will our children love and protect what they do not know?

Here’s evidence of the boundaries we make: today, 42 percent of the private land in America is posted *No Trespassing* (Environmental Resource Assessment Group, 1997). And conservationists, also, show both our love and our fear by what we fence out. Nearly 70 percent of land protected by private conservation organizations is posted *No*



*Trespassing.* In the span of my lifetime that sign has become America's best known symbol of our disconnection from the land and a common reminder of our fear of one another. Seeing those signs reminds me of the extent to which we have all become children of a broken relationship.

### **SOFT BOUNDARIES AND HARD BOUNDARIES**

Boundaries are essential in both ecology and society. Healthy systems of life require places of safety as well as places of transition. In ecology, the boundaries between different systems are often the richest ecotones: the edge between forest and pasture that supports so many mammals, or the edge between water and land where most marine life reproduces, or the edge between land and sky that is home to most bird life. When these boundaries are soft and permeable, for example a forest canopy between land and sky, or a coral reef between land and water, they are great ecological sources. When those boundaries are hard like the crashing waves on a beach, or as hard and violent as the boundary between Israel and Palestine, these are biological sinks where little life can thrive.

In human cultural systems, we need boundaries as well, but there's an enormous qualitative difference when those boundaries are soft and permeable and when they are hard and defining. Soft boundaries are where people come and go, where there is trust, openness and freedom. Hard boundaries are gated communities and the ubiquitous *No Trespassing* sign, the Berlin Wall and the triple wall that is now proposed for the United States' boundary with Mexico. A soft boundary is Central Park in New York City, which divides very wealthy neighborhoods from very poor neighborhoods and is where those different people rub shoulders and pass one another. Hard boundaries are created out of fear and become deeply symbolic of the process of "othering," calling some "others" because of differences in skin color, wealth, politics, nationality, and even when they moved to town. Generally speaking, soft boundaries are celebrated as great achievements of human life and hard boundaries are pointed to as examples of our fear, our hoarding, our need to oppress. Of course, those on different sides of hard boundaries tend to see those boundaries very differently and use language that subtly represents

those differences. This is exactly why it can be damaging for environmentalists to use defensive “border” terms like *to protect* and *to save* because these words prompt others to ask behind our backs *protecting it from whom? And saving it for whom?*

A defining characteristic of this era has been the turning of soft boundaries into hard boundaries. As a lover of land and people, I have great compassion for this instinct to cradle, literally to protect, and I have also come to clearly see how in its current advanced form this expression of love by holding tightly can contribute to our further separation, our alienation and loss of relationship. The great work, then, is about turning hard boundaries into soft boundaries and teaching the mature skill of gracefully navigating this new terrain.

### **A LINEAGE OF RELATIONSHIP**

We have prospered from our collective memory of the land, a lineage of direct human experience of nature that has functioned for 160,000 years and which is now largely broken. (Two of the most helpful books I’ve read recently on this topic are Elizabeth Marshall Thomas’s *The Old Way* and Hugh Brody’s *The Other Side of Eden*). We’re just beginning as a people to understand the consequences of that fracture. Until this isolation from the land, every human culture had specific words to express their fundamental relationship it. The Nguni of southern Africa speak of *Ubuntu*, meaning connectedness and social responsibility. The mestizos of northern Mexico and the southwestern United States have *Querencia*, which means the place and source of one’s meaning and responsibility. The Russians have *Mir*, which means both land and peace. And the Hawaiians have *Kuleana*, which means personal sense of responsibility and one’s homeland. Sociologists and psychologists have told us for more than a hundred years that the world we create for ourselves, the economic, social and environmental systems that surround us (or not) give us the social clues to be our better or worse selves. Conservation and restoration put into our everyday lives the social clues for how to live well, and thus, help us to be our better selves, and to foster a culture of respect, forbearance, tolerance and peace. This is the extraordinary power of conservation: to help create healthy people and whole communities.

Conservationists have vital work to do. One in four Americans will suffer sufficiently from clinical depression to send them to a hospital at some point in their lives (Whybrow, 2005). Wealth has consolidated: the richest one percent of our population now controls one-third of the nation's wealth, creating a more dangerous and immoral divide between haves and have-nots. The poverty rate for African Americans and Hispanics is now nearly three times as high as that for whites. These are the realities of American life. As conservationists aspire to speak to a broader range of Americans we must understand that they are waiting first for our response to these everyday realities.

### **THE WALK TOWARD WHOLE COMMUNITIES**

With a spirit of humility and grace, we must ask ourselves the difficult questions that beg us to move beyond our memberships to serve a larger humanity. Can we expand upon the motivating questions of our movement (how much land can we protect, how many laws can we pass, or how much money can we raise?) to these questions: What relationships do we need to be whole again? What is a whole community and how do we get there together?

The work of Center for Whole Communities is to make these ideas real in the bone and muscle of today's efforts to make whole the land and the people. We teach that relationship is as fundamental as places and things. Conservationists have made a strategic error in assuming that our work is more a legal act than a cultural act, assuming we can protect land from *people through laws as opposed to with people through relationships*.

Laws codify values, not create them. If the people in a democracy no longer care about the land, the laws that protect that land will not hold. Imagine, alternatively, how conservation grounded in an ethos of relationship might be different from conservation grounded in law. In order to protect land we would need to involve as many different people as possible: hunters, biologists, artists, ranchers, loggers, hikers, urban gardeners. We would need a new quality of dialogue, and the ability to hear and respect each other's stories and to make mature choices between types of relationships.

Today, who has right relationship to the land? To know this, we will need to initiate inside our organizations and coalitions, and outside

among our neighbors, an ongoing dialogue that will ask us to live with considerable tension and uncertainty as we learn from one another. Also, we will need to balance the rational, legal mindset needed to protect land with the more empathetic, relational mindset needed to connect people and the land.

Let's start with the controversial and difficult work of envisioning a hierarchy of relationships, an understanding that some types of relationship with the land are more important today than others. Resilient relationships, those that have succeeded in place over long periods of time – say more than 500 years – deserve our respect. Second, healthy relationship is defined by use of land more than by ownership of land. Third, right relationship seeks balance and continuity and would see the destruction of other species as ultimately destabilizing. Right relationship might be defined, in part, through the degree that the human is invested and the land is not depleted. Work and livelihood, as long as the land is not depleted, are higher, more valued relationships with the land than recreation because a nation of people living on the land, growing their food and fiber, is more valuable today to the long-term health of the planet than is nurturing a nation of consumers. Similarly, a whole community is resilient and endures not just because of its quantity of protected land but because of the variety and depths of its relationships to all of its land. Finally, our definitions of right relationship must include encouraging people to experiment today by living on the land. Ways of life are best preserved by living them. Museums are critical places to store our knowledge, but they should never replace opportunities for people to continue to evolve on the land. The walk toward whole communities sees the conservation of land as a cultural act to sustain our democratic traditions, to help people become native to a place, to nurture respect and forbearance, independence, and the source of our sustenance.

At Center for Whole Communities, we also teach that all people deserve a relationship to the land. The social foundations that enable conservation to happen in this country – namely, the wealth of many of our organizations, the access we have to political and social power, the ability we have to evolve a legal system to our benefit, even our ability to own land and to work effectively with other land-owners – reflect a very privileged position. If we use that privilege primarily for

ourselves, we ultimately squander the opportunity to create a whole community and we diminish ourselves. If we use that power and privilege to make meaningful relationships with land available to all people, we have taken what was never really ours in the beginning and turned it into something of value for everyone. The core challenge to conservation today is our capacity to create trust and dialogue among a diverse people. A whole community is built upon a *moral landscape* where people are treated fairly and where other species of life are respected.

Lastly, we teach the power of story. We tell stories to cross the borders that separate us from one another and to help us imagine the world – past, present, future – differently. Story enables us to see through the eyes of other people, and opens us to the claims of others. Stories help us dwell in time; they teach us empathy and how to be human. Story is the way we *carry the land inside of us*. Stories of the land awaken and rekindle these experiences of wholeness inside each and every one of us. Wallace Stegner meant just this when he wrote that “no place is truly safe until it has a poet.”

Story helps us find the different renderings of what is valuable. The shades of love that people feel for the land, whether they are new to that place or have been there for generations, are adequately expressed only in terms of human emotion: the expression of our deepest felt values. Telling these stories about our values helps conservationists to explain the role that land plays in shaping healthy human lives. When I tell you who I am and you tell me who you are, our isolation as people and leaders comes to an end; the re-weaving of our conservation movement begins anew.

The most important work that can be done today is to create the safe harbors where different people can have honest and sustained dialogue with one another about the land: its meaning, what we value, our vision about it, and our capacity for shared leadership. We need places where people can ask reciprocal questions: Why do I need you and why do you need me? Why does the health of the land and people need us working together? Wayne Howell, of the National Park Service, is doing this at Glacier Bay by investing years in creating a new relationship with the Hoonah people through hearing their stories and re-connecting them with that landscape by organizing trips to pick berries, harvest eggs, and perhaps one day, even hunt seals again.

The presence of each organization within the environmental movement focusing on individual pieces of the drama, making its own arguments to its own audiences, is why we collectively have not been able thus far to offer a compelling new story for how to be an American. It is also why our movement places a much greater emphasis on strategies and tactics than on story. The former are perceived as “hard” and the latter are perceived as “soft.” But without both in equal measure our movement can never flourish.

Martin Luther King did not say, “I have a *plan*.” He said “I have a *dream*,” and he spoke of his values without offering strategy and tactics about how we might achieve them. He knew that if he could reach people with shared values then he could respect them to move in the right directions of their own accord. Today’s “I Have a Dream” speech for conservationists would be a story about children, about a return to healthy, local food, and about healing the isolation and divides between us all. Healthy food and healthy children are today’s most important “doorway issues” to enter more American’s homes with a new story about land, people and health. Imagine how many millions of Americans would take conservation seriously if its focus was the protection of our children and our food.

### **INVITING PEOPLE IN**

Six years ago, in coming to live at Knoll Farm in central Vermont, my partner and I realized from our observations of the land and people in this valley, and from science, that the health of the place we loved was completely tied to health of the human community we had joined. No sign keeping people away would protect this land; instead, our only choice was to invite people in, to play and buy some of their food here, to let them discover this place and, perhaps, to love it the way we did. This act of making room for others on our land has never been easy and didn’t start out successfully. In the early days, when people thought us naive, there were vandals and disruptions of our privacy and challenges to our ethics. Through dialogue and practice, our community has come to understand that our intention is to include them in our view of how best to create a healthy place. Though we have dozens of buildings, hundreds of acres, miles of trail, there are no acts of disrespect and, indeed, we have come to learn

much about this land from others, such as where the best hunting is and where one finds the chanterelles. Through their stories, we understand that this land is filled with both seeds and ashes and is thereby much more meaningful to us. And by fostering more of a culture of care and attention in our neighbors, we believe we are protecting our land for the bear, fisher cat, deer and turkey at a much larger and enduring scale. And by showing this possibility to many others within the conservation movement, we are re-weaving those leaders with their most powerful visions for how to nurture both the land and the people.

### **THINKING LIKE A MOUNTAIN, NOT A BUSINESS**

There is a new breed of leaders who run their organizations not like businesses but like an ecosystem. Their organizations have their own specialized niche, but they also collaborate, adapt and act interdependently. They know their own success is dependent on those with whom they once competed. For these leaders, “survival of the fittest” doesn’t mean survival of the toughest, or survival of the one with the best messaging campaign, or the closest funding relationships, but those that cooperate and adapt. These successful organizations are able to quickly form new alliances, share resources, pick up new tools, and adapt to changing conditions. Today’s fashionable Resilience Theory says that ecosystems work best when there are strong feedback loops helping organizations and the system as a whole to learn through *experience of current conditions*. These new conservation leaders have moved beyond “staying on mission” to lead by responding to what’s actually happening in the world right now. They are regularly speaking their vision for the future, finding the language and story that reaches more Americans, recognizing and speaking aloud past mistakes and injustices.

And when leaders and their organizations work in this manner, new life flows to them. They become less brittle, more flexible and better collaborators. They are putting the fragmented pieces of their lives and of our movement back together again. These leaders are using their land for food production and buying new land to create permanent locations for farmers markets. They are processing sustainably harvested wood from conserved land for affordable

housing. They are conservationists committed to building wealth for people with low incomes by selling their own restricted land to co-ops, and they are translating their newsletters and websites into Spanish. They are committed to making a meaningful response to global issues like climate change and scarcity of water.

Future generations will look back at the creation of very different parks like Glacier Bay in Alaska and Central Park in New York City with the same gratitude: they remind us of what it means to be human in healthy relationship to the world. We have been right to act quickly and to save these places from the grinding, numbing wheel of the industrial revolution. The vital work today is to re-weave people and the land with the specific intention of creating a more resilient community, one that can not be achieved through fencing people out but only through the far more challenging work of inviting people in. We will never replace the dominant culture of fear and emptiness with a culture of care and attention until more Americans, of all colors and classes, carry the land in their hearts and minds.

**Peter Forbes** is the Executive Director of the Center for Whole Communities. He is a writer, photographer, farmer and conservationist. A life long student of the relationship between land and people, he has worked throughout the world to record and protect our human connections to the land. He is the co-founder, with his wife Helen Whybrow, of the Center for Whole Communities, an organization of people and ideas devoted to exploring and deepening the connections between land, people and community. He came to this after eighteen years leading land conservation projects for the Trust for Public Land. In 2001, he founded the Center for Land and People, a program of the Trust for Public Land, to help re-define the success of the conservation movement as a force for creating a more tolerant and joyful human culture. He is a graduate of Dartmouth College and has served on the board of directors of many organizations, including the Center for New American Dream, Vallecitos Mountain Refuge, and the Good Life Center.

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# Sustainability in Action: New Thinking and a Better Way

*Ray C. Anderson*  
*Founder and Chairman, Interface, Inc.*

My intent in this essay is to open a door – maybe in a way you’ve not heard before – and to invite you to walk through that door into a world you may not have seen before.

But first, I want to introduce myself. I am a husband, the father of two daughters, step-father of one stepson, the grandfather of five terrific grandchildren, and I am an industrialist – some would say a radical industrialist, but as competitive as anyone you know, as profit-minded as anyone you know. My 53-year-long working life has been spent in industry. I founded my company Interface, Inc., from absolute scratch, from just an idea 36 years ago (1973), to produce carpet tiles in America for the emerging “Office of the Future.” Today it is a billion dollar global producer of carpet tiles and broadloom carpets, primarily for commercial and institutional interiors, but carpet tiles also for the home under the brand name FLOR®. We operate production facilities on four continents, with sales in 110 countries.

Now, come through that door into my world. But this is not your typical door into industry. Come into a rather unusual industrial setting, and see *sustainability in action*, my passion for the last 15 of those 53 years. The point of this visit? To gain a sense of what is possible. However, you must be willing to think analogously about your own organization to gain the most from this visit. So I invite you to learn, both explicitly and by analogy.

## §

A mechanical engineer is commissioned to design a production line to produce the same product at the same production rate as the production line he designed and built 10 years before. The process

requires the pumping of a lot of viscous liquid. This time, he designs it to use 93 percent *less* horsepower (1/14 as much!). How can this be possible? This time, he specifies big pipes and small motors to pump the viscous material, rather than small pipes and big motors. He arranges to install the big, *straight*, short pipes *first*, and then install the production line thereafter, rather than installing the production line first and bending pipes here and there to fit them to the line. He has largely defeated the pump's enemy, friction. He now knows that friction varies inversely with the 5<sup>th</sup> power of the pipe diameter, and every bend in a pipe further increases friction and decreases efficiency, as does distance (i.e., pipe length). Doesn't every engineer learn these things in school? Apparently not; this is "new thinking". Oh, yes, the entire production line costs less to build than its counterpart built 10 years before, and less to operate. The engineer has practiced *whole system optimization*, new thinking that has evolved from just 10 years before.

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A carpet factory manager in southern California, where there's lots of sunshine, muses over the possibility of using photo-voltaics to produce some of the factory's electricity directly from sunlight. He scouts around and discovers that state assistance is available for such projects; then he asks his accountant to work out the justification. Even with state assistance, the project doesn't "pencil," according to the accountant, who is looking hard at investment and energy costs.

But the manager doesn't give up. He asks his marketing and sales counterparts, "Can you sell 'solar-made' carpet, something the world has never seen before?" They reply, "Bring it on!" And today, 127kw of photo-voltaic, factory-generated voltage at peak sunlight is connected to the California grid, producing electricity in such quantities that, were the electrical current channeled into the tufting process of the factory, it would power the production of one million square yards of "Solar-made™" carpet per year, generating incremental sales which the accountant overlooked in his preoccupation with costs.

Decisions about sustainability, made *in the round* including marketing and sales and customers, are better decisions. This is new thinking brought on by a receptive market, astute marketers, and a technical innovation of the new industrial revolution – *the solar revolution*.

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A factory engineer calls his counterpart at the city in which his factory is located. The conversation goes like this: “Say, Patrick, the city has that unregulated landfill east of town. Any idea how much methane is coming off it, going straight into the atmosphere?” The city engineer replies, “No, but I don’t think it’s much.” “Why don’t you check?” “Ok, I’ll get back to you.” He checks, and he is amazed at how much methane there is and how offensive it is to the nearby African-American neighborhood. Twenty circling vultures attest to that.

The two engineers begin to collaborate, and a year later a public-private partnership is solidified. The city commits the \$3 million in capital cost to capture and pipe methane nine miles to the factory. The factory commits \$50,000 to adapt two boilers, representing 26 percent of the factory’s total energy usage, to substitute the landfill methane for the present natural gas. The two agree on a price for gas that is 30 percent less than natural gas (per unit of energy). Calculations indicate the landfill will have a life of some 40 years, which translates into a revenue stream for the city, at present value, of some \$35 million (for a \$3 million investment)! A further advantage emerges: As methane is drawn off, the entire landfill volume is drawn down, increasing its capacity enough to allow the city to postpone opening its next landfill for an estimated 15 years. This is “win-win-win” – new and synergistic thinking.

Let’s recap who has won:

1. The city reaps a huge financial return on its investment, converting a polluting *waste* stream into a lucrative *revenue* stream, and postponing the cost of opening a second landfill for years.
2. An offensive public nuisance is eliminated, an environmental injustice corrected.
3. The factory reduces its energy costs.
4. The earth is spared greenhouse (GHG) gas emissions that contributes 21 times as much as carbon dioxide to global warming (methane is that powerful a GHG, really 60x, but it remains in the atmosphere a shorter time than CO<sub>2</sub>).

5. The factory receives credit for a greenhouse gas offset of  $21 \times 6\% = 126\%$  of its total energy usage, and can now declare its operations “climate neutral” – no net contribution to global warming. For a further modest investment in verifiable offsets the factory can neutralize its entire supply chain’s greenhouse gas contribution to global warming, and declare its products to be “climate neutral” for their full life cycle, third party certified. The marketing arm for the factory realizes the market appeal of “climate neutral” and dubs its climate neutral products “Cool Carpet®”, which becomes a huge marketing success, contributing incremental sales and lifting the company’s image in ways that advertising never could – at any cost.

Sure enough, we see that *waste can be food*, as in nature. In nature one organism’s waste is another’s food. What does nature have to do with business? We shall see.

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A product designer, frustrated with lack of progress in implementing sustainable design, pleads, “Let’s do something, anything!” So a designer re-designs a typical product to have 4 percent less of its most expensive and energy-intensive material component (in this case, Dupont nylon). The re-designed product performs well in all the usual tests, so for the moment, this is considered to be the “something” the designer was pleading for.

But an engineer, thinking new kinds of thoughts, wonders about the effect upstream of this kind of design modification if it were made across the factory’s entire product line. So he asks Dupont a question that Dupont has never, ever been asked before: “How much energy did Dupont expend from well-head to my receiving dock in making and delivering that bit of nylon?” We now know to call this “embodied, or embedded, energy.” The Dupont response is applied by the inquiring engineer, theoretically, across the hypothetically re-designed product line, and to his amazement and everyone else’s, on an annualized basis this turns out to be enough energy *not used* by DuPont (call it “nega-energy”) to run the engineer’s entire factory for half a year!

Today the average product in this factory contains 17 percent less nylon than 10 years ago; all perform extremely well, and the offset

created upstream is equivalent to more than two years of nega-energy (to Earth's great benefit) each year. The approach is now referred to as *de-materialization through conscious design*. It is new thinking that considers upstream effects – whole system optimization of another type, with expanded boundaries of consideration, reaching back into the supply chain all the way to the wellhead. The new thinking reminds us that each of our companies or organizations is its entire supply chain. No one stands alone.

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A team of engineers, production personnel, and product designers collaborate to find another way to create patterned carpet. The conventional way, employed for years by the factory and its chief competitors, is to wet-print patterns on plain colored carpet bases. Wet-printing is water-intensive and energy-intensive, requiring an aqueous dye application, high energy steaming to fix the dye, washing to remove excess un-fixed dye, and energy intensive drying to remove the wash water. Excess wash water and dye also require chemical treatment before release into the waterways.

But new thinking suggests that the tufting machine that forms the pile face of the carpet, in the first place, has untapped potential to precisely place tufts of yarn of selected colors to form quite intricate patterns. The bold decision is made to *burn the bridges* and abandon wet printing altogether, and to scrap the existing, stranded investment. Left with only one means of creating patterns, which the marketplace demands, development efforts result in entirely new families of patented inventions, giving the factory a proprietary *edge*, rather than handicap, in its marketplace.

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What does nature have to do with anything? One of those patented inventions in the previous example arises from the outrageous assignment by the Head of Design to his design team: to go into the forest and see how Nature would design a floor covering, “. . . and don't come back with leaf designs (he says); that's not what I mean. Come back with Nature's design principles.” The Head of Design has read *Biomimicry* by Janine Benyus. (Biomimicry: Nature as teacher, Nature as inspiration, Nature as mentor and measure.)

So the design team spends a day studying the forest floor and the stream beds, and they come to realize there is total diversity, even chaos – no two things are alike, no two sticks, no two stones, no two leaves. Yet there is a very pleasant orderliness in this chaos. So the designers go back to the design studio and design a carpet tile such that the face designs of no two tiles are identical. All are similar, but every one is different, contrary to the prevailing industrial paradigm that every mass produced item must be the “cookie-cutter” same – six sigma uniformity. Nature, the inspiration, is anything but cookie-cutter uniform. She knows nothing of six sigma, yet she is very effective.

This new product is introduced to the market with the name “Entropy®” (a scientific term associated with disorder), and in a year and a half it moves to the top of the best seller list, faster than any other product ever has. The advantages of breaking the old paradigm, *insistence on perfection and sameness*, are surprisingly numerous: There is almost no waste and no off-quality in production. Inspectors cannot find defects among the deliberate “imperfection” of no-two-alike. The installer can install tiles very quickly, without having to take the traditional care to get the pile nap running uniformly – the less uniform the installation, the better; so he can just take tiles out of the box the way they come and lay them randomly. There is almost no scrap during installation; even piece-tiles can find a place in the installation. Then, the user can replace an individual, damaged tile without creating the “sore thumb” effect of a new tile placed among the old, that so typically comes with uniform precision perfection. Furthermore, there are no longer issues of dye lots; dye lots merge indistinguishably. This obviates the need for shelf stock (extra tiles) of the original dye lot on the shelf waiting to be used. And the user can even rotate the carpet tiles on the floor to equalize wear, the way we rotate tires on our cars, and make selective replacement of damaged areas. All of this is good for the environment through increased resource-efficiency.

Yet, even with all these unexpected benefits, one wonders: Is there still more to explain the success of “Entropy®”? Perhaps there is. A speaker on the environmental speaking circuit begins every speech by having her audience close their eyes and picture in their mind’s eye that ideal place of peace, repose, tranquility, serenity, creativity, comfort, and security – that perfect comfort zone. Then she asks,

“How many were somewhere outdoors?” And almost every hand goes up. It is amazing! We humans – the vast majority of us – gravitate to nature for that ideal comfort zone. I think that, somehow, Entropy® brings outdoor indoors in a subliminal way, and that is its real appeal. This quality has a name: “biophilia,” coined by the great Harvard biologist E. O. Wilson. There is enormous power in *biomimicry* and in *biophilia*. This is *very* new thinking. Today, a family of products – 82 in all – are designed on the Entropy principles and represent more than 40 percent of sales for the enterprising business.

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A similar team, thinking “out of the box” asks, “How does a gecko cling upside-down to the ceiling?” The question arises in a session to figure out how to completely eliminate glue from the installation of carpet tiles. Even free-lay carpet tiles need a 25' x 25' grid of anchor tiles, stuck to the floor to create a repeating grid or “picture frames” of anchored tiles, within which the self-lay tiles are installed without glue. The session is about how to get rid of glue altogether.

Though the answer does not utilize *van der Waals* forces, as the gecko does, the answer is nevertheless completely revolutionary. A 2-1/2" x 2-1/2" releasable adhesive tape is applied, *sticky side up*, to the underneath side at each conjunction of four tile corners. The effect is to connect all tiles in the installation laterally, then let gravity hold the room full of carpet tiles snug-to-the-floor and in place, like wall-to-wall carpet. Sticky side up, not down, and only 6-1/4 square inches at that, less than 2 percent of each tile's underneath surface.

The new installation technique, called TACTILES™, provides the market with the world's first totally glue-free carpet tiles and becomes another successful proprietary differentiator for the company and its products. Glue can be a devilish source of volatile organic compounds (VOCs) and contribute significantly to poor indoor air quality; but not so any more for this company's customers, thanks to new thinking. *Upside down thinking*; Geckos and carpet tiles? Who would have imagined?

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Seven examples – real examples – of sustainability in action, leading to new thinking, previously unimagined innovations, and drastic reduction in fossil fuel usage.



1. Whole system optimization – big, short, straight pipes and small motors, not the other way ‘round.
2. Waste as food, converted to a revenue stream, a renewable energy source, and a greenhouse gas offset, rather than continuing as a pollutant. A climate neutral factory and “Cool Carpet” – win-win-win – and an environmental injustice removed (another win).
3. In-the-round investment decisions, justified not on the basis of cost, but on market appeal, and a commitment to leadership, ushering in a new industrial revolution – the solar revolution.
4. De-materialization through “conscious design” and upstream thinking. The leverage may be *up there*, the *embodied* energy that can be avoided upstream by the use of less material downstream? No one stands alone.
5. Burn the bridges, abandoning high impact technologies for low impact and, out of necessity, creating new inventions and a better way.
6. Biomimicry – how would nature do this? Biophilia – subliminal appeal to our limbic impulses designed into products, increasing customer satisfaction and psychological well-being.
7. Think upside down.

As physicist and energy expert Amory Lovins says, “The best way to have good new ideas is just to stop having the bad old ideas.”

Believe me, I could go on and on with examples of new thinking. Fifteen years of this kind of new thinking and innovation, combined with a determination to abandon the comfort of the status quo, can produce unimagined results. Yet it does not come naturally for us Homo sapiens, only through extraordinary commitment. The status quo is a powerful opiate, is it not? Breaking with “We’ve always done it this way” is hard.

Yet, I know an industrial company that did make the break in the total, absolute, whole-hearted pursuit of sustainability, and is transforming itself daily.

Consequently, I can report to you today that this company, that was once so petro-intensive for its energy and raw materials you could have said it was an extension of the petro-chemical industry, from that starting place, with the new thinking I just described and a sense of shared purpose, over the last 12 years has reduced its worldwide net greenhouse gas (GHG) emissions by 71 percent, in absolute tonnage, against its 1996 baseline, as adjusted for acquisitions and divestitures (i.e., “apples to apples”). Half the reduction has come from efficiencies and renewables, and half from verifiable offsets. The cheapest and most secure energy supply of all is *energy not used*, through efficiencies.

During roughly the same time frame, the company increased its top line sales by 60 percent and its EBIT (earnings before interest and taxes) doubled (2008 vs. 1996). Profit margins expanded, not contracted.

Consequently, GHG intensity, relative to sales, is down 82%! This is the magnitude of reduction the global economy must realize by 2050 to avoid catastrophic climate disruption. The lesson here: it is possible.

All the while, this company was working through a four-year long industry recession that saw its primary marketplace – the entire segment – shrink 36 percent, and entailed divestitures of businesses representing some \$600 million in peak annual sales volume, pre-recession.

Twenty-four percent of its raw materials now comes from renewable sources, either recycled or bio-based. Its goal: 100 percent renewable by 2020.

Moreover, its water usage, again “apples to apples,” is down by 75 percent in its core business, 72% overall. A major factor is abandoning energy- and water-intensive printing for a more efficient way to create patterns with its carpet tiles, burning that bridge. Its total energy intensity is down 44%, and fossil fuel-derived energy is down 60 percent. Its electrical energy is now 89 percent from renewable sources (eight of its ten factories operate on 100 percent renewable electricity); while 28 percent of *total* energy is from renewable sources. Its goal is 100 percent renewable by 2020.

A third of its smokestacks have been closed off, obviated by process changes; 71 percent of its effluent pipes have been abandoned, obviated by process changes. Its goal is to eliminate smoke stacks and

effluent pipes altogether. Carbon dioxide (CO<sub>2</sub>) emissions from 185 million airline passenger-miles have been off-set by the planting of 98,000 trees, though admittedly there's a time lag for the trees to grow. Its vehicle fleet's CO<sub>2</sub> emissions have been completely off-set, in cooperation with BP, with "trees for travel" and other off-sets costing less than four cents per gallon (amazing how cheap carbon-neutral can be!).

Its manufacturing scrap going to the landfill has been reduced by 78 percent; and 175 million pounds of its products, at the end of their first useful lives, have been diverted from landfills by its closed loop recycling efforts (precious organic molecules salvaged to be given life after life). Since 2003, it has produced and sold more than 83 million square yards of climate neutral "Cool Carpet™".

Its total waste – measured against perfection, meaning *do everything, everything, right the first time, every time* – is down by half. The waste elimination effort has avoided costs totaling more than \$405 million over the fourteen years, more than covering all the costs associated with R & D, process changes, and capital investments made in the pursuit of sustainability. Sustainability has been self-funding.

This company reckons it has reduced its overall environmental footprint by more than 50 percent, perhaps 60 percent, and by the year 2020, believes it will be totally sustainable with zero environmental footprint: taking nothing from Earth that is not rapidly and naturally renewable (not another fresh drop of oil) and doing no harm to the biosphere. It has publicly stated this goal, and annually reports its progress, or lack of progress, on its web site in completely transparent fashion.

This reduced footprint is reflected in every product the company makes anywhere on Earth, not just one here and one there. This company simply does not believe it or anyone else can produce green products in a "brown" company.

This company further believes it will become restorative, putting back on balance more than it takes from Earth and doing good for Earth, not just no harm, through the power of its influence and in its role as *Sherpa*, leading others along the path it is blazing as it climbs "Mount Sustainability" – that very high mountain but, very importantly, one that *is* proving to be scalable.

Yes, the company *is* publicly owned. Its shares trade on NASDAQ. Its Board of Directors is highly independent and also highly supportive

of the sustainability mission. They recognize that the very persona of their company, resulting from its sustainability mission, is a competitive advantage in an extremely competitive marketplace.

This company's people will tell you emphatically that these initiatives have been amazingly good for business. The business case is crystal clear: Its costs are down, not up, dispelling a myth and exposing the false choice between economy and environment – those \$405 millions in waste elimination, alone!

Its products are the best they have ever been, because sustainable design, especially biomimicry (inspiration from nature), has provided an unexpected wellspring of innovation.

Its people are galvanized around a shared higher purpose. Better people are applying, and the best people are staying and working with purpose. You cannot beat this for attracting and bringing people together.

And the goodwill in the marketplace generated by this initiative exceeds, by far, what any amount of advertising or marketing expenditure could possibly have generated.

Notice I have not mentioned risk mitigation, which I consider to be an incidental bi-product of doing the right thing, yet is where so many discussions of sustainability begin and end.

This company believes it has found a better way to bigger and more legitimate profits – a better business model. Even during the most trying days of deep recession and belt-tightening, in 2001 and again in 2008, there was not one thought of turning back, not one. This company's very survival is largely attributable to its sustainability initiative, looking to nature's renewable, cyclical, solar-driven, waste-free, resource-efficient processes for its inspiration.

This company fulfills what Amory Lovins is talking about when he says, "If it exists, it must be possible". Fifteen years ago, had I described a hypothetical industrial company this way, it would have been thought to be impossible. Yet, as Amory says, if it exists, it must not be impossible after all. And it could not be happening without the new thinking, what Amory says Edwin Land, the inventor and founder of Polaroid, use to call, "The sudden cessation of stupidity."

It also requires permission from the top to fail, but to learn from failure and try again. Radical innovation simply will not happen without a willingness to risk failure but to learn and try again.

I know this company very well because it is my company, Interface, and I know first hand that everything I just said about it is true.

§§§§§

Someone has said, “Everybody has just one story to tell, her or his own story.” I have just given you a rather lengthy excerpt from my story. But how did this particular excerpt originate? Where did it come from? Well, there’s more to my story.

In 1994, at age 60 and in my company’s 22<sup>nd</sup> year, I experienced something totally unexpected and unprecedented. We began to hear a new and recurring question from our customers, especially architects and interior designers – a question we had never heard before: “What is your company doing for the environment?” And we had no good answers. To address this disturbing question, we formed a new environmental task force at Interface. Its purpose: to frame some answers. What were we doing for or to the environment?

The organizers of the task force asked me to launch the new task force with a kick-off speech, to give the task force my environmental vision. Well, I did not have an environmental vision. In all my working life, 38 years at that time, I had never given one thought to what we were taking from the Earth – except to be sure there always were adequate supplies of raw materials – or what we were doing to the biosphere in the making of our products, except to obey the law, to comply. So, I hemmed and hawed and dragged my feet, but they stayed on my case. Finally, I relented and agreed to speak. The date was set, August 31, 1994.

Come the middle of August, I am sweating. I have not a clue as to what to say. Somehow, I know “comply” is not a vision. It is a propitious moment. At that very moment, by pure serendipity, a book lands on my desk. It is *The Ecology of Commerce*. Its author is Paul Hawken. I have never heard of him. I pick it up and begin to thumb it. By page 19, I am reading – a chapter entitled, “The Death of Birth” (think about that). By page 25, it is a spear in my chest, an epiphanal experience.

Hawken’s central point is in three parts: 1) The living systems and life support systems of Earth are in decline. We humans are degrading the biosphere. (My expert advisors tell me that there has not been a single, peer-reviewed scientific paper in the last 30 years that would refute that.) If the decline goes on and on unchecked, we, i.e., our

descendants, will lose the biosphere, the livability of the earth; 2) The biggest culprit in this decline is the industrial system, the linear “take-make-waste” industrial system, digging up the earth, converting it to products that end up as waste in a landfill or incinerator, or as greenhouse gases in the atmosphere; 3) The only institution on Earth that is large enough, wealthy enough, pervasive enough, powerful enough, and influential enough to lead humankind out of the mess it is making for itself is the same one doing the greatest damage – the institution of business and industry – my institution. I was convicted there and then as a plunderer of the earth; and I thought to myself, my God, some day people like me will go to jail – for theft, theft of our grandchildren’s future.

I took Hawken seriously and I used his material to make that kickoff speech, with almost more vision than I could handle. I challenged that tiny task force to lead our company to sustainability, and beyond, to become restorative. I just stunned them, and amazed myself with this whole new challenge in my 61<sup>st</sup> year. I simply said, “If Hawken is right, and business and industry must lead, who will lead business and industry? Unless somebody leads, nobody will. Why not us?” They accepted the challenge, I found a new purpose in life, and for more than 15 years now, I have been a recovering plunderer. The 3,200 people of Interface are a daily part of that recovery.

So, how are we, one petro-intensive company, climbing Mount Sustainability? I can tell you the first decision was mine: To determine that we *are* going to climb it, and to articulate this BHAG – this big, hairy, audacious goal – as a vision for my company; and even when many people thought I had gone ‘round the bend, to stay on message, consistently, persistently, year after year; and, second, to put the right people in the roles, and empower them to make it happen. But, the most important decision was made collectively by the people of Interface, one mind at a time, to embrace this challenging vision.

In 1994, we began where we were (doesn’t everybody?), with a schematic, showing all of the connections or linkages between Interface and the Earth – its lithosphere and its biosphere – directly, and through our people, our suppliers, our customers and communities. Then we asked ourselves, “What is wrong with this picture?” We asked this when very few, if any, companies anywhere were asking such a question of themselves.

Out of that analysis came a plan, in terms of climbing the seven faces of Mount Sustainability, to meet at the top – that point at the summit symbolizing zero impact (zero footprint). The plan is the heart of the book I published in 1998, entitled *Mid-Course Correction*. I'll quickly sketch the plan for you, because I believe it offers a template for the entire industrial system, if the system of which (let us not forget) we are each a part, is to become sustainable into the indefinite future. As I describe our plan, I urge you again to think analogously about your own organization. Find the corollaries. I believe the model is universal, even if only through analogy.

1. *Waste elimination*. Eliminate even the very concept of waste, emulating nature in our industrial processes. In nature, I repeat, there is no waste; one organism's waste is another's food. This means revolutionary re design and re engineering of processes – the new thinking – severing the unwanted linkages to Earth represented by our waste streams. We started here, and have made money, i.e., avoided cash, every step of the way (\$405 million cumulatively through 2008). By the way, we count any energy derived from fossil fuels as waste, by definition, to be eliminated.
2. *Benign emissions*, to do no further harm to the biosphere. This means re shaping *inputs* to our factories, working up-stream. What comes into our factories will go out – as product, waste, effluents, or emissions. We want to eliminate smokestacks and obviate effluent pipes, and for sure to eliminate all toxics as well as our contribution to global warming.
3. *Renewable energy*, focusing on energy efficiency first, then harnessing sunlight, wind, bio mass, and (someday) hydrogen – to cut the *fossil fuel umbilical cord* to Earth – and closing any remaining “carbon gap,” so to speak, with verified greenhouse gas offsets.
4. *Closed loop material flows*, to cut the *material umbilical cord* to Earth for virgin, fossil-derived materials, by creating cyclical flows. The technologies did not exist when we started. One by one they fall into place, including beginning the shift to carbohydrate polymers to replace petro-derived, energy-intensive, hydrocarbon polymers – using corn dextrose as a feedstock to replace fossil fuel feedstocks, with

significantly reduced environmental impacts – “dust to dust,” with a bio-tech wrinkle. Our most recent breakthrough is beginning to introduce into our products post-consumer recycled nylon, type 6, 6 – something we had been told by the inventors of nylon, themselves, would be impossible.

5. *Resource efficient transportation*, to achieve carbon neutrality by eliminating or off-setting greenhouse gases generated in moving people and products.
6. *Sensitivity Stakeholders*. Perhaps this is the most important and should come first, because nothing lasting happens without it. It is the culture shift, the mind set shift, to sensitize and educate everyone, *changing minds* – customers, suppliers, employees, and communities, to inspire environmentally responsible actions (the thousands of little things everyone can do, and the occasional big one). We are connecting in more meaningful ways with all stakeholders, especially with suppliers and customers on Life Cycle Assessments (LCAs) – using the most rigorous measurement system in the world – and we are connecting with communities on educational initiatives.
7. *Commerce redesign* depends on getting the other six right. Then we hope to pioneer the true service economy, that goes beyond *people* selling their service – accountants, consultants, lawyers, teachers, waiters, etc. – to selling the service that our *products* provide, instead of selling the products themselves. In the case of carpets this means selling color, texture, design, acoustics, comfort, cleanliness, ambiance, functionality – selling intangible service, rather than tangible product – retaining ownership in the tangible means of delivery. Giving those products life after life in closed loop material flows brings about manifold improvement in *resource-efficiency* by using stuff over and over.

Success on all seven fronts (a successful climb on all seven faces) will bring us to the summit and our goal, “The Prototypical Company of the 21<sup>st</sup> Century” – modeled after nature (again, biomimicry). What will it look like?

If I can put a picture into words, it will be: Strongly service-oriented by means of products that deliver service, even as nature



delivers its own services (such things as climate regulation, pollination, and seed dispersal, etc.). It will be resource-efficient, wasting nothing; cyclical (no more linear take-make-waste processes). It will be driven by renewable energy (minimized/afforded via efficiency); strongly connected to all constituencies; communities engaged, customers engaged, suppliers buying into the vision, and connected to each other within the organization. Altogether, forming *an eco-system, with trust and cooperation replacing confrontation*, that includes Earth and future generations in win-win-win relationships. This company will be way ahead of the regulatory process, rendering it essentially irrelevant; taking nothing from Earth's lithosphere that's not naturally and rapidly renewable, and doing no harm to her biosphere. All the undesirable linkages, gone! New, vital linkages, in place. Sustainable and just, an example for all, and *doing well by doing good*. Winning in the marketplace, but not at Earth's expense, nor at the expense of our descendants, but Nature's way: at the expense of inefficient adapters, competitors who just don't get it. Growing, yes, even in a no-growth world, should we come to that, by increasing value and market share, but not footprint, and with declining throughput of virgin materials, eventually to *zero*. Only zero throughput of extracted natural capital – nature's reserves – is sustainable over evolutionary time (the true long run), in consideration of the thousands of generations of *Homo sapiens*, and all the other species, yet to be.

At Interface we call this entire initiative to climb this enormous mountain on all its faces, "Mission Zero™", as we aim for zero footprint by 2020. If we can do it, anybody can. Further, we continue to look for and try to understand the eighth face; we know it is there, waiting to be discovered – and climbed.

Today, I consider Interface's ultimate purpose to be proving the business model and setting the irrefutable, undeniable example for other businesses. This is how we can become a restorative company, putting back more than we take, doing good to Earth not just no harm, thru the power of influence.

§§§§§§

As big as the challenge of sustainability is for one company, like mine, a far bigger challenge remains for all of society to move towards sustainability. How in the world do we do it?

Fifteen years of near total immersion in this subject have convinced me that a sustainable society into the *indefinite* future – whether seven generations or a thousand or more – depends totally and absolutely on (among other things) a vast, ethically driven, re-design of the industrial system, triggered by an equally vast mind-shift.

But this is the hard part: It will happen, it must happen, one mind at a time, one organization at a time, one technology at a time, one building, one company, one university curriculum, one community, one region, one industry at a time, until the entire system has been transformed into a sustainable system, existing ethically in balance with Earth's natural systems, upon which every living thing utterly depends – even civilization itself.

For what economy, what civilization, can exist without the services provided by nature: air, water purification and distribution (the hydrologic cycle), soil creation and maintenance, thus food; energy, climate regulation, pollination, seed dispersal, nutrient cycling, an ultra-violet radiation shield, flood and insect control, and net primary production, the product of photosynthesis?

If you have read Jared Diamond's compelling book, *Collapse*, you know that his central thesis is that cultural survival and biological survival are two different things, and civilizations can collapse biologically, even as their cultures thrive but ignore the limits of biological and ecological reality which surround them, i.e., "carrying capacity."

It seems to me that culture, with all of its taboos, assumptions, and mores, is a reflection of a society's mind-set. So, what about the mind-set that underlies our culture? What is society's general view of reality – the prevailing paradigm? I strongly suggest that we have been, and still are, in the grips of a flawed view of reality – a flawed paradigm, a flawed world view – and it pervades our culture, putting us on Jared Diamond's biological collision course with collapse. It is the paradigm that is reflected in our culture's infatuation with stuff.

The truth of a new paradigm doesn't just spring into existence. It will have been there all along. It will just have been obscured by the old, flawed view of reality. The earth was always round, even when everybody knew it was flat. It always circled the sun, even when everyone knew it was the center of the universe. The divine rights of kings were the "natural law," even as revolution was gathering in the New World.

That old, flawed view of reality that I refer to is the one that treats Earth as if it were infinite in its ability to supply the stuff to feed the industrial system's metabolism, when clearly – for one example – oil's coming peak (sooner or later, but surely, whether 10 years, or 50 years, or 650 years) reminds us vividly that Earth is finite; or treats Earth as if it were an infinite sink into which to pour our poisonous waste, including greenhouse gases into the atmosphere.

*A sustainable society, into the indefinite future, will accept and honor the fragile finiteness of Earth.*

That old, flawed view of reality is the one that adopts as its relevant time frame for caring about the consequences of our decisions, the life of a human being – more likely the working life – rather than recognizing the true long term, evolutionary time; that holds onto the notion that Earth was made for humankind to conquer and rule, to take whatever we want from nature without regard for the other species that depend on, and even comprise, nature – nature, of which we too are a part, not separate. Surely, what we do to the web of life, we do to ourselves.

*A sustainable society will adopt the truly long view and put humans in right relationship with and within nature.*

The old, flawed view of reality holds that technology, coupled with left-brained human intelligence, will see us through, without addressing the extractive, abusive attributes of technology that are part of the problem, and without appreciating the right-brain attributes of intelligence that include the human spirit.

*A sustainable society will transform its technologies (to make them renewable, rather than extractive; cyclical, rather than linear take-make-waste; benign rather than abusive, solar driven, rather than fossil fuel-driven; waste-free and focused on resource-efficiency, rather than labor productivity); and it will build on the ascendancy of women in business, the professions, government, and education, for this is one of the most encouraging of all trends, as women bring their right-brained, nurturing nature to bear on the seemingly intractable challenges created by us left-brained men with our pre-occupation with bottom lines and other “practical” considerations. After all, it's the practical and pragmatic that got us into this mess. Surely, a different kind of thinking is needed to get us out.*

That old flawed view of reality holds that the “invisible hand” of the market is an honest broker, when clearly the market can be very dishonest if it is blind to the externalities as it establishes prices. Does the price of a pack of cigarettes reflect its true cost? Not close! The price of a barrel of oil? Not within at \$150, considering the cost of wars in the Middle East and of global climate change! The “invisible hand” is blind as a bat if prices are dishonest. What kind of broker or allocator of resources can it be, stumbling along in its blindness?

*A sustainable society will insist on ecologically honest prices, so a sighted market will operate for sustainability rather than against sustainability.*

The old, flawed view of reality holds that increasing labor productivity is the route to abundance for all, when it is obvious in a world of diminishing nature and increasing human population that the route to abundance for all is through increasing *resource*-productivity – for example, using precious organic, petrochemical molecules over and over. That’s the logic behind all recycling efforts. Even inorganic materials have embodied energy that can be salvaged. And one very important result of increasing resource productivity is that it generally puts people to work in the process.

*A sustainable society will respect nature’s limits, and draw inspiration from them for innovative ways to conserve resources and simultaneously address poverty.*

For clearly the heart of the challenge humanity faces is lifting the poorest among us out of grinding poverty while healing the already badly damaged Earth.

The old, flawed view of reality holds that happiness is to be found in abundance and material wealth (the trappings of affluence), when we *know* there is more to happiness than more stuff. We know that consumerism will not bring real happiness, despite the messages with which our children (and we) are bombarded to saturation through advertising.

*A sustainable society will seek a higher level of awareness and transcendent meaning in life – more true happiness with less stuff.*

The old, flawed view of reality holds to the belief that business exists to make a profit, when we know in our hearts that business makes a profit to exist, and it must surely exist for some higher purpose. What

CEO really expects to stand before her or his Maker someday and talk about shareholder value? Or market share? Or clever manipulation of a gullible public?

*A sustainable society will realize that, done right, the triple bottom line of Corporate Social Responsibility – economy, environment, social equity – can come together under the banner of authenticity, to create a truly superior, totally ethical, financial bottom line – a better way to bigger and more legitimate profits, a better business model.*

The old, flawed view of reality holds that the environment is a sub-set of the economy, you know, the pollution part. In our new enlightenment, we acknowledge that the economy is the wholly owned subsidiary of the environment, to quote the late U. S. Senator Gaylord Nelson. The environment is the parent; the economy is the child. It is not the other way ‘round, which most of our economists still seem to believe.

*A sustainable society will develop a system of economics that gets the prices right economically and ecologically by internalizing the externalities, and thus jealously protects the parent, nature – “the goose that lays all the golden eggs.”*

Will we shift paradigms in time and truly embrace this new view of reality? That is the question of our era. The hell of it is, it’s up to you – and me.

§§§§§

Back to the present. I do not believe a single one of those seven innovations I described earlier, or hundreds more, would have happened at Interface without our commitment to sustainability, because the lens of sustainability opens up new and different and better ways of thinking and seeing the problem, out of a new mindset, a better more accurate view of reality; and *that* leads to significant competitive advantage.

This new business model, this new industrial paradigm, has a name I have already mentioned: “Doing Well by Doing Good.” It is a better way.

Doing well by doing good: Cause and effect, effect and cause, all rolled into one positive feedback loop that is good for Earth. As the triple bottom line of Corporate Social Responsibility comes together

in that superior *financial* bottom line, companies everywhere will want to emulate the example. And that is how an entire industrial system can move toward sustainability, one company at a time, beginning with the early movers, then the fast followers, and someday – soon we hope – the large middle ground that represents the mainstream.

So, at Interface we have asked ourselves: What more can we do as early movers, other than continue to climb, set an example, and wonder why others do not embrace the example more quickly? And we have decided that maybe we can do something to help accelerate the transformation of the industrial system.

After more than 15 years of total immersion in this new paradigm at Interface, we know how to *do* sustainability. Therefore, Interface is building capacity, a consulting arm, to be an enabler to other industrial companies that want to shorten their learning curves as they, too, begin to *do* – to move toward sustainability. This is the *Sherpa* role. When we began our quest in 1994, there was no “how to” manual in existence. We wrote our own manual for ourselves, and are living it every day. Now we are inviting other companies to benefit from that experience-based learning. We believe that what we have learned has great value.

Jim Hartzfeld, who has been integral to our sustainability initiative from the beginning, is leading this effort. We call this new initiative, InterfaceRAISE. It is “for profit,” and we intend to deliver superior value in this service as we always have with our products. For this is how we hope to become a restorative company, putting back more than we take and doing good to Earth, not just no harm, through our role as *Sherpa*.

In all of this hoped-for societal transformation, especially the diffusion – the rapid spread – of new thinking, there is a very great need for urgency. With continuing unchecked decline of the biosphere, a very dear person is at risk here – frankly, at unacceptable risk. Who is that person? Not you, not I. But, let me introduce you to the one who is most at risk.

I, myself, met this person in the early days in this mountain climb. On a Tuesday morning in March 1996, I was talking to our people, as I did at every opportunity – this time in southern California – trying to bring them along, often not knowing whether I was connecting. But about five days later, back in Atlanta, I received an e mail from

Glenn Thomas, one of my people in the California meeting. He was sending me an original poem that he had composed after our Tuesday morning together. When I read it, it was one of the most uplifting moments of my life, because it told me at least one person had really *got it!* Here's what Glenn wrote and here's that person most at risk. Please meet:

*Tomorrow's Child*

*Without a name; an unseen face  
and knowing not your time nor place  
Tomorrow's Child, though yet unborn,  
I met you first last Tuesday morn.*

*A wise friend introduced us two,  
and through his sobering point of view  
I saw a day that you would see;  
A day for you, but not for me.*

*Knowing you has changed my thinking,  
for I had never had an inkling  
That perhaps the things I do  
might someday, somehow, threaten you.*

*Tomorrow's Child, my daughter-son,  
I'm afraid I've just begun  
To think of you and of your good,  
Though always having known I should.*

*Begin I will to weigh the cost  
of what I squander; what is lost  
If ever I forget that you  
will someday come to live here too.*

Glenn Thomas, ©1996

Every day of my life since, *Tomorrow's Child* has spoken to me with one simple but profound message, which I presume to share with you: We are each and every one a part of the web of life (the continuum of humanity, sure, but in a larger sense the web of life itself), and we have a choice to make during our brief visit to this beautiful, blue and green, living planet – to hurt it or to help it. For you, dear reader, it is your call.

**Ray Anderson** founded Interface in 1973, revolutionizing the commercial floor covering industry by producing America's first free-lay carpet tiles. He served as co-chairman of the President's Council on Sustainable Development during the Clinton administration; was recognized by Mikhail Gorbachev with a Millennium Award from Global Green; was the Ernst & Young Entrepreneur of Year for the Southeast Region, and was named Georgia Conservancy's Conservationist of the Year. His honors also include the prestigious George and Cynthia Mitchell International Prize for Sustainable Development; the SAM-SPG Sustainability Leadership Award; the U.S. Green Building Council's Inaugural Leadership Award; and the National Wildlife Federation Conservation Achievement Award for Corporate Leadership. He was named a Senior Fellow and Leading Voice for Green and Sustainable Design by the Design Futures Council, and also received the IIDA Star Award. He has also received the National Ethics Advocate Award from The Southern Institute for Business and Professional Ethics, the Harvard Business School Atlanta Alumni Club's Community Leadership Award, as well as a Corporate Ally Award from Possible Woman Enterprises. He holds honorary doctorates from Northland College (public service), LaGrange College (business), N.C. State University (humane letters) and the University of Southern Maine (humane letters), Colby College, (Doctor of Laws, honorary), The University of the South, (Doctor of Civil Law, honorary), Kendall College of Art and Design, (Doctors of Arts, honorary), Emory University, (Doctor of Science, honorary), Clarkson College (Doctor of Science, honorary) and Chapman University, (humane letters).

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## Field Notes on Communication

*Alison Hawthorne Deming*

*Professor of Creative Writing, University of Arizona*

*Though human beings have created much of the beauty of the world, they are only collaborators in a much vaster project . . .*

– Elaine Scarry, *On Beauty and Being Just*

### **DEFINITION**

A cormorant the size of a human thumb has been found in Germany's Swabian Mountains. One of three figurines carved from mammoth ivory, the find provides the earliest evidence that our archaic human ancestors made figurative art more than 30,000 years ago, the period during which bison, mammoth, and lion images began to transform European caves into shrines. All three carvings in the recently discovered cache depict animals: one horse's head, one half-lion/half-human creature, and one bird with body and neck extended into the graceful tension of a cormorant rising toward water's surface after a feasting dive, rising from the invisible underwater world into the air. The beauty of animals called these ancestors to acts of creation.

The figures, which were skillfully carved, may be among the earliest art works made by human beings, are polished from constant handling, as one might rub a beach stone or hardwood burl, letting the oil of one's fingers raise the object's sheen while the thumb's repetitive motion against that smoothness leads the mind to the clean place one comes to when staring into space and thinking. Rather than being savages, our forebears were sculptors, painters, contemplators, their minds like ours in a daydream. As long as we've been human, we've been making art. Or perhaps it is more accurate to place this eagerness to participate in creation at the center of what it is to be the animal we are: as long as we've been making art, we've been human.

Art from the primal world draws the imagination back into the unthinkably deep well of time it took for the human mind, as we

know it, to evolve. “We” may have been around as toolmakers, language users, dietary omnivores, cosmological celebrants, nomadic socializers, and combatants for 500,000 to 2,000,000 years, depending on what markers you use to start measuring proto-humanity. It is not until 40,000 to 100,000 years ago that fossil forms look indistinguishable from those of modern human beings. And as we dig up more and more of the last remote places on Earth looking for the bones that will teach us the nature of what we are, we keep turning up art and asking, What does it mean?

It means what it is. Mammoth tusk transformed to water bird by a creature who, seeing the beauty and mystery of the bird, was moved to hold it in mind and hand, to become intimate with the bird, and so carved a likeness that would preserve and keep it close. And so begins the long human braiding of art, nature, and the idea of the transcendent: the bird transcends the limits of its birdness by flying through water, and the carving transcends the circumstance of the encounter with the water bird, prolonging the interaction for as long as hand and mind desire, and providing the opportunity to share it with others.

That’s communication.

I’ve included these opening paragraphs from a book I’m working on entitled *With Animals in Mind: a Bestiary for the 21<sup>st</sup> Century* because I wish to enlarge this word “communication.” I consulted Wikipedia – that universally recognized font of, if not wisdom, at least the Zeitgeist – for a definition. “Communication,” it told me, “is a process that allows beings – particularly humans – to exchange information.” The entry, of course, expanded upon that definition, but I was struck by this as the cream that had risen to the top, reducing such a rich word which suggests so many forms of connectivity to something as meaningless as a beaker full of numbered dice that could be poured from one vessel to another.

In tracking the word back into its history, some of its richness began to shine. “To commune” (L., *communio*) is to have an intimate (especially mental or spiritual) exchange, to feel in close touch with. It leads people to share in “communion,” secular or sacred, to make “common” gesture or cause. And here we are right in the center of our concern, back in the commons, the whole Earth speaking now to us all in its diminishment.

Gary Snyder has written of the “commons” as being more than the dictionary definition of “the undivided land belonging to the members of a local community as a whole.” He writes of the commons as a social institution, a pact people make with each other and with their local place. He tracks the idea back through its “instructive history.”

“It is formed of *ko*, ‘together,’ with (Greek) *moin*, ‘held in common.’ But the Indo-European root *mei* means basically to ‘move, to go, to change.’ This had an archaic special meaning of ‘exchange of goods and services within a society as regulated by custom or law.’ I think it might well refer back to the principle of gift economies: ‘the gift must always move.’ The root comes into Latin as *munus*, ‘service performed for the community’ hence ‘municipality.’”

## DISSENT

My first response to the idea of a “new consciousness in harmony with nature” was one of dissent. Isn’t “the new” the very nature of consciousness? The world is our consciousness. The trees, the yellow throats and warblers, civets and corms, the storms, thoughts, dreams, memories, feelings – all are in a continual process of becoming and are not subject to human will. Consciousness is the manifestation of that emergent energy in our inner lives. Quantum thinkers – Freeman Dyson comes to mind – suggest that consciousness may be a quality of matter and energy that goes all the way down to the quarks and all the way up to God. To use “communication” to create a “new consciousness” seems to me as outsized a task as using a cellphone to make mycorrhizal fungi. As educators, thinkers, and communicators, we can raise awareness, share information, fuel passion, influence policy, celebrate progress, and lament defeat. But is creating a new consciousness within our purview? Perhaps humility is the keystone to moving in concert with this aspiration.

It is hard to predict and impossible to control where change will come from. But experience tells us that the most meaningful change in individual lives comes from within. No one quits smoking simply because the information is available that smoking is harmful. A person quits smoking because inner cues are triggered. Perhaps the

cue is a sickness that frightens the smoker. Perhaps the cue is a change in the cultural situation. Everyone in a social group used to smoke. Now no one does, except...

Inner cues may very well have a social address. The more people I see driving a Prius or moving into the new co-housing project downtown, the more my consciousness grows greener.

## **CULTURE**

We live in a pathological culture. It is sick with violence, greed, waste, contentiousness, cynicism, and a sense of futility. We live in cities that we despise for their ugliness, menace, and lack of community. We have poor people whom we ignore, leave stranded on their roofs in a flood, or cast out onto the street, asking their children to die in a senseless war. We have had, in the Bush years, leaders who had no business leading, so lacking were they in wisdom and the capacity for reflective thought or empathy. Whatever sympathy our nation earned from the world community when we were assaulted by violent fanatics was squandered with bullying, warmongering, arrogance, and lies. The disdain for learning and scientific research, the absurdly simplistic posturing about the state of religion in a pluralistic democracy, would have made such leaders laughable, if their actions had not caused so much anguish around the world and erosion of our national pride at home.

And yet, and yet...we have seen change. At the root the culture keeps sprouting, promise emerging everywhere we turn. Paul Hawken has counted the sprouts (*Orion*, May/June 2007): an estimated thirty thousand environmental organizations around the world; add social justice and indigenous organizations "and the number exceeded one hundred thousand"; four thousand organizations in North America that have adopted a river, creek, or stream; six thousand women's groups in Africa planting trees; "tens of millions of ordinary people willing to confront despair, power, and incalculable odds in order to restore some semblance of grace, justice, and beauty to the world." These groups are communicating with each other by their example and creating fertile ground for yet more constructive change.

I'd be interested to add here some numbers and specifics about the greening of the entertainment industry, the perfusion of environmental values into popular music, films, television, and magazines. It

seems that the mainstream communications media have begun to smolder with concern about the plight of the Earth. What the smaller scale publications add to this critical mass is significant. Every green newsletter, church bulletin, poem distributed on a broadside, or fragment of scientific research shared with colleagues, is building a shared sense that we care enough about the brokenness that surrounds us to act. It is in our national leadership where we are most lacking. Despite the advances of an enlightened Obama administration, partisanship continues to thwart national progress, while on the ground, green is becoming hot. No more evidence is needed than the transition from Al Gore to Leonardo DiCaprio as our superstar Earth avatar.

I used to think that we needed a “Manhattan Project” in peaceful conflict resolution and maybe a second one in alternative energy development. We owe it to the world, as the only nation to have inflicted nuclear weapons on another, and as the most well-fed though ceaselessly hungry nation in the world, to become a laboratory for constructive, *truly* conservative, and peaceful change. We need that kind of leadership, focus, and passion to make the leap.

But the roadmap for the future is being drawn by thousands and thousands of people whose feet are on the ground. Culture is an organism that follows the same imperatives to survive as an individual creature does. Given half a chance it will thrive despite the threat of decline and will pass on what life-enhancing skills it has accrued. Culture is an organism: you can’t control its life cycle, but you can decide what to feed it.

### **AUTO-ETHNOGRAPHY**

By now it will be clear that I am useless at addressing a topic directly. I invoke in my defense the spirit of the late Lewis Thomas, who wrote, “I wish that poets were able to give straight answers to straight questions, but that is like asking astrophysicists to make their calculations on their fingers, where we can watch the process.” I might wish that straightness for myself as a poet and essayist, except that I cherish the blundering journey of artistic creation, the blind intersections, dead ends, and sudden openings into an unexpected

vista. To make a poem or essay requires an act of faith that one's conscious and unconscious impulses can work together in some kind of harmony that will flow with the energy of the emergent and show up on the page and in the ear as a song. It's a messy and belabored process, not the light bulb of inspiration depicted on stage and screen.

Is one thinking about "communication" in this process? Well, yes, one is thinking of communing with the glimmer of an idea, a feeling too complex to articulate in speech, an attraction to a certain music that seems inherent in a particular experience. And one is imagining, perhaps, an ideal reader, someone who is as open to the associational movement of the poem or essay as she is to that of her own dreams. A poem (any work of art) is an embodiment of wholeness, if only a wholeness that flits like interstellar dust through the mind. It is a vessel that contains contradictions without breaking under the strain. It is a reflection of the mind's inherent attraction to beauty and form. What good is a poem? The same good as a prayer, as a contemplative practice, a painting, sunset, or jazz riff. It adds to the beauty of the world, and it employs benign human agency in creation of that beauty. And, most profound and most rare, the poem communicates from one inner life to another – domains that can seem irredeemably self-enclosed.

John F. Kennedy celebrated the power of poetry in a 1963 commencement speech at Amherst College:

"Robert Frost coupled poetry and power, for he saw poetry as the means of saving power from itself. When power leads man toward arrogance, poetry reminds him of his limitations. When power narrows the areas of man's concern, poetry reminds him of the richness and diversity of his existence. When power corrupts, poetry cleanses. For art establishes the basic human truth which must serve as the touchstone of our judgment."

Such human truths live at the more inaccessible registers of one's being. It is at this register that the deepest changes occur, individually and collectively. This is why social engineering never works and is repugnant for all freedom-loving people. You cannot control people into right action, you can only inspire them. But once one has experienced the connectedness that art inspires, one is eager to seek it once more. That too is communication, perhaps the farthest reach of it.

## NATURE WRITING FROM THE GROUND UP

Language has the power to shape people's experience of the world, and nature writing, while hardly enjoying an audience granted to Hollywood movies, makes a strong case in point. It's worth making a hasty reassessment here of the three major phases of the genre's evolution, to help us locate where we are and where we may be headed.

The first great wave of nature writing came in the 19<sup>th</sup> century as an act of witness. Rich with field observation of the natural world, it was an aide-de-camp on voyages of discovery from Darwin's *Voyage of the Beagle* to the expedition reports of Lewis and Clark, John Wesley Powell, and George Catlin. Catlin's descriptions of bison on the western prairie are painterly and appreciative accounts of animal behavior. No one again will see the spectacle of wildness that he witnessed, but what a record he left. His account of a buffalo wallow and its effect on the landscape, found in his *Letters and Notes on the Manners, Customs, and Conditions of the North American Indians*, is a small masterpiece.

Darwin's travel journals show his careful attention to collecting specimens and observing natural phenomena – and the quality of mind that led to his Earth-changing work. He is constantly asking questions about deep time, about deep cause, a passionate curiosity he carried with him everywhere – along with a copy of Milton's "Paradise Lost." In 19<sup>th</sup> century New England, where love of learning slow-danced with love of the land, Thoreau and Emerson were also engrossed in witnessing nature, but their approach leaned more toward the philosophical. What is the effect of nature on consciousness, they asked? They answered by making the active experience of nature a contemplative practice.

The second important wave of American nature writing came in the mid 20<sup>th</sup> century as a period of advocacy. In *A Sand County Almanac*, Aldo Leopold penned the most quoted two sentences in the 20<sup>th</sup> century environmental movement in his land ethic: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." His effort to extend the sphere of human ethical consideration beyond the confines of the human is an aspirational benchmark for moving toward a harmony with nature. Whether we are capable of actualizing

the aspiration remains an open question, but having a crystal clear principle to invoke certainly helps.

Rachel Carson belongs to this wave of advocacy, a writer whose *Silent Spring* combined personal narrative with science journalism, laying its foundation on a single metaphor: what would happen if there were a spring with no bird song? The grammar of this metaphor – giving the enormity of the threat presented by pesticides a home in one beloved manifestation of Earth’s beauty and diversity – brought the point into the public arena and into needed policy making. Both Carson and Leopold were scientists who combined the lyrical with the scientific in ways that speak to both heart and head. Their works have lasted because they added the important element of unabashedly impassioned love for the natural world to earlier writing-as-witness.

Add to these voices, the second most quoted passage in the history of American nature writing, the wilderness ethic written by Wallace Stegner in his 1960 letter in support of wilderness protection legislation, excerpted here in some length:

“Something will have gone out of us as a people if we ever let the remaining wilderness be destroyed; if we permit the last virgin forests to be turned to comic books and plastic cigarette cases; if we drive the few remaining members of the wild species into zoos or to extinction; if we pollute the last clear air and dirty the last clean streams and push our paved roads though the last of the silence, so that never again will Americans be free in their own country from the noise, the exhausts, the stinks of human and automotive waste...”

“We need wilderness preserved – as much of it as is still left, and as many kinds – because it is the challenge against which our character as a people was formed. The reminder and the reassurance that it is still there is good for our spiritual health even if we never once in ten years set foot in it.”

“Our means of sanity is to retain a hold on the natural world, to remain, insofar as we can, good animals. Americans still have that chance, more than many peoples; for while we were demonstrating ourselves the most efficient and ruthless environment-busters in history, and slashing and burning and cutting our way through a wilderness continent, the wilder-



ness was working on us. It remains in us as surely as Indian names remain on the land. If the abstract dream of human liberty and dignity became, in America, something more than an abstract dream, mark it down at least partially to the fact that we were in subtle ways subdued by what we conquered.”

Stegner brings in this passage both spiritual and historical dimensions to our relationship with the wild. He understands the reciprocating nature of the relationship: we shape nature, and nature shapes us — as evidenced in biology and consciousness. It feels a bit like wishful thinking now to suggest that the American people have been subdued by what we conquered — but again this is an aspirational idea, and I’ll happily hang on to it. History is character-building if it humbles a person rather than making him or her more arrogant.

Stegner bridges us to the third wave of American nature writing, on which I’ll hang the shingle “re-framing.” If there is any unassailable truth remaining in the postmodern period, it is that all things are connected, as are all versions of history. It will do us no good to protect the rivers and air of North America if global warming imperils the whole show. Heck, New England gets to drink the acid rain of the industrial Midwest. Reframing has meant in recent decades creating a larger context for witness and advocacy. And it has meant a tremendous flowering of the genre, along with works of ambitious scope that one might simply call “science journalism” had they not become surprise bestsellers: David Quammen, E. O. Wilson, Jared Diamond, and most recently Alan Weisman, come to mind as authors who have worked to enlarge the frame within which we see the human story in relationship to the Earth story.

But the genre has found other audiences — multiple audiences — as it has branched out into the margins. Along with the great literary heroes (Peter Matthiessen, Annie Dillard, Wendell Berry, Mary Oliver, Barry Lopez, Gary Snyder form a decent pantheon), we’ve begun to hear voices from the margins. Ken Lamberton’s field biology conducted from inside prison walls; Evelyn White’s testing of the white water as a Black woman who fears wilderness; Gary Paul Nabhan’s collaborative work with indigenous people of the desert southwest, to name a few of the refreshingly off-center presences. The flowering of contemporary Native American literature surely belongs

in this camp, as does the growing interest in how issues of environmental justice and social justice are related. While devotees of the genre might once have cried, “Not in my back yard!” they do so now at peril of ignoring whose backyard the offending presence will inhabit. So conservationist and urban planner meet in the “new urbanist” publications, scientist and philosopher meet in the experimental forest to search for new language to convey the complexity of a forest’s ecosystem, and the stories of migrant agricultural workers (as told for example by Ruben Martinez) begin to make their mark on the land and in our consciousness. It’s a time for making new connections and feeling our way beyond the constraints of the polarized arguments (nature versus culture, science versus religion, them against us) that plague our public life. It’s a time for making connections across the borders that separate us, rather than standing on respective sides and firing salvos. It’s a time when a voyage of discovery can take us to the far reaches of the wild, but just maybe also to the dining table at which our environmental policies and choices come home to settle into our gut.

I love to recount the story of W.S. Merwin’s visit to the Poetry Center in Tucson at the time *The Folding Cliffs*, his epic poem of Hawaiian natural and cultural history, was published in the mid-1990s. He gathered with student poets and environmentalists in the Center’s backyard, his soft voice interleaved with the coos of Inca doves and roars of medical helicopters touching down and lifting off at the nearby medical center. He described his conservation work in Hawaii, ongoing efforts to slow the relentless wasting of an island paradise. There was little good news. The students slumped visibly under the weight of his stories. Then one student asked him how he continued to keep faith, when so much of what he values is being drubbed (or sold) out of existence. “How do you keep going? I mean, are you at all optimistic?” the student asked. “I’m not optimistic. I am very pessimistic. But that doesn’t mean that I am not hopeful. You make a decision to be hopeful. When you’re in a lifeboat, that’s not the time for your worst behavior, but for your best.” I’ve held onto his words, probably poorly remembered here, as a talisman against hopelessness.

American literature, in general, can celebrate a richer palette of cultural diversity than we knew fifty years ago, but our nature writing has remained, for the most part, lily white – a concern primarily of

the privileged class and not of the disadvantaged or oppressed. My guess is that Hurricane Katrina may have changed this, though it is too soon to see what literature will come from that natural and political disaster. Of course, we writers defend, (contend that) we are the voice for those who have no voices. And that may ring true for the other-than-human citizens of Earth. But we should know by now that to speak for others can too often serve to drown out their own voices.

### **THE NEXT 10,000 YEARS**

I was captivated a few years ago by news of the little Lucy-like hominids whose bones turned up on the Indonesian island of Flores. An artist's rendering of *Homo flores* depicted him walking home for dinner with a golden retriever-sized rat slung over his shoulder. How many millennia had passed since his ancestors migrated away from Africa and Asia? There were three or four or five species of old world hominids living at the same time. *Homo erectus* was the first colonizer, making it to Java around 1.8 million years ago, according to evolutionary biologist Francisco Ayala. Modern humans are not descendents of those early migrants. The diaspora of *Homo sapiens* from Africa to Asia came much later, starting about 100,000 years ago. The earlier migrants appear to have had a long and relatively peaceful tenure on Flores, and they represent a different branch on the tree of life than our ancestors. They make one contemplate the possibility that rather than a tree of hominid life, there was a thicket — many starts, many entanglements, many failures, and only we survived. Unless, of course, you believe in Bigfoot. Somehow this time-deep story grows more fascinating as the fear increases that our story may be growing short and that our species' résumé may show us to have been terrible animals, heedless devourers of the beautiful Mother that gave all Earth's beings their lives.

But thinking backwards in such a time frame also calls the question of a symmetrically long future. What if we make it? What if this sensitivity to brokenness is tweaking our intelligence to make the next leap in our evolutionary history? A leap that turns the runaway force of human culture toward restraint and mutual aid, toward the acquisition of knowledge rather than junk, toward a ten-thousand-year project to restore Earth to a state as close to Eden as we could

come, and to grow an outlying garden on Mars? Is that not a technological dream that we could love? I want this to be as possible as our doom. Ten thousand years from now, I want someone to say of us, What amazing courage they had, what spirit, how smart they were, how inventive, and how profoundly they must have loved Earth.

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# What Can the Humanities Contribute to a New Consciousness in Harmony with Nature?

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Succinctly to answer the question that is the title of this essay, I would argue that the role of the humanities in creating a new consciousness in harmony with Nature is to forge a partnership with the sciences in order to bridge the chasm separating what C. P. Snow (1962) long ago characterized as two coexisting but mutually estranged cultures: that of cutting-edge science and that embodied in the great literary, religious, and philosophical legacy of the past. And just how to bridge that chasm? By expressing the new nature of Nature, as revealed by the sciences, in the grammar of the humanities. The putatively “value-free” discourse of science – a mixture of mathematics, statistics, and technical jargon – is not readily or easily accessible. The discourse of the humanities – rich with imagery, metaphor, emotion, and honest moral judgment – resonates with a much wider audience.

I suspect, however, that many if not most humanists believe that they will find little in science to fire the imagination, to stir the emotions, to stimulate our aesthetic sensibilities, and to touch our deepest moral sentiments. The world revealed by science is as dull as the language scientists use to characterize it – if the attitudes of my incoming philosophy graduate students are any indication of a prevailing humanistic alienation from a scientific worldview. Many appear to be seeking in philosophy a counter-scientific worldview – even an anti-scientific worldview – and seem disappointed when my enticingly titled course, “Philosophy of Ecology,” turns out actually to be about ecology, the science.

Science did, indeed, once represent a natural world that was imaginatively, emotionally, aesthetically, and morally unappealing, even repugnant to most non-scientists and especially to most humanists. Well, it was not altogether aesthetically unattractive, but its beauty was of a sterile mathematical kind, that only a logician could love. What did the late Harvard philosopher W. V. O. Quine (1953) once proclaim? – “a taste for desert landscapes” – something like that. The erstwhile Newtonian world was populated by inert, externally related bodies, moving along straight lines, subject to various forces, communicated by impact – a fragmented, material, mechanical world, devoid of life, spirit, mind, and meaning. Thus alienated by Newtonian science, most humanists took little if any notice when a second scientific revolution occurred in the early twentieth century and few take much if any interest in exploring and helping to articulate the post-Newtonian worldview. Instead, most humanists repair to their hermeneutical studies of the sacred texts, the great secular books, classical music, the old-master painters. Alternatively, other humanists provide a playful analysis and celebration of a contemporary literature, art, and music that ignores – or even rebels against – the supposedly dull world depicted by scientists. That I mean no disrespect for hermeneutic studies is testified to by my personal love of Plato, especially, and the other ancient Greek philosophers, generally – a love that I continue to try to inspire in every new cohort of students that I teach at both the undergraduate and graduate levels. And while I am not personally engaged in the sophisticated study of contemporary high, low, and hybrid culture, I have the greatest respect for my colleagues who are – and I am delighted when I receive an invitation to their hip soirees.

While the two cultures passed one another by in the twentieth century, like the proverbial ships in the night, the scientific worldview was indeed undergoing revolutionary change. At the turn of the twentieth century, space, time, and matter became anything but dull and unexciting. Our universe had become non-Euclidean, with space and time constituting one curved, warped four-dimensional continuum. The solid Newtonian corpuscles, which had been located in Euclidean space, had become nano-scaled solar systems, spun out of the very fabric of non-Euclidean space, with only vaguely located, leaping electrons orbiting tightly bound nuclei that might lose mass

and emit energy. Not only were energy and matter convertible, mind and energy-matter were conversable – as scientific observation of quantum systems actualizes one potential reality rather than another. Being is as being is interrogated and observed. At the opposite end of the spatio-temporal spectrum of scale, the universe of stars and galaxies came to be understood as evolving and expanding, instead of, as formerly, in a static steady state. The universe is now understood to have originated in a dramatic Big Bang and to be riddled with mysterious and awesome Black Holes. A whole new holistic biology – ecology – took shape in the twentieth century.

Despite the many science magazines, websites, television shows, zoos, aquariums, and other forms of communication about science, what is going on in quantum physics, astrophysics, and ecology seems to be popularly under-appreciated nor, certainly, does it seem to have rent the fabric of the prevailing metaphysic. Perhaps because the worldview latent in contemporary science has gone uncelebrated by humanists, it is not registering in the public zeitgeist. Now and again a scientist with a gift for accessible prose – a Carl Sagan, a Stephen Hawking, a Stephen J. Gould, a Brian Greene, a Carl Safina – will popularize one or another domain of new scientific discovery. But articulating the newly enchanted *worldview* latent in science requires the synthesizing genius of philosophers and the capacity of poets to move the human heart. Yet humanists have pretty much remained indifferent to the opportunity and the humanities unresponsive to the challenge.

This is puzzling because the first scientific revolution did produce a corresponding revolution in the humanities. Why did Descartes – whom we philosophers call “the father of modern philosophy” – entertain such extravagant doubts about the reliability of his senses, even about the very existence of his own body? Because up until Copernicus, a century before, all humankind had labored under a colossal and nearly universal deception, fairly attributable to too trusting a reliance on our senses. We believed that the earth upon which we stand lay immobile at the center of the universe and that the sun and moon, planets and stars revolved around us. After all, that’s how it looks and feels! If we could be so wrong about that, who knows what else we might be wrong about? The old empirical philosophy had to be swept away at a stroke and a new rational one erected upon

fresh and hyper-critical foundations. In the visual arts, linear perspective, which is but an application of projective geometry, created the life-like illusion of three-dimensional space, the space of Euclid, Descartes, and Newton. New forms of literature, such as the novel, not accidentally or coincidentally emerged. The studied mathematical precision of the music we now call classical constitutes, in effect, a new modern science of music. Even theology became rational and deistic.

The original scientific revolution, that of the sixteenth and seventeenth centuries, even more insidiously transformed ethics and politics. The free-standing, free-thinking human individual is, in effect, the social analogue of an atom. Formed from the alpha-primitive, *a-tomos* in Greek means “indivisible.” We social atoms were conceived by Thomas Hobbes originally to live a life that was “solitary [as well as] poor, nasty, brutish, and short” as we moved in a pre-social vacuum driven on our inertial courses by two simple forces: desire and aversion. In the absence of a social contract to give law and order to their movements these social atoms were bound to collide in a mutually destructive war of each against all. After the original atomism of Democritus and the correlative ancient social contract theory of the Sophists had been forgotten, and prior to the revival of atomism in the seventeenth century, to conceive of human existence in a pre-social condition would have been nearly impossible.

That’s right, for better or worse, our vaunted social and political individualism – which seems so natural, a matter of fact not of thought – originated as a conceptual adaptation in the humanities of atomism in classical physics. That the same sequence of intellectual events occurred two millennia earlier proves my point. Can it be a mere coincidence that – during both the fifth century BCE and the seventeenth century CE – atomism in natural philosophy was immediately followed, in moral philosophy, by social and political individualism and the social contract theory of the origin of law, society, and ethics? Just as the ontology of the physical world was reductively conceived to be an aggregation of externally related indivisibles, so the ontology of the social world was also reductively conceived to be but an aggregate of externally related individuals. But whatever the cause, individualistic social ontology took hold of the Western zeitgeist after the seventeenth century and has become the



foundation for our human rights, especially our rights to life, limited liberty, and property. The price we pay, however, is a tragic unawareness of the robust ontology of social wholes.

This unawareness of the robust ontology of social wholes is, incidentally, particularly costly today as we face problems, such as global climate change, that are of such unprecedented spatial and temporal scales that they cannot be effectively addressed by individual responses. I was appalled by what I saw at the end of Al Gore's otherwise excellent documentary, *An Inconvenient Truth*: a list of things that each of us, individually and voluntarily, can do to reduce our carbon emissions. I myself do most of those things: replace halogen light bulbs with compact fluorescents; make my home-to-office-and-back commute by bicycle; etc. But I live in Denton, Texas – not Ashland, Oregon or Boulder, Colorado. So I am painfully aware that my individual efforts to lessen the size and weight of my own personal carbon footprint are swamped by the recalcitrance of the overwhelming majority of my fellow citizens. Many of them have never heard of global climate change. Many of those who have are convinced that it's a hoax cooked up by self-righteous pinko environmentalists who can't stand to see common people have their mechanized fun. And many of those who think that it's for real welcome it as a sign that the End Times are upon us, the horrors of which they will be spared by the Rapture. It will not suffice, therefore, to simply encourage people individually and voluntarily to build green and drive hybrid. But what's worse is the implication that that's all we can do about it, that the ultimate responsibility for dampening the adverse effects of global climate change devolves to each of us as individuals. On the contrary, the only hope we have to temper global climate change is a collective social response in the form of policy, regulation, treaty, and law. What is required, in the words of Garrett Hardin's classic treatise, "Tragedy of the Commons," is "mutual coercion mutually agreed upon."

Please forgive this peevish digression. I've just been frustrated by the way discussion of the ethical aspect of anthropogenic global climate change has been limited to individual responsibility. I return now to the two-cultures theme of this essay. So...after the excitement of the Enlightenment, the arts and the humanities rebelled against the Newtonian worldview – for better or worse. The romantic

counterculture in the humanities was openly antagonistic to the modern scientific worldview in both philosophy and the arts – albeit still colonized by the insidious atomic sense of self and aggregative sense of society. And while romanticism per se may have come and gone, indifference – if not antagonism – to the other culture, that of science, became entrenched in the arts and humanities.

Perhaps for this reason, the response of the humanities to the second scientific revolution, that of the twentieth century, has been anemic. In the visual arts, Cubism is, arguably, an expression of non-Euclidean geometry, but it hardly conveys the geometry of Einsteinian space-time as perfectly and faithfully as linear perspective conveys the geometry of Cartesian space. In music we have the aleatoric music of such composers and performers as John Cage, which beautifully reflects the indeterminacy and stochastic nature of the quantum world – but Cage and his few exponents remain anomalous. Twelve-tone compositions, jazz, blues, folk, rock, pop, rap, and hip-hop all may be revolutionary – but in ways disconnected, so far as I can tell, from the second scientific revolution. In literature there have been some interesting experiments with what might be called the relativity genre, in which time is as fractured as Cubist space and characters have incommensurable perceptions of a common reality – James Joyce's *Ulysses*, Virginia Wolfe's *Mrs. Dalloway*, and Vladimir Nabokov's *Pale Fire* come to mind – but it remains a genre for the rare genius and has not taken the literary arts by storm. The theory of relativity is best reflected in culture studies, a central dogma of which is that all cultural reference systems are equal and none is privileged. But the scientific worldview, even as it evolves and changes, is regarded in culture studies as illegitimately hegemonic and a prime target for deflation and deconstruction. What about science fiction? With a few exceptions, such as the novels of Arthur C. Clarke, science fiction is no better informed by state-of-the art science than other genres of pulp fiction.

The reaction of twentieth-century philosophy to twentieth-century science was particularly unfortunate. Phenomenology, the dominant movement in Continental philosophy, hubristically aspired to replace science as we know it – called “naturalism” by phenomenologists – with something truer to the phenomena immediately given to our intentional consciousnesses. Science had become, in their

view, a skein of abstractions, of theoretical entities, such as atoms, which we do not – indeed cannot – directly experience. The alternative “science” that phenomenologists offered up was based on the assumption that we could “bracket” the abstract concepts that obscure the pure phenomena and accurately and exhaustively describe them as they present themselves to consciousness in raw form. By the same token, we could reveal to ourselves the very essence of consciousness itself. Such bracketing, of course, is impossible to do; and even if it could be done, the value of doing it is by no means obvious. All along, however, science as we know it – increasingly abstract and theoretical – continued to thrive and attract funding and prestige, while phenomenology remains an arcane and marginalized specialty in academic philosophy, exerting little influence in the larger intellectual community of academe.

By contrast, Anglo-American philosophy held up scientific knowledge as the epitome of positive truth. Anglo-American philosophy of science is largely dedicated to setting forth the methods and means by which such magisterial knowledge is obtained. Surely then the traditional concerns of philosophy – ontology, metaphysics, ethics – could themselves become domains of positive knowledge by imitating the rigorous epistemological methods and means of science. Accordingly, such fields of study were isolated and divided into their elemental parts and painstakingly argued to putatively certain conclusions – about which, however, little agreement is ever reached. This virtual worship of scientific epistemology – obeisance to the ways and means of positive knowledge – combined with an application of it to the special turf marked out as their own by “analytic” philosophers, rendered twentieth-century Anglo-American philosophy as isolated from the dynamic content of twentieth-century science as was twentieth-century Continental philosophy. Missing the revolutionary holism implicit in the theories of relativity, for example, Bertrand Russell, a founding figure of twentieth-century analytic philosophy, retrogressively espoused “logical atomism” and eschewed the notion of internal relations, which characterize the ontology of quantum field theory.

Simply but boldly stated, what I am suggesting is that philosophy – and, *pari passu*, the humanities generally – retake its traditional place in the panoply of disciplines as “Queen of the Sciences.” Unfortunately,

twentieth-century Anglo-American philosophy exchanged that exalted office for something more like Handmaiden to the Sciences, while Continental philosophy – to continue the royal metaphor here running wild – exchanged the throne of Queen of the Sciences for some little Duchy in the intellectual Balkans. As scientific knowledge grows in volume, scientists themselves must ever more narrowly focus their research, exchanging breadth of knowledge for depth. Unless someone steps forward to synthesize, integrate, interpret, and extract meaning and morality out of all that specialized knowledge, we – scientists and humanists alike – shall remain bewildered and adrift in a world bursting at the seams with information and devoid of sense and direction. That's a tall order for humanists. It's more comfortable to ever more narrowly specialize ourselves in the ever more detailed dissection of the aphorisms of Nietzsche or the sonnets of Shakespeare.

Or is it? Poet and essayist Gary Snyder – who ought to know – thinks it's easier than you might think. In a delightful essay titled, "The Forest in the Library," he compares the academic information community to the biotic community of a forest. In the basements and windowless laboratories scattered across the campus, the data gatherers – the science graduate students and bench scientists – tediously work away at small scales, just like the detritus reducers on the forest floor and photosynthesizers in the understory. At the next trophic level "the dissertations, technical reports, and papers of the primary workers are . . . gobbled up by senior researchers and condensed into conclusion and theory."

"When asked, "What is finally over the top of all the information chains?" one might reply that it must be the artists and writers, because they are among the most ruthless and efficient information predators. They are light and mobile, and can swoop across the tops of all the disciplines to make off with what they take to be the best parts, and convert them into novels, mythologies, dense and esoteric essays, visual or other arts, or poems (Snyder, 1995)."

Settling into a comfortable academic sinecure, in any case, is not what attracted me to philosophy as a young humanist. I was inspired by the audacity of the pre-Socratics, such as Heraclitus, who tried to paint a picture of the whole universe in a series of enigmatic

epigrams, or such as Empedocles, who tried to best Heraclitus in two grand didactic poems, one titled “On Nature,” the other “The Purifications.” For me, the opportunity to do natural philosophy like the pre-Socratics – to paint in bold strokes with a broad brush – came with the advent of the environmental crisis. Nature was talking back. It was saying that the prevailing, still essentially Newtonian assumptions – about the nature of Nature, human nature, and the proper relationship between people and Nature – that were still informing industrial development, were flawed. The message came across loud and clear in the form of unbreathable air over our big cities, fouled and stinking rivers and seashores, coastal dead zones, disappearing flora and fauna, statistically anomalous outbreaks of cancer, the threat of silent springs. Just as Descartes did half a millennium before me, I felt we needed to rebuild again from the foundations and ask anew the oldest and most fundamental questions of philosophy: What is the nature of Nature? What is human nature? What is the proper relationship between people and Nature?

Other humanists also seized the opportunity afforded by the environmental crisis to try to transform their respective disciplines. The first to respond were a couple of historians. The signal year was 1967. Roderick Nash’s *Wilderness and the American Mind* was published that year and so was Lynn White Jr.’s (in)famous essay, “The Historical Roots of Our Ecologic Crisis.” Donald Worster, the former dean of environmental history, once remarked that what historians do is to spin good stories based on otherwise mute facts. Nash’s classic represents much more than a history of wilderness. The story he tells became the canonical story of the American environmental movement. Nash identifies and delineates its founding figures: George Perkins Marsh, Henry David Thoreau, John Muir, and Aldo Leopold. In addition to these vernacular philosophers, he ranges comfortably over the natural sciences, literature, and the visual arts, discussing the contributions to an evolving environmental awareness of Alexander von Humboldt, James Fennimore Cooper, Thomas Cole, and George Catlin, to mention but a few.

In retrospect, Lynn White Jr.’s essay provided the mandate and set the agenda for a future environmental philosophy, which got underway in the 1970s. White was a historian of technology and made the obvious point that the then newly discovered environmental crisis

was a serious side effect of “modern” technology. What made modern technology modern was its heretofore unprecedented union with science. Ever since the Greeks and up until the eighteenth century, natural philosophy and eventually science was pursued only by leisured aristocrats who prided themselves on seeking knowledge of Nature for knowledge’s sake and distained any practical application of their theories as beneath their social station. And technology was the concern of only the working classes to whom fell the job of supporting the privileged intellectuals as well as themselves.

Both science and an aggressive technological *esprit* are Western in provenance, argued White, and could be traced to the late Middle Ages when Europe was steeped in the Judeo-Christian-Islamic worldview. Created in the image of God, man’s mind might recapitulate that of the Creator as He created the world. That was the inspiration for scientific inquiry. And God commanded man to be fruitful, to multiply, to have dominion over the creation and to subdue it. That was the motivation for developing an aggressive technology. In short, White placed ultimate blame for the environmental crisis on Genesis 1:26-28. Of course, White’s thesis is both jejune and cavalier. But obscured by his lurid and brassy text was a more general and plausible subtext: that what we do in relationship to Nature depends on what we think about Nature, about ourselves as human beings, and about our proper relationship to Nature; and, corollary to that, effectively to change what we do in relationship to Nature, we first have to change what we think about Nature, about ourselves as human beings, and about our relationship to Nature.

Exposing what we think about things and changing what we think about them is the work of philosophers – or at least it used to be and, hopefully, soon will be again. There are two moments to this process. The first is critical, the second creative. White himself had taken the first, critical initiative. He criticized the ideas about the man-Nature relationship that we had inherited from our Judeo-Christian cultural roots. But those are not our only cultural roots. The Greco-Roman cultural roots run at least as deep and bequeathed to modern Western civilization just as many environmentally noisome notions. Thus a few philosophers and intellectual historians, such as J. Donald Hughes (1975) and Carolyn Merchant (1980), began to reread Plato’s otherworldly theory of forms and Aristotle’s anthropocentric teleology,

Bacon's coercive epistemology and Descartes' divisive dualism through the new lens of environmental crisis. They afford good examples of the way humanists can use their hermeneutical expertise in new, socially relevant, and exciting ways. I, for example, was able to use my knowledge of ancient Greek natural philosophy to call attention to the way physical atomism in natural philosophy was followed by social atomism and social contract theory in ancient Greek moral philosophy. As noted here already, after atomism was revived in the modern scientific worldview, it was followed once more by social atomism and social contract theory in modern moral philosophy. In doing so, my purpose is to provide much more than a nifty historical insight. I aim to reveal the contingency of our prevailing individualistic social ontology and sense of self, opening us up, hopefully, to possibilities for alternative social ontologies and senses of self latent in the ontologies of contemporary science – the ontology of the space-time continuum, the unified quantum fields, the integrated ecosystems, and the self-regulating, superorganismic biosphere – that are more commensurate with the problems we face.

The second, creative moment in the agenda for an environmental philosophy set by White is more difficult to pull off. How do we generate new ideas about the nature of Nature, human nature, and the proper relationship of people to Nature? We cannot just gin them up from scratch, just make them up out of the blue. Not even Thales, whom Aristotle identifies as the first natural philosopher, operated in an intellectual vacuum. Two early approaches were (1) to look for an alternative worldview in non-western intellectual traditions and (2) to scour the theological and philosophical canon of the West for alternative worldviews that had not found their way into the mainstream but had been washed into intellectual side channels. Here again, White showed the way. He suggested, but ultimately rejected, adopting the Zen Buddhist worldview. That got what we now call comparative environmental philosophy started; and essays soon appeared that proposed that we adopt other strains of Buddhism, such as Hwa-yen, or Daoism, Hinduism, and other non-western worldviews. Huston Smith, for example, wrote a piece titled "Tao Now: An Ecological Testament." White himself thought that the West was unlikely to convert wholesale to a foreign worldview. So he concluded his essay by recommending that we in the West resurrect

and mainstream the heretical and radical ideas of St. Francis of Assisi, according to which animals too had immortal souls and man was brother to the Earth and its many creatures. Following White in method, but looking to the secular Western canon, Arne Naess recommended reviving and mainstreaming the monistic philosophy of Spinoza. Michael Zimmerman suggested we take Heidegger's advice to "let beings be." And so on.

The approach that I took – and am here recommending to humanists generally – is to espouse the philosophical and humanistic essence out of contemporary scientific theories. We in the West are as unlikely to dust off and collectively adopt an idiosyncratic historical worldview, especially one that never made it into the Western mainstream in the first place, as we are to adopt a foreign worldview. Science is what is happening now in the West. Moreover, while it may have been western in provenance, it is no longer western in practice and pursuit. Science has international cachet and currency. And it is one of the few intellectual endeavors, if not the only one, that is culturally unaccented. While, for example, we can instantly tell the difference between Bollywood and Hollywood cinema, the string theory cogitated in Beijing is no more distinctly Chinese than that cogitated in Berkeley. Further, as already noted, science serves up some ideas with extremely exciting and congenial philosophical potential. Nor is abstracting a contemporary philosophical worldview from the sciences the exclusive province of philosophers. Theologians, most notably Thomas Berry (1992), have found ideas in contemporary cosmology that bespeak a human harmony with Nature. Scientists themselves who have a philosophical bent have also contributed to the work of worldview reconfiguration. Physicist Fritjof Capra (1975), for example, has explored the general implications of quantum theory for a new more integrative and holistic ontology.

My own past work has concentrated more on evolutionary biology and ecology than on any of the other sciences. Following the lead of Aldo Leopold (1949), in the former I find three very useful things. First, from an evolutionary point of view, we are kin to all other species on our small planet, which would instill in us, if we took the trouble to think about it, Leopold believes, "a sense of kinship with fellow-creatures; a wish to live and let live." Second, we may derive a



kind of neo-heathen spirituality from the theory of evolution, “a sense,” as Leopold put it, “of wonder over the magnitude and duration of the biotic enterprise.” Third, Darwin provided a detailed account of the origin and evolution of ethics in *The Descent of Man*, which represents the best foundation, in my opinion, for contemporary environmental ethics. Darwin argued that ethics evolved to facilitate social organization and community. One of the most fundamental concepts in ecology is that of a biotic community. When this ecological concept of a biotic community is overlain on Darwin’s analysis of the origin and evolution of ethics, an environmental ethic clearly takes shape. Just as all our memberships in various human communities – in families, municipalities, nation states, the global village – generate peculiar duties and obligations, so our membership in various biotic communities also generates peculiar duties and obligations.

Lynn White Jr.’s (in)famous essay also induced a dialectical response among Christian apologists – whom we may regard as humanists without a special academic disciplinary portfolio, except for those in religious studies. They responded less with a revival of Franciscan theology, as White himself had suggested, than with an alternative, theocentric stewardship reading of the early chapters of Genesis to counter White’s despotic anthropocentric reading of the same texts. The Judeo-Christian stewardship environmental ethic is very potent: His creation belongs to God, not us; in declaring it to be “good,” God invested the creation with what environmental philosophers call “intrinsic value;” and He gave it over to us humans, not to exploit and destroy, but to dress and keep. If Christianity could be greened in this fashion, what about the possibility of greening other religious traditions? While Westerners are unlikely to adopt a foreign worldview such as Japanese Zen Buddhism – despite its popularity among a small cadre of Californians and others – perhaps those for whom such worldviews are not foreign, but are their own living traditions of faith, could also find in them an environmental ethic.

We must remember that the environmental crisis, popularly recognized as such in the 1960s, was then understood to be global in scope, and so it remains, now more than ever. If adherents of Buddhism, Islam, Hinduism, etc., could also find a potent ecological

ethic in their worldviews, a network of religiously grounded ecological ethics could be formed around the globe. I barely scratched the surface of this possibility in my book, *Earth's Insights*. But it was fully cultivated and brought to full flower by the great vision and the great work of fellow contributors to this volume, Mary Evelyn Tucker and John Grim. They gathered leading representatives of the religions of the world in a series of conferences at the Harvard Center for the Study of World Religions in the last decade of the twentieth century and then published the fruits of those gatherings in a series of Harvard University Press books.

History, philosophy, theology, religious studies – all humanities disciplines – have taken an environmental turn and in so doing have bridged, to one degree or another, the gulf isolating them from the sciences. It is not accidental that we almost unconsciously link environmental history, environmental philosophy, and so on, with ecology, and thus with the sciences generally, by means of such labels as “Deep Ecology,” “religion and ecology,” “eco-theology,” “ecological ethics” and so on. We now even have “ecological economics” – as distinct from “environmental economics” – which indeed most academic economists would prefer to think of as one among the humanities rather than as one among the social sciences. The humanities elephant in the room, which I have so far ignored, is the scholarly, critical study of literature – the sort of thing most English professors do. But that field too has recently taken an environmental turn, and is now commonly referred to as “ecocriticism” by those engaged in the specialty.

As the field emerged institutionally it focused largely on the study of what I call “cabin narratives.” Such works typically feature a solitary, ruggedly individual individualist – usually a male protagonist – seeking himself, in communion with Nature, and measuring the culture from which he retreats by the norms of Nature. Leopold, for example, concludes the Foreword to his cabin narrative by envisioning “a shift of values...achieved by reappraising things unnatural, tame, and confined in terms of things natural, wild, and free.” Very often the first-person protagonist of such narratives is deeply engaged in the scientific study of Nature, most often in scientific natural history. Thoreau's *Walden* is the prototype – the genre exemplar – of the cabin narrative. And Lawrence Buell's (1995) study of Thoreau is the prototype and genre exemplar of ecocriticism.

Other cabin-narrative classics are Henry Beston's *Outermost House*, Leopold's *A Sand County Almanac*, Edward Abbey's *Desert Solitaire*, Edward Lueders' *Clam Lake Papers*, Annie Dillard's *Pilgrim at Tinker Creek*, and Rick Bass's *Winter: Notes from Montana*.

Environmental history and environmental philosophy have been around long enough to greatly diversify; the latter into a number of antagonistic camps – anthropocentrists (strong and weak), biocentrists, and ecocentrists; Deep Ecologists; ecophenomenologists; environmental pragmatists. More deeply and more significantly, it also diversified by including the voices of those historically marginalized. Ecofeminism, as the name suggests, is a species of environmental philosophy representing a female point of view; and analyses of race and class are central to environmental justice. Ecofeminism, environmental justice, more recently environmental queer theory provide unique epistemological points of view, in addition to wider demographic representation. There are stirrings of such diversification now detectable in ecocriticism as the nature of nature writing is being contested. And just as in environmental philosophy, so in ecocriticism, we find that epistemic diversity accompanies representative diversity. For example, Priscilla Solis Ybarra, a young ecocritic, contends that the works of Chicana/o writers – which often lament the dispossession of and longing for their ancestral homelands in what is now the American Southwest – should be counted as nature writing equally with the cabin-narrative canon. The cabin narrator, from a liminal epistemological point of view, is a man, or less commonly a woman, who is repairing to Nature from a position of social privilege. Thus, Ybarra argues, we can begin to see social privilege, through the lens of ecocriticism, as insulation from Nature by strata of mediators – the invisible people who work the fields and forests, producing the staple foodstuffs, nature-writing paper, and cabin-building materials for the cabin narrator who is connecting with Nature, from which he or she was alienated precisely by his or her privileged social station. Thus nature writing is also expanded to the cultural productions of those whose social and economic status puts them in daily, unmediated, often uncomfortable, and certainly unromantic contact with Nature.

According to Aristotle, metaphysics is First Philosophy, but by that he meant it was first in the hierarchical order of knowledge, not the

first to be pursued. Aristotle himself is the first systematic historian of philosophy and informs us that the first philosophy, in order of occurrence, is physics, in the Greek sense of the word, *peri phusis*, concerning Nature – that is, natural philosophy. After Greek natural philosophy was rediscovered during the Late Middle Ages and Renaissance it evolved thereafter into science proper. Natural philosophy got underway in the sixth century BCE and culminated with atomism in the mid-fifth century. While many of the natural philosophers had something to say about ethics and politics – some more than others – moral philosophy did not become a central preoccupation of philosophers until the time of Socrates and his contemporaries in the second half of the fifth century. This pattern of development is repeated after the Renaissance. First comes a revolution in natural philosophy, which was started by Copernicus in the sixteenth century and completed by Newton in the seventeenth, followed by a revolution in moral philosophy, which was started by Hobbes in the seventeenth century and completed by Kant and Bentham in the eighteenth. In both instances we find some overlap, but also a lag-time of about a century between the thoroughgoing changes in natural philosophy and those in moral philosophy.

Why this sequence? In the first instance, the Greek gods were closely associated with the forms and forces of Nature. Zeus, for example, is a weather god. Alternative, naturalistic explanations of weather and other natural phenomena led to skepticism among sophisticated Greeks about the existence of the gods. But Zeus was also the institutor and enforcer of justice. So if there is no Zeus, why should we be just? – the overarching question of Plato's *Republic*. The first philosophical explanation of the origin and nature of justice (and ethics more generally) was, as noted, the social contract theory, a variation on which theme played practically all the so-called Sophists – including Thrasymachus in the first book of the *Republic*. And as I have also already noted, the moral ontology of the social contract theory – egoistic, externally related individuals colliding in a perpetual state of war, each with all, in a social vacuum – mirrors the physical ontology of the atomists: externally related bits of indivisible matter violently colliding in a physical vacuum.

The sequence is only slightly more complicated in the second instance. The Christian worldview had become entangled with

Aristotelian geocentric cosmology and dynamics, due in large part to the efforts of Thomas Aquinas in the thirteenth century. When the Earth was displaced from the center of the universe and then, as the sun became a star and the putatively infinite universe lost its center altogether, not only had Aristotelian dynamics lost its reference point – a center toward which earth moves and away from which fire moves and around which the ethereal heavenly bodies revolve – Christianity also lost its locations for heaven and hell. So again, religious skepticism ensued, which in turn led to moral skepticism – because God is the author and enforcer of the Ten Commandments and the lesser moral rules – and the need for a naturalistic theory of the origin and nature of ethics was again felt. And once more the same social contract theory, only slightly modified by Hobbes, filled the void. (Greek social contract theorists – such as Thrasymachus, if we are to believe Plato – thought that some were naturally stronger than others; and thus the strong would be reluctant signatories of the social contract, because it would deprive them of their natural prey. Hobbes insisted that – despite clear differences in strength, intelligence, and other natural endowments – all were sufficiently equal that no one could win the war of each against all; and therefore all should be willing signatories of the social contract.)

Given this clear historical pattern, the scientific revolution of the twentieth century should be followed with some overlap, but also after a lag time of about a century, by a revolution in moral philosophy. Evidence that this is occurring has been detectable for somewhere between a quarter and a half century in the environmental turn in various disciplines of the humanities reviewed here – environmental history, environmental philosophy, religion and ecology, ecotheology, ecocriticism, ecological economics. Further, in the two historical precedents, moral ontology mirrors natural ontology. And the ontology of the contemporary sciences appears to me to be more systemic, holistic, and internally related than in the Newtonian sciences. This of course is highly debatable. While, for example, ecology in biology is all these things, molecular biology appears to be more and more reductive and materialistic. With the advent of a second moment of environmental-crisis awareness – increasing awareness of the crisis of global climate change – the science thrust to the forefront of attention is biogeochemistry, which

reveals a Gaian Earth that is certainly systemic, holistic, internally related, and indeed self-organizing and self-regulating.

Finally, there is an even larger, more profound revolution afoot, the likes of which has occurred only once before in history, so we have a less reliable basis of anticipating its humanistic implications. This is a revolution in communications and information technology. The first such revolution was the shift from orality to literacy. A few humanists – Walter Ong, Eric Havelock, Marshall McLuhan, David Abram – have given it serious study. They generally conclude that the advent of literacy was accompanied by a profound shift in human consciousness – from a sense of community identity to personal identity and from mythic thought to abstract philosophical and scientific thought being the most salient. Why after all, did a Thales emerge in Greece, just when he did – neither earlier nor later – to be followed by a steady stream of natural philosophers and then moral philosophers? Because, answers Havelock (1986), the Greeks became literate; and, adds Abram (1996), the Greeks were the first to have a fully phonetic alphabet, enabling them perfectly and completely to supplant the oral word with the written word, in contrast to other emerging literate peoples. We are presently in the midst of another revolution in communications and information technology, from literacy to Googality – I'm sorry, but I cannot think of a better name. If these scholars are right about the transformation of human consciousness affected by the transition from orality to literacy, then another transformation of human consciousness may be forthcoming as we leave the linear world of letters and the privacy and intimacy of the one-way conversations we have with books, for the simultaneity, interconnectedness, and interactivity of the cyber world.

Comprehending, understanding, and making sense of all these things is the role of the humanities in creating a new consciousness in harmony with Nature – as I see it, as a humanist; and indeed as I have been doing it, as a humanist. But not only should humanists witness and testify to these changes, driven by science and communications and information technology, I believe that humanists are one of the main channels through which a new consciousness in harmony with Nature shall flow. Not only can we humanists articulate and interpret the wonderful new natural world that the sciences are revealing, we can even steer consciousness change in positive and hopeful ways. In

our collective cultural life, as in our individual personal lives, I believe in the power of optimism. A new collective consciousness in harmony with Nature will come about – if it does come about – partly through an inexorable historical dialectic, which has a life of its own, and partly because we humanists have tried with our historiographies, philosophies, theologies, and other scholarly endeavors to put saddles and reins on current currents of thought and steer them in the best directions that we can make out for them to go. And, as I am sure you can now tell, this essay is also an exercise in such humanistic optimism.

I began this essay by suggesting that the humanities forge a partnership with the sciences to create a new human consciousness in harmony with nature. From all I have written in it, one would suppose that the sciences need only go on, pretty much as they have, ignoring the humanities, and that the humanities should take the initiative to open themselves up to the wonders of the sciences. But it's not much of a partnership if all the reaching out is all one-sided. I have been primarily addressing my fellow humanists. Were I addressing scientists I would remind them of the origins of science in natural philosophy and that the high-end scientists – “the noble monarchs of the academy forest,” in Gary Snyder's idyll, “who come out with some unified theory or perhaps a new paradigm” – are still essentially natural philosophers, only now wearing a lab coat. I would point out the dynamic nature of science, rendering current “truths” at best provisional. I would argue that facts are theory-laden and theories are value-laden. I would note the insidious ways in which science is embedded in society and not immune from influence by social biases, politics, economics, and funding sources. Above all I would insist that claims to objectivity and value-free discourse are a pernicious and dangerous pretense. And finally, I would conclude that – for all these reasons and more – the sciences need to open themselves to the wonders of the humanities. But that's a topic for another essay.

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# Transforming Religious Discourse: Strategies of Hope

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I teach in a divinity school that offers a joint degree program with a school of environmental studies. Unnecessary or unthinkable in another era, offering simultaneous professional degrees in religious leadership and environmental management seems timely in ours. For this intersection of ecological and theological training indicates the difficult dimensions of the problems society now faces.

Consider that human development drives life-forms into extinction at epochal rates; that the provenance of everyday weather increasingly traces to human causes; that air and light pollution progressively obscure the night stars; that oceans which once seemed infinite with life can be made barren by our imprudence. Events of such historical moment seem to outstrip our received capacities for response. We have no traditions of wisdom for deciding the fate of a species or managing the climate. Such problems simultaneously challenge ecological and cultural integrity, and seem to bear ominous consequences for both environmental and spiritual health.

In another era signs such as disappearing creatures and dying fish, barren lands and blotted skies, might have been occasion for repentant change – for sackcloth and ashes, to use a biblical image. The Hebrew prophet Hosea warned his people that the consequences of a broken faith appear in the living world around them: “the land mourns . . . the wild animals and birds disappear, and even the fish of the sea perish.” (Hosea 4:3). In our era we see such omens, yet rarely interpret them as signs of ruptured covenant or a call to conversion. Working for social change therefore seems to require a new kind of prophetic vocation, guided by both ecological and moral expertise.

A host of sustainability discourse that we might call prophetic has already begun to appear. Among the many books in an expanding literature of ecological warning: Bill McKibben's *The End of Nature* (1989), Jared Diamond's *Collapse* (2005), James Lovelock's *The Revenge of Gaia* (2007), E. O. Wilson's *The Future of Life* (2002), and Gus Speth's *The Bridge at the End of the World* (2008). These are the contemporary heirs to Jeremiah, say Herman Daly, Robert Costanza, and Thomas Prugh in the introduction to their book, *The Local Politics of Global Sustainability* (2000). They represent prophets calling us to social and economic change, to a cultural conversion.

Yet hearts seem hardened against their words, for the prophetic warnings usually fail to provoke social and economic transformation. Rivers still run dry before reaching the sea, mountain ridges are "removed," species quietly disappear, migrations slowly thin, forests become emptier. We even look past injustice to our human neighbors in the racist distribution of environmental hazards, unfair control of ecological resources, and cultural violence by displacement. What explains the indifference?

When the Hebrew prophets wondered at brazen injustice, at the indifference of the wealthy to the poor (across more modest margins than ours), their usual diagnosis was idolatry. Call it the fallacy of misplaced devotion, if you like a less theistic phrase. Some prospect of their own making so captures the awe of a people that they become disconnected from their true promise, even as the land turns barren or their neighbor is "sold for a pair of sandals" (Amos 8:6). In Jean-Luc Marion's philosophical analysis, the idolatrous gaze has been fixated by its own reflected intensity on some object, and thus is the beholder bedazzled by the pseudo-divine reflection of her own adoration (Marion, 1991).

Our contemporary prophets wonder at indifference to losing worlds of mystery (from sea creatures to winged migrations to the night sky), and they often diagnose some tragically misplaced devotion. Perhaps the market has become repository of our hopes and longing, and now appears a fixating power. Awed by its dictates, we allow our neighbors to suffer for a pittance. Or perhaps it is the pseudo-divine persona of progress, beckoning societies to some unknowable fate, that blinds us to the sacrificed creatures. Or perhaps

it is bedazzling technological powers, offering their own proxy for participating in godly works.

Each of these explanations for humanity's indifference refers to some idolatry in which the health of the living Earth is no longer morally iconic. No longer does humanity recognize in the natural world a power to transform, judge, or reorient cultures. One of the most astonishing accomplishments of industrial modernity was this disenchantment of nature. By sacralizing human separation from the nonhuman world, societies were morally insulated from ecological portents. Wild animals and fish may disappear, the land may mourn, but these phenomena are concealed in our bedazzlement by other powers. "Disenchantment" may in fact be a misleading metaphor; Bronislaw Szerszynski (2005) argues that the western world produced a radical resacralization, making a new kind of sacred that allows technological progress to function as civil religion. Indifference, then, is not so much a moral lack as a devotional production, a kind of pious self-discipline required by the civil religion of economic progress.

If the obstacles to social transformation invite description by theological concepts, no wonder that sustainability advocates so often reach toward religious language: Lovelock appeals to "Gaia" and Speth to a "new consciousness;" both the Methodist McKibben (1994) and the atheist Wilson (2006) publish books with titles appealing to the concept of "creation;" the economist Daly joins with theologian John Cobb to invoke God's economy (Daly et al., 1994). For many, the challenge of sustainability seems to bear spiritual dimensions or invite religious registers of response.

Taking recourse to the religious, however, encounters certain perils. Religious traditions have been historical keepers and cultivators of wisdom, and sometimes sources for political justice and social transformation. But they have also been accomplices (witting and unwitting, and sometimes just dim-witted) to cultural bedazzlement, political violence, and social terrors. The western Christian traditions in particular lie entangled with the emergence of global cultures shaped by modern markets and technological progress.

All this – from epochal problems to social indifference to cultural entanglements – lies in the background of the need for "transforming religious discourse" – discourse with the capacity to change and sustain cultures. Understanding the role of religious discourse requires

understanding the relation between three kinds of transformation: (1) change within religious traditions; (2) change in discourse about religion and religious communities; and (3) transformative public uses of religious concepts. All three kinds are needed for sustainable social transformation, for they are mutually related within dynamics of religious and cultural change. But to see why and how we must first recognize a difficult paradox in working for dramatic social change.

### **RELIGION AND SOCIAL TRANSFORMATION**

While many factors promote and inhibit social change, from political structures to economic incentives to cultural values, one general fact about social change particularly contextualizes the challenge of sustainability: as the complexity of our problems outstrips the capacity of responses at the political and economic level, they force us to reflect upon the basic values implicit in our political and economic societies. For one common example, meaningful civil rights improvement in the United States required not only changed political structures but changed cultural attitudes as well (a moral transformation as incomplete as American social equity).

Moreover, when multiple complex problems seem related, or combine to produce a web of social threats, then the causes of the crisis push even deeper – beyond shared values to the fundamental stories that we live by. If, for example, the separate problems of environmental apartheid, biodiversity loss, and climate change are related through a characteristic pattern of living on earth, then the challenge of sustainability cannot be met without addressing that basic pattern. The deeper the roots of our problems, the more radical the change required.

So far, so familiar. That dynamic explains why many otherwise practically-minded professionals find themselves deliberating over how we can move “toward a new consciousness.” Faced with a deep social crisis, they sense also a crisis in our guiding narratives and stories, and look for resources for a new story. Since the root causes of the sustainability crisis seem to reach into our moral consciousness, so do the roots of response. This is why Thomas Berry (1988, 1999) calls the cultivation of a new cultural story the “great work” of our era.

That point often marks the entry of religion into deliberations. For not only do religious traditions currently tutor the moral consciousness of adherents around the world, they also have historically shaped many of the guiding values and patterns held in secular societies (Tucker and Grim, 2001; Tucker, 2002, 2003). This religious role of shaping moral consciousness offers ambivalent help, for it means religions stand as both resource and rival to movements for cultural transformation. Lynn White's famous 1967 thesis observes Christianity's historical role in shaping the western worldview and consequently traces the roots of ecological crises to theological ideas (White, 1967). The implication: any adequate response to ecological problems will require reforming the axioms that drive exploitative cultural practices. On this view, cultural change requires changing religious cosmologies.

Seeking sources of cultural change, scholars and activists have vigorously debated the ecological culpability and promise of Christianity, as well as global, indigenous, and emerging religions of every sort. For insofar as ecological challenges indicate the need for a new consciousness or new cosmology, questions of a religious register become nearly unavoidable. How should we live on earth? What does a just and sustainable world look like? What really sustains us? What manner of consideration do we owe our fellow creatures? What do we owe the future? What purpose or destiny does human consciousness seek?

Those questions bend toward matters of ultimate concern, and the answers often appeal to religious vocabularies or cosmologies. For some, that means retrieving or reconstructing one of the global traditions. For others it means learning anew from the wisdom of indigenous cosmologies, generating new forms of nature-based spirituality, and/or recasting the human narrative through reflection on the evolutionary story. Some may borrow from multiple traditions and cultural sources in order to combine the most useful moral values, metaphors, and concepts. Whatever the mode of religious engagement, the basic task remains similar: meet the deep challenge of sustainability by renewing and transforming humanity's moral capacities.

All this ferment excites religion scholars and social activists, and offers revitalizing opportunities for theological traditions. However, there lies a significant tradeoff in the reformist's recourse to religious

talk: the deeper the roots of a problem, the more difficult it is to excavate them. That holds true in two senses. First, change at legislative and economic levels will usually be easier to achieve than transformations in consciousness. Religious ideas are notoriously difficult to uproot or redirect. Second, our fundamental narratives or worldviews provide the very conditions for perceiving and responding to new social problems. So how do we criticize the landscape of our moral consciousness without undermining its capacities for making sense of the crisis?

In other words, diagnosing the deep roots of a sustainability crisis produces a wicked paradox. Insofar as we let ecological problems call into question the stories people live by, we lose the ability to make those problems intelligible and urgent within lived moral cosmologies. In the case of my own tradition, if the roots of modern environmental exploitation lie in Christianity's story of salvation, then the contemporary reformer has a double task in relation to Christian communities: in order to help them adequately respond to ecological problems she must also convince them to reject or reorder the story by which they make sense of their lives. But if that story constructs, orients, and animates their moral perception in the first place, they may trim their understanding of the crisis to their story's received abilities to make sense of it, rather than let new social problems reconstruct their beliefs and practices. For those beliefs and practices support some way of inhabiting the world that lets them continue to make sense of it and provides the capacity to respond to problems within it (Jenkins, 2008).

So too for any other basic guiding story. The more comprehensive a crisis becomes for a moral cosmology, the less it can present itself as a real, actionable problem. Pierre Bourdieu describes how a cultural "*habitus*" (a structure of action through which a culture interprets and reproduces its relations to the world) constitutes an issue as a problem only because the *habitus* already contains the principle of the problem's solution. In regard to issues for which it has no competency, says Bourdieu, the *habitus* will rather produce information to avoid knowing about it – what he calls "avoidance strategies." (Bourdieu, 1990). Niklas Luhmann makes the point at a different level: the communication structure of a society cannot produce the "resonance" needed to generate responses compre-

hensive threats. A problem that threatens everything never becomes problematic in relation to any of the structures by which we learn to recognize something as a threat (Luhman, 1989).

Thus the wicked paradox: the more comprehensive the threat, the less capable our moral capacities for recognizing it and responding. So how to create comprehensive social change? How can we move toward a new consciousness? In the case of sustainability, I think, “changing the religious discourse” in all three senses can help meet the paradox by producing more robust cultural capacities for recognizing complex threats and developing creative strategies of response.

### **CHANGING RELIGIOUS TRADITIONS**

Effective transformation toward a sustainable society requires ongoing change from religious communities, in several ways. Structural transitions will require the political support of religious constituencies, which may entail winning the moral support of religious leaders. Transforming a culture’s ecological consciousness will need contributions from the social imagination, spiritual practices, and self-commitments cultivated by faith traditions. Yet in all those aspects religious communities often lag behind the movement for sustainability, as they still proclaim and enact stories impoverished of the earth. Indeed, some religious communities seem exceptionally skilled in producing “avoidance strategies.” So, mindful of the paradox of crisis, how to press religious communities for change without overwhelming their ability to respond at all?

We can begin by identifying the capabilities a specific religious tradition already possesses for appropriating new problems and generating responses. The great faith traditions do not live by static reproductions but rather continually regenerate themselves in relation with the world around them. Even as they seek to protect their accounts of historical events and scriptures, they reshape their practices and reiterate their messages in response to arising challenges. The most significant challenges – from a rival belief system, new understanding of the cosmos, or new ethical problem – help stimulate lively internal arguments over the tradition’s central meaning. (Mary Evelyn Tucker says we might think of them more like



“processes” than traditions (Tucker, 2003: 12)). Those arguments and the changes they produce may happen through practices and negotiations only fully apparent to the insider. The Islamic legal scholar Wael Hallaq has shown how principles of jurisprudence protect historical values by creating conditions for the adaptive evolution of Islamic law. The Sunni moral cosmology has expanded and adapted over history, Hallaq argues, by following rules for incorporating new problems into authoritative patterns of moral reasoning. They may appear defensive and static to outsiders, but those rules, Hallaq shows, initiate processes of change precisely by working to preserve religious authority in the face of new challenges (Hallaq, 2001).

Hallaq’s close analysis of Sunni schools of legal thought demonstrates a general characteristic of adaptive religious change: religious communities tend to make new problems morally important by locating them within a carefully constructed dynamic of continuity and reform. Religions make new problems exercise an authoritative claim on human action by locating them within wider patterns of moral commitment, and thereby reaffirm and reconstruct those core commitments. The ability to generate change therefore helps make new problems morally important for religious adherents and secures the vitality and authority of the tradition itself.

The global religious traditions thus exhibit both adaptive and conservative capacities; they appropriate new ethical challenges in order to reaffirm and protect basic commitments. They may share an analogous temperament in that way with indigenous religions, which often seek to conserve ancient wisdom through adaptive responses to changes in the landscape. But there is a crucial difference between the two: whereas the global religions pay close attention to a changing moral or political landscape often disconnected from any particular place, many indigenous religious communities pay close attention to changes in their own bioregions. One tremendous challenge that the sustainability transformation poses to the global traditions lies in reconnecting their moral and ecological landscapes, so that they are as responsive to their earthly context as are many indigenous religions.

That challenge to the global religions may also present an unprecedented interfaith opportunity for reconciliation between global faiths and indigenous traditions. For in order to meet the

problems of an ecological age with the resources of their faith traditions, the global religions must find ways to re-establish cognitive relations with nature – mindful, reflexive relations with the ability to reconfigure moral reasoning, renew spirituality, revitalize ritual, and even restore their sense of the divine (Gilkey, 1993; Gustafson, 1994). Much of this the global religions might learn from humble listening to indigenous cosmologies (for a start, see Lathrop, 2003). American Indian theologian George Tinker writes that sustainability crises show colonized members of a tradition transformative gifts that they can give to the global colonizing traditions. Summarizing broad themes of regional liberation theologians, he writes: “Indigenous peoples stand in opposition to the globalization of the new world order of late capitalism, against mass consumption, against the exploitation of our land, against ecological devastation that particularly affects poor communities and communities of color, against the devaluation of women, and against the devaluation and exploitation of any human being. Indigenous cultures present us with the beginnings of a new, critical paradigm that could generate a liberative force” (Tinker, 2008, 2004). A Christianity of solidarity with all creation and deep sensitivity to particular lands would require dramatic change, but because of Christian indigenous communities, it is not impossible to imagine. Already networks of Christian indigenous communities find that they play an increasingly important role tutoring that tradition’s understanding of and witness to sustainability. For one example, the Gwich’in people of northern Alaska have taught Episcopalians to pay attention to the entire social ecology of oil exploitation, and its cultural consequences (see Grau, 2007).

The conditions for listening to these indigenous witnesses include not only repentant respect for their cultural dignity, but also recovering the ability to listen respectfully to the living world. Some non-indigenous Christian communities already represent kinds of moral responsiveness to land and ecology. Exemplifying the range of adaptation in conservative and progressive stances toward tradition, consider two (quite different) examples of minority Christian communities. Amish communities around the world, once viewed as outliers to civilization, are now increasingly respected and even studied for the wise patterns of their sustainable farming and simple living. Often pushed to marginal lands and isolated by political persecution,

they have learned how to cultivate the abundance of a place while selectively adopting only those technological practices fit for the social good of their community (Redekop, 2000; Kline, 1990; Peterson, 2005).

Exhibiting a more revisionary temperament, a network of “green sisters” – women’s Catholic religious communities – has been ecologically overhauling everything from their buildings to their liturgies in order to re-inhabit both their tradition of faith and their place on earth. As they do, their vocations are reshaped by their relations to soils, gardens, and forests, and their experience of earth reshapes their experience of God (Taylor, 2007). The two communities exhibit unique patterns of adaptation, but each in its own way listens to the earth while self-critically governing the logic of change with reflection on the sources of their faith.

In order to stimulate this sort of land-shaped change, to contemplate global faiths becoming native again to earth community, we must understand the various incremental processes of reform at work in different religious traditions. As Hallaq shows, in order to make ecological problems matter for a religious community, we must know about that community’s patterns of practical reasoning, their processes of moral authority, and their ways or negotiating change. Those beliefs, practices, symbols, or stories closest to the heart of a tradition’s faith will determine that tradition’s operational pragmatics – its capacity for producing internal change and making proposals for broader cultural change (Ward, 2005). Reform movements within a tradition therefore tend to make new social problems intelligible, urgent, and disturbing for religious traditions by inscribing them within central beliefs and practices, attempting to stimulate that tradition’s logic of change.

Successful grassroots initiatives within religious communities often exhibit a native fluency with these parochial grammars of change. Consider the emergence of Christian environmentalisms in the United States in the past two decades. Their most remarkable feature is not so much the surprise of their existence, but their diversity: styles of Christian environmentalism proliferate, and they seem to correspond to the major patterns of Christian faith. Catholic initiatives tend to incorporate a sacramental respect for the earth along with deliberation over the common good of all creatures; they do so because participation in sacraments and a community of the

common good shape their experience of faith. Evangelical initiatives, for a different example, tend to privilege the trope of stewardship because it frames environmental problems within personal relationship with God, and thus as an aspect of following Jesus Christ. Environmental justice projects, in another style, tend to appeal to the environmental dimensions of human dignity because doing so illuminates new terrain in God's movement of liberation for the oppressed (Jenkins, 2008).

A first step in changing religious communities, therefore, begins in attending to the movements already at work within them. By interpreting grassroots projects as strategic religious productions, the successful ones will point toward the most powerful grammars or processes in their tradition for effecting authoritative change. Internal reform movements often can help identify the possibilities for transformation resident within a religious tradition, and the most effective ways toward realizing them.

That is merely where to begin, however; for these native steps toward change may fall well short of what an adequate response to sustainability actually requires. Stewardship may succeed in getting climate change on the table of ethical concerns, for example, but fail to generate support for the broader structural changes required for meaningful response. Indeed, insofar as it promotes an individualist approach of personal responsibility to a global, structural problem, or retains managerial metaphors of humanity's ecological dominance, stewardship discourse may still support the moral consciousness at root of the crisis.

In that case, religious change requires ongoing cultivation and critique, to keep the gap between a tradition's moral response and society's practical problems productive of ongoing religious reform. Effective criticism can make that gap press religious communities to produce new strategies of social action (see Jenkins, 2009). Here lies an important role for critical, public engagement with religious communities. The religious traditions hosting some of the most promising and rich resources for a new consciousness need critical interfaith and public engagement in order to stimulate and sustain their processes of creative reform. (The Forum on Religion and Ecology has organized a major network for public engagement; see [www.yale.edu/religionandecology](http://www.yale.edu/religionandecology)). That leads to the second meaning

of “transforming religious discourse:” changing how the environmentalist public understands and engages religion.

### **CHANGING ATTITUDES TOWARD RELIGION**

In a disconcerting conclusion to his history of Islamic legal theory, Hallaq writes that the challenges of globalizing modernity now facing Islam exceed its traditional mechanisms of reform. In his view, the power of Islamic jurisprudence to create processes of authoritative change cannot meet the scope of the crisis presented by its modern encounter with the west (Hallaq, 1997). Right or wrong about Islam and modernity, Hallaq’s view raises two major points about religious change. First, some crises – especially those of unprecedented scope and complexity – may outstrip the capacity of religious traditions to produce adequate moral responses. Second, some cultural contexts will be more conducive to promoting the processes of religious reform than others. The case could be made that if the major processes of Sunni legal reform have been closed down before the challenge of modernity, the blunt hostility of western political engagement with the Islamic world may be partly to blame.

In the case of sustainability, the first point remains an open question. Since religious responses to environmental problems have only begun to develop their strategies, they may yet move in deeper, richer, more adequate directions. The evangelical response to climate change may yet develop its theology of faithful responsibility into constructive support for meaningful political and economic change, or into a more ecological sensibility of human personhood.

The ability of religious responses to develop in those ways, however, depends in part on the second point: the public context in which they develop their strategies. Internal movements for change are conditioned by how the community relates to the world beyond its fellowship. Here two kinds of confrontation are especially crucial. First, the stark reality of environmental and human distress must be held continually before the community, so that the tension between its moral capacities and the earth’s problems generates meaningful reform. Second, unproductive cultural tensions cannot be allowed to distract or excuse the community from its reform processes. Rivalrous enmity between religions, or the “clash of civilizations,” or the so-

called “culture war” between alternative moral sensibilities, or contests with the new “cultured despisers of religion” – all these can absorb the social engagement of a religious community and stall its processes of reform. (“Clash of civilizations” refers to the unfortunately popular thesis of Samuel Huntington; “culture wars” to that of James Davison Hunter. The theologian Friedrich Schleiermacher wrote *On Religion: Speeches to its Cultured Despisers* in 1799 as an apologetic work for the cultural vanguard of his day).

To avoid unproductive, stalling engagements, some of the sustainability discourse *about* religious communities needs to change. Too often religion appears in environmentalist writings as an inevitably conservative drag on sustainability reforms. Other times it is dismissed as the root of ecological problems in the first place. Perhaps because of these two perceptions, the few public alliances among environmental groups and religious communities often seem awkward alliances of political constituencies rather than cooperative movements toward transforming culture.

Both perceptions could be made more useful for cultivating religious and social change. First, if adaptive religious change happens through re-inhabitations of the central commitments of a tradition, then at least some “conservative” tendencies empower reformist movements. The “Evangelical Declaration on the Care of Creation,” for example, begins in confession of Jesus Christ as Savior – a rather conservative, even confrontational, opening move it would seem (see the Declaration at: <http://www.creationcare.org/resources/declaration.php>). But notice the practical accomplishment of that confession: it allows the Declaration to reframe environmental problems as matters of sin and faithful obedience, and therefore intelligible within the evangelical moral landscape. It creates a first step toward the possibility of a faith allied to the plight of the earth, and implies at least minimal ecological conditions for authentic political governance. Recognizing this move as an innovative first step toward a renewed consciousness – not merely the parochial vocabulary of a political identification – the environmentalist public can focus on its practical adequacy and ecological promise. Therein lies the most productive arena for critique.

The second perception, that religions have caused the crisis, may well be right: if the roots of ecological problems lie in the roots of our

moral consciousness, then religions may be to blame. Western Christianity especially stands accomplice to some bad stories of transcendence and their disenchantment of the natural world, as well as to displacement of indigenous cultures that knew better. Yet precisely because of that causal culpability, religious engagement remains crucial. Insofar as sustainability problems have religious roots, then projects for cultural transformation cannot afford to dismiss the role of religious communities. As Lynn White noted, if religion explains the problem, it also bears the solution. White's analysis seems simplistic on both counts (causes and solutions seem more complex), but it does point to another important paradox: the very reason for dismissing religious communities is also reason for substantively engaging them. Religious thought shapes the terrains of moral consciousness that we have all inherited and therefore influences the social economies which fit us in relations with nature's economy.

Moreover, because religious traditions can generate processes of moral change at once imaginative and authoritative, breezy dismissals of belief may be the most counterproductive stance toward the unsustainable values held by some religious communities. For as participants in the traditions of a culture's moral inheritances, communities of faith can act as innovative, savvy agents of reform. Yet if not taken seriously, if dismissed and isolated, these communities may not sense the moral tension necessary to inaugurate those regenerative processes, or may spend their social energies in unproductive culture wars instead.

By recognizing how religious communities develop moral reform, environmental groups can encourage, empower, and critique their efforts in several ways. First, they can keep clear descriptions of environmental problems before the vision of the community and openly ask how they will respond. This creates a practical tension for the community as it seeks out its tradition's capacities of moral response. Second, they can supply reliable informational resources to community-based initiatives. Even well-educated and motivated members may not possess confident ecological knowledge or an understanding of scientific methods. Faith communities often wonder where to find accessible outlets for scientific description, useful primers on sustainability issues, and how to assess the

information that does come before them. Then, with the problem reliably described, public advocacy groups achieve a third level of engagement: by criticizing the gap between the community's response and the problems it faces, it can help cultivate further change. These critiques can point out how a community's responses remain practically inadequate, and may propose alternative practices.

Building this kind of civic trust in appreciation for religious processes of moral reform, environmental groups can change their own religious discourse – from exasperation or expediency to imaginative cooperation. By perceiving religious groups as responsive, dynamic, regenerative moral communities, rather than (merely) troublesome political constituencies, environmental groups can create opportunities for deep change to happen. In conditions of understanding and criticism, they may even be able to invite religious communities into experiences that facilitate spiritual renewal and moral imagination.

For example, sustainability advocates can invite faith communities to directly observe environmental problems, in trust that regenerative moral reflection will begin to happen in consequence. Offer them flights over mountain-top removal mining in Appalachia. Take them to villages sinking into permafrost. Have a naturalist explain the changes wrought by invasive species, or recount declines in bird migrations. Offer a toxic tour through an environmentally racist landscape. Organize parishes for riverbank restoration or help them find grants for urban gardening – anything that invites them to rediscover the ecology of their faith. These experiences will help ground and inspire the community-based initiatives that often drive religious change. Members discover and invent the nascent ethical possibilities in their faith communities as they interpret transformative experiences within their vocabulary of fundamental experience.

Finally, non-governmental organizations focused on conservation and sustainable development could work much more effectively with religious organizations. All around the world, faith communities find themselves facing imperious political ecologies and many have independently generated resistance and restorative strategies. In a poignant bid of desperation, a now famous community of Thai monks ordained trees to protect them from logging. Less well-known, there are church-organized greenbelt initiatives, mosque-authorized marine conservation programs, and interfaith anti-mining efforts.



Many struggle to connect with the political, financial, and informational resources that NGOs can offer. There are precedents. In the human development arenas of microdevelopment and human rights protection, there are many successful models of NGO cooperation with faith communities. For sustainability NGOs it seems only a matter of changing their religious discourse to develop similar cooperative ventures.

### **VOCABULARIES OF TRANSFORMATION**

I have argued that fostering a spirit of sustainability requires change within religious traditions as well as change in civic approaches to religious communities. These two kinds of change invite a third: a new public and interdisciplinary engagement between environmental and religious thought. Constructively engaging the religious concepts and spiritual registers that regularly attend civic discussion of sustainability can stimulate more imaginative cultural conversations with deeper possibilities for civic transformation.

I began this chapter recalling senses of disenchantment and the specter of destructive idolatries. Insofar as those are shared perceptions, desecration and idolatry function as public religious concepts. They work to illuminate complex, deep roots of an eco-social crisis. They name the spiritual dimensions of environmental problems like dead zones and species loss, implying that they threaten essential, life-quickening relations with the natural world. Using religious concepts – even outside particular religious contexts – can invoke an innate, ultimately significant connection with the natural world (Gottlieb, 2006).

If disruption of that root connection lies behind environmental problems, no wonder that public environmental speech so often adopts religious metaphors or registers. For religious speech can make ordinary news of degraded ecologies bear extraordinary meanings: infidelity to creation, a divine covenant ruptured, a trust betrayed, or a mystery impoverished. With no specifically religious intention, a conservationist borrows from theological meanings when she describes a forest as a temple, a mountain as holy, or a region of biodiversity as sacred. A scientist otherwise inclined to sociobiological description will, when impelled to describe the

human connection to nature, talk of “the gravitational pull of the natural world on our spirit, and on our souls” (Wilson, 2006). Saving nature and saving human souls seems to go organically together. Even *Orion* – a journal generally circumspect of the official faiths – shows that sustainability talk of “idols,” “altar calls,” and “conversion” is more than rhetorical irony when a prize-winning essay focuses on “the sense of timelessness, of ritual and grace” in pelican flight. The author makes it clear he takes the metaphors seriously, for he discovers in pelican grace a moral for how humans find their own (Gessner, 2006).

Historian Thomas Dunlap argues that American environmentalism has so many functional analogues that it can be analyzed as a religious movement. It seems to possess its own grammar of sin and salvation, membership and mission. It offers complex moral guidelines for those seeking to change their ways; it orients the moral life around a central spiritual relationship with a divine character (nature); it even mobilizes for the sake of its own kind of holy lands (Dunlap, 2004; for alternative accounts of the religious roots of American environmental thought, Merchant, 2003 and Stoll, 1997). Dunlap makes a controversial and provocative claim, one perhaps too easily seized by anti-green ideologues; but he does call attention to the quasi-religious discourse that attends civic environmental discussion.

Not all of the environmental religious discourse, after all, serves the sustainability movement. When government officials are pressed to speak about humanity’s ecological role and responsibility, they invariably deploy the notion of stewardship. Absorptive of nearly any political agenda, the concept pleases for its wide, thin religious roots (Palmer, 2006). Opponents of sustainability measures may appeal to “dominion” or “vice-regency” – concepts also derived from the Abrahamic scriptures.

Whatever its political intent, all this public religious discourse about the environment invites deliberation over what it does and how it comes to mean new things when put to new uses. That should at least occasion analysis about how religious concepts shape civic culture, for better or worse. Thinking of both public strategy and theological analysis, I opened a book on environmental ethics and Christian theology with quotations of salvation talk from great American nature-writers:

“Consider how commonly nature writers reach for a salvific metaphor to communicate the power of an environmental experience. Of course, the rapturous John Muir, who saw cathedrals in the forest and choirs in the storms, and who put the words of Jesus into the mouths of trees, often did. His register was blatantly soteriological (“I pressed Yosemite upon him like a missionary offering the gospel”). I have in mind the more subtle reaches of down-to-earth environmental writers, like the scientist Rachel Carson: “There is something infinitely healing in the repeated refrains of nature.” Or the usually plainspoken forester Aldo Leopold; when explaining what he learned from “the fierce green fire” in a wolf’s eyes and from trying to “think like a mountain,” Leopold misquotes Thoreau’s dictum, “In wildness is the preservation of the world,” to say “In wildness is the *salvation* of the world.” He immediately goes on to say that “this is the hidden meaning of the wolf, long known to mountains.”

“Contemporary environmental writers do this too. Scott Russell Sanders writes that encountering nature involves a kind of faith “in the healing energy of wildness, in the holiness of creation. One of the reasons many of us keep going back to Thoreau and Muir and Leopold and Carson is because they kept that faith.” Environmental writing seems to dwell within the literatures of faith, as is attested by the fact that an editor would ask the nature writer Barry Lopez to introduce an anthology of spiritual writing. Lopez does so by focusing on the cultivation of reverence, which allows a landscape to enter and elevate a person. Humans are “creatures in search of...a pattern of grace,” writes Lopez elsewhere. When “the land gets inside of us,” says Lopez, those patterns of grace are crucial for deciding what we will do about it.”

“These writers seem to sense that they hold a sacred trust, remembering forms of holiness and salves of healing nearly forgotten by an alienated world. Terry Tempest Williams: “There is a holy place in the salt desert, where egrets hover like angels...I am hidden and saved from the outside world.” Even David Gessner, who professes to be sick of pious writing about nature, cannot help saying in the concluding words of one

book, “If we look for it, we will find that a whole world is waiting for us. And it is in that world that we, not seeking it, will find a sort of salvation. Some of our best environmental writers exhibit an organic reach toward grace” (Jenkins, 2008).

However indisposed these writers may be toward institutional religions, their adoption of grace talk creates an arena for public theological engagement. Finding shared vocabularies in classic environmental writing and in classic theological narratives gave me license to explore afresh Christian theologies of grace, with an eye toward their role in constructing civic environmental strategies. Maybe environmental studies and religious studies can learn something about effective sustainability discourse from one another.

Citizens in a pluralist democracy have reason to worry about religious language in public; bringing religious discourse into the public square always involves a calculated risk. Religious discourse can powerfully illuminate corruptions at the root of civil society and inspire hopeful movements to reform them. But it can also alienate citizens from one another and threaten the foundations of civic life. All the more reason for attending very carefully to religious discourse, especially where vocabularies overlap among political actors.

Those who reach for religious vocabularies may learn how to wield them more effectively by paying attention to religious grammars, to the operational relations among concepts developed into strategies of life by religious traditions. For example, civic environmental leaders often seem hesitant and awkward about connecting personal sacrifice and social sustainability. They might do better with some lessons from the theologies of spiritual practice. There they could find psychologically effective patterns for linking self-discipline and hope, voluntary simplicity and joy. Elements of sacrifice make up most views of cultivating the spiritual life. Recent sermons from leaders in the Eastern Orthodox churches go a step further, proclaiming that “ecological asceticism” is not only good for our souls and good for the earth, but a way of being trained to see the beauty of creation. Even without accepting the doctrinal background to such sermons, learning the analogical moves would be useful. The reason John Muir was so powerful a rhetorician of the sublime, able to connect natural beauty to the human soul, was in part because he was thoroughly (if roughly) schooled in scriptural theology as a child.

In other words, theological traditions can demonstrate how to do interesting things with public concepts. Specifically, they can show how to claim that the ways into living sustainably move us closer into the heart of knowing what actually sustains us. Understanding and naming the goods of Earth may be tied to openness to the unnameable; lamentation for injustice and loss may arise from faith in justice and healing; commitments to beauty may emerge from practices of self-sacrifice. This capacity of theological reasoning, to tie moral practices into a participatory vision of the deep goods in life, can create productive analogies for other forms of public discourse. At the least, it can cultivate commitments to science-based processes of sustainable reform, making adaptive management schemes function as transformative cultural projects.

Consider, for example, how theological reasoning might help public deliberation over ecological restoration projects. While restoration might seem to merely involve regenerating natural processes, the practice is beset by controversies over manufacturing landscapes, inventing memories, falsifying reality, and justifying exploitation (Elliott, 1997; Katz, 2002). Observing the conceptual connection of restoration with salvific metaphors, we might ask if the logic of forgiveness could help us think through the controversies. In most Christian traditions, the notion of forgiveness involves the recognition of sin, the experience of reality made hopeful again, memory transformed, and the future opened in recommitted relationship. Those theological markers govern against thinking of forgiveness as easy justification for wrongdoing or magical erasure of personal history, while maintaining a sense of brokenness made right and the past turned anew toward the future. (Consider, for example, reading restoration controversies with Desmond Tutu's *No Future Without Forgiveness* or Miroslav Volf's *Free of Charge: Giving and Forgiving in a Culture Stripped of Grace*.) For the practice of ecological restoration, reflecting on forgiveness might then offer ideas for talking about biodiversity loss in relation to regenerating nature, remembering past scars and looking forward to hopeful relations, admitting fault and recovering relationship. Theologies of forgiveness may exhibit a grammar of hope for renewing the face of the land, and offer a discourse that helps a public imagine the culturally transformative potential of restoring its landscapes.

With the concept of forgiveness we have now come near the religious idea most likely to attract ecological suspicion: salvation. Promising transcendence, notions of salvation seem to invite humans to think of themselves as otherworldly sojourners and hallowed pilgrims indifferently moving through the world, rather than responsible residents and plain members of a land community. It can make humans forget their biological kinship with fellow creatures and suppose earth exists for the taking. As theologian Rosemary Radford Ruether has shown, the western technocratic project might well be interpreted as a grotesque salvation project: humans trying to grasp transcendence by making the domination of nature a spiritualizing exercise (Ruether, 1995).

Yet remember Muir and Carson, Lopez and Thoreau: notions of grace can also invoke the ways nature heals, grounds, embodies, and sustains us. Remember Leopold and Gessner: we may find no better name for the way nature can rescue us from our grotesque projects than “salvation.” The theological and environmental rhetorics serve different stories undoubtedly, but they share a common aim: conversion. It might be worth considering, then, how theological grammars of grace work, in order to see if there are analogous moral functions useful for the transition to a sustainable society.

Observing the radical transformation that achieving a sustainable culture seems to require, Gus Speth (2008) asks: “Can an entire society have a conversion experience?” (Speth, 2008). If the transition requires more reform than our political commitments and social values can generate, if it anticipates change beyond what seems humanly possible or culturally imaginable, then looking toward salvation might indeed bear some relevance. For insofar as salvation describes the experience of conversion, it develops a logic for a peculiar kind of event, at once fully human and fully other, fully cultural and yet somehow different, wholly natural and yet transcendently new. However wild and irrational it seems, there is a logic to conversion: a person or a society becomes a new creation, made whole within by being claimed from without. Anticipating the unexpected becomes then a theological task, naming and calling others into an existential stance of waiting and turning, hoping and doing.

Within Christianity, part of that theological task involves describing the conditions for the experience of conversion. One of

those conditions is a certain kind of relationship between nature and grace. In fact, the phrase “nature and grace” stands for some of the grand arguments among Christian traditions about how to describe the experience of God. One of the most important assumptions, put differently by various theological communities but almost universally shared: nature and grace are never exclusive concepts. They are inclusive, beyond symbiotic or even synergistic, they realize and actualize one another. The more grace, the more natural; the more natural, the more full of grace. Muir knew that logic and put it to public work: for Muir, nature offers grace and grace teaches us how to see nature. In their unity is the mystery, enchantment, and power of earth’s intimacy with us. In their distinction is the possibility of transformation, the ability to be called out of ourselves, beyond what we can expect, into a new kind of relationship.

Now suppose the logic of “nature and grace” informs our sense of the possibility of social conversion. We cannot force or predict truly radical transformation, but we can anticipate the unexpectable by describing conditions for waiting and hoping. Let “sustainability” stand in for theological description of the conditions for “salvation,” and we may find an existential pattern of anticipation. In theology, the logic of salvation falls apart if grace overwhelms and obliterates nature, as it does if nature and grace appear as two alien worlds. Under those conditions, it is much harder to anticipate conversion. So too for sustainability: the relation of ecology and culture can be neither dominant nor disconnected. But where the relation is mutually actualizing, where social experience and ecological experience reflect one another, where cultures are shaped by a responsiveness to their lands and societies listen to the voices of creatures, there we can anticipate conversion to sustainability. That helps explain why learning to listen to the earth – in so many cultural, political, economic, and personal ways – forms “the great work” of our cultural era (Berry, 1999).

Thinking about grace this way lends an anticipatory hope to all the little works of building sustainable culture. Practices like urban gardening, habitat restoration, or biophilic design help create the conditions for radical change. For they become ways to participate in hope, empowering the social ability to keep imagining and working in anticipation of the unexpectable: that a whole society would turn

away from death and choose life. Understood as practices of grace, all these little works – from taking children on bird walks to eating from one’s own watershed – become ways of enacting prophetic witness. So understood, we see how they form in us a pattern of salvation, cultivating habits of wonder and awe before the Earth, even from within the midst of anger and lament over its degradation (see Smith, 2001). Practices as a pattern of grace, these little works of love and hope for the earth community become “second nature” to us.

I have argued here for open examination of grace concepts. Others have renewed discussion of other public theological concepts. John Cobb and Herman Daly (1994), for example, have proposed reclaiming anthropology for sustainable communities by reopening the theological dimensions of personhood and economy. Anna Primavesi (2001) has drawn attention to the nexus of thinking around creativity, Gaia, and evolution to open public theological reconsideration of gift concept. Interdisciplinary discussions about the intersection of place, culture, and spirituality have also begun to develop (see, for example, Gorringer, 2002; Plumwood, 2002; Inge, 2003).

The point to all this religious talk is that, in face of the need for complex and radical cultural reexamination, open theological discussion can help cultivate imaginative and effective social strategies. Paying attention to theological traditions offers guidance for how to avoid mere appropriation of religious symbols and values, as if so many fungible resources, and instead discover the strategies of action that make those resources produce new cultural possibilities.

This kind of open, public theological interaction can help the civic prophets of sustainability describe rich patterns of ecological community and economic common good. It can also help religious communities recognize more fully how the ecological crisis represents a crisis in their faiths. For if they cannot explain how their message matters for this moment of peril for the community of life, then they no longer possess a sustaining story, no longer have anything worth saying in public. For both our religious and civic prophets, therefore, collaboratively examining the religious and spiritual vocabularies they may share can deepen and renew the discourse of each. It may also help prepare and orient society toward the possibility of transformation.



## CONCLUSION

I have discussed three related senses of transforming religious discourse, and have argued that we need all three to produce and sustain social hope. Along the way I have made theological discourse appear much more ecological than the practice of many Christians believeth. Clearly there is nothing about simply knowing their story that makes Christians or other religious folk more apt to live intimately with the earth. Working in a divinity school, I can attest that it often seems to work just the other way: many of those who make it their vocation to learn and rehearse the tradition's narratives of God's way with the world seem to harbor hearts hardened against the earth's graces. Part of the task of theological education now involves reanimating the stories of grace by reterrestrializing them, so that Earth seems more kin with the flesh of God, and so apt for the experience of God.

In divinity school we talk about "cultivating the pastoral imagination," or training leaders to find practical ways to make everyday worlds come alive within the experience of faith. Theological schools are slowly learning that the pastoral imagination remains incomplete without the ecological. And it may be that the ecological imagination will remain incomplete without something like the pastoral – the ability to speak to the most essential, heart-orienting, life-quickenning relations of the human experience. It is not, after all, for lack of prophets that we suffer, but for inability to come alive to the graces of life on earth. For those we need to learn the practical strategies of cultural conversion – the habits that open us to receive graces not our own.

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# Religious Transformation in an Ecological Key

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As reported in the Millennium Ecosystem Assessment (2005), we humans are destroying the life-support systems of the Earth at an alarming rate. The data keeps pouring in that we are altering the climate and toxifying the air, water, and soil of the planet so that the health of humans and other species is at risk. The explosion of population into the 21<sup>st</sup> century to more than 6.8 billion and the subsequent demands on the natural world are on a collision course.

Along with this population expansion, consumption appears to have become not simply a means for satisfying the basic needs of life but an ideology or quasi-religion. Faith in economic growth drives both producers and consumers. Their production and consumption are likened to a therapeutic act, or quasi-religious ritual, culminating in the local mall as church. Consequently, we are consuming the resources of the planet – faster than its ability to regenerate – even as we gasp in congested lanes of acquisition and expenditure.

This convergence of our unlimited demands with an unquestioned faith in economic progress raises questions about the roles of religions in relation to encouraging, discouraging, or ignoring our dominant drive towards satisfying material needs.

Moreover, our all-consuming worldview relies upon and legitimates rational, analytical ways of knowing. Support for a consumerist ideology depends upon and simultaneously contributes to a worldview based on the instrumental rationality of the human. In this worldview rational choice is seen as that realm of commonsense in which both the world and human demands on the world are laid out as commensurate, equal realities that confront decision-makers. That is, in this rational scheme the assumption for decision-making is that all choices are equally clear and measurable. According to that perspective, the

challenge is to find a common metric for evaluating the quantitative differences among the relevant factors. Different values are integrated into this metric by assuming that all values are relative and that trade-offs are made between these values in order to arrive at a choice.

The metrics used may vary, but in the current market-driven worldview such metrics as price, utility, or efficiency are dominant. This can result in such diverse views of a forest, for example, as so much board-feet or as a mechanistic complex of ecological systems that provide previously unmeasured services to the human. In environmental policy, ecosystem services and cost-benefit analysis have been used as metrics to determine how a plant or animal species contributes to human welfare in a quantifiable way. These modes of commensuration may provide invaluable bridges into the business community for bringing environmental issues onto their table for serious consideration. Moreover, ecosystem services analysis certainly manifests a form of the transformation of consciousness urgently needed at this time. However, it is also important to ask if such rational perspectives that transform reality into information – namely, manageable, quantifiable data – alter or eliminate other significant ways of knowing reality in relation to decision-making.

### **TRACES OF A DISTANT SHORE**

One long-term effect is that the individual human decision-maker is distanced from nature because nature is reduced to measurable entities. From this perspective we humans may be isolated in our perceived uniqueness as something apart from the biological web of life. In this context humans do not seek identity and meaning in the numinous beauty of the world, or experience themselves as dependent on a complex of life-supporting interactions of air, water, and soil. Rather, this logic sees humans as independent, rational decision-makers who find their meaning and identity in systems of management that now attempt to co-opt the language of conservation and environmental concern. It is a short step within this commensurate worldview to psychological reflection on happiness as personal power derived from simply managing or having more stuff.

This modern, mechanistic view of matter as so much utilitarian material for human use arises in part from a dualistic Western

philosophical view of mind and matter. Adapted into Jewish, Christian and Islamic religious perspectives, this dualism associates mind with the soul as a transcendent spiritual entity given sovereignty and absolute control over wild matter. Mind is often valued primarily for its rationality in contrast to a lifeless or, at best, irrational world. By means of a rational, values-oriented metric, the measure of the world is taken at the same time as we ensure our radical discontinuity from it. Modern humans enshrine this linear, cause-and-effect logic as a proof text for explaining progress at any cost. This instrumental worldview justifies rapacious demands as coming from humans, the supremely rational creature.

Interestingly, views of the uniqueness of the human bring many traditional religious perspectives into sync with scientific rationalism. In the Western religious frames, for example, the human is seen as an exclusively gifted creation with a transcendent soul whose rationality manifests the divine image and likeness. In many contemporary scientific perspectives the human with rational mind and technical prowess stands as the pinnacle of evolution. Ironically, religions emphasizing the uniqueness of the human as the image of God meet market-driven applied science and technology precisely at this point of the special nature of the human to justify dominance of the natural world. Yet, this conjunction of views of the human within forms of religion and science have generally not caused a majority of individual scientists to accept religious perspectives.

From the standpoint of rational analysis, many traditional values embedded in religions, such as the sacred, the placement of the sacred in particular geographical locations, the spiritual dimension of the human, and care for future generations, are incommensurate with an objectified reality and not quantifiable. Thus, they are often ignored as externalities, or overridden by more pragmatic profit-driven bottom line considerations. Contemporary nation-states in league with transnational corporations have seized upon this individualistic, property-based, use-analysis to promote national sovereignty, security, and development exclusively for humans. The concept of eminent domain, for example, is asserted as an argument nonpareil for the superior dominion of the modern human community over creation measured out in meets and bounds. Similarly, transferring our rational relationships with mechanistic matter and space onto



paper in literate symbolic modes, such as currency, contracts or abstracts, allows bounded urban, civilized societies to further analyze, separate, and divide these objectified realities.

### **SCIENCE THAT SEES THE WHOLE**

Yet, even within the realm of scientific, rational thought, there is not a uniform approach. Resistance to the easy marriage of applied science and instrumental rationality comes from what we might call science-that-sees-the-whole. By this we refer to a lineage in the world of empirical, experimental science of valuing wonder, beauty, elegance, and imagination as crucial components of knowing the world. Knowing within these perspectives stresses both analysis and synthesis – the reductive act of observation, as well as placement of the focus of study within the context of a larger whole. Science-that-sees-the-whole resists the temptation to take the micro, empirical, reductive act as the complete description of a thing, but opens analysis to the history of a large interactive web of life.

Within this framework, scientists are moving beyond distanced observations to engaged concern. Thus, for example, scientists are stepping forward to speak out about environmental problems and destructive trends along with religious leaders. In 1990 there was a “Warning to Humanity” from the Union of Concerned Scientists stressing the pressures increasingly placed upon our fragile planet. In 1992 a “Joint Appeal by Religion and Science for the Environment” brought together scientists with religionists “in a common endeavor to preserve the home we share.” In the last several years scientists and Evangelical Christian leaders have joined forces to draw attention to the enormous burdens placed upon the poor by climate change. In addition, conservation groups are increasingly coming together with indigenous elders to report that climate change is fundamentally altering the habitat and interactions of species in the last undeveloped regions of the planet.

Moreover, scientists are now reporting that because of the population explosion, our consuming habits, and our market drive for resources, we are living in the midst of a massive extinction period. A conservative estimate of the number of species being lost, now more than 20,000 annually, is due to cutting of forests,

unmonitored development, and destruction of habitat. This period represents the largest loss of species since the extinction of the dinosaurs 65 million years ago. In other words, we are shutting down life systems on the planet and causing the end of our current geological period, namely, the Cenozoic era. A plaque on the floor of the Hall of Biodiversity at the American Museum of Natural History in New York calls it “the sixth extinction period in Earth’s history.” The plaque also notes that in contrast to the earlier extinctions this one is due to the consequences of human action. Thus, the current activities of the human species are not adequately described as having simply personal, social, or historical implications. Rather, we are acting on geological and biological scales of magnitude with little or no awareness of what we are doing. As the cultural historian Thomas Berry observed some years ago, we are making macrophase changes on the planet with microphase wisdom.

In light of this mass extinction, is it the case that the wisdom traditions of the human community, to some extent embedded in institutional religions, can provide for self and social reflection at the level needed? If the impact of human activity has been global from the Industrial Revolution, can the analysis of our problems be other than global? Can the religions provide leadership into a synergistic era of human-Earth relations characterized by empathy, regeneration, and renewal? Or are religions themselves the wellspring of those exclusivist perspectives in which human societies disconnect themselves from the natural world? Are religions caught in their own meditative promises of transcendent peace and redemptive bliss in paradisaic abandon? Or does their drive for exclusive salvation cause them to seek to destroy the Other lest they themselves be destroyed?

Questions are arising within the religious communities regarding the appropriate responses of the human to this destruction and diminishment of life. What form of symbolic visioning and ethical imagining can call forth a transformation of consciousness and behavior before it is too late? Can religions provide vision and inspiration for grounding and guiding new human-Earth relations? Have we arrived at a point where we realize that more scientific statistics on environmental problems, more legislation, policy or regulation, and more economic analysis ignoring externalities are no longer sufficient for the large-scale social transformations needed?

What, then, can “stem the tide of destruction” as the Hall of Biodiversity at the Museum of Natural History spells out with its display of examples of efforts to preserve the amazing variety and interconnectedness of life.

### **HISTORICAL TRANSFORMATIONS IN THE WEST**

As we have suggested, from the Enlightenment period in Western Europe some three centuries ago, the human community has increasingly gravitated towards rational, scientific ways of knowing the world. Modern mechanistic worldviews engender value orientations that separate humans from the Earth. Simultaneously, modernity encourages the primacy of human extractive use and dominion over material reality. The Enlightenment legacy emphasizes knowing the world rationally and scientifically, not religiously or ethically. Rather, religion in modernity orients one away from the immanent and towards the transcendent; whereas ethics examines behavior between humans or between humans and the divine. Moreover, in its economic dimensions, modern worldviews rationalize nature. In this sense, the world at large is without intrinsic value, unless it is calibrated in a metric based on its use value for humans.

This human capacity to imagine and implement a utilitarian-based worldview regarding nature undermined many of the ancient wisdom insights of the world’s religions by segmenting any meaningful religious values as psychological choices or subjective interests. More insidiously, some religions, allured by the individualistic orientations of market rationalism and short-term benefits of social improvement, seized upon wealth and material accumulation as containing divine approval. Thus, early in the 19<sup>th</sup> century, Max Weber identified the rise of Protestant Christianity in Northern Europe with an ethos of inspired work and accumulated capital. Interestingly, Weber also articulated a disenchantment from the world as this rational, analytical, profit-driven worldview became dominant as global capitalism. The prior enchantments of the old creation stories were burned away in the critical fires of rationality. Wonder, beauty, and imagination as ways of knowing were gradually superseded in a turn from the organic wisdom of traditional worldviews to the analytical

reductionism of modernity. A mercantile mindset sought to shift the play and sport of the world in ways that accorded with modern industrial productivity as the epitome of progress. Contemplation of the garden, so rich a concept in Abrahamic religious thought and architecture, gradually became a suggestive symbol for human advertisement and a mode of design for human material enjoyment. The imagined experience of being at play in the garden replaced both the ancient mystery of actual encounter with wild, divine creation, as well as the contemplation of the garden as the place of creative origins.

Traditional creation stories of the emergence of the world faded in their power as explanations of reality, and cosmology became the exclusive domain of science. The traditional stories of nature as a reality more intimately related to the human quest for meaning and purpose was overwhelmed in diverse historical and cultural contexts by emerging scientific and objectivist cosmologies. Such objective distance from creation has fostered in part the potential for a technology singularity in which machine intelligence could grow beyond our control. While still a science-fiction imaginary, these forms of applied science have not only accomplished technical wonders, but as a way of learning it has itself become subservient to the ongoing production of those wonders. As Jacques Ellul observed decades ago, technology had become an end in itself that identified and marked our era. This dehumanized technology cannot be a standpoint from which to undertake critical review of human engagement with the natural world as the whole drive of technology is ongoing replacement as improvement. Thus, technology cannot adequately provide an ethical field for response to concerns of control, manipulation, and utilitarian decision-making regarding the world. Yet, our technological entrancement stands as the inspiration under-girding progress and underlies our mechanistic, modern cosmological worldview of physical laws that govern a universe of dead, inanimate matter.

## **WAYS OF KNOWING THE WORLD**

Certainly the insights of scientific, analytical, and rational modes of knowing are indispensable for understanding and responding to our contemporary environmental crisis. So also, we will not bring

ourselves out of our current impasse without the technologies that brought us into it and they are being reshaped in more ecological directions as witnessed in such developments as industrial ecology and green chemistry. But it seems important also to recall that other ways of knowing are manifest in culturally diverse cognitive pathways that treasure emotional intelligence and affective insight. These are evident in the arts – music, painting, literature, poetry, drama – that celebrate human experience in a more than rational mode. Moreover, in their explorations of embodied experience of humans and nature, many aspects of Western culture, such as visual aesthetics, literary arts, narrative poetry, and cinema are far from dormant in modern consciousness. *Orion* magazine is an important example of celebrating these varied ways of understanding human-Earth relations in literature, poetry, and photography.

What is especially striking in this regard are the versions of empirical observation found among indigenous, or aboriginal, peoples that have both rational and affective components. This involves knowledge of lands and ocean, animals and fish, plants and trees. These many ways of knowing appear in an amazing variety of human interactions with the natural world that include the development of traditional herbal knowledge, proto-chemical understandings, healing practices, and agricultural cultivation. These diverse ways of knowing are evident in the domestication of various crops such as rice, millet, wheat, corn and tobacco. Much of modern science was built upon these foundational insights. Such understandings must have come through a wide range of careful observation and attention to seasonal changes and animal interactions. Similar observational knowledge of the migratory patterns of plants, animals, birds, and fish is evident among many native cultures. Almost uniformly, the remaining indigenous oral narratives describe this trial and error in experimental usage along with inspired reflection on the beauty and profundity of an in-spirited world.

For example, navigational knowledge developed by Polynesian peoples in the Pacific Ocean resulted from, and extended the progress of, remarkable transoceanic voyages of exploration and settlement. We now have some initial understanding of their observations of large-scale ocean currents as these patterns extend for thousands of

miles across the Pacific Ocean after being formed by the interactions of planetary oceanic currents with islands and undersea land formations. What we do not yet understand are the ways in which this knowledge was instilled in the young by means of religious lifeways – that is, the complex mix of rituals, symbols, and myths that could inscribe these ways of knowing into cultural life as meaningful relationships with reality-as-a-whole, or cosmology. A caveat against over-romanticizing aboriginal human-Earth relationships is helpful especially for individuals in dominant societies who might misunderstand the transformational character of indigenous knowledge. The transformational potential of traditional ecological knowledge is an experiential whole, a systems theory, that often arises in the interactions of place, culture, wisdom teachers, maturity of the student, and time of practice.

One insight is that many modes of indigenous knowledge often refer to these connections with the world as kin relationships. The first National Indigenous Anglican Bishop in Canada, Mark McDonald, described the differences with dominant worldviews in this manner: “Over time, it has become clear that many people in the West cannot understand the living relationship that is involved in the ecological community of life. In aboriginal societies, this relationship is often spoken of in family terms, underlining its importance and intimacy. In contrast, though the environment may have a high value for the West, it appears that humanity can exist apart from it or that science can create a substitute for it. The destruction of the environment, however tragic, does not imply the end of human life, in this view. The relationship between humanity and eco-system is a mechanical or chemical exchange, not a reciprocal one.” (“Aboriginal Christianity/Ecological Christianity: A Church of and for Turtle Island,” *Forum on Religion and Ecology Newsletter* 1.1: 2007)

Science-that-sees-the-whole is beginning to appreciate these other ways of knowing without giving over its foundational analytical approach. In recent years, science has returned to study indigenous knowledge not simply as idiosyncratic experiences, but as connected to larger social and ecological phenomena. Increasingly, these connections are understood as creative entanglements of the senses and the cognitive faculties. Over the last century new ways of understanding reality have moved from the periphery of our

knowledge into more common usage that increasingly tip us toward creative engagement with cosmology. For example, ways of seeing reality at the quantum level as simultaneously particle and wave, as multicentered, and as foaming into and out of existence are beginning to challenge creatively our articulation of everyday life. Our mental horizon now embraces the comprehensible and the intuitive in ways that formerly would have been dismissed as contradictory or logically incompatible. Interestingly, the most forward thinking religionists welcome respectful scientific investigation with a confidence in their impulse to explore the inherent creativity of spiritual life as a form of reality. Thus, creativity remains one area in which religion and science connect in their critique of market driven rationality that would consider consumption of the Earth as an acceptable end in itself. What does a turn toward such a horizon of mutually enhancing creativity hold for us?

### **RELIGIOUS KNOWLEDGE AND TRANSFORMED CONSCIOUSNESS**

Increasingly, there is a growing awareness that utterly new questions of meaning, purpose, and orientation loom over our collective human future. The anticipated move from environmental crises into more sustainable human-Earth relationships calls for a change of consciousness. In what way is this different than simply experiencing a new political or historical period? In this sense, Thomas Berry described the magnitude of the changes humans were implementing on the Earth as on the order of a geological period rather than simply historical change. Are we called to spiritual and material understandings that signal a creativity emerging from the very challenges our environmental crises present to us? Is it possible that new cosmologies, new ways of knowing the world, are emerging from this science-that-sees-the-whole? When Karl Jaspers identified the “axial age” – that cluster of civilizations that emerged in the 6<sup>th</sup> to 2<sup>nd</sup> centuries BCE in which many of the scriptural and institutional expressions of the world’s religions took shape – was he sensing this type of seismic shift?

The transformation of consciousness in the face of global climate change, ozone depletion, biodiversity loss, toxic pollution, and the pervasive genetic changes of life forms resulting from their mix – that

transformation cannot simply be another form of the mentality that has led to this impasse. No legal doctrine, national fiat, technological know-how, or rational explanation can address the questions that challenge our mode of creativity more significantly than we can know. As Einstein observed, we cannot solve a problem with the same mentality that created the problem.

True, we cannot go forward without the Enlightenment spheres of objective knowing. The Harvard Confucian philosopher, Tu Weiming, observes, "... as both beneficiaries and victims of the Enlightenment mentality, we show our fidelity to our common heritage by enriching it, transforming it, and restructuring it . . ." ("Beyond the Enlightenment Mentality" in *Worldviews and Ecology*: 38). Thus, we need new and ancient ways of being that allow for sense-embodied knowing that recognizes the creativity of interdependent life. We need new words – perhaps a new dictionary – that expresses our embodied knowing as it arises from places other than a transcendent, rational mind. We need metaphors that re-embed cultural languages in place and in relationships with the non-human world. We need symbolic languages that lead us beyond our circumscribed body to reconnect with bioregions and the Earth as a whole sphere of interdependence. There is a need for grammars of meaning, purpose, and orientation that elevate our local differences, as well as our planetary aspirations amidst ongoing political fragmentation. In this regard, the political machinations of a nation-state are no longer sufficient to circumscribe the yearnings of the human community toward new ways of acknowledging both unity and difference. Earth itself in all of its changing nature provides a context for re-imagining who we are as reflective symbol-making mammals amidst the vast community of life.

### **AN AMERICAN FORM OF RECOVERY**

In this search for a broader and more inclusive consciousness we in the United States need to attend to the values that motivated earlier environmental efforts and subsequent socio-legal policies. Are we not troubled, as was John Muir, by the "greedy gobblers" driven only by economic profit? Are we not still motivated by the call of Aldo Leopold for a land ethic that includes the whole biotic community?



Are we not concerned, as was Rachel Carson, with the environmental health of our children? Can we in honesty and in humility revisit the wisdom of native peoples such as the Iroquois (Haudenosaunee) whose governance was based on concern for the effects of actions upon seven generations into the future? Or are we captive to a truncated vision of the nation-state as an isolated entity whose sovereignty resides solely in the force of its human-centered, market-driven dominance?

We need to recapture the moral force of the preservationist ethos that launched the conservation movement in several settings around the globe. True, those orientations toward preservation of lands often had elite or aristocratic leadership, and that still needs to be broadened both in terms of class and race. Yet, that deeper motivation to conserve shows itself as strikingly different from the plunder mentality of current market politics. In some instances the religions were vehicles of these alternative visions of land and human relationships. While this awareness of place is especially clear in the close subsistence and religious practices of indigenous peoples, it is also evident in a sense of sacred place among the Abrahamic traditions in valuing Jerusalem, Rome, and Mecca respectively. So also, within the South Asian traditions, regard for the Ganges and other rivers of India, along with pilgrimage sites such as Benares compare to East Asian affection for sacred mountains, and sacred capitals such as Bangkok, Xian, and Kyoto. These values continue to inform the Haudenosaunee Environmental Task Force as these indigenous peoples confront the massive pollution of Lake Onondaga in upstate New York. This is the sacred site of their founding as a confederation as early as the 15<sup>th</sup> century and the site of the revelation to these American Indian peoples of the Great Law of Peace.

We also seek broader democratic participation in a conservationist creativity even as we try to examine the consumer ethos and the underlying plunder of matter that erodes planetary integrity. We need to understand the ways our pervasive drives for national sovereignty and economic security disassemble the interdependence of the community of life, piece-by-piece, resource-by-resource, life-by-life. Why has the “good life” been so thoroughly attached to the acquisition of things? What causes us to exclude the concept of limits from our aspirations? What does accumulation mean in the finality of

death, or is that the point, namely, a staving off of our mortality in the piling up of “goods.” Is being more simply having more?

Similarly, embodied knowledge gives us cause for pause in the impossibly heated discussions regarding human population control, reproductive life, and gender identity. Is it conceivable that we can learn to broaden our instinct to nurture life so as to embrace the larger community of life? Can we empower women in this regard? In what ways does our human quest for offspring drive our understanding of the “good,” the “beautiful,” and the “true.” Is it possible that we can find again such values in local forms of life, in the place that we call home?

Moreover, it is clear that the religious traditions have not yet adequately presented the full range of views in their diverse traditions about human interactions with the beauty of the natural world. In addition, we only recently have begun to explore “biophilia” in the depth and range of its expressions by which humans nourish, enrich, and re-create themselves in close relationship with more-than-human life. There is work to be done here in partnership with the next generation.

## **RELIGION AND AN ETHICS OF PLACE**

A broader populist, embodied, and place-based knowledge will not emerge from wishful thinking, laboratory analysis, or legislative coercion. It calls for a creative commitment. This is similar to the faith grounded in a life devoted to meditation, to prayer, as well as to the insights of science, and economic exchange. The stories of such creative historical commitments of the human in close relationship with nature remembered in the religious traditions are numerous. Many indigenous traditions still transmit ancient shamanistic vocations based on a “call” from the natural world to a healing vocation. Many Jews reflect upon the voice that spoke to Moses from the burning bush as an affirmation of the world created by God. Some Christians understand the forty days that Jesus went into the desert as a meditative exercise on the challenges of an arid life to nurture fecundity. Increasingly, Muslims ponder the contemporary implications of the Qur’anic verses in which humans accepted the “trust” to care for Allah’s creation. Even in the market aggrandizement that grips China, there are calls from Pan Yue, the Deputy Minister of the

Environment, for Confucian, Daoist, and Buddhist ethics as ways to rethink the co-creative presence of Heaven, Earth, and human. And in India there are efforts to clean up rivers and protect forests based on Hindu and Jain principles.

We also know that religions focused on the values of a particular cosmology can go astray, just as a secular faith settled exclusively on human liberty, equality, and fraternity can be used (even if inadvertently) to oppress others. What guides and grounds a vision so that it prospers life? What is the form of religious experience evoked by the term creativity that might redirect the single-minded drive of the rational human to recognize kinship with the larger community of life?

Several observations seem relevant here. In the framework of science-that-sees-the-whole, creativity and elegance are recognized in the cosmos itself. This is manifest in the fact that increased complexity and consciousness arises within the emergent, self-organizing evolutionary processes of the universe and the Earth. Moreover, such creativity is accompanied with loss and destruction. Yet, we are challenged to distinguish what Buddhists call *dukha*, the suffering, clinging, and destruction we bring on ourselves from the dissolution and fragmentation in the emergent process of evolution itself.

Finally, the changes of consciousness needed are radical and transformative for religions themselves. There are those within religious communities who have acknowledged the critical nature of this transformation like cultural historian, Thomas Berry, the Greek Orthodox Patriarch of Istanbul, Bartholomew, the Tibetan Buddhist Dalai Lama, the Jewish Rabbi, Michael Lerner, and the Vietnamese Buddhist teacher, Thich Nat Hahn. Many in the Evangelical Christian community now speak of their awakening to the reality of climate change as a “conversion experience,” namely, a larger call for humans to attend to the poor and less fortunate who will be more severely affected by continuing environmental and climate related disruptions. By their responses to the terrors and challenges as well as to the wonder, intricacy, and beauty of life itself these religious leaders strike a hopeful chord. However, there is a largely unspoken concern arising in both religious and environmental circles about whether humans, within the fixation of our destructive habits, are indeed a viable species. We question whether our present form of modern consumptive life on the planet is sustainable.

As the Greek Orthodox theologian, John (Zizioulas) of Pergamon, has observed, what is required is not simply creating a stewardship ethic where humans are “managing” the Earth. Rather, he suggests the environmental crisis challenges us to reformulate our very being as humans, our ontology. We need a new consciousness of ourselves and a language that attends to our place in the community of life before we rush to redeem ourselves from it. If we are willing to stand by and merely witness the withering of the Earth, has not something of our religious sensibilities and our biophilia become deadened or at best severely reduced?

### **RELIGION AND THE INTELLIGENCE OF THE WORLD**

This, in turn, raises questions about the obstacles in the religions to their full participation in such a transformation given their dubious commitments to material embodiment. Have concerns for personal salvation or the exclusive welfare of our human offspring, or the redemption out of this world become an obstacle to caring for creation? Why has apocalyptic thinking regarding the end time surfaced as an interpretation for ecological collapse?

We need not deny the intolerant dimensions of religions as expressed in sectarian violence, claims to exclusive authority, and blind obedience. However, many recognize that religions, as ancient shapers of culture and values, can make seminal contributions to rethinking our current environmental impasse. There is in all religions an awareness that the special reflective intelligence of the human stands in direct relation to the created world. Religions may go immediately from existence to the creative intelligence, or creator, that brought the world into being. But when religious thinkers reflect on human intelligence they often describe those mental capacities in analogies and metaphors drawn from the natural world. Thus, the preacher in Ecclesiastes observed; “And I applied my mind to know wisdom and to know madness and folly. I perceived that this also is but a striving after wind.” (1: 17) Mencius remarked that: “Since all humans have these four principles in themselves [benevolence, righteousness, propriety, and knowledge], let them know to give them all their development and completion, and the issue will be like that of fire which has begun to burn, or that of a spring which has begun

to vent.” (Pt.1, Ch.6: 7) The seers of the *Brihaddaranyaka Upanishad* surmised that: “The intelligent, immortal being, the soul of the earth, and the intelligent, immortal being, the soul in the individual being – each is honey to the other.”

Embedded within all the religions, then, are these diverse reflections on the formative and intentional character of human intelligence as something akin to the natural world. It is as if throughout the diverse modes of human ways of knowing there has been a sense that reflection on knowing itself leads to awareness of the deeper sources of intelligence in the world. These ways of valuing mind as in-the-world lead to an intimation of that which sustains life. The world’s religions realized that finding sustaining ways of being in the world led to creating vibrant whole communities of life. The fragmentation of this continuity appears to be linked to the dissolution of these ethical links that connected community life to bioregions.

### **A PLANETARY ETHICS OF INTERDEPENDENCE**

In the modern period ethical thought in the religious and local communities separated itself from these modes of relatedness to Earth as the forces of market driven rationality articulated orientations for extraction and commodification. The ecological devastation caused by our fragmented industrial and commercial drives led the biologist Peter Raven to write an essay titled, “We are Killing Our World.” From their traditional orientations, the religions developed ethics for homicide, suicide, and genocide; now they are challenged to respond to biocide, ecocide, and even the imponderable thought of geocide.

The common ground among the world’s religions is the Earth itself and a shared sense of the interrelatedness of all life. This shared religious sensibility is evident in the different stories that accounted for the interrelationship of life. These creation narratives of the interdependence of life transmitted “religious ecologies.” Now, the extent of the environmental crisis presents itself as a moment of enormous opportunity for cooperation around a common cause – the continuity of flourishing life as at the heart of all human-Earth relations. This calls for a declaration of our planetary inter-dependence, much more than our independence from one another. One strong expression of this

planetary interdependence is the Earth Charter. Moreover, the environment presents itself as one of the most compelling concerns for robust inter-religious dialogue. Yet these are but dimensions of that changed consciousness towards which we move. Dialogue, ethics, and environmental activism are all folded into a deeper creativity that the religions hold sacred. Religions are just beginning to move from their forgetting of natural revelation to their planetary phase.

### **IMPLEMENTING THE PLANETARY PHASE OF RELIGIONS**

Scientists and policymakers recognize the importance of religious and cultural values when discussing the environment. While scientists may question the capacity of the religious mentality to know material reality in a mode as penetrating as science, those who sense the larger whole also mark the significance of this moral endeavor by the religions. E.O. Wilson in his book, *The Creation*, urges cooperation between religion and science on environmental issues. Stanford scientists Paul Ehrlich and Donald Kennedy, have called for a major study of human behavior and values in relation to environmental protection and preservation. (*Science*, July 2005) The Yale School of Forestry & Environmental Studies, under the leadership of Gus Speth, initiated an interdisciplinary project on climate change that includes the roles of religion and values. ([www.environment.yale.edu/climate](http://www.environment.yale.edu/climate)) The Yale School of Forestry & Environmental Studies and Yale Divinity School have developed a joint Masters Program. Many environmental studies programs are now seeking to incorporate this broader ethical approach into the curriculum. In all these instances, interdisciplinary approaches need to be constantly challenged to attend to fundamental questions that arise when a transformation of consciousness is posed. Thus, when we ask, "What is consciousness?" and "What constitutes transformation?" these questions require a fuller range of voices than we have often allowed.

Indeed, only transformations of consciousness that lead directly to a transformation of being-in-the-world will enable our species to endure. How we act in our embodied beings interrelated with the community of life is crucial. Human activity as planetary creativity may now become salvific, not simply for the autonomous individual or the exclusively chosen community, but in relation to larger

communities of life. Such transformations, it would seem, are at the heart of all the religions. But the paths that connect to the Other seem to have been covered at times by a misplaced concreteness in which words as symbols were taken as the realities toward which they pointed. Is it possible, for example, to find salvation in the incarnate Jesus as Christ and lose communion with the world as Word or *logos*? Can the Dharma Buddha open enlightenment through the intrinsic interrelation of suffering change (*samsara*) and abiding compassion (*nirvana*) without mindfulness of our contemporary sixth extinction of biodiversity? Can Muslims claim again that trusteeship (*khalifa*) and unity (*tawhid*) articulated in the *Qur'an* without attention to the plight of the planetary community of life?

### **MAPPING RELIGION AND ECOLOGY**

An effort to identify and to map religiously diverse attitudes and practices toward nature was the focus of a major international conference series on world religions and ecology. Held at the Harvard Center for the Study of World Religions from 1996-1998 it resulted in a ten volume series of books. Over 800 scholars of religion and environmentalists participated, and a Forum on Religion and Ecology, now located at Yale, has grown to over 8,000 participants with a densely packed website ([www.yale.edu/religionandecology](http://www.yale.edu/religionandecology)). The conference series and books have assisted the foundation for a new field of study in religion and ecology.

Courses on this topic are being offered in numerous colleges and universities across North America. Within the American Academy of Religion there is a vibrant section focused on scholarship and teaching in this area. A peer-reviewed journal, *Worldviews: Global Religions, Culture, Ecology*, is celebrating its fifteenth year of publication. Clearly this field of study will continue to expand as the environmental crisis grows in complexity and requires increasingly creative interdisciplinary responses.

Of late, scholars and theologians from diverse religions explore culturally diverse environmental ethics shaped by their confrontation with environmental degradation. The monotheistic traditions of Judaism, Christianity and Islam formulate original eco-theologies and green practices that activate engagement but they are currently

ahead of the commitment of their institutions and the mass of their believers. Hinduism and Jainism in South Asia and Buddhism in both Asia and the West have undertaken projects of ecological restoration, but their capacity to affect the market drive of Asian nation states is still strikingly limited. Moreover, informed voices from these regions wonder about the relationships of large, low-consuming populations to small populations in more developed countries with exceedingly high-consumption rates. Confucianism and Daoism in China have contributed mightily to social formation and family ethics in East Asia but their contributions to an indigenous environmental ethics is muted by the commitment to rapid industrialization throughout mainland China, Korea, and Japan. Indigenous traditions of Africa, Asia, the Pacific, and the Americas contribute their traditional environmental knowledge to the emerging discussions. Yet, the Enlightenment mentality continues to usurp their cultures and ways of knowing thus prohibiting their full and informed participation in discussions of sustainability. There is a realization that mapping this field of religion and ecology, which is still necessary as initiatory work, is no longer sufficient in itself. Flowing from this earlier work some deeper creativity and consciousness are needed to understand the multiple modernities, the diverse globalizations and the varied ways of knowing that will shape our way forward.

### **RELIGIOUS ENVIRONMENTALISM**

All of these religious traditions are groping to find the languages, symbols, rituals, and ethics for altering our life-threatening behavior, and for encouraging protection of bioregions and species. They are themselves challenged by their own bilingual languages, namely, their languages of transcendence, enlightenment, and salvation; and their languages of immanence, materiality, and respect for nature. In some cases as they puzzle over the meaning of matter, they often turn towards applied science and market rationality for language to express utilitarian relationships to the world. For example, only recently has the motto of Nehru that “Dams are the new temples of India” been sharply questioned by religious leaders there as the negative consequences of mega-dams on the human and natural communities become more visible. The creative strength of many of the religions of



late has been their ability to bridge the gap between those concerned with socio-economic justice and those working for a healthy environment.

For example, in many settings around the world religious practitioners are drawing together traditional religious ways of respecting place, land, and life with understanding of environmental science and the needs of local communities. For example, in Malaysia as health officials plan protocols for malaria reduction they are beginning to take into account the concerns of indigenous Temiar elders regarding the use of pesticides and the well-being of birds who inspire their traditional healers. There have been calls in 2009 by Catholic Bishops in the Philippines and Alberta, Canada alarmed by the oppressive social conditions and ecological disasters caused by extractive mining. In northern Thailand efforts to block the construction of a tourist gondola on Doi Sutep mountain coalesced around the local Buddhist monastery's appreciation of the mountain as similar to a sacred stupa that holds the relics of a Buddha. The Greek Orthodox Ecumenical Patriarch Bartholomew will hold his eighth symposium on "Religion, Science and the Environment" focused on the transformative character of water on the Mississippi River as well as the ongoing eco-justice issues from the impact of the hurricane, Katrina, in New Orleans.

In the United States the greening of churches and synagogues leads religious communities to search out sustainable building materials and renewable energy sources through InterFaith Power and Light. A group of evangelical Christian leaders are focusing on climate change as a moral issue that will adversely and disproportionately affect the poor around the world (*New York Times*, 2/8/06). Green Yoga is exploring ways in which yoga practitioners can bring their meditative focus to greater awareness of environmental concern. The "Green Nuns," a group of Roman Catholic religious women in North America, sponsor a variety of environmental programs drawing on the ecological vision of Thomas Berry and Brian Swimme. In Canada the Indigenous Environmental Network is speaking out regarding resource extraction and unmonitored military dumping on First Peoples' Reserves and its negative impact on sacred sites and biodiversity.

Some of the most striking examples of the intersection of religion and ecology have taken place in the Islamic world. Prior to the

Ahmadinejad administration in Iran, which has exploited religion for market rationality, in June 2001 and May 2005 the Islamic Republic of Iran under then President Khatami and the United Nations Environment Programme sponsored conferences in Tehran focused on Islamic principles and practices for environmental protection. The Iranian Constitution has a platform that identifies Islamic values for appropriate ecological practices and threatens legal sanctions against those who do not follow them. One of the earliest spokespersons for religion and ecology is the Iranian scholar, Seyyed Hossein Nasr, now at George Washington University. Islamic thought suffuses the environmental work of Fazlun Khalid who founded the Islamic Foundation for Ecology and Environmental Science. In Indonesia grassroots projects of tree planting and restoration work draw on Islamic principles encouraging students in Islamic boarding schools to practice careful stewardship of the environment.

Such a transformation of consciousness embodied in these examples flows from a sense of the created world as at the heart of all the religions. They illustrate ways in which an emerging alliance of religion and ecology is occurring around the planet. Religions foster an inherent diversity that results wherever their cosmologies creatively function to connect the human to the community of life. These traditional values within the religions may cause them to respond to environmental crises in ways that are strikingly different than industrial ecology, environmental engineering, or green chemistry, for example, but they may find interdisciplinary ground for dialogue in concerns for eco-justice, sustainability, and cultural motivations for transformation. The difficulty, of course, is that the moral force of humility required of the religions may have been squandered by the religions in promoting their more narrow institutional concerns.

The challenge of our contemporary call for a transformation of consciousness and ecological renewal cannot be ignored by the religions. Nor can it be answered simply from out of doctrine, dogma, scripture, devotion, ritual, belief, or prayer. It cannot be addressed by any of these well-trod paths of religious expression alone. Yet, like so much of our human cultures and institutions the religions may be necessary for our way forward yet not sufficient in themselves for the transformation needed. The roles of the religions cannot be exported

from outside their horizons. Thus, the individual religions must explain, acknowledge, undertake, and transform themselves if they are willing to enter into this age of environmental engagement that is upon us. Religions as cultural coding must attend to the genetic coding, not simply of humans but of the community of life. If the religions can participate in this creativity they may again empower humans to realize that their ways of knowing lead to values that sustain life and create a vibrant whole Earth community.

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# Planetary Awareness, Worldviews, and the Conservation of Biodiversity

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*“Our enormously productive economy demands that we  
make consumption our way of life, that we . . . seek our spiritual  
satisfactions . . . in consumption. . . . We need things consumed, burned  
up, worn out, replaced, and discarded at an ever increasing pace.”*

Victor Lebow, 1955: 7

*“Why should we care about the Earth when our duty is to the  
poor and sick among us. God will take care of the Earth.”*

attributed to Mother Teresa, 1988, by James Lovelock, 2006: 2

*“. . . people can recognise how the human predicament evolved and  
what changes need to be made to resolve it. No miracles, no outside  
intervention and no new inventions are required. Human beings  
already have the power to preserve the Earth that everyone  
wants – they simply have to be willing to exercise it.”*

Anne and Paul Ehrlich, 1987: 252

*“The planet takes care of us, not we of it.”*

Lynn Margulis, 1999: 143

*“The only action for the preservation of the environment  
which is likely to be effective must be based first of all on the  
thesis that we are responsible for our actions: we cannot sit  
down and do nothing with the pretext that this has been  
destined by God or is inevitable because of the march of  
modern technology.”*

Seyyed Hossein Nasr, 1999: 28



*“The choice is ours: form a global partnership to care for Earth and one another or risk the destruction of ourselves and the diversity of life. Fundamental changes are needed in our values, institutions, and ways of living. We must realize that when basic needs have been met, human development is primarily about being more, not having more.”*

Earth Charter, 2000

*“The changes needed to sustain human and natural communities can only be achieved in the context of the rise of a new consciousness.”*

James Gustave Speth, 2008a: 5

## **INTRODUCTION: SOME ASSUMPTIONS ABOUT HUMAN BEHAVIOUR IN THE CONTEXT OF SUSTAINABLE LIVING**

Awareness of the accelerating degradation and loss of species and ecosystems caused by human activity commenced in the early 1960s, with the first major exposition on biodiversity appearing less than two decades later (Wilson and Peter, 1988). Despite an explosion of interest at that time and since, including the launch of the Convention on Biological Diversity in 1992 (Glowka et al., 1994), concern about biodiversity now appears to have been overtaken by fear of climate change. However regrettable the loss of biodiversity, terrible storms, flooding, drought and lack of fresh water seem far more devastating for human life than the anticipated loss of other species – most of which we never see, and know little about. Shouldn't we just concentrate our efforts on stabilising the climate, and let biodiversity take care of itself?

Would this be a correct view? In the short term, this could be the case – because climate change is also a very potent threat to biodiversity (Table 1). But in the longer term, and from a more informed perspective, this view cannot be right. It is often said that “Water is Life” – but we can reformulate this familiar slogan as “Life is Water.” Without the millions of species that make up the biosphere, and the billions of interactions between them that go on day by day, and have gone on between species throughout the three-billion-year history of life on Earth, there would be no water on the surface of this planet (Harding and Margulis, 2009) – nor would there be the oxygen-rich atmosphere essential for us and all familiar organisms

(Lovelock, 1979; Margulis, 1999). Nor would we have any food, or any of the other living resources on which we depend. Without biodiversity there is no sustainable living – indeed, for us there is no living at all. So the conservation of biodiversity is not some passing fad or fashion of the late 20<sup>th</sup> century that has been surpassed by more acute concerns about climate change and water shortages. Biodiversity conservation is fundamental – as is climate control. They are but two sides of the same coin (Lovelock, 2007).

As reflected in the words of the *Earth Charter*, there is now genuine concern that our consumerist lifestyle is leading to a reckless exploitation of nature's resources, threatening both biodiversity and human well-being. This could also echo a widely held view that, without religious beliefs to provide a fixed and firm foundation for moral action, materialism (in one or even all of its various senses: e.g., physicalism, central-state-materialism, dialectical materialism, consumer capitalism, etc.) will inexorably lead to a degradation of the biosphere and undermine its ability to sustain human life. While this might be true, any assumption that a religious attitude *per se*, versus a non-religious attitude *per se*, inevitably leads in the first case to a sustainable relationship with nature, whereas the latter inevitably leads to disaster, is highly debatable (e.g., see papers in Rogers, 2004; also Jena, 2009: 71). What does appear to be true about the consumer life-style, once it far exceeds provision of basic human needs, is that it is pursued in the mistaken belief that it offers a path to happiness – which, based on empirical evidence, it clearly does not (e.g., Durning, 1992; Kasser, 2002; Leiserowitz and Fernandez, 2008: 37).

Jared Diamond's (2005) overview indicates that no simple relationship exists between societal values and practices, and community survival or failure. If so, contingent on many other possible factors, religious beliefs may help or hinder the path to sustainability. The so-called "greening of religion" phenomenon (Nash, 1989) suggests that religions themselves are being transformed, or may be transformed, as a result of growing human awareness that planetary systems are finite (Nasr, 1976: 119) – even to the point that "a kind of civic planetary earth religion may be evolving" (Taylor, 2004; cf. *Earth Charter*, 2000; Korten, 2006; Jena, 2009: 78-79). This may be due, at least in part, to an increasing impact of scientific thinking on our general awareness. As Callicott

(2005) pointed out, “If it weren’t for ecology we would not be aware that we have an ‘ecologic crisis.’” Even so, Callicott’s (1994) earlier review suggests that religious and other spiritual disciplines have much to offer in trying to deal with our environmental predicament – as advocated by, for example, Nasr (1976), Berry (1982), Rolston (1999), Tucker and Grim (2007), and numerous other commentators on the relationship between humanity and the rest of nature. First, however, I would like to consider the issue of the evolution of scientific thinking over the past 500 years that appears to be responsible for some major changes in religious interpretation, perception, and even preoccupation.

**Table 1 Ten major threats to biodiversity.** This list is not exhaustive, nor are the categories mutually exclusive. While climate change may now be seen as the most potent short-term threat, faith-based responses to biodiversity loss should address all categories, and in particular 2, 3 and 9. Will they also tackle 10, when many politicians seem unwilling to do so?

<i>Threat</i>	<i>Comment</i>
1. Climate change	Increasingly anthropogenic since the onset of the industrial revolution, current changes are now driven by massive and still rapidly increasing release of fossil carbon by burning mineral oil, natural gas and coal, coupled with massive deforestation in many parts of the Earth.
2. Poverty	Impoverished people living off the land have little or no control over their resources, and can severely damage local ecosystems, especially when faced with starvation. Much poverty appears to be linked to globalisation, due to macroeconomic forces dependent on cheap fossil energy that have made consumer overexploitation possible.
3. Overexploitation	Wholesale ‘resource’ and landscape conversion (e.g., clear felling of tropical forests, opencast mining), global economics, transnational corporations, industrialised farming, ‘commoditisation’ of nature for profit, and the adoption of excessive consumer lifestyles, have very negative impacts on local and global biodiversity.
4. Fragmentation	Fragmentation of natural habitats as a result of over-exploitation, highway construction, urban and agricultural expansion etc., has numerous negative effects on biodiversity, notably a great increase in local extinction due to normal stochastic population fluctuations. Coupled with climate change, the loss of continuous habitat also means that many sedentary species cannot respond by moving to new areas, but become trapped and go extinct as climate change advances beyond their limits of tolerance.

5. Human use of net primary productivity	Humans now capture or divert 25 percent (and rising) of all photosynthetic activity in support of our single species. This is totally out of proportion with any other large animal that has ever lived, and is reason alone to question the sustainability of the current human “enterprise.”
6. Human appropriation of available fresh water	Wholesale diversion of water for human use, including irrigation, has already brought about extinction of entire freshwater biotas (such as the freshwater insect fauna of the main Canary Islands). Water is life for other species as well as humans!
7. Invasive and translocated species; GMOs	Species introduced by accident or intention from their native ecosystem into another ecosystem often cause unexpected damage and loss to local biodiversity, sometimes with near-disastrous results. The outcomes of such translocations are typically impossible to predict. Each translocation of a gene from one species to another by ‘genetic engineering’ is an uncontrolled and irreversible experiment with largely unknown ecological consequences. GMOs represent the commoditisation of genetic diversity in which the rest of biodiversity is treated as a disconnected “externality,” as in all economic systems which regard the environment in this (ultimately) irresponsible way. Genetic “engineering,” based on the ‘atomistic’ concept of genes, reflects an outmoded concept of how genomes are constructed and operate.
8. Pollution	Chemical pollutants, including pesticides, stress and poison wildlife, even in remote areas; run-off from artificial fertilizers causes eutrophication of waterways and wetlands, often with disastrous consequences for biodiversity; plastic bags and plastic particles are ingested by macrofauna (e.g., fish) and microfauna (e.g., filter-feeders) with various deleterious effects, etc.
9. Alienation and indifference to nature	With more than half the world’s human population now living in cities, alienation from and indifference to nature are likely to rise, even leading to increased biophobia, making the task of helping people to understand their dependence on the rest of nature ever more difficult.
10. Population growth of humans and farm animals	The human population trebled in the 20 <sup>th</sup> century, from 2 billion to 6 billion, and looks set to rise to 9 billion by 2050; at the same time the number of large farm animals such as cows (currently estimated at 1.5 billion) has also increased by a comparable magnitude (cf. 5). Such numbers are almost certainly unsustainable; meanwhile our “enterprise” causes ever-accelerating changes to the biosphere and concomitant losses of biodiversity.

## COPERNICUS, DARWIN, AND LOVELOCK

The dawning realisation that the Earth is not at the centre of the Universe, but is just one of several planets revolving around an

average star in an average galaxy in a universe so large, complex and old (*ca* 15 billion years) as to defy imagination, was ushered in by Nicolaus Copernicus (1543). Nearly 500 years later we are still entranced by this emerging vision, trying to draw fundamental truths and understanding from glimmers of light that started out from distant galaxies billions of years ago. To look into deep space is to connect with unbelievably remote events – in distance and time. Some cosmologists now also consider the possibility that there may be hundreds or even thousands of parallel universes (Carr, 2007). This ongoing exploration of physics has also led us to look into the equally unimaginable ‘world’ of quantum mechanics (Peat, 2002).

Life has been around for a long time too – over three billion years – but it is still only known to us from this one place in the universe. Since its origin on or introduction to the Earth, there have been massive changes to the planet, and to life itself. After the first two billion years of microbial evolution, including concomitant changes in the Earth’s atmosphere, multi-cellular animals started to appear in the seas about 650 million years ago (Margulis, 1999). Colonisation of dry land followed about 150 million years later, heralding land plants, insects, mammals and birds. Major extinction spasms also occurred – but the universal genetic code is consistent with the view that all things alive on Earth today have a common origin. If so, coupled with the dependency of DNA replication on cellular metabolism, this means that all must be interconnected back through time in an uninterrupted stream. Birth and death, origin and extinction, while significant with respect to individual organisms and species, are subordinated within this great and continuous, 3.5-billion-year unfolding.

Two huge developments in our understanding of life brought us, successively, to a second and then a third “Copernican revolution.” The first of these, already anticipated in the previous paragraph, started with Linnaeus and other 18<sup>th</sup> century taxonomists who, by bringing order to the seeming chaos that the diversity of life presented (Jarvis, 2007), paved the way for the Darwin/Wallace 19<sup>th</sup> century theory of evolution by natural selection. As a result, we were not just relegated from the centre of the universe, but our often-assumed separateness from supposedly brute nature was no longer assured.

There is some reason to believe that, although the great majority of species that have ever lived have long gone extinct, when the lineage

of apes that gave rise to the genus *Homo* evolved a mere 5-6 million years ago, life on Earth was probably approaching an all-time biodiversity maximum (Swimme and Berry, 1992: 140; Rohde and Muller, 2005). Humanity emerged into a world occupied by as many as 15 million or even more kinds of other living organisms (accurate assessments still remain very uncertain). Those animals, plants, fungi and microbes were divided among a remarkable range of ecosystems, from the bottom of the oceans to the tops of high mountains, from the poles to the equator, in arid deserts, teeming tropical jungles, rich alpine meadows, ponds, lakes, rivers and swamps, in mid-ocean smokers, shallow seas, deep ocean basins and trenches, abundant coral reefs, mangroves and deltas (Wilson, 2002). Although we are now at the beginning of a human-induced mass extinction (May et al., 1995), most of those 15 million or more species are still with us. The consequences of their wholesale loss – for the human psyche as well as the function of the biosphere – are unknown.

The third key change in thinking about life on Earth started in the late 1920s, with the research of population ecologists such as Charles Elton, and systems theorists such as Ludwig von Bertalanffy, together with numerous others, including cyberneticist Norbert Wiener, embryologist Conrad Waddington, and the long-overlooked Russian pioneer of “tectology,” Alexander Bogdanov (Capra, 1996). These various strands of thought concerning the goal-directed capacities of living organisms (Walsh, 2006; Vane-Wright, 2009b) as self-organising, thermodynamically open systems operating far from equilibrium and embedded within networks, always interconnected through complex positive and negative feedback loops, came together dramatically in the 1960s in the form of James Lovelock’s *Gaia Hypothesis* (Lovelock, 1979). The Earth’s biosphere is now understood to act as a self-regulating, homeostatic system, involving the interrelationships of both living and non-living elements, that is favourable to the continuing existence of life itself (Capra, 1996; Harding, 2006).

*Gaia Theory*, and earth systems science, now encompasses the unfolding totality of life on this planet, and the varied and complex relationships between its myriad components, both living and non-living. In reaching this level of understanding, new forms of mathematics have had to be developed to deal with the complex, non-linear systems that give rise to emergent properties and chaotic events

(e.g., Goodwin, 1994; Stewart, 1998; Gribbin, 2004). These processes maintain the delicate, dynamic and ever-changing balance (Clements, 1995) within which life, on our finite Earth, has survived through an unending evolutionary process for more than three billion years (Wilson, 2002: 39). The fresh understanding that general systems theory and the *Gaia Hypothesis* have provided is that the totality of interactions within the biosphere is responsible for its fitness for human life, and that the interactions of all things within the biosphere are consequential – although very rarely in a simple, direct cause and effect way (Macy, 1991a: 170).

Thus the causal chains affecting the biosphere are complex and highly contingent. Even so, the mass effect of many millions of seemingly trivial individual actions, such as chopping down one tree or burning a single lump of coal, do add up. Human appropriation of net primary productivity (HANPP) already exceeds 25 percent (Vitousek et al., 1986; Imhoff et al., 2004; Haberl et al., 2007) in support of our single species. This, and our release into the atmosphere, over just a few decades, of vast quantities of fossil carbon that took the biosphere millions of years to sequester, now means that our collective impact threatens to destabilise the entire planetary system on which we, and most familiar forms of multicellular life, are dependent. Even 50 years ago nobody save a few visionaries could imagine the consequences of our collective action being so great – the so-called “forces of nature” always seemed overwhelming compared to our puny efforts. While the forces of nature may still be set to overpower us (Lovelock, 2006) – tropical storms Katrina and Nargis being mere foretastes of what could yet be to come – there can be no doubt that we will largely be held responsible by our descendants for whatever may happen as a result of our disregard of nature. This would not be due, in my view at least, to the wrath of a reproachful or judgmental godhead, but the fact that we now understand how life on Earth really works and is sustained. If we have reached this understanding of how our biosphere functions but choose not to act, for whatever reason, this can only be seen as a collective ethical failure (Nasr, 1999: 28) – whether we believe in the supernatural or not. Given this new knowledge, can anyone still afford to express a view like “God will take care of the Earth” and be content that they are acting correctly?

With our emergent awareness of the interconnectedness of all living things, and that our actions do have and will have consequences

for the future of life, including our own, it is imperative that we re-examine our relationships with nature. There is ample evidence that the need for a revolution in our values and commitment to a whole-Earth-programme is now well recognised (e.g., Earth Charter, 2000; Korten, 2006; Goodwin, 2007; Leiserowitz and Fernandez, 2008). There is also evidence that this recognition has passed from the intellectual ivory-towers to living worldviews that are not just thinking about the need, but actually taking steps to try to bring about such changes within secular, religious, and grass-roots organisations (e.g., Beatley and Manning, 1997; Gardner, 2006; Hawken, 2007).

Attitudes to nature are culturally encoded – notably by the world’s great religions (Holm, 1994), and/or secular ideologies, including materialism in its various forms. Attitudes to nature reflect the values that we place on or perceive in nature, in terms of received benefits and ethical concerns (Passmore, 1995) – as explored below. Our attitudes to nature also inform a major component of the “universal” motivational values that drive human societies (Schwartz, 1994) and, if correctly balanced, can ensure sustainability (Armstrong, 2005). As part of an on-going attempt to analyse major worldviews with respect to the general attitudes to nature that they enshrine, and to biological diversity in particular, I present two approaches, one theoretical, the other empirical, to exploring the values that we place on biodiversity by logical analysis, or perceive by our emotional reactions to it.

## **BIODIVERSITY: TWO SYSTEMS OF VALUES**

### **Values of biodiversity classified by logical *a priori* division**

#### *Instrumental values*

The values most widely attributed to biodiversity are utilitarian, extrinsic – or *instrumental* (Hargrove, 1989: 230). This connotes the values that components of biodiversity have for others, including other species (Wilber, 1995: 518). However, instrumental value is usually considered only from a human, anthropocentric perspective. According to Passmore (1995: 141), Saint Augustine was of the opinion that “nature exists only as something to be used, not enjoyed.”

Once nature has been reduced to components (i.e., particular genes, species, ecosystems, etc.), from a human utilitarian viewpoint,



some can then be regarded as more valuable than others (Norton, 1988: 202). From this it is a short step to considering that some or even all are open to improvement by human agency, through translocation, domestication, artificial selection or transgenic modification, soil fertilization, drainage, or any other means. In so doing, no account is taken of the value of those components of biodiversity for other elements of the biosphere (e.g., other species), or of the autonomous (intrinsic – see below) value of those components (Wilber, 1995: 544-547).

Instrumental value is determined *a priori* by human usage: those elements of biodiversity that are known to be useful to us are valuable, while those that are not used (or appreciated) are not valued. Of course, new or potential uses are found (or re-discovered) over time. Such uses yet to be recognised can be reflected by quasi-option value (below).

Instrumental values can be divided into *direct* and *indirect* use (McNeely, 1988: 15). Direct use usually involves cropping: components of biodiversity can provide food, materials, blood sport and, through manipulation or experimentation, useful knowledge. Indirect use, in contrast, largely equates with intact, living ecosystems, which provide services such as clean air, fresh water, pollination, carbon sinks etc, and even various forms of spiritual succour. Direct use values largely derive from the ability of the genealogical hierarchy (Eldredge and Salthe, 1985) to provide *commodities*, while indirect values mainly stem from the ability of the ecological hierarchy (Eldredge and Salthe, 1985) to provide *services*. The implications of these two views of instrumental value can be very different (McNeely, 1988: 19) – fundamentally because commodities are readily “owned” and priced within conventional economic systems, whereas services are “free to all,” and rarely if ever figure in institutionalised accounting procedures. They are the most important of the “externalities” that constitute the core failure of conventional economic systems (Daly and Cobb, 1994: 37).

### *Intrinsic values*

Are those elements of biodiversity excluded from human utilitarian league-tables devoid of value? For those able, since the 1970s, to embrace land, environmental, ecological, and even general (non-anthropocentric) ethical views, all living systems, insofar as they are autonomous ends-in-themselves (Wilber, 1995: 544), have their

own value, independent of any human perception (Rolston, 1999). Moreover, they all have more or less extrinsic (utilitarian) value for other components of biodiversity, as all elements of biodiversity are ultimately linked by the great web of life. In a way analogous to the revolution due to Copernicus, we are thus invited by those who hold such views to step away from a human-centred perspective, and see ourselves as just one among millions of living kinds. Over and above this, we are also asked to set our needs not above but merely alongside theirs. Such a view accords all components of biodiversity (including variations in human cultural diversity) *intrinsic* value (Naess, 1986; Rolston, 1988; Hargrove, 1989: 230; Speth, 2008a: 7), regardless of whether they have instrumental value for humans or not.

Considerable resistance to according intrinsic value to non-human life comes from certain philosophers and conservation professionals (see e.g., Callicott, 1986; Sober, 1986; Norton, 1986, 1987; Hargrove, 1989; Kellert, 1996; Takacs, 1996; Pearce et al., 2006). Some conservationists are perhaps fearful that such ideas may be seen as “unscientific” (Midgley, 2004: 11), or that only arguments based on instrumental values will carry weight with politicians (McNeely, 1988: 9). Even so, many people seem at ease with the notion that the rest of nature can have intrinsic value (Butler and Acott, 2007).

Given the strong endorsement of the concept by leaders of the environmental ethics movement (e.g., Naess, 1986; Rolston, 1999), and even a critic of some manifestations of this orientation (Wilber, 1995: 543-547), intrinsic value is taken here to be a legitimate value of biodiversity (cf. Norton, 1988: 202) – in the sense that, in order to assess the full diversity of different worldviews and philosophies with respect to attitudes to biodiversity, it has to be taken into account. Potential candidates for inclusion under intrinsic value include respect for and celebration of the whole of creation and/or organic evolution (Swimme and Berry, 1992), biophilia (Wilson, 1984, in the sense of identity with and love of nature), ecocentrism (O’Riordan, 1976), biocentrism (Taylor, 1986), extended altruism (Singer, 1981), deep ecology (Sessions, 1995), reverence for life (Schweitzer, 1970), cosmic purpose ethics (reviewed by Fox, 1990: 179-184), and transpersonal ecology (Fox, 1990). However, these are all human constructs: if accepted, intrinsic value must exist independent of human perception (Ehrenfeld, 1988). To admit this as fact, let alone

live by the consequences, is challenging (Singer, 1981: 170), and may explain why many people do have difficulty with accepting the notion that all forms of life have intrinsic value (Midgley, 2004: 135-141).

### *Option values and 'stewardship'*

Option value reflects current income foregone from conversion of a resource to keep it for later possible use (McNeely, 1988: 22). Option value is closely linked to insurance, the precautionary principle (O'Riordan and Cameron, 1995), and safe minimum standards (Randall, 1986). It represents a willingness to forego immediate benefit in favour of non-conversion as a hedge against an uncertain future (Reid, 1994). Such self-restraint acknowledges potential future direct instrumental value – or unknown “downstream” consequences of conversion (potential future indirect instrumental value). With respect to the benefit of conserving components of biodiversity that currently have no known use (for humans), in the expectation that new discoveries may reveal real or potential uses, this is referred to as quasi-option value (Randall, 1986).

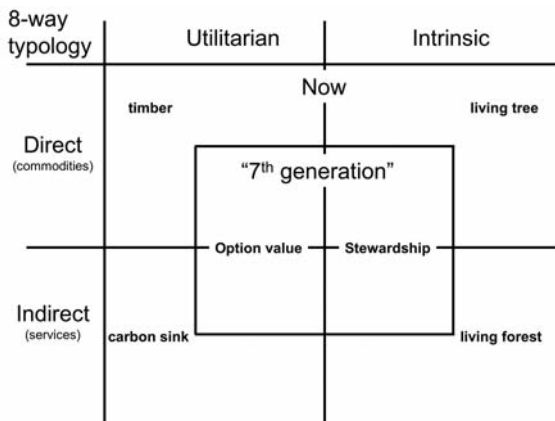
“Stewardship” represents an approach that can be construed as projecting all forms of instrumental and intrinsic values indefinitely into the future. The goal is to manage our heritage of biological diversity in such a way that it can be passed on as intact and un-degraded as possible, generation after generation (cf. intergenerational equity: Meffe and Carroll, 1994: 455-457; see also Macy, 1991b). Stewardship is, however, an anthropocentric notion, and has clear overtones of dominion and self-delusion (Margulis, 1999: 143). If we are to survive, however, we have to learn how to live in cooperation with the biosphere rather than plundering it. Stewardship, therefore, remains a worthy notion in practice (Rolston, 1994: 36), possibly better expressed as “custodianship” (Habel, 2000). Custodianship could be equated operationally with conservation of the genealogical hierarchy by pursuing maximally efficient representation goals, and the ecological hierarchy by sustaining the ecological and genetic processes that both maintain and generate biodiversity (e.g., Magurran, 1998; Mosquin, 2000; Pressey et al., 2007; cf. Ladkin, 2005) by endeavouring to minimise or mitigate negative impacts on all local ecosystems (Vane-Wright, 1996).

### *Synthesis of a values scheme based on a priori logical division*

Six core values related as three binary alternatives have been described: *instrumental* versus *intrinsic* values, *direct use* versus *indirect*

use values, and *current* versus *future* values. These can be combined, by means of a trilateral (2 x 2 x 2) diagram, into a single scheme of eight potential classes (Vane-Wright, in prep, fig. 1). Such a classification, by generating a multiplicity of classes based on combination of a smaller number of core values, offers the possibility to differentiate the richness, narrowness or bias towards particular values represented by different worldviews. Even so, this classification may not be rich enough, and it may be necessary to look for additional dimensions. A possibility might be transformative value (Norton, 1987: the potential to alter preferences, not just to satisfy them; see also Perlman and Adelson, 1997: 44-45), given so much attention by Sarkar (2005) – but I currently prefer to include this idea under spiritual well-being (indirect utilitarian value).

**Figure 1 Combinatorial classification of eight possible values of biodiversity based on three pairs of contrasting value parameters: utilitarian versus intrinsic values, direct versus indirect values, and current (“now”) versus future (“7<sup>th</sup> generation”) values.** The 7<sup>th</sup> generation concept reflects the Iroquois plea to live in a sustainable way by refusing any action likely to have a negative impact on our descendants seven generations ahead. To help visualise these classes, consider a tree cut down now as a source of timber for human use, a living tree as an individual organism valuable in its own right, a living forest as a carbon offset, and a living forest as a complex ecosystem valuable in its own right. All of these values can be projected into the future: a tree not cut down now can be a source of timber in the future, etc. Option value reflects future commodity or service value. Stewardship (or custodianship) describes a notion of human care for biodiversity consistent with the 7<sup>th</sup> generation concept; however, true intrinsic value should be seen, ideally, as independent of human interest or even existence (see text).



The major limitation of the combinatorial scheme presented above is that it fails to deal with negative values. Biophobia can be very real

(e.g., Schwarzschild, 1984; Midgley, 2004: 163-168) and, according to some commentators, it represents a growing problem (e.g., Orr, 2004: 131-137). Negative values were recognised and factored into the empirical scheme of Kellert (1996), which will be examined next.

### Values of biodiversity discovered by empirical research

During the 1970s, the U.S. Fish and Wildlife Service became aware of changing attitudes and demands. They also wished to acknowledge the increase in recreational activities such as “birding” and ecotourism. A programme of research was undertaken that culminated in Stephen Kellert’s book *The Value of Life*. This involved development of “a taxonomy of basic values as a way of organizing and describing people’s feelings and beliefs about animals and nature” (Kellert, 1996: 6). Based on information gathered from numerous people, notably in the USA, Canada, Japan and Germany, Kellert developed his scheme over a number of years.

Perlman and Adelson (1997: 44) commented that Kellert’s account was the “only...classification of what we are calling values” of biodiversity they could find in the literature. The essential point for them was that in all other schemes, instrumental values were externalised as “worths” projected onto components of biodiversity (as in utilitarian “values”), whereas Kellert’s scheme “describes the types of conduct that individuals undertake, and the emotions that they feel, toward nature” (Perlman and Adelson, 1997: 45). This distinction underlines a key difference between the *a priori* scheme presented above and Kellert’s approach: the former represents a rationalisation (how we *think* about the possible values of elements of biodiversity), whereas the latter is concerned with how people *feel* about life and its diversity.

That Kellert’s “taxonomy” is an *a-posteriori* scheme is apparent from the difference between his earlier (e.g., Kellert, 1986) accounts and his final system. By a process of trial, application and modification, he eventually arrived at a 9-fold tabulation, which he felt reflected the full range of values encountered and involved minimum redundancy and overlap. Not only does his system offer a typology, with a working definition (diagnosis) for each of the nine classes, but it also offers suggestions regarding the likely biological function that each value-class represents. Kellert’s scheme is outlined in Table 2.

**Table 2 Stephen Kellert's empirical typology of nine basic values of nature**

<i>Value</i>	<i>Description</i>	<i>Function</i>
1. Utilitarian	Practical and material exploitation of nature	Physical sustenance and security
2. Naturalistic	Satisfaction from direct experience and exploration of nature	Curiosity, discovery, recreation
3. Ecologistic-Scientific	Systematic study of nature (forms, functions, interrelationships)	Knowledge, understanding, observational skills
4. Aesthetic	Physical appeal and beauty of nature	Inspiration, harmony, security
5. Symbolic	Use of nature for expression in language and thought	Communication, mental development
6. Humanistic	Strong emotional attachment and "love" for aspects of nature	Bonding, sharing, co-operation, companionship
7. Moralistic	Spiritual reverence and ethical concern for nature	Order, meaning, kinship, altruism
8. Dominionistic	Mastery, physical control, dominance of nature	Physical skills and prowess, ability to subdue
9. Negativistic	Fear, aversion, alienation from nature	Security, protection, safety, awe

Source: Kellert, 1996

Kellert used his typology to explore differences in values and attitudes to nature within and between cultures, through time and with respect to ethnic origin, gender, age, education, income, urban/rural divide, human activity, animal diversity and endangered species, and found significant differences in almost all cases. He concluded his work with a number of practical suggestions for wildlife management and conservation. However, in his introduction he stated: "During the course of this research . . . it became apparent . . . that these patterns of thought might reflect universal dispositions toward nature somewhat independent

of group affiliation, history, and culture...tendencies rooted in the biological character of the human species..." (Kellert, 1996: 6).

If certain values with respect to biodiversity are fundamental (universal) to the human condition, can we hope to discover their essential properties? Do our values regarding nature form a subset of a wider, more encompassing set of universal human values? If human values are truly universal and do have essential properties, could this mean they are incapable of evolving? If they can evolve, must we wait for desirable changes in the human genome to occur, or can we rely on social/cultural evolution? Alternatively, is the notion of universal human values overstated? If so, what would be the implications? In the remainder of this essay I will try to address some of these issues, either explicitly or implicitly – but I am unable to offer a comprehensive account.

## **HUMAN MOTIVATIONAL VALUES**

According to Leiserowitz and Fernandez (2008: 42), to promote research on sustainability, *inter alia* "we need to understand, through rigorous empirical studies, the role core values play in human behavior." Are there core human values that "provide us with reasons for action" (Singer, 1981: 74)? If so, can these be determined *a priori*? Or can such values only be discovered, as Leiserowitz and Fernandez suggest, through observation? If the latter, are they universals with essential attributes, or evolutionary products, and thus spatio-temporally bounded, lacking essential characteristics, and capable of change?

According to the celebrated psychologist Shalom Schwartz, "none of the theory-based attempts to classify the substantive content of values...enjoys wide acceptance today" (Schwartz, 1994). His own work is based on the extensive empirical research of Rokeach (1973) who, for the purpose of cross-cultural comparison, identified 36 different sorts of values. Schwartz (1992) reduced this long list to 10 "motivational types" of values (Schwartz defines basic values as beliefs about desirable life-goals), and grouped them, with only minor overlap affecting one value type, into four higher-classes related in two opposing dimensions: openness to change *versus* conservation, and self-enhancement *versus* self-transcendence (see caption of Table 3). Based on very extensive surveys, involving people from many

nations and continuing to the present day, Schwartz remains of the opinion that, contrary to his original expectations, “there is support for the near universality of the four higher order value types...[and that]...many people, across contemporary societies, implicitly recognise the ten value types and the postulated conflicts and compatibilities among them” (Schwartz, 1994: 42).

**Table 3 Ten “universal” human value-goals.** These can be arranged into four higher-order classes forming two (orthogonal) dimensions: *Openness to Change* (A, B, and C in part) – *Conservation* (E, G, H); and *Self-Enhancement* (C in part, D, E) – *Self-Transcendence* (I, J).

<i>Value types</i>	<i>Core goals</i>
A. Self-direction	Independent thought and action – choosing, creating, exploring
B. Stimulation	Excitement, novelty and challenge in life
C. Hedonism	Pleasure and sensuous gratification for oneself
D. Achievement	Personal success through demonstrating competence in accord with social standards
E. Power	Social status and prestige, control or dominance over people and resources
F. Security	Safety, harmony and stability of society, relationships and self
G. Conformity	Restraint of actions, inclinations and impulses likely to upset or harm others and violate social expectations and norms
H. Tradition	Respect, commitment and acceptance of the customs and ideas provided by traditional culture or religion
I. Benevolence	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact
J. Universalism	Understanding, appreciation, tolerance and protection of all people and nature

Source: Based on Schwartz, 1994

Were value systems truly universal, it might imply that they could not evolve. Ehrlich (2000: 305-331) is very clear that human ethical systems and values have evolved, and in some circumstances or at particular times, very rapidly. Mary Midgley (in conversation, March 2007) is equally emphatic on this point. The notion of “progress in ethics” is basic to Singer’s (1981) thesis of expanding altruism. This all



being so, the near concordance between various schemes based on different data might suggest, instead, that there are patterns in human value systems due to evolution, and that these can be revealed by similarity or “family resemblance” (overlap: Wittgenstein, 2001: §66-7). Such an interpretation of Schwartz’s work appears plausible.

If human values were truly universal, and thus immutable, this might be unhelpful if humanity is to respond to the emerging environmental crisis. On the other hand, so much commonality between attempts to recognise fundamental value types could also be seen as encouraging. Moreover, organic evolution can proceed not only by mutation, but also by changes in gene frequency. In this context this would correspond, by analogy, to a shift in priority accorded to the ten particular human motivational values, or the four higher-order value types. Recent work by Schwartz (e.g. 2006) suggests this is entirely possible, because he and co-workers have repeatedly shown that people belonging to different cultural groups accord different collective priorities to the values types, and that each community tends to have its own unique value-priority profile. If so, there is reason to believe that the processes of education and introspection described below could bring about, if not a revolution in our attitudes to nature, at least significant shifts in the oppositions between technological change and traditional methods, and between individual advancement and community-based action, in favour of greater emphasis on conservation and collective values.

#### **THE FOUR SOCIETIES PROCESS**

A very similar if not identical set of Schwartzian “higher order value types,” based on community decision-making practices of the Okanagan people of British Columbia, is reported by Jeanette Armstrong (2005), and used widely in Center for Ecoliteracy literature (e.g. Barlow, 2000). The four-fold system (the En’owkin or “four societies process”) is used to indicate a need for a combinatorial balance between ‘vision’ *versus* ‘tradition’, and ‘action’ *versus* ‘community’. This concordance between psycho-sociological synthesis, traditional practices, and systems-theory approaches is surely suggestive of some fundamental common framework, at least within the universe of the human species.

## **HARMONISATION BETWEEN AND WITHIN DIFFERENT WORLDVIEWS**

### **Worldviews and harmonisation**

The many writings of J. Baird Callicott include his rich comparative study of environmental ethics as latent or manifest in diverse human religions and philosophies (Callicott, 1994). This book, and numerous more specific works that have appeared in recent years, also give grounds for optimism (for an overview, see Tucker, 2006). However, the major worldviews are still under-researched with respect to the specific values of biodiversity they recognise, and those they do not. Moreover, *within* most major worldviews there is often huge variation in interpretation of beliefs and values. If each worldview is to be a force for good regarding biodiversity, then internal harmonisation is much to be desired – insofar as it does increase the degree to which each religion articulates a wholehearted commitment to respecting and working with, rather than against, the living world.

### *Worldviews and dialogue*

Terrible conflicts exist within and between many religious sects and ideologies. In two recent books, Jonathan Sacks (2002, 2005) has written about ways in which “the clash of civilizations” might be avoided. His discussions of the problems of globalization are framed in terms of the need for great conversations, not only between politicians, entrepreneurs and religious leaders, but also between the religions themselves. “The greatest single antidote to violence is *conversation*” (Sacks, 2002: 2). If much of the conflict relates to fundamental differences regarding inter-human relationships and the meaning of human existence, then undertaking conversations about our relationships with the rest of nature might be less fraught, and thus a practical and potentially fruitful starting point.

### *Strategies*

To respond effectively to our understanding of planetary interconnectedness, and our place as part of nature rather than above or separate from it, will require “an unparalleled upheaval in our moral consciousness” (Midgley, 2004:171) – a view endorsed *a fortiori* by the contributors to this volume. With respect to the promotion of ecoliteracy and reconnection with nature necessary if this shift is to

occur, three broad social/cultural strategies can be envisaged (I am discounting the possibility of genomic change, as this is likely to be far too slow given the current “crisis”).

First is education. Basic understanding of life and living systems, engagement with local environmental needs (such a watershed restoration), and hands-on organic gardening and cookery are potent elements in the outstanding schools programmes created by the Center for Ecoliteracy based at Berkeley (Stone and Barlow, 2005). Such ideas are of course very much “of our time,” and similar schemes are being created in many places and by many people around the world. The “organic movement” is growing rapidly, with enlightenment about ecoliteracy through understanding food and food production encouraged by popular writers such as Michael Pollan (2006), as well as academics concerned with the cultural dimensions of agricultural practice (Pretty, 2002: 146 *et seq.*).

A second major strategy should affect the political process and macro-economics (Speth, 2008b). Porritt (2005) makes many valuable suggestions in this arena, and we can but hope for a rapid reduction in economic expansionism and military interventionism. Political systems need to shift from centralised power-holding to community empowerment. “The land is too various in its kinds, climates, conditions, declivities, aspects, and histories to conform to any generalized understanding or to prosper under generalized treatment.” Berry (1977) said this in an agricultural context (cf. Pretty, 2002), but such an understanding applies just as strongly to the conservation of biodiversity (and to issues affecting social justice: Jena, 2009). Structural (local) solutions are necessary, not just for efficiency (Vane-Wright, 2005), but for acceptance and commitment – in other words, sustainability through community “ownership.” Within political systems at all levels, it needs to be recognised that universal human values do appear to exist (Schwartz, 1994), as discussed above. If so, these need to be held in dynamic balance, involving respect and desire for all elements in the “four societies process” (openness to change, conservation, self-enhancement, self-transcendence: Table 3; Armstrong, 2005), if our decision-making is to be effective in sustaining human and natural communities.

According to Klaus Töpfer, addressing the World Council of Churches in October 1999 (then still Executive Director of the United

Nations Environment Programme), “We have entered a new age. An age where all of us will have to sign a new compact with our environment . . . and enter into the larger community of all living being. A new sense of communion with planet Earth must enter our minds” (UNEP, 2000: 3). While there are many signs that such a transformation is already occurring (O’Dea, 2007: 5; for a brief overview see Vane-Wright, 2009a), it is my belief that an enormous amount of work needs to be done if “a new sense of communion with planet Earth” is to be kept centre-stage in people’s minds, as environmental stress, war, greed, fundamentalism and other misanthropic forces vie for our attention, and we threaten to fall back on selfish and short-term solutions. As Speth (2008b) indicates, despite the supposed growing “strength” of the environmental movement, environmental abuse and destruction continue unabated, and appear to be accelerating.

The Great Work, to appropriate the late Thomas Berry’s famous title (Berry, 1999), includes the third strategy. This would involve introspection at the level of individuals, communities and religious and spiritual institutions, as Töpfer’s words imply. To achieve meaningful progress would involve both conversation and harmonisation (as discussed above), set against the framework of the Earth Charter or its equivalent. Harmonisation could, perhaps, be approached by Fox’s ‘method of responsive cohesion’ (Fox, 2006: 128-130) – which, in this context, challenges us to discover, through dialogue, the best interpretation within each worldview of how its embodied truths relate to biodiversity, and how its teachings affect individual attitudes to nature.

It is my belief that, by comparison of the world’s major religions and other worldviews with respect to how and to what extent they enshrine the values attributable to biodiversity, both cross-cultural dialogue and within-cultural harmonisation can be facilitated, as a step towards our new planetary awareness – which includes the pressing need for the conservation of biodiversity. This will be an essential part of any New Consciousness capable of generating a global society of humans that could live in harmony with the rest of nature. The form of consciousness required will need to be of the sort that Ken Wilber refers to as “depth” – acknowledging the relationship among “wholes that are simultaneously parts of other wholes, with no

upward or downward limit” (Wilber, 1995: 43). Although it will also necessarily recognize “span” (Wilber, 1995), including our quantitative, “scientific” understanding of the cosmos and how it has evolved – and, in particular, how the biosphere functions (Swimme and Berry, 1992; Berry, 1999; Lovelock, 2006) – it will need to transcend the limitations of conventional science (Lorimer, 1999, 2004; T. Berry, 1999; W. Berry, 2000; Goodwin, 2007). This huge challenge lies before us.

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# The Role of the Natural Sciences in Sparking an Environmental Ethic

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## **INTRODUCTION**

Humanity wields destructive forces, which press the shores, seas, and skies of planet Earth today at a rapidly accelerating rate. The history of environmental conservation in the United States has been one of addressing certain practices or saving specific sites and species, but it has not brought – nor really attempted – deep, widespread social change. Despite the birth of the National Park System, National Forest Service, and Environmental Protection Agency, despite the Clean Air, Clean Water, and National Marine Sanctuaries Acts, among others, habitats, flora and fauna, and life support systems of the United States – and the world – continue to deteriorate.

To turn this tide of degradation requires fundamental change in humanity's perception and relationship to the wild places and ecosystem services of the planet. It necessitates that all societies, political parties, and nations fundamentally value sustainable use of nature and natural resources. It requires that we see in this value superior moral, ethical, economic, and practical advantages, as well as the rights of all that exist today and all who will come tomorrow. And we need this changed perspective now. Currently, only 1 percent of Americans surveyed in 2005 named the environment as the most important problem facing the country today. Concern over the state of the environment has decreased in recent years (NSF, 2006).

Our goal is to instill in society a deep-rooted environmental consciousness. To accomplish this, we argue that natural scientists must assume responsibility as the voice of a social movement. They

must foster this movement among the general populace, and must learn to frame the movement in terms of current value systems. We assert that the natural sciences have been limited in their ability to affect social change but that it is possible to break down the barriers around the ivory tower. Science must move from a passive warehouse of information to an active conduit of information, inspiration and reform. Factors contributing to creating a successful social movement include voice, audience, and framing the movement. Success will require changes in the modern self-perception of natural scientists and reforms in the structure of academia and scientific organizations.

## **THE VOICE OF THE MOVEMENT**

### **Historical insight**

Behind every successful social movement are the tireless efforts of a select group of individuals within society who first took up the call for change. These leaders were often members of an undervalued community, which rose up to defend their worth: ex-slaves such as Frederick Douglass fought for abolition; women gathered to lobby alongside Susan B. Anthony for the right to vote; and African Americans led by Martin Luther King Jr. called for racial equality. While these movements were spearheaded by a few exceptional leaders, their momentum was based upon the support and strong backing of an oppressed minority.

For the environment, the situation is slightly different, as forests, rivers, and wolves cannot engage in public discourse. Historically, the leaders of environmentalism have not come from within the ivory towers, but from the fringe of academia or were educated individuals who lived, experienced, and chose to fight for nature. At the dawn of ecology in the mid 19<sup>th</sup> century, it was the diplomat George Perkins Marsh who pointed out, in his *Man and Nature*, (Marsh, 1865), “the dangers of imprudence and the necessity of caution in all operations which, on a large scale, interfere with the spontaneous arrangements of the organic or the inorganic world.” This precautionary approach contrasted greatly with the Progressive Era conservationists, led by government officials like Theodore Roosevelt and Gifford Pinchot, who argued that “the first principle of conservation is development, the use of the natural resources now existing on this continent for the benefit

of the people who live here now” (Pinchot, 1910). The call to protect and preserve the environment, and the idea of an environmental ethic, were pushed by the naturalist John Muir and the philosopher Alfred North Whitehead in the 1930s, neither of whom were scientists.

This is not to say that scientists have always remained disengaged from moral arguments about nature. Aldo Leopold, famous for promoting the notion of a Land Ethic, was a University of Wisconsin professor and former employee of the Forest Service; Rachel Carson was an employee of the Fish and Wildlife Service; and during the 1940s and 1950s, the University of Chicago’s “Ecology Group,” led by Professor Warder Allee, promoted the notion of ecological interdependence, and with it, the need for cooperation among all of life’s components, including people (Worster, 1994).

However, the *obligation* to respond to the moral dilemma regarding mankind’s relationship with nature has never been part of the scientific profession. Instead, individuals, from philosophers and writers to scientists and government officials, have used science, particularly ecology, to support different arguments regarding the degree to which nature should be used as a resource for human consumption. The leaders of the “environmental movement,” in all its varied forms, have seldom been prominent scientists and academicians. And thus, after the spectacular burst of legislation in the 1970s, the environmental “movement” as a social phenomenon has languished. The severe and widespread degradation of the environment in recent decades, the most rapid in all human history (Millennium Ecosystem Assessment, 2000 <http://www.millenniumassessment.org/en/Condition.aspx>), requires a new approach. As with the emerging shift in the source of trusted information regarding climate change, wherein scientists are transmitting an ever-clearer public message, we argue that the scientific community must more broadly assume the role of “public voice for the environment.”

### **Assuming responsibility**

Many within academia believe that science must remain disengaged from policy, and that any attempt to express an official ethical stance will lead to the politicization and loss of objective science (Kendler, 2003; Rotblat, 1999). But, because the products of scientific endeavor are ultimately used by society, we argue that it is



the responsibility of scientists, as the experts on their data and its implications, to ensure that these products are used wisely.

This is not a new concept. Bertrand Russell and Albert Einstein began their Russell-Einstein manifesto of 1955 with the statement, “In the tragic situation which confronts humanity, we feel that scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction” (Russell-Einstein Manifesto, 1955). In it, scientists including Herman Muller, Max Born, and Joseph Rotblat, urge governments of the world to refrain from entering into world war and instead, to find peaceful solutions to all matters of dispute. It is a foreign policy resolution, written by some of the most prominent scientists of the 20<sup>th</sup> century.

One of these scientists, the Nobel Peace Prize laureate (1995) Joseph Rotblat, took this ethic even further in his article, “Science and Humanity in the Twenty-first Century” when he argued that

“In exercising our intellectual powers we have to be responsible for the social impact of our work...the need for such responsibility is particularly imperative for scientists, if only because scientists understand the technical problems better than the average citizen or politician. And knowledge brings responsibility” (Rotblat, 1999).

He claimed that the “destiny of mankind” was “lying in the hands of scientists” and wanted all scientists to take a modified Hippocratic Oath of ethical conduct, to generate awareness and stimulate thoughts about the wider issues among young scientists. He also called for ethical committees to examine potentially harmful long-term effects of proposed research projects. He believed these committees would promote a greater involvement of academies of science in ethical matters (Rotblat, 1999).

Rachel Carson led by example in the natural sciences. She compiled the effects of chemical pesticides for her 1962 book, *Silent Spring*, out of a sense of duty more than from scientific interest. At first she tried to get others to tackle the issue, but when nobody responded, she wrote to her editor that “I feel I should do something on this” and later to a friend “I am pressing ahead just as fast as I can . . . driven by the knowledge that the book is desperately needed” (Graham, 1970). In his work, *Consilience*, evolutionary biologist and ecologist E.O. Wilson argues that

policy, social science, ethics, and biology are all necessarily linked, informing one another through a fluid flow of information (Wilson, 1998). Even Stephen J. Gould, always cautious to avoid mixing ethics and science (Van Houtan, 2006), believed that “Human choice, not the intrinsic content of science, determines the outcome – and scientists, as human beings, therefore have a special responsibility to provide counsel rooted in expertise” (Gould, 1998). A survey of 1600 British scientists found that the majority of scientists believed it their duty to disseminate their findings and discuss the social and ethical implications to policy makers and to the non-specialist public (MORI, 2000).

Given the magnitude of the need for science-informed awareness, restricting the study of nature to data collection and documentation leaves ecologists with the limited and rather morbid option of simply writing nature’s obituary. This is not only depressing – it’s irresponsible. Potential solutions for conserving what remains, and restoring what has been lost, lie within the natural sciences, particularly in ecology. It is time for scientists to stop debating whether it is their role to disseminate, engage, and create change. It is all these. So let’s accept the reality of science’s revolutionary power and its critical societal importance as expressed by Gould (with allusion to Benjamin Franklin):

“...What option remains for science (as an agent of such power for good or for evil) or for society (as the expression of our moral choices...) but to hang together or to hang separately? (Gould, 1998).”

It is time for all the disciplines of the natural sciences to officially assume responsibility for disseminating information about the current state of the environment and the means for its sustainable use. The uniquely informed voice of natural science professionals must speak directly to the populace in order to affect social change. How to most effectively accomplish this is the subject of the next two sections.

## **THE AUDIENCE OF THE MOVEMENT**

*With public sentiment, nothing can fail; without it, nothing can succeed. Consequently, he who molds public sentiment goes deeper than he who enacts statutes or pronounces decisions.*

– Abraham Lincoln

Movements of social change are inherently bottom-up, driven by inspired leaders who arise from the populace to raise awareness and incite action among their fellow citizens. While the goal may be government or institutional reform, the life support system of the movement, the source of the energy, is the behavioral and psychological change of the people.

The current degraded state of the environment testifies to government failure to instill or even employ ecologically wise thinking (we define wisdom as using experience in acting for the wider good). To cite just a few examples, the EPA documents a 36 percent increase in beach closures due to unsafe water quality since 2001 while reporting a 75 percent decline (between 2001-2004 compared with 1997-2000) in the number of federal lawsuits filed against companies violating national environmental laws ([www.nrdc.org](http://www.nrdc.org)). On August 23, 2007, the Bush administration announced that it was issuing regulations to allow for increased dumping of waste from mountaintop mining into streams and rivers (Broder, 2007). According to the NRDC, this persistent dumping continues today despite communities fighting against the destructive practice (<http://www.nrdc.org/energy/coal/mtr/about.asp>). And still the United States has not ratified the Law of the Sea or the Kyoto Protocol. Government failure to instill an environmental ethic remains acute.

Therefore, the natural science profession, we believe, must use its voice to engage the public. Its practitioners are best positioned on the issues and have the most credible understanding of the facts. But there are several inherent barriers in the sciences that make interaction with a lay audience difficult. These barriers include a lack of motivation within the discipline to engage in the public arena, the language gap between highly specialized scientific terminology and the common speech of everyday people, and the generally slow or restricted flow of information from the research to popular outlets. Perhaps the worst internal barrier is that reaching out to non-professional audiences is widely frowned upon within the profession, viewed as unprofessional by peers, and discounted in tenure decisions. Outside of the discipline, barriers exist within the general public in the form of mistrust of scientists, and a lack of basic understanding of how humans and the environment are interconnected. In the case of climate change, public misunder-

standing has been largely driven by a fearsome corporate and ideological misinformation campaign to distort, confuse, and reduce the credibility of scientific facts.

## **INHERENT ACADEMIC BARRIERS TO ENGAGING THE PUBLIC**

### **Lack of motivation**

Not everyone in the field of science is motivated by the desire to help society or the planet. Historically, scientists have studied the natural world for reasons that stretch from a religious desire to understand God to the pursuit of satisfying their own, inexplicable curiosity. In contrast to the medical field, there is no code of ethics that demands that natural scientists use their knowledge to help those in distress, be they a person, a society, or the planet. Rotblat called for a code of ethics to prevent development of harmful scientific advances. We call for an environmental code of ethics, whereby professionals within the natural sciences accept as part of their duty the responsibility to contribute to addressing the current environmental crisis. This oath can be taken at the end of a PhD defense before final declaration of acceptance by the committee and can also be introduced and displayed in journals and at yearly meetings of academic societies, such as the Ecological Society of America, the American Society of Limnology and Oceanography, the American Association for the Advancement of Science (AAAS), etc. The oath is a symbolic gesture, and as stated by Rotblat, will at least bring awareness of the larger issues at stake and show peer acknowledgment of the importance of addressing public issues.

Further motivation can come from more concrete changes within the structure of academia and scientific funding organizations. First, the system of both tenure and training within universities should be modified to include public lectures and articles and editorials in popular magazines, newspapers, etc. as an important component of professional achievement. This would do much to license and increase the engagement of individual scientists within the public arena. Currently, the tenure system for all disciplines revolves around three basic principles: research (or scholarship), teaching, and service. Of these, research is, in general, the highest weighted criterion, hence the familiar “publish or perish” (Centra, 1977). While there are

arguments in favor of increasing the role of teaching (McCauley, 2004) and especially service to the university (Lakso and Tuten, 2007), there is little mention of interaction with the general public as a valued component to gaining tenure. Where public or community service is considered at all, it is a minor factor (Centra, 1977).

For example, a list of general standards for scholarly evaluation for the Forestry and Environmental Resources department of North Carolina State University includes: superior performance as evidenced by peer evaluation; awards for excellence; receipt of external funding; publishing peer reviewed papers; publishing or editing books; presentations at professional meetings; successful mentoring of undergraduate, graduate, and post docs; and receipt of patents. In addition, there are vague items, such as “leadership in development and implementation of international activities” or “leadership in the development and implementation of new programs” (NC State University, 2007). No criterion highlights public interaction in the form of written or oral communication and/or dissemination of information. Including such a criterion would go a long way in motivating more community involvement of scientists in their local and the national public arenas.

In addition, public lectures or classroom visits by graduate students to local school systems, community centers, places of worship, etc. should also be included as part of a masters or PhD requirement. This would serve three purposes: 1) it would help to train graduate students how to communicate simply and effectively to a lay audience; 2) it would help motivate the next generation of scientists by fostering interaction between young, enthusiastic students and young scientists; and 3) it would help to increase public trust and value of scientists and science by providing stimulating, interactive, personal information flow.

Second, the current state of the environment warrants high-priority attention and therefore, priority funding within the National Science Foundation and other funding bodies. The National Science Foundation in 1997 made changes in its merit review criteria, resulting in two main criteria: 1) the intellectual merit of the proposed activity and 2) its broader impacts (NSF, 1997). The broader impacts component is fairly open, with many different types of “impact” qualifying, ranging from increasing participation of minority groups

in the sciences to enhancing the infrastructure for research and education (NSF, 1999). While the potential benefits of the proposed research to society are included as part of this broader impact, we argue that a separate merit criterion should be made that encourages development of research which directly enhances understanding of the environmental crisis. Research endeavors in all fields of science remain important; one can seldom guess how new discoveries may be applied in the future. A separate merit criterion would help those research projects that directly address issues of environmental degradation, sustainability, alternative energy use, etc. to gain traction within the highly competitive funding framework that currently rules the research realm.

Third, the prestigious National Academy of Sciences, an official advisor on science policy to the U.S. government, should include in its criteria for electing members their contribution to public understanding of science. This is in stark contrast to the current unwritten practice of dismissing as unworthy scientists who communicate with the public. The most infamous case is that of Carl Sagan, who was rejected for membership by a rare, specially held vote. As summarized by Jared Diamond, "It may well be that Sagan lost his potential seat in the academy not because he failed to produce sufficient important scientific research but because he had too much success as a popularizer of that research" (Diamond, 1997). The academy already awards a Public Welfare Medal, which ironically, Sagan received two years after his rejection. This award should confer membership into the academy. Rather than strike fear into the hearts of scientists who attempt to branch out and bridge the gap between research and public understanding, this high-honor society of all sciences in America must embrace outstanding achievement, in all scientific disciplines, of the remarkable and difficult feat of engaging the public imagination with regard to science, its findings, and their implications.

### **Communication**

Scientific training entails reduction of language to an esoteric, specialized vocabulary and an impersonal, passive, and detail-oriented voice (Sand-Jensen, 2007). This sterile style is not only often boring, but also frequently unreadable even by fellow scientists! Top

journals, such as *Science* and *Nature*, which are aimed at scientists from all disciplines, contain a table of contents listing titles that are fundamentally incomprehensible and undecipherable to most professionals (Diamond, 1997). The result of this unfortunate circumstance is strangled information flow among scientific disciplines, and the general public's near-complete lack of science comprehension.

Writing for the public requires skilled simplification of language, clarity of ideas, and a more personal, active voice. This requires that scientists restructure their messages. Such reconfiguration is not always intuitive. There is a great need for training in public communication that can complement the scientific writing that consumes professionals.

Some individuals, like Carl Sagan or Stephen Jay Gould, are natural talents. For the rest of us, workshops on public speaking and writing would go a long way toward offering alternative forms of communication outside of academia.

The Aldo Leopold Leadership Training out of Stanford University is an important and successful program that could serve as a model for how to train scientists to be effective communicators. The focus of the program is on "training, networking and outreach to help leading environmental scientists move ideas into action and advance science-based decision-making" ([www.leopoldleadership.org](http://www.leopoldleadership.org)). Currently, only about 20 scientists from the U.S and Mexico are selected each year. Additional funding from organizations such as the National Science Foundation could extend the program to reach out to scientists in a wider diversity of fields and support more scientists per year. The good news is that we do not have to start from scratch. The foundations for this program exist, and the scientific community just needs to support such training as part of the healthy development of its professionals.

Another available resource that can serve as a model and would benefit from expansion is the Communication Partnership for Science and the Sea (COMPASS). The focus of this organization is to promote science that addresses marine conservation issues and "create and facilitate strategic communication and outreach opportunities for scientists to inform decision-making through dissemination of credible, up-to-date marine conservation science.

We tailor our communications outreach primarily to the media and policy-makers, as well as to others engaged in advancing marine conservation” ([www.compassonline.org](http://www.compassonline.org)).

Marine scientists benefit from working with staff within the organization who can help them craft press releases, draft public lectures, and submit information to policy makers. Unfortunately, COMPASS has operated somewhere between a closed shop and a semi-permeable membrane, and at any rate is limited to marine conservation science. Such a service could be made available to all scientists addressing Earth’s biodiversity and life-support systems. The AAAS, the National Academy of Sciences or the National Science Foundation could themselves erect such programs funded by NSF, to facilitate rapid, comprehensive, and effective communication of research results to the public, media, and policy makers.

The Aldo Leopold Fellowships and COMPASS focus on both written and oral skills. But while the written media is the predominant form of communication within the sciences, “word of mouth is – even in this age of mass communications and multi-million dollar advertising campaigns – still the most important form of human communication” (Gladwell, 2000). Face to face contact and interaction is desperately needed; over 82 percent of Americans surveyed said they did not personally know any scientists (NSF, 2006). It is important for scientists to be able to speak impromptu, understand the value of “talking points,” learn how to simplify their messages, and lead with conclusions about what we have learned rather than what remains debated and in need of further study. All of these skills can be easily conveyed in workshop formats.

Enhanced communication skills benefit both academia and the public. At the graduate level, students are encouraged to give presentations at professional meetings and within their departments. Academia would benefit greatly by simply arranging for such talks to occur across the disciplines of science or better yet, across all departments within an institution. Fellow students from the law, economics, history, and language departments would serve as great critics for judging accessibility of information, and students would acquire skills in critiquing and presenting from each other in an informal and less-intimidating setting. This cross flow of information is a critical component of innovation and creative discovery, as one



discipline can apply, in totally new and different ways, the results of another discipline's research (Diamond, 1997).

It is not enough to rely upon scientific journalism alone to convey science to the public, for “journalists, no matter how gifted they are, can't replace scientists themselves as role models for young people contemplating a career in science, or as advocates before Congress at times of budget hearings, or just as the people most knowledgeable about their subjects. That takes someone like Sagan” (Diamond, 1997). Like any great singer, scientists must be trained in how to articulate, craft, and carry their voice most effectively to their audience.

### **Slow and restricted flow of information**

The complete scientific endeavor, from generation of the initial hypothesis to the publication of results is an awfully slow process, often taking years – and this assumes that funding has been secured to implement the research project. After months of field work and data analysis, a manuscript may be submitted, accepted for review, and then rejected after six months, with the author required to start the submission process all over again. During this time, it is unlikely that a scientist will share their findings publicly, lest they undermine their own chances for publication in a professional journal. If published, access to professional journals is expensive. For example, currently it costs \$10.00 to download an article from *Science*, and not all articles are available. Membership in AAAS, which publishes *Science*, is \$142.00 per year. Thus, dissemination of scientific information is also limited by financial restrictions. Smaller universities, school systems, and public libraries cannot afford subscriptions to a wide array of journals.

An important recent innovation that meets both of these concerns is the development of the free-access, peer-reviewed, online Public Library of Science (PLOS). This non-profit, grassroots organization has several associated journals which publish cutting-edge science that is entirely free for anyone to access, distribute, and use, with proper citation. The turn-around time for these journals tends to be faster than other print journals (8 weeks from time of acceptance), also aiding with increasing information flow. We encourage scientists to turn first to this resource as a primary publishing option.

### **External barriers to scientific engagement with the public**

Less than half of Americans (44 percent) believe in evolution and only 35 percent in the big bang (NSF 2006). Evolution is the organizing principle of our understanding of life. Yet a third of American adults indicated that evolution is “absolutely false” (compared to only 7 percent in Denmark, France, and Great Britain, and 15 percent in the Netherlands). The percentage of U.S. adults who were not sure about evolution increased from 7 percent in 1985 to 21 percent in 2005. Only 14 percent of American adults believe evolution is “definitely true.” In Iceland, Denmark, Sweden, and France, 80 percent or more of adults accept evolution, as did 78 percent of Japanese adults. Only Turkish adults were less likely to accept the concept of evolution than American adults. Religious fundamentalism and the politicization of science in the United States are major factors in these statistics (Miller et al, 2006). Major reforms in public science education are needed.

We assert that this educational reform will be much easier to achieve once an environmental ethic – a moral framework within which science is seen to operate comfortably – is widely perceived and established in the general public. Many people of faith see science as amoral, aloof, and threatening to their beliefs. They are surprised when they can interact with scientists and see them as ethical, warm people. Scientists building bridges with religious leaders shows high promise in this regard. (see [http://chge.med.harvard.edu/media/releases/jan\\_17.html](http://chge.med.harvard.edu/media/releases/jan_17.html). See also: [http://www.uakron.edu/news/articles/uamain\\_1839.php](http://www.uakron.edu/news/articles/uamain_1839.php). And: <http://carlsafina.wordpress.com/2007/09/09/baked-alaska/>. See also below.)

It is currently critical for scientists to rout out the organized and pervasive disinformation campaign, funded largely by the oil industry, to undermine scientific credibility among the faith community and wider public, especially as it relates to climate change. The Union of Concerned Scientists has been active in this regard. We would like to see additional, concerted activity by the National Science Foundation, AAAS, and the National Academy of Sciences. All scientists can, individually or in coalition, watch the print, TV, and radio media outlets, and counter attacks on scientific facts or scientists themselves. Such involvement can include writing editorials and contacting media representatives (journalists, news reporters, etc.) to promote accurate understanding of the presented

information and dispel any attempts by denialists to muddle scientific findings. It is the professional responsibility of the entire scientific community to defend science, prevent misinformation from spreading through the public, and work actively to bring about a new relationship between science and society.

A nationwide ad campaign targeting movie audiences could help alleviate both the lack of scientific understanding and combat the misinformation endeavors. Today, movie-goers are subjected to 20-30 minutes of pre-movie trivia questions, commercial advertisements, and previews of coming attractions. This is a captive audience from across multiple sectors of society and provides an opportunity to present information regarding the state of the environment and the choices the public can make in a humorous or dramatic, highly motivating fashion. For instance, an information campaign that describes the amount of money saved on gasoline per month due to driving a fuel-efficient car versus an SUV, or how much energy would be saved by raising the national fuel standards for cars, are simple messages that could be presented. Tapping into current value systems to relay the message is important in this effort, and will be discussed in further detail in the next section.

### **FRAMING THE MESSAGE**

Fifty-six percent of American respondents in 2004 agreed with the statement: “We depend too much on science and not enough on faith” (NSF, 2006).

Having the voice and knowing where and how to effectively direct it will achieve nothing if the content of the message is not relevant. Past successful social movements, such as women’s voting rights, abolition, and civil rights, all reveal strong associations with dominant contemporary social, religious, or political value systems (Grimes, 1967; Banaszak, 1996; Stowe, 1851; Van Houtan, 2006).

For example, the women’s voting rights movement in the 19<sup>th</sup> century had little success on a national level, with few states passing enfranchisement legislation. In the first two decades of the 20<sup>th</sup> century, women seeking access to the ballot box aligned with the temperance, populist, and progressive movements, all of which held the collective value of challenging the status quo and fighting for reform (Banaszak, 1996). Proponents of the progressive movement

supported women's voting rights because they saw shared values between the two: superiority of a more puritan morality; the superiority of native-born white Americans; and the superiority of a kind of direct control of government to combat the "political machines" of big business (Grimes, 1967; Banaszak, 1996). Thus, this "suffrage" movement gained success not by introducing the value of equal rights for women, but because it fit within the value of puritan, progressive reform. The use of contemporary values fosters a movement's success (Banaszak, 1996).

There are two ways in which contemporary value systems play important roles in fueling successful social movements. First, a movement will gain popularity and acceptance if it is embedded into the existing, dominant value systems of the time (Van Houtan, 2005). Second, collective values and beliefs that support tactics to challenge the status quo will help fuel other social movements. Such a coalition of shared beliefs in challenging the norm can be seen in the 1960s and 1970s, where civil rights and environmental reform fought side by side for changes in legislation.

We propose that instilling an environmental ethic is therefore not so much about creating a new value in society as it is about framing this ethic within already accepted values. The current dominant value systems that are likely to be easily aligned with an environmental ethic and reach a broad audience are the Judeo-Christian notion of environmental stewardship, personal health issues, and economic arguments regarding the sustainable use of natural resources.

### **Religious value systems**

There is no one specific "Judeo-Christian" environmental view and, of course, some of the worldviews held by religious groups are also held by secular groups. The most promising Judeo-Christian perspective for environmental concerns revolves around the notion that biodiversity conservation is an ethical issue with a biblical origin (Van Houtan and Pimm, 2006). This perspective, which views the loss of biodiversity or damage to earth's natural systems as a sin, is supported by a range of religious groups, from United Methodists Church to branches of the Jewish tradition (Van Houtan and Pimm, 2006).

Progress has already been made between scientists and conservative U.S. evangelicals in this arena. A collaborative effort, led by leaders from the National Association of Evangelicals (NAE) and

the Center for Health and the Global Environment at Harvard Medical School, serves as a model for additional interactions. In a statement released in January 2007, these leaders declared that “protection of life on Earth is a profound moral imperative” and called upon leaders from every sector of society, from business to religious, to “work toward the fundamental change in values, lifestyles, and public policies required to address these worsening problems before it is too late” (An Urgent Call to Action, 2007). Natural scientists have engaged with these religious groups to provide clear, factual evidence on the dire state of the environment – evidence of the harm caused by human actions and the negative consequences that threaten the well-being of humanity, especially the poor. Here, the role of science is to inform the value structure of this religious worldview that holds that it is sinful to harm Creation and that there is a moral obligation to help the needy (who are often most affected by environmental injustice). By providing the ecological information in such a manner, scientists can serve as a trusted source of vital messages leading to shared initiatives between these two distinct sectors of society.

*“We are glad to be partnering with our  
friends in the scientific community.  
They have the facts we need to present to our  
congregations; we have the numbers of activists  
that will work through churches, government, and the  
business community to make a significant impact.”*

– Dr. Joel Hunter, Senior Pastor of  
Northland Church in Orlando, Florida

We encourage continued and extended collaboration between scientists and religious leaders. Scientists must take the initiative to engage and offer their expertise as a means of furthering the shared need to conserve life and maintain Earth’s life-support systems and ecological services – in other words, to care for creation. Relating the ecological crisis to human health issues (discussed below), especially the well-being of the poor, will help form bridges of shared values among groups.

Another important aspect of framing a message, besides targeting existing value systems, is accessing the language (Van Houtan, 2005). When working with evangelicals, the use of “creation” instead of

“biodiversity” or even “nature” has profound significance (Van Houtan and Pimm, 2006). Just as scientists must learn to adjust their talks to the expertise level of the audience, so too can they adjust their vocabulary to embrace concepts familiar to the audience. For example, in a recent joint meeting of scientists and Christian leaders, the statement: “Every time you fill your gas tank you are tithing to terrorists” resonated strongly with the religious members of the group. Scientists will better communicate and more effectively translate by considering their audience’s language.

### **Personal health values**

During the 1960s and 1970s, much of the environmental movement was focused on issues that directly related to human health. One of the most famous examples is Rachel Carson’s *Silent Spring*, which targeted chemical pesticides as a medical threat. *Silent Spring* was released during a time when the public was already highly sensitive to the health risks associated with radioactive fallout from nuclear testing (Lutts, 1985). Carson purposefully tapped into this framework by using language and descriptions of chemical pollutants that reflected this already well-known threat (Lutts, 1985). For example, she writes in the “Fable for Tomorrow,” “In the gutters under the eaves and between the shingles of the roofs, a white granular powder still showed a few patches; some weeks before it had fallen like snow upon the roofs and lawns, the fields and streams” (Carson, 1962). She then links this threat to that of the chemicals she is targeting in her book, writing that the pesticides “have been so thoroughly distributed throughout the animate and inanimate world that they occur virtually everywhere...major river systems and even from streams of groundwater flowing unseen through the earth. Residues of these chemicals linger in soil to which they may have been applied dozens of years before. They have entered and lodged in the bodies of fish, birds, reptiles and domestic and wild animals...” (Carson, 1962). She concludes with the unambiguous connection: “We are rightly appalled by the genetic effects of radiation; how then can we be indifferent to the same effect in chemicals that we disseminate widely in our environment?” This evidence is provided in the chapter entitled “Elixirs of Death.” The message is clear: it’s not just the death of the insects that the reader needs to be worried about.

People respond to threats to their health. In 2004, nearly half of Americans surveyed believed that pollution of drinking water, contamination of soil by toxic waste, and maintenance of the nation's supply of fresh water for household needs were major environmental concerns (NSF, 2006). This compares with only 26 percent who felt global warming was of concern. The Clean Air Act and the Clean Water Act were direct responses to public demands for the right to breathe healthy air and drink uncontaminated water. Thus, one way to motivate social change is for scientists to make the links between issues such as global warming and human health more explicit. For example, steps to reduce greenhouse gases will also reduce air pollution that is harmful to human health. Framing the information in terms of the human health value system will help instill a sense of importance and urgency in the public.

The same applies with runoff from agriculture and sewage that creates dead zones in the oceans and fuels harmful algal blooms along the coasts. Red tides from the blooms of *Karenia brevis* produce enormous amounts of brevetoxins which not only kill millions of fish and shellfish, hurting the fishing and tourism industries, but can lead to neurotoxic shellfish poisoning in humans and cause respiratory inflammation or illness from breathing in the air nearby (Centers for Disease Control and Prevention, 2007; Backer et al., 2003). Water quality and air quality issues should be used by scientists as a way of linking the environmental crises to the daily lifestyles and health of their audience.

### **Economic incentives**

The environmental crisis is also an economic one, and natural scientists will benefit from describing the cost of environmental degradation in the language of money, jobs, and economic growth. For example, the rise in asthma in children since 1980 is suspected to be associated with air pollution, despite current regulations ([www.epa.gov](http://www.epa.gov)), and puts a strain on the health care system; harmful algal blooms fueled by run-off and pollution negatively impact the economies of states like Florida and Texas by closing down fisheries and affecting tourism (Centers for Disease Control and Prevention, 2007); assuming fuel costs of \$2.04/gallon, SUV drivers pay up to \$2200 more in gas for every 45,000 miles than owners with higher fuel

efficiency cars that contain the same seating and cargo capacities ([www.consumerreports.org](http://www.consumerreports.org)); and investing in water treatment plants cost billions of dollars compared to maintaining healthy, natural watersheds ([www.nyc.gov](http://www.nyc.gov)).

For scientists, it is well known that natural hydrological, chemical, and atmospheric cycles provide the life support systems upon which we depend, gratis. But the public is generally not aware of these connections nor the costs that disruptions to them have incurred. However, detailing the costs is not enough – it is critical that these costs are presented in terms that are familiar and accessible to the audience. Again, language and familiar concepts are key. For example, the estimated costs of sea level rise to coastal communities, changes in precipitation patterns to agriculture and basic food supplies, and increased drought due to climate change are astronomical and hard for anyone to really grasp. Framing these costs in terms of how they relate to household income, the price of cars or gas, or other daily, familiar budgets will help the audience identify with the enormity of the problem. Also, it may be best to use comparisons to more familiar budgets than to use percentages of larger economic indices, such as GNP. Again, it depends upon the audience, but scientists must tailor their messages accordingly, even within a given framework. Talking in terms of the price of potatoes will work much better in Idaho than on Cape Cod.

There is a false dichotomy that asserts that environmentalism and economic growth are mutually exclusive. But environmental concepts such as greater energy efficiency have been shown to have direct economic and security benefits. For instance, economic savings in the trillions of dollars have resulted from regulations on energy-efficient refrigerators, air conditioners, heating and lighting, and clean air (Goldstein, 2007). The problem is not in the economics, but the politics. Corporations with a vested interest in the status quo lobby political leaders and form strong alliances (Goldstein, 2007). For example, since 1990, the oil and gas industry has consistently increased its contributions to political campaigns, with approximately 80 percent financing Republicans ([www.opensecrets.org](http://www.opensecrets.org)). Scientists must work with economists to show the direct economic benefits of environmental regulation and protection. This is not a front they must fight on alone – groups such as the Coalition for Environmentally



Responsible Economies (Ceres) have created models for businesses with incentive programs to encourage more sustainable practices. But scientists, in delivering information on the state of the world to public audiences, need to include discussions about how degradation directly impacts economies. This value system would serve as a good framework for the national ad campaigns in movie theaters, discussed in the previous section. Just as people respond to their health and to their faith, so too, they respond to their pocketbooks.

## CONCLUSION

One of the major dangers in sparking a social change is that the fire burns out too quickly. Minor successes may be won relatively rapidly, in terms of legislative action, but the underlying value system, the ethic, remains unchanged. There is a danger of complacency: once the public assumes that politicians have gotten the message and legislative action has taken place, then they assume the problem is solved. But, as the history of environmental conservation shows, legislation is not enough. For example, agriculture remains a culture of chemical warfare, despite the popularity of *Silent Spring* and rapid legislation to ban DDT – from 1962 to 1977 pesticide use increased by a factor of 2.5 and the United States has yet to ratify the Stockholm Convention treaty to ban specific persistent organic pollutants (POPs) and the Rotterdam Convention which regulates international trade in highly toxic chemicals ([www.worldwildlife.org](http://www.worldwildlife.org); [www.pic.int/home](http://www.pic.int/home)).

One major area that we have not yet discussed is the role of population control. The environmental crisis in its most reduced form is really the result of too many people extracting too many resources. Since 1850, per capita energy consumption has risen about five-fold globally and the population has increased four-fold, resulting in a twenty-fold increase in the scale of the human enterprise (Ehrlich and Ehrlich, 1997). Research efforts into more effective, safer, and more diverse birth control practices can be encouraged through funding initiatives and is one means by which the scientific community can help address this issue. Alternative energy use and development of more environmentally benign technologies, especially in developing nations, is desperately needed to help diminish the impact of increased human densities on a finite planet.

What we seek here is not the development of legislation, but of lifestyles. And this is about a shared value and future vision that must be informed by what science is learning about how the world is changing.

The Earth is sick, and natural scientists are the most qualified medics. It is not enough simply to diagnose the disease — we must also work to cure the illness. This requires that we inform, motivate, and create change across vast sectors of society, from business to politics to religion. Natural scientists are uniquely positioned to be the leaders of this movement, having both the knowledge and a reputation of trustworthiness among the majority of citizens (NSF, 2006). The time to act is now. And the first step, the most critical, is to break from the traditions of the ivory tower and engage in face-to-face dialogue with the rest of the people with whom we share the planet and its destiny. Within their value systems, their daily choices, lies the power to turn the tide of degradation. We must access this power, and infuse it with an ethic that will achieve harmony between human society and the Earth's life support systems.

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# The Gaian Generation: A New Approach to Environmental Learning\*

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How would schooling change if it were completely overhauled so as to educate students to observe, assess, and interpret environmental change? What if our most prominent educators and scientists developed an approach to K-16 schooling in which an understanding of the biosphere – a Gaian approach – became the foundation of an entire curriculum? How might we train a “Gaian Generation” of environmental learners? This essay is a speculative attempt to answer that question. We are on the verge of a new twenty-first century environmental science, and we urgently need cohorts of learners who can apply this science to the daunting task of planetary well-being.

Our challenge is compounded by the prevailing absence of natural history knowledge and awareness. Fewer children spend time outdoors (see Louv, 2006). Louv’s book triggered a national movement in environmental education, culminating with proposed national No Child Left Inside legislation. See [www.naaee.org/ee-advocacy](http://www.naaee.org/ee-advocacy) for more information). Fewer children can identify the local flora and fauna of their neighborhoods and communities. And yet, with just basic computer skills, they have access to a global network of environmental information and tools. How do we revitalize an interest in the natural world, supplement it with the vast information repository that’s available, and educate a new generation of environmental learners?

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## **REFORMULATING ENVIRONMENTAL EDUCATION**

“Pattern-based” environmental learning must become the conceptual foundation of an integrated environmental change science curriculum. This can be accomplished, in part, by linking a hands-on, empirically oriented, observational approach to natural history (visceral learning), with a broader conceptual, computer-enhanced, pattern-based approach to environmental science (virtual learning). Make no mistake. Gaian learning starts with intimate awareness of local natural history. Direct observation of the natural world is the curricular substrate for understanding the biosphere. But such learning also requires an awareness of spatial and temporal variation. With the power of laptop computers, interactive databases, and the scaling tools that both facilities enhance, a pattern-based approach to environmental learning is at our fingertips.

I am urging a reformulation of K-16 science, an approach that is substantively informed by but also linked to new conceptual frameworks. What are the developmental structures, the cognitive orientations, and the perceptual foundations that form the basis of this reformulation? This essay proposes exactly such a reformulation, informed by state-of-the-art global change science, culminating with concrete suggestions for educational institutions.

## **THE MANDATE (THE IGBP CHALLENGE)**

The International Geosphere-Biosphere Programme (IGBP) is an interdisciplinary consortium of research scientists who are primarily concerned with the earth system challenges posed by global environmental change. Its research agenda “comprises a suite of research projects focused on the major Earth System components (land, ocean, and atmosphere), the interfaces between them (land-ocean, land-atmosphere and ocean-atmosphere) and system-wide integration (Earth System modeling and paleo-environmental studies)” (IGBP Brochure).

They publish a series of comprehensive environmental change science anthologies (The IGBP Series) representing the epitome of peer-reviewed, international, interdisciplinary, innovative, approaches to a holistic, biospheric assessment of the earth system (<http://www.igbp.org>).

igbp.kva.se/page.php?pid=230). Anyone interested in developing a deep understanding of the complexities of environmental change science should be familiar with these volumes. The seminal work, *Global Change and the Earth System* (Steffen et al., 2004), provides both a comprehensive assessment of the various stresses and pressures on the earth system and a compelling epistemological approach for researching, interpreting, and communicating concepts of environmental change. The final chapter, “Towards Earth System Science and Global Sustainability,” offers an “earth system science toolkit.”

The guiding premise of the IGBP approach is that an “integrative Earth System science is beginning to unfold” as “observations of Earth from the surface and from space are yielding new insights almost daily.” They suggest a conceptual reorientation is necessary and the “biggest challenge” facing the scientific and educational communities “is to develop a substantive science of integration” (Steffen et al., 2004)

The IGBP Mandate trumpets a challenge to reorient environmental science education to provide students with the conceptual tools for interpreting, assessing, and comprehending global environmental change.

I will describe this challenge in some detail as it offers an authoritative, compelling, and ultimately urgent case for such a reorientation. The IGBP Mandate provides a biospheric perspective on environmental change science, with an emphasis on both the analytical and cognitive orientations that such a science demands. Its additional emphasis on sustainable solutions links theory and practice – there is a tangible reality to environmental change. Human life, ecosystem integrity, and planetary health will be profoundly impacted by earth system changes. Hence urgency, if not a moral imperative, is the foundation for this mandate.

In 2001, the Global Analysis, Integration and Modeling Task Force (GAIM), a subcommittee within the IGBP, “developed a set of overarching questions as a challenge to the scientific community concerned with global change.” These questions were organized into four categories: analytical, operational, normative, and strategic. The analytical questions are of particular interest for environmental science education.

1. What are the vital organs of the ecosphere in view of operation and evolution?



2. What are the major dynamical patterns, teleconnections, and feedback loops in the planetary machinery?
3. What are the critical elements (thresholds, bottlenecks, switches) in the Earth System?
4. What are the characteristic regimes and time-scales of natural planetary variability?
5. What are the anthropogenic disturbance regimes and teleperturbations that matter at the Earth System level?
6. Which are the vital ecosphere organs and critical planetary elements that can actually be transformed by human action?
7. Which are the most vulnerable regions under global change?
8. How are abrupt and extreme events processed through nature-society interactions? (Steffen et al., 2004)

Further, the IGBP Mandate poses a series of conceptual challenges, dictated by the characteristics of a complex, multi-layered template of interconnected biospheric systems. For example, a student of environmental change science must be able to cope with complexity and irregularity. “Most environmental systems are characterized by a multitude of non-linear internal interactions and external forcings” (Steffen et al., 2004). How do you learn to interpret non-linear Earth System behaviors? How do you recognize thresholds and irreversible changes? How do you accommodate for indeterminacy or intrinsic uncertainty? How do you recognize the characteristics of emergent properties and complex systems? Finally, and at the core of the toolkit, is an understanding of scaling effects, recognizing the interactions and distinctions between local, intermediate and global spatial scales, as well as interpreting vastly different temporal relationships. The IGBP Mandate describes these as the “visionary tools” that are a prerequisite for global change research.

### **THE EARTH SYSTEM SCIENCE TOOLKIT**

These conceptual challenges are the cognitive foundation for an “Earth System Science Toolkit...an interlinked suite of probes and

processors that sense and interpret Earth System behavior in a holistic way” (Steffen et al., 2004). This suite includes paleo-science, contemporary observation and monitoring, earth system experimentation, global networks, and the simulation of earth system dynamics.

Although rapid environmental change presents complicated “no-analogue states,” that is, the “Earth System has recently moved well outside the range of the natural variability exhibited over the last half million years,” the use of “multi-proxy” approaches remains crucial. Paleo-science emphasizes the recovery of “key archives of past change” (Steffen et al., 2004). Those archives include mountain glaciers, coral reefs, tree ring records, biological species assemblages in lakes, boreal peat lands coastal environments, coastal tropical wetlands, or any ecosystem in rapid transition, where data gathering from the more recent past provides an historical context for assessing rapid environmental change. The collection, interpretation, and assessment of this data must become a foundation for environmental science teaching.

In the last few decades we’ve seen a proliferation of earth system data, enabled by extraordinary advances in computer technology, observation of the Earth from space, and sophisticated monitoring techniques. Through global computer networking and the relative accessibility of the Internet, much of this data is publicly available and accessible. This global change information base should be effectively organized so that educators can use it as the basis for teaching environmental science.

Rapid environmental change results in dramatic earth system experimentation – altered biogeochemistry of the oceans, the introduction of alien species, the removal of endemic species—these processes reflect a contemporary, ubiquitous, perceptual challenge. Any student of environmental science can observe simulations of future environmental conditions on Earth by studying “the structure and functioning of ecosystems under new combinations of atmosphere and climate” (Steffen et al., 2004).

The depth, richness, and complexity of this data requires a global network of thousands of trained, dedicated observers, who use similar protocols, and who have access to this shared data. “Planetary patterns emerge more clearly when small-scale or site-specific measurements and process studies are carried out in a consistent and comparative way across the globe.” Emerging global computer networks facilitate

the exchange and accessibility of this data. Such a global initiative should be linked to a similarly comprehensive network of schools and other educational institutions.

The portability and power of computer technology also supports increasingly instructive and dynamic “virtual” simulations, scenarios, and experiments. Although highly technical knowledge is required, for example, to “simulate mathematically the physical dynamics of the atmosphere and the oceans and their coupling,” or to incorporate the dynamics of major biogeochemical cycles, more simplified versions of these models serve to enhance a student’s understanding of earth system processes. Why not provide school systems, teachers, and students, with the software and training to explore such simulations in environmental science classrooms?

For the purposes of this essay, I will present hands-on, educational approaches that integrate the IGBP Mandate as the basis for environmental science education. To create a resilient, comprehensive, and deep understanding of biospheric processes, environmental science must emphasize the interpretive dimensions of the eight analytical questions as suggested by the GAIM task force. What are the conceptual, developmental, and perceptual challenges intrinsic to their investigation? This is the educational essence of the IGBP Mandate. What particular challenges do they create for environmental learning?

### **PATTERN-BASED ENVIRONMENTAL LEARNING**

How can we train an entire generation of students and teachers to reorient their approach to learning so as to enhance their understanding of biospheric processes? This is both a perceptual and substantive challenge. Learning about biospheric processes requires a perceptual reorientation, an educational approach that stresses pattern-based learning. The task for the science educator is to develop a conceptual curricular sequence that helps students perceive, recognize, classify, detect, and interpret biospheric patterns. At the core of this approach is an emphasis on scale, an understanding of how to interpret spatial and temporal variability, linked to the dynamics of biospheric processes and local ecological observations.

Consider some of the dynamic biospheric processes that are crucial to understanding global environmental change: biogeochemical cycles,

watersheds and fluvial geomorphology, biogeographical change (including, species migrations, radiations, and convergences), plate tectonics, evolutionary ecology, and climate change. What if these concepts became the basis of science teaching as soon as a child starts school? You can teach a first grader to follow the hydrological cycle, to observe the flow of water in a river, to observe phenological changes, to understand animal and plant migration. You can teach an elementary school child about plate tectonics, climate change, seed dispersal and pollination, or atmospheric and oceanic circulations.

I believe that the source of this learning is a pattern-based orientation. Once you understand the basic earth/land/water movements of a biogeochemical cycle and the various teleconnections between these mediums, you have perceptual awareness of a fundamental biospheric process. Depending on the grade level and learning sequence of the curriculum, the substantive depth of the investigation may be enhanced. Each year, K-16, a student can study the carbon cycle, with additional layers of complexity as the necessary mathematics, modeling, or mechanics is enhanced. The curricular substrate is the ability to interpret the patterns that are intrinsic to biogeochemical cycles as linked to a growing understanding of scale and connectivity.

Variable scalar hierarchy is an important conceptual tool for biospheric perception. The observer learns that causation depends on context. Depending on the scale of your observation, you learn to link different phenomena, and you understand the dynamic changes inherent in any landscape are a function of spatial and temporal boundaries. There is a pattern language that transcends scale. The emerging science of landscape ecology, for example, works with a taxonomic lexicon that implies such a structured pattern language: corridors, gaps, mosaics, borders, and boundaries. Observing such structures through tangible, hands-on, research projects provides students and teachers with the opportunity to explore these patterns.

A deeper exploration of biospheric patterns and processes (as in the case of landscape ecology) yields mathematical and linguistic learning opportunities that further deepen the curricular sequence. Should this change how we teach math and language? Would math instruction be more meaningful if it was coordinated with the

observation of biospheric patterns? Can such coordination be linked to the earliest years of schooling?

Pattern-based environmental learning is the conceptual foundation for a biospheric curriculum. This approach is necessarily visceral and virtual. It must proceed, on the one hand, with hands-on, outdoors-based, field observations, taking advantage of the perceptual gifts of the five senses. There is no better educational approach for biospheric learning, than intimate, empirical observations of field natural history. However, pattern-based learning also requires the ability to explore and practice the manipulation of data by experimenting with scale. Through the use of computers and other forms of instrumentation this manipulation can occur through magnification and miniaturization. Science teaching has some remarkable perceptual tools that are now widely available. How might they further enhance biospheric perception? First, let us look at the visceral approach and why intimate awareness of local natural history is a prerequisite for pattern-based environmental learning.

### **THE VISCERAL APPROACH: BIOSPHERIC NATURAL HISTORY**

Richard Louv's 2006 book *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* suggested that an entire generation of North American youth no longer play outside. This became a rallying cry for dozens of environmental organizations, culminating in the sponsorship of federal legislation entitled the No Child Left Inside Act of 2007, an effort to restore and revitalize environmental education funding for American public schools. The explicit assumption of such legislation is that less time outdoors results in declining awareness of and interest in ecological issues and knowledge. Implicitly, it assumes that the dominance of computers, television, video games, and other electronic entertainment, leads to inactivity, a decline in physical fitness, and less curiosity and interest in the natural world.

I'm not sure there is enough evidence to warrant a clinical psychological term such as "nature-deficit disorder" but Louv's basic point is well taken. One can presume a declining awareness of natural history, and such a decline can only be reversed with a dedicated effort on the part of schools, communities, and families to promote outdoor

learning. Louv suggests that outdoor play is crucial to the healthy psychological development of children. Environmental educators insist that outdoor play is a prerequisite to promoting an ecological understanding of the natural world.

What's the relationship between outdoor play and biospheric natural history? Intimate awareness of local natural history is the educational foundation for interpreting biospheric patterns. There are "exemplary biospheric naturalists," scientists whose lifework is to study the ecological, evolutionary, and geological dimensions of earth system science, and whose insights are grounded with their natural history skills. Lynn Margulis and Tyler Volk (Margulis and Volk, 1998; Volk, 1998) derive their Gaia-based interpretations from a combination of lab-based studies (using sophisticated instrumentation), and avid field observations. Margulis, a remarkable science educator, as well as a great theorist, has written a series of outstanding "five kingdom" field guides which stress how immersion in field-based observations yields rich insights into environmental evolution. Volk's work emphasizes field-based observations of biogeochemical cycles, linked to observing the interfaces between oceanic, atmospheric, and terrestrial milieus.

Charles Darwin, surely an exemplary biospheric naturalist, is a particularly interesting educational case study. How do Darwin's impeccable field observations, detailed analytical investigations, and insatiable curiosity lead to his expansive theoretical view? *The Voyage of the Beagle* is the ultimate biospheric field trip, a circumnavigational data-collecting journey, which enabled Darwin to juxtapose data from different habitats, link ornithological and geological observations, and speculate on both spatial and temporal variation. Yet, some of the most compelling reading in *Voyage of the Beagle* is Darwin's Galapagos material, specifically, his comprehensive experimental observations of the *Amblyrhynchus*, a "remarkable genus of lizards." Here Darwin demonstrates his extraordinary capacity for asking profound ecological questions. His deeply interpretive, sharply analytical questioning process throughout "The Voyage" depicts an attention to detail, ultimately linked to broader patterns. The source of Darwin's inspiration and perceptual awareness originates in his outdoor, field-based investigations, the basis for his investigative protocol.

The integration of hands-on field exploration with global travel is the milieu of nineteenth century natural history, and serves as the origins of evolution, ecology, geology, and ultimately earth system science. Visceral approaches to natural history provide an intimate awareness of species and habitats. The outdoor experience provides a dynamic learning milieu and an inspirational and motivational context. There is sufficient narrative evidence to suggest that outdoor, immersive, field-based studies are crucial to developing the observational capacity that leads to biospheric awareness. Only extraordinary individuals have the motivation and perseverance to pursue such learning on their own. Like all forms of learning, this approach requires supervision, structure, mentoring, and a learning community of like-minded collaborators. What are the implications for environmental learning in schools? How is this approach incorporated into a unified environmental change science curriculum?

Consider the curricular potential of phenology (the scientific study of periodic biological phenomena, such as flowering, breeding, and migration, in relation to climatic conditions). Phenology is essentially the study of the changing of the seasons. People interested in phenology might study plant budding and floral blooms, spring and fall migration of birds or butterflies, and the appearance of insects. Of particular interest, phenological observations can be tracked locally, compared to other data on an annual basis, and then compared between places. You can study changing climatic circumstances, the life cycles of specific plants and animals, and other indicators of biological and climatic change.

In a 2001 article in *Science*, Josep Penuelas and Iolanda Filella report that although phenological changes differ from species to species, there are geographically diverse, substantial climate-warming induced changes in a variety of habitats. The report cites several dozen studies in peer-reviewed scientific publications indicating short-term phenological change is a global phenomenon, linked to climate warming.

They conclude “as in many areas of environmental science, the key requirement is long-term data sets. . . . Today, thousands of people – professionals and volunteers – record phenological changes all over the world, as do international and national phenological monitoring networks such as Global Learning to Benefit the Environment

(GLOBE) or the European Phenology Network. Together with remote sensing, atmospheric, and ecological studies, these data will help to answer the many questions raised by the recently reported climate effects on phenology: What are the limits of the lengthening of the plant growth season and the consequent greening of our planet? Will the (less seasonal) tropical ecosystems be less affected than boreal, temperate and Mediterranean ecosystems? How will different aquatic ecosystems respond? How will responses to temperature and other drivers of global change interact to affect phenology and the distribution of organisms? How will changes in synchronization between species affect population dynamics both in terrestrial and aquatic communities? Will appropriate phenological cues evolve at different trophic levels?” (Penuelas and Filella, 2001).

Answers to these questions all require field-based observations, locally gathered data sets, and scores of professional and volunteer observers. What an ideal learning opportunity for science classrooms. Students and teachers can track the weather, keeping daily logs of moisture, sunshine, cloud patterns, and the accompanying landscape changes. These on the ground observations can be linked to satellite photos and other global climate patterns. Gardening serves as a fine introduction to both local natural history and global climate patterns, or as an introduction to plant domestication, evolutionary ecology, and coevolution. Watershed studies teach the movement of water in a landscape, hydrological cycles, and basic geomorphology.

What’s crucial is that the outdoor field experience serves as the foundation for pattern-based environmental learning. The visceral, hands-on experience – integrating sensory observations with empirical data collecting – provides an enduring, whole body/mind perceptual approach to learning about the biosphere. It serves as the template for more abstract learning, and deeper explorations of the scaling phenomena that is fundamental to understanding biospheric patterns.

### **THE VIRTUAL APPROACH: EXPLORING A BIOSPHERIC PATTERN LANGUAGE**

As much as environmental educators rue the great numbers of children left inside, there is another side to the increasingly screen-



filled hours of childhood. Video games, internet-based communications, cell phones, digital photography, and digital recording programs, have profound conceptual impact on their users. I take a McLuhanesque view – the use of these technologies promotes specific, pattern-based conceptual practice. Concepts of connectivity (networking), scaling (magnification, miniaturization), and complex systems (emergent properties, non-linearity), are all intrinsic to the use of computers and the Internet.

A basic word processing program teaches its users how to instantaneously change the size of text, rearrange text on a page, organize notes and information, create layers of text within text, and how to share text with other users. Any basic digital photography program provides its users with remarkable scaling tools – changing the size and detail of pictures, rearranging them, linking them to music, turning them into slide shows. A power point presentation (when skillfully arranged) can be a magnificent exercise in juxtaposing scale.

Consider a highly popular computer game like *The Sims*. In this simulation you observe and manipulate a community of individuals who interact differently depending on how you program them. Their social interactions are a lesson in emergent properties. Entirely unanticipated situations can occur. Based on the variables that contribute to this emerging sociology, you can change the social settings and characters accordingly. *The Sims* is a “simplified simulation” of complex systems.

Any computer user can freely download Google Earth, which gives you the ability to instantaneously find your neighborhood, zoom out to a spinning globe, and then come back again. This is an extraordinary, hands-on experiment in scaling, a global atlas of unprecedented conceptual power.

We have raised an entire generation of computer-oriented, screen-based learners who already have many of the conceptual skills (scaling and networking) that are a prerequisite for biospheric perception. Indeed, in ways that we cannot even imagine, perhaps we are on the verge of a true Gaian generation of educational opportunity. What if you take all the conceptual skills that are so easily learned with the use of computers and the Internet and apply them to pattern-based environmental learning? Exploring the spatial and temporal

dimensions of biospheric processes requires scaling and connectivity tools. These are at the fingertips of anyone who has access to the Internet and a computer.

I am suggesting that the scaling, networking, and complex systems skills that are intrinsic to the IGBP Mandate are already being taught by virtue of computer technology and the Internet. Our challenge is to apply those skills with environmental change science in mind. This can only be done through organized curricular approaches, integrated in formal and non-formal educational settings. Imagine if the power of Google Earth became the foundation for a K-16 environmental change science curriculum. Surely elementary school children raised on computers and video games would be comfortable with Google Earth software, as they already have the conceptual ability to intuitively navigate the software with minimal supervision. But what exactly do we ask them to do with Google Earth?

At this moment I am looking out the window of my small cottage in rural, central Maine, watching a dynamic shower pass through the landscape. It's mid-September and the wetland maples have already turned to shades of red and orange. The strong winds accompanying the shower are sending the first wave of brown leaves to the ground. I fully expect a wave of migrating warblers to arrive on tomorrow's northwest wind. My gaze shifts from the window to the laptop. I visit an appropriate website so I can trace the storm on a weather map. I notice the heavy showers from this morning over downeast Maine. I see that the current shower is part of a thin band of rain, and that the heaviest rain has passed. I zoom out on the map and notice there is one more band of showers in New Hampshire, still a few more in New York State, and dry air will soon follow.

But I am not satisfied. I wish that from this same Internet mapping location I could view a wide-ranging series of maps to challenge my ecological curiosity. I would like to view a biogeographical portrait of the changing leaf patterns, or a map of bird, insect, and bat migrations. I imagine collecting daily ecological or meteorological data and inputting them on these maps. I would like to know about other folks who have similar interests and communicate directly with them about what they're seeing.

All of these requests are feasible. They are technologically available, inexpensively provided, easy to use, and absolutely pertinent to the

ecological portrait of the planet. How can the use of the Internet and computers and all of the conceptual skills they embody be integrated with hands-on field observations? And how might this integration serve as the basis for a comprehensive environmental change science curriculum?

### **THE COGNITIVE PERCEPTUAL CHALLENGE: AN INTEGRATED FRAMEWORK FOR TEACHING ENVIRONMENTAL CHANGE**

How exciting it would be to organize a conference for an internationally statured group of cognitive theorists, anthropologists, educational researchers, environmental change scientists, classroom teachers, and experts in traditional ecological knowledge who would be convened to organize a K-16 environmental change science curriculum that is developmentally appropriate. Is there an exemplary sequence of instruction and an effective layering of teaching methodologies that coordinates multiple intelligences, childhood and adolescent development, and cognitive development so as to optimize learning about environmental change?

Pending the research agenda necessitated by such a charge, I offer some tentative suggestions, influenced by reading dozens of autobiographical and biographical accounts of “exemplary biospheric naturalists,” as well as observing dozens more undergraduate and graduate environmental studies students. These suggestions are merely an example of paths that may facilitate pattern-based environmental learning, based on relative “success stories,” that is individuals, who have always been attracted to studying ecological and biospheric phenomena. My assumption is that the single greatest conceptual challenge in perceiving environmental change is the difficulty in interpreting spatial and temporal relationships. The challenge then is how to develop the ability to observe what is close at hand (intimate awareness of local natural history) and link those observations to biospheric phenomena. How do educators sequence such learning?

Exemplary biospheric naturalists understand how to juxtapose scale, see multiple spatial and temporal dimensions in a landscape, and move conceptually through ecological space and geological time. I suggest there are three interconnected learning approaches that form the basis of this awareness – field-based natural history,

interpretive questioning, and an ability to observe patterns at different scalar levels. These are coordinated dimensions of learning, appropriate at all age levels, but with increasing degrees of sophistication. With greater depth of knowledge, more refined perceptual awareness, and greater sophistication of expression, the learner is increasingly capable of discovering and understanding the patterns of environmental change.

For a child or adolescent, field-based natural history often is organized around a natural history collection of some kind, often informed by either a standard (keys and taxonomies) or an improvisational classification scheme (for an interesting anthropological approach to collections, natural history, and the organization of ecological knowledge, see Atran, 1993). The child typically plays with this collection, using it as the basis for understanding order and structure. Young naturalists gather these collections by immersing themselves in whatever local habitats are available, often experiencing sensory exploration of the outdoors. These collections are further enhanced with note-taking, visual illustration, or other forms of coding and explanation.

I suggest that natural history collections should be a priority for an integrated environmental change learning sequence. Such collections can take the form of photographs, note taking, mapping, other forms of visual illustration, as well as a “leave no trace” approach to handling natural artifacts. However, what’s most important is how these collections become the basis for interpretive classification schemes. It’s not enough to collect things and sort them. The purpose of the collection is to heighten your observational awareness – to know what’s common and what’s rare, to know what can be found here and what can be found there, to observe associations, characteristics, and correspondences.

By an interpretive classification scheme, I refer to a method for asking and answering questions about environmental change. Why do so many birds migrate from the North to South and back again? Why have invasive species become so dominant in this landscape? Why are there more (or less) Monarch butterflies in the garden this year? How much carbon is there in this forest? How much carbon is there in the atmosphere? When is there too much carbon in the atmosphere?

You can't ask questions such as these unless you first know what you are looking at. Collection, identification, and classification are meaningless without interpretation, causation and sequence. Taken together, collection and interpretation lead to observations of scale. The essence of good interpretive questions is the juxtaposition of time and space. How did events over there influence what is happening here? How did events from the past set up the circumstances of the present?

Ultimately, to satisfy the learning requirements of the IGBP Mandate, an educational curriculum should aspire to cultivate "pattern-based environmental learning." There are patterns that transcend scale, that emerge in a variety of landscapes and milieus, that link atmospheric, oceanic, terrestrial, and organismic phenomena, and that show the relationship between spatial and temporal variation. The purpose of environmental change science is to detect, interpret, and assess these patterns, and use them as a basis for public policy.

This is the essence of the cognitive perceptual challenge: how to derive a curriculum and a teaching methodology that allows the observer to detect such patterns. My educational hypothesis is that such pattern-recognition is the conceptual foundation for understanding how to cope with complexity and irregularity – the core of the Earth System Science Toolkit as proposed by the IGBP. Understanding non-linearity, thresholds, irreversible changes, indeterminacy, complexity, emergent properties, and scaling effects, requires an environmental change pattern language.

Landscape ecology provides an approach that illustrates concepts of ecological spatial variation (mosaics, gaps, boundaries, corridors, patches, edges, fragments, etc.). How might we elaborate such a pattern language as a template for teaching environmental change science? What are the patterns of connectivity (networks, nodes, and link)? What are the patterns of oceanic and atmospheric circulations (wave, rhythm, flow, fluidity, and fluctuation)? Is there a language to discern various rates of change? What is the relationship between a trend and a discontinuity?

In teaching how to observe environmental change, concepts such as waves, thresholds, and cycles are crucial, and with supervised curricular attention, can be taught throughout the K-16 learning sequence. Waves appear ubiquitously as visual and acoustic

representations of rates of change. They reflect frequency, longevity, and periodicity. They can be evaluated mathematically as ratios and rates. A wave is a tangible manifestation of environmental change, observed both virtually and viscerally.

Waves can be used to teach about thresholds. A threshold describes a point, level, sequence, event or flow that causes a dramatic shift in condition. When is a threshold reached? How do you know? At what point does it cause an irreversible condition? Can thresholds be predicted? Is a threshold a discontinuity in a cycle?

A cycle is a continuous and predictable series of relationships within a system, in which the flow and exchange of materials, ideas, or events, move according to repeatable, yet variable patterns. Of particular interest is the relationship between cycles, which may form another system of cycles, or have non-linear emergent properties. School children can observe cycles, and yet it is the depth and complexity of cycles that is so crucial to understanding environmental change.

An integrated cognitive framework for teaching environmental change is an epistemological challenge. It requires a reconsideration of how science is taught, how it's linked to mathematics, language, and the arts, and how it serves to empower students to assess and propose solutions for problems of planetary significance. It starts with emphasizing how important it is to promote ecological awareness and observe natural history. It is deepened and enriched with the use of computers and the Internet and the implicit scaling conceptualizations embedded in their use. It is coordinated with substantive curriculum about the earth system. It is applied by changing the meaning and purpose of schooling.

### **SCHOOLS TO TEACH ENVIRONMENTAL CHANGE: A “GAIAN GENERATION”**

I propose developing an international network of high schools organized around teaching to the IGBP Mandate, designed to train a new “Gaian” generation of environmental change science researchers. Let's design these schools as educational laboratories for teaching environmental change science. Let's organize them so that the schools become nodes in a research network, each becoming a center for long-term environmental change research, with teachers supervising

students through community-based projects, linked to partner schools in an international network. These schools will share both their teaching approaches and results, while compiling databases of biospheric observation. Let's organize art and music instruction, literature and philosophy, social studies and psychology, around environmental change.

As a starting point, consider a field-based approach (linking the visceral and virtual), as informed by the IGBP "earth system science tool kit." For example, using *paleo-science* as the foundation for hands-on field natural history, provide students with the interpretive skills to reconstruct past environments at a variety of spatial and temporal scales and at different organismal levels. Every habitat has a uniquely interesting history. Teach students to reconstruct a habitat using a sequence of time scales, starting with the immediate past to a historical time frame, to a Pleistocene approach and then finally a geological time scale. What creatures walked this place ten million years ago? Were there mountains here or was this place covered with ocean? And then have the students envision what the place will look like in the future (ten years, one hundred years, one thousand years).

The IGBP Mandate stresses *contemporary observation and monitoring*. Teach the students how to understand, develop, and assess indicators of ecosystem health, and to apply those indicators to human well-being. Let the school become the center for assessing ecosystem health. Equip the school with laboratory capabilities to become a regional monitoring center for ecosystem health. Publish those observations on a school website, in local newspapers, as public demonstrations of the vitality and usefulness of such learning.

Emphasize ecological monitoring of the school itself. How much energy does it use? Where does its food come from? How much carbon does the school emit? To what extent is the school a living laboratory for sustainability initiatives? How are those initiatives linked to a broader conception of global environmental change?

Let this monitoring become the basis for integrated regional studies. What environmental issues does your community face? How can the school collect data to better inform public decisions about those issues? What role can the students and their teachers play in informing the public about local environmental issues? How might these regional studies involve local politicians and businesses? Let's

elevate our high schools by making them centers for community deliberations about urgent environmental issues.

These regional studies can be the basis of international partnerships and learning affiliations. The IGBP Mandate recommends *global networks* for sharing research data. Schools can have both “sister” schools in diverse regions and affiliations with relevant NGO’s, especially those that themselves are nodes in long-term environmental change networks. Students can spend a year at their partner schools. They can be sponsored by science education facilities (museums of natural history) or service organizations (Rotary International). They learn to see their work as international in scope and importance.

Finally, the IGBP Mandate recommends *earth system experimentation and simulating earth system dynamics*. Depending on the scale, one can design “what if” scenario-based curriculum. What will happen to a given place given several different climate change scenarios? How will the habitat change if a particular invasive species travels here? How are these local changes linked to more complex, biome-scale variables?

This is an excellent milieu for using innovative computer software. Some years ago, Electronic Arts released two outstanding computer games, *Sim Earth* and *Sim Life*, modeled after their commercially successful *Sim City*, and then followed by the remarkably successful *The Sims*. Unfortunately, *Sim Earth* and *Sim Life* lacked that same commercial success. However, they were remarkable simulations about earth system experimentation. *Sim Earth*, designed with Gaian principles in mind, allowed the user to explore a range of atmospheric, oceanic, and biological variables. *Sim Life* allowed you to tinker with ecosystems at the community and genetic level. What if Electronic Arts and other computer game designers were commissioned by the National Science Foundation to develop a new generation of these simulations, linked to an international network of environmental change pedagogy? Might the NSF partner with the IGBP in developing such software for use in schools, in combination with a comprehensive approach to pattern-based environmental learning?

These suggestions, by way of example, are merely a few of the possibilities that are within the reach of imaginative educators and scientists. They can be applied in diverse educational environments, anywhere on the K-16 learning spectrum, modified accordingly. None



of them are beyond the educational capacities or the international learning infrastructure of twenty-first century schools, colleges, and universities. But they do require a mobilization of resources in service of environmental learning. And they require an urgency of purpose, a common awareness that the future of the planet is at stake.

We live at a time when extraordinary learning resources are available for schools everywhere. We are on the threshold of a deeper planetary awareness, an emerging understanding of biospheric dynamics, a comprehensive “science of integration.” But none of this will occur without challenging the status quo of science education. We should be planning schools so as to train a “Gaian” generation of learners, students who see the biosphere in every habitat and organism, who are equipped to interpret environmental change, who are keen to observe the natural world, and who know that their very survival may depend on it.

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# The Universe Story as a Basis for a Multicultural Planetary Civilization

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As we see our present interconnected global challenges of widespread environmental degradation, climate change, crippling poverty, social inequities, and unrestrained militarism, we know that the obstacles to the flourishing of life's ecosystems and to genuine sustainable development are considerable.

In the midst of these formidable challenges we are being called to the next stage of evolutionary history. This requires a change of consciousness and values – an expansion of our worldviews and ethics. For the evolutionary life impulse moves us forward from viewing ourselves as isolated individuals and competing nation states to realizing our collective presence as a species with a common origin story and shared destiny. The human community has the capacity now to realize our intrinsic unity in the midst of enormous diversity. And, most especially, it has the opportunity to see this unity as arising from the dynamics of the evolutionary process itself. We have for the first time a scientific story of the evolution of the universe and Earth that shows us our profound connectedness to this process. We are still discovering the larger meaning of the story.

Our sense of the whole is emerging in a fresh way as we feel ourselves embraced by the evolutionary powers unfolding over time into forms of ever-greater complexity and consciousness. We are realizing too, that evolution moves forward with transitions, such as the movement from inorganic matter to organic life and from single celled organisms to plants and animals that sweep through the evolutionary unfolding of the universe, the Earth, and the human. All such transitions come at times of crisis, they involve tremendous cost,

and they result in new forms of creativity. The central reality of our times is that we are in such a transition moment.

Surrounding this moment is an awakening to a new consciousness that is challenging older paradigms of the human as an isolated being in a random, purposeless universe. Peter Raskin has called this the Great Transition while Joanna Macy has named it the Great Turning. Our consciousness is shifting from valuing hyper-individualism and independence to embracing interdependence and kinship on a vast scale. The Enlightenment values of life, liberty, and the pursuit of happiness are being reconfigured. Thus life now includes the larger life of the Earth, individual freedom requires responsibility to community, and happiness is being defined as more than material goods. A sense of a larger common good is emerging – the future of the planet and its fragile biosphere.

In this spirit we are in a transition from an era dominated by competing nation states to one that is birthing a sustainable multicultural planetary civilization. This birth is occurring within the context of our emerging understanding of the universe story.

### **THE COSMOLOGICAL CONTEXT: EVOLUTION AND EXTINCTION**

Over the past century, science has begun to weave together the story of a historical cosmos that emerged some 13.7 billion years ago. The magnitude of this universe story is beginning to dawn on humans as we awaken to a new realization of the vastness and complexity of this unfolding process.

At the same time that this story is becoming available to the human community, we are becoming conscious of the multidimensional environmental crisis and of the rapid destruction of species and habitat that is taking place around the planet. Just as we are realizing the vast expanse of time that distinguishes the evolution of the universe over some 13.7 billion years, we are recognizing how late is our arrival in this stupendous process. Just as we are becoming conscious that Earth took more than 4 billion years to bring forth this abundance of life, it is dawning on us how quickly we are foreshortening its future flourishing.

We need, then, to step back to assimilate our cosmological context. If scientific cosmology gives us an understanding of the origins and

unfolding of the universe, philosophical reflection on scientific cosmology gives us a sense of our place in the universe. And if we are so radically affecting the story by extinguishing other life forms and destroying our own nest, what does this imply about our ethical sensibilities or our sense of the sacred? As science is revealing to us the particular intricacy of the web of life, we realize we are unraveling it, although unwittingly in part. Until recently we have not been fully conscious of the deleterious consequences of our drive toward economic progress and rapid industrialization.

As we begin to glimpse how deeply embedded we are in complex ecosystems and dependent on other life forms, we see we are destroying the very basis of our continuity as a species. As biology demonstrates a fuller picture of the unfolding of diverse species in evolution and the distinctive niche of species in ecosystems, we are questioning our own niche in the evolutionary process. As the size and scale of the environmental crisis is more widely grasped, we are seeing our own connection to this destruction. We have become a planetary presence that is not always benign.

### **The American Museum of Natural History: Universe and Earth evolution**

This simultaneous bifocal recognition of our cosmological context and our environmental crisis is clearly demonstrated at the American Museum of Natural History in New York with two major permanent exhibits. One is the Rose Center that houses the Hall of the Universe and the Hall of the Earth. The other exhibit is the Hall of Biodiversity.

The Hall of the Universe is architecturally striking. It is housed in a monumental glass cube, in the center of which is a globe containing the planetarium. Suspended in space around the globe are the planets of our solar system. In a fascinating mingling of inner and outer worlds, our solar system is juxtaposed against the garden plaza and street scenes of New York visible through the soaring glass panels of the cube. After first passing through a simulation of the originating fireball, visitors move onto an elevated spiral pathway from which they participate in the exhibit. The sweeping pathway ushers the visitor into a descending walk through time that traces the 12 billion-year-old cosmic journey from the great flaring forth in the fireball, through the

formation of galaxies and finally to the emergence of our solar system and planet. It ends with the evolution of life in the Cenozoic period of the last 65 million years and concludes with one human hair under a circle of glass, with the hairsbreadth representing all of human history. The dramatic effect is stunning as we are called to re-image the human in the midst of such unfathomable immensities.

The Hall of Earth continues this evocation of wonder as it reveals the remarkable processes of the birth of Earth, the evolution of the supercontinent Pangaea, the formation of the individual continents, and the eventual emergence of life. It demonstrates the intricacy of plate tectonics, which was not widely accepted even 50 years ago, and it displays geothermal life forms around deep-sea vents, which were only discovered a decade ago. This exhibit, then, illustrates how new our knowledge of the evolution of the Earth is and how much has been discovered within the last century.

In contrast to the vast scope of evolutionary processes evident in the Hall of the Universe and the Hall of the Earth, the Hall of Biodiversity displays the extraordinary range of life forms that the planet has birthed. A panoply of animals, fish, birds, reptiles, and insects engages the visitor. A plaque in the exhibit observes that we are now living in the midst of a sixth extinction period due to the current massive loss of species. It notes that while the five earlier periods of extinction were caused by a variety of factors, including meteor collisions and climate change, humans are, in large part, the cause of this present extinction spasm.

With this realization, not only does our role as a species come into question, but our viability as a species remains in doubt. Along with those who recognized the enormity of the explosion of the atomic bombs in Japan, we are the first generations of humans to actually imagine our own destruction as a species. And, while this may be extreme, some pessimists are suggesting this may not be such a regrettable event if other life forms are to survive.

The exhibition notes, however, that we can stem this tide of loss of species and habitat. The visitor walks through an arresting series of pictures and statistics where current destruction is recorded on one side and restoration processes are highlighted on the other. The contrasting displays suggest the choice is ours – to become a healing or a deleterious presence on the planet.

These powerful exhibits on cosmic evolution and on species extinction illustrate how science is helping us to enter into a macrophase understanding of the universe and of ourselves as a species among other species on a finite planet. The fact that the Rose Center is presenting the evolution of the universe and the Earth as an unfolding story in which humans participate is striking in itself. Indeed, the introductory video to the Hall of the Universe observes that we are “citizens of the universe” born out of stardust and the evolution of galaxies, and that we are now responsible for its continuity. In addition, the fact that the Hall of Biodiversity suggests that humans can assist in stemming the current extinction spasm is a bold step for an “objective” and “unbiased” science-based museum.

Scientists are no longer standing completely apart from what they are studying. They are assisting us in witnessing the ineffable beauty and complexity of life and its emergence over billions of years. They are pointing toward a more integrative understanding of the role of the human in the midst of an extinction spasm. Some of this shift in the museum’s perspective arose in the late 1990s when the curators were searching for an ornithologist. Of the final six candidates, four of them had had their birds go extinct while they were studying them. This was alarming to the museum curators who realized they could not simply stand by and witness extinction with a disinterested objectivity.

It can be said, then, that this new macrophase dimension of science involves three intersecting phases: understanding the story of the universe with the best scientific methods, integrating the story as a whole (cosmic, Earth, human), and reflecting on the story with a sense of our responsibility for its continuity.

Environmental ethicists and scholars of the world’s religions are also being called to contribute to this macrophase understanding of the universe story. The challenge for religion and ethics is both to revision our role as citizens of the universe and to reinvent our niche as members of the Earth community. This requires reexamining such cosmological questions as where we have come from and where we are going. In other words, it necessitates rethinking our role as humans within the larger context of universe evolution as well as in the closer context of natural processes of life on Earth. What is humankind in relation to 13.7 billion years of universe history? What is our place in the framework of 4.6 billion years of Earth history?



How can we foster the stability and integrity of life processes? These are critical questions underlying the new consciousness of the universe story. This is not simply a dynamic narrative of evolution; it is a transformative cosmological story, which engages human energy for a future that is sustaining and sustainable.

## **COSMOLOGICAL STORIES**

Since the earliest expressions of human culture, humans have struggled to understand and define our place in the universe. We have developed cosmologies, which are stories that describe where we have come from and where we are going. The religious and cultural traditions we have honored for millennia all bear witness to our deep desire to find meaning in what we see and feel around us.

Over the last two centuries, however, the scientific paradigm has taken root and, in many cases, become a dominant worldview. Through the scientific method, science tends to objectivize what it describes. In recent years, scientific and religious cosmologies have therefore co-existed uneasily. Some scientists and philosophers have come to the conclusion that the universe, while appearing to follow certain natural laws, is largely a random and accidental accretion of objects, with little meaning and certainly no larger purpose. Scientific facts are separate from human values. One of the aims of the universe story perspective is to counteract this view with a presentation of a meaningful universe. Relying on the best of modern science, we discover how we are part of this ongoing journey of the universe and now shaping its future form. This can be an important context for ecological, economic, and social transformation on behalf of our emerging planetary community.

### **The goal: Providing an integrating story**

The goal of the universe story is to tell the story of cosmic and Earth evolution drawing on the latest scientific knowledge, in a way that makes it both relevant and moving. What emerges is an intensely poetic story, which evokes emotions of awe, and excitement, fear and joy, belonging and responsibility.

This universe story is a dramatic one. Throughout billions of years of evolution, triumph and disaster have been only a hair's breadth

apart. Violence and creativity are pervasive. The ability of matter to organize and re-organize itself is remarkable – from the formation of the first atoms to the emergence of life. We are coming to realize that the energy released at the very beginning has finally become capable in the human of reflecting on and exploring its own journey of change. Simple hydrogen has become a vibrant living planet, with beings that now are able to investigate how this has happened and imagine a life sustaining future.

Waking up to our fundamental relationship with the cosmos will be a means of re-engagement with life. The universe story enables us to connect more deeply with the universe and the Earth of which we are a part. In doing this, we will appreciate the need for a sustainable human presence on the planet.

Thus the integrated story of the origin and development of the universe, of Earth, and of humans could become an inspiring vision for our time. This is because this story is giving us a sense of common evolutionary heritage and shared genetic lineage. This new understanding of kinship of humans with each other and with all life could establish the foundations for rediscovering our past and sustaining the future. Carl Anthony, one of the leaders of the environmental justice movement, has said this perspective has been profoundly transforming for his life and work.

We can be inspired by this scientific view of nested interdependence – from galaxies and stars to planets and ecosystems – so that we sense how personally we are woven into the fabric of life. We are part of this ongoing journey. From this perspective we can see that our current destructive habits towards the environment are unsustainable. In an evolutionary framework the damage we are causing is immense – indeed cataclysmic. We can thus recognize ecological, economic, and social change as not only necessary but inevitable. But this will require expanding our frame of reference and broadening our worldview.

## **THE CHALLENGE: REFRAMING OUR CONSCIOUSNESS AND BROADENING OUR CONSCIENCE**

### **Living in the microsphere: Political history**

Most Americans think of their history as beginning with the

American Revolution and the Declaration of Independence. This 230 year history is indispensable for orienting us in our national identity, but insufficient for orienting us in our planetary identity so as to respond adequately to the environmental crisis. We are now seeking an appropriate story of our comprehensive journey. This is why there is such intense debate in the United States right now surrounding the theory of evolution. We are moving out of our more limited political history and religious myths into the larger story of our origin and development.

Many Americans do not relate to the environmental tragedy personally because we have been living within a modern political and economic story which values personal freedom and individual competition, and a religious story that values personal salvation and relationship to a Creator outside of the world. The larger community of life is left behind in these worldviews where particular human interests dominate, especially economic growth and progress. The well being of land, air, water, and species are not seen as fundamental to many Americans – politically, economically, or religiously. Thus they are in denial or oblivious to the fact that we are causing a mass extinction of species, toxifying the water and land, radically altering the climate, and contributing to the causes of poverty around the world.

### **Responses: Political, economic, ethical, religious, and cosmological**

Many environmentalists are trying to address this issue by following Aldo Leopold's directive to extend our sense of value and moral responsibility to the biotic community. How do we do this? We can expand our political and economic framework to include the rights of nature and the economic value of ecosystems. We can follow the philosophical arguments of environmental ethicists regarding valuing nature; we can bring forward the resources of the world religions as the Yale Forum on Religion and Ecology is doing; we can call on the principles of a global ethics as represented in the Earth Charter. In concert with all of these efforts, we can begin to tell our fuller story as bio-historical beings.

### **Living in the macrosphere: Universe history**

Our times require this large-scale rediscovery of our history – not just human history but universe history. Every civilization has

oriented itself around the story of their origins and development to map their way into becoming a coherent and flourishing community. For Jews, Christians, and Muslims it is the Genesis story of creation that is their orienting myth. Until recently this has been the cosmological story in the West of the creation of Earth and humans. It suggests that the role of humans is to be fruitful and multiply and subdue the Earth. Here, in part, is where we went awry. Our numbers exploded and our modern economy exploited Earth's resources in the name of progress. Many people do not relate to the tragedy of Earth's diminishment that has been a result of our sense of dominion from Genesis and domination from technology. These two forces have given us a false sense of invincibility and control, thus increasing our feeling of detachment from Earth itself.

A traditional Biblical cosmology, then, is no longer adequate for our times and the recognition of this is what is causing Jewish, Christian, and Muslim theologians to reexamine the Genesis story. Many of them are involved in redefining the role of the human in relation to the growing environmental crisis. The reconstruction of the meaning of stewardship versus dominion is at the heart of these discussions.

In this spirit there is also an emerging effort at defining our role in relation to the story of evolution as presented by modern science. This requires not simply a factual or objective description of evolution, but one that values our embeddedness in this process. Our cosmological origin story in the big bang, the formation of stars, galaxies, and planets, and finally the emergence of life provides a new context for discovering our fuller history. The vast unfolding of time for this process – nearly 14 billion years – and the huge expanse of space in which we dwell amidst a trillion galaxies provide a remarkable new perspective for understanding the critical nature of our present moment. The complex self-organizing processes that eventually allowed our planetary life to emerge means we too have arisen from these processes. We now know that the atoms of our bodies have come out of stellar explosions. Our sense of ancestry and lineage is extended beyond human history to the whole of the evolutionary journey. The challenge now is to ignite this new consciousness for the benefit of a viable and vibrant future for the Earth community.

## **EVOLUTIONARY DYNAMICS OF THE SIMPLE TO THE MORE COMPLEX**

One source of inspiration in these efforts is a realization that the difficult transition we are making to a sustainable planetary civilization is profoundly coherent with the evolutionary dynamics of the universe. Drawing on the history of the evolution of the universe and Earth we can see both the cost and creativity of transitions.

We have learned not only the historical details of the main lines of this cosmic evolution; we have also acquired some understanding of the fundamental forces that brought about this evolution. These forces or processes are invisible to us and yet they shape so much of what takes place all around us. These are the forces of gravitation and electromagnetic interactions, as well as the strong and weak nuclear forces. By studying them in isolation in the laboratory, we have learned the details of these interactions, but, with our discovery of cosmic and biological evolution, we can now see these processes from the point of view of the large-scale universe.

We are, just now, coming to understand the processes of the universe primarily as self-organizing dynamics aimed at developing complex structures. As we observed earlier, this development always comes with a cost. We are now able to appreciate this from our deepening knowledge of evolution as an emergent process.

When the universe was very young, only a million years old, it consisted predominantly of hydrogen and helium atoms billowing out in great clouds that filled the universe from one end to the other. One can imagine such a scene unfolding for all eternity. But that was not to be.

While the clouds were hot they continued to expand, even though their gravitational attraction pulled them in the opposite direction. But as the atoms cooled sufficiently, they arrived at a state in which the gravitational attraction could overcome the thermal expansion. The cloud would now collapse under its own gravitational pull, everything being drawn into a point. But in this crisis situation of extreme temperatures, a surprising twist took place. At temperatures of 10 million degrees, hydrogen began fusing together to form helium. In this fusion process mass was converted into energy, so a new burst of energy appeared at the center of the cloud. A new system had emerged that would be called, billions of year later, a star.

Concerning this process of complexification, it is worth noting that a single atom cannot produce a star. Nor can a million atoms. It requires trillions of atoms, and when such a cloud of atoms reaches an extreme state of temperature there is the possibility of the emergence of a more complex system. This more complex system can avoid the destruction of total collapse, but there is a cost. The cost is the loss of hydrogen through its conversion into helium. Those hydrogen atoms are lost, being needed for the energy to stave off total collapse. But out of all this there is the creativity of bringing forth a new being. A star is composed of atoms but is so very different from an atom. A star has its life cycles: its birth, its development into maturity, and its death as it exhausts all its atoms for fusion.

These same dynamics of the universe are also at work in the evolution of life, biological and human. They show themselves most clearly in moments of crisis.

### **TRANSFORMATIONS IN HUMAN HISTORY**

Just as we can see the great transitions in evolutionary history from smaller units to ones of larger complexity, so too can we identify some of the significant transition moments into greater complexity in human history. Our own period is experiencing such a major transition from that of separate nation states to a sustainable multicultural planetary civilization.

Twentieth century historians of world history have helped us take in the sweep of human presence on the planet – brief as it is in relation to evolutionary time. The first major transition occurs when nomadic hunters and gatherers, after 100,000 years, settled into more complex agricultural villages 10,000 years ago. These villages cohered into more developed societies, which in turn gave birth to the great classical civilizations along the river valleys of the Nile, the Tigris and Euphrates, the Indus, and the Yellow Rivers, some 5,000 years ago.

Our current transition to forming a planetary civilization began 2,000 years ago with the linking of the great Eurasian landmass through trade along the Silk Road. The Roman Empire and the Han Chinese Empire initiated this intricate exchange of ideas and goods. A further step toward the creation of planetary civilization emerged

when these trading connections exploded from land routes to sea routes with the Columbian expansion out of Europe 500 years ago.

Our recent understanding of world history shows us that these interactions included a significant cost. In all of these exchanges there existed both a dialogue and a clash of civilizations. So too, in our own period, we are participating in the intensification of the transition toward planetary civilization. We find ourselves poised between persistent conflict and the hope of mutually beneficial exchange and dialogue among individuals and communities, and among different cultures and religions.

This creative process of historical exchange reached a new level of intensity several hundred years ago with the scientific and industrial revolutions. With the explosion of population, with our search for food and resources, and with increased industrial-technological power, our presence has become overbearing. As the 2005 *Millennium Ecosystem Assessment Report* made abundantly clear, the planet is now being encircled by an industrial-technological juggernaut that is extinguishing the very foundations on which life depends.

Within the last 50 years the clash of humans, not only with each other but also with the planet, has become especially heightened. The widespread destruction of topsoil, pollution of air and water, and the loss of species are beyond the capacity of individual nation states to handle and of the Earth to absorb. The challenge now is to construct a responsive civilization that is truly planetary in its scope, sustainable in its functioning, and democratic in its decision-making process.

In looking at the historical record, the transition from smaller and disparate states to greater units required the provision of internal coherence and ecological stability. This was true, for instance, 2000 years ago in the early formation of China. The first emperor of China created economic, political, and cultural unity out of disparate ethnic groups. Economically, he standardized currency and weights and measurements. Politically, he instituted the civil service exam system, based on the Confucian classics, to insure that qualified and moral ministers would rule the country. This was the first such meritocracy of its kind and was much admired by the French Enlightenment thinkers. Culturally, Confucian humanism was linked to political rule in order to create a broad sense of Chinese identity across the vast geography and among the far-flung peoples of China. The transition

from differentiated states to a unified civilization, from diverse ethnic groups to the Han Chinese people, was consciously crafted using human ingenuity and statecraft. The struggle to maintain the larger unity was threatened at times, yet this unity successfully continued for two millennia. This long-lived cohesion was also based on sustainable agriculture and irrigation practices, in addition to economic, political, and culture unity.

All of the great empires of human history faced similar challenges of creating larger and more complex units. This was accomplished through a sense of power and privilege, as well as with the dazzling spread of art and culture. The transition from the age of empires to the age of nation states has occurred in the blink of an eye – hardly 200 years since the French revolution and the emergence of nation states in Europe, Asia, Africa, and Latin America. We are now entering a period that is beyond the nation state as a privileged unit, to the Earth community as a common destiny.

In our present post war period, we have a remarkable example of that movement from clashing states to a cooperative whole. Two world wars have resulted in the European Union (EU), in which the individual nation states of Europe are finding their way toward a larger common good in political and economic union. As imperfect as this may be, and as challenging as it still is to find cultural unity, it is an important illustration of what is happening on a larger planetary scale. Namely, we are at a moment in history when we can imagine that our common good as a species rests on care for our common ground, the Earth. Ignited by collective purpose, the European Union is an illustration of how we are moving toward a larger unity, guided by a sense of shared destiny.

A final example of this is in the post cold war period when the Earth Charter emerged as a basis for a global ethics for a planetary civilization. For over a decade of drafting the Charter, an intense process of dialogue and negotiation took place with enormous respect for differences. Arising from the United Nations Conference on Environment and Development in Rio in 1992, the Charter consists of a Preamble and four integrated sections. The Preamble articulates the cosmological context for a sustainable future stating, “Humanity is part of a vast evolving universe. Earth, our home, is alive with a unique community of life.” There is then a broad call for Respect and



Care for the Community of Life. To fulfill this call requires the commitment to three interrelated areas: Ecological Integrity; Social and Economic Justice; Democracy, Nonviolence, and Peace. The Charter is now endorsed by thousands of individuals and organizations including UNESCO and the International Union for the Conservation of Nature (IUCN).

Beyond world wars and the cold war, there beckons the sense of a larger planetary whole – an emerging, multiform, planetary civilization. It is in participating in this transition moment that we will fulfill our role as humans on behalf of future generations. It requires a profound transformation (to link with the title of the book) of consciousness and values – both an expanded worldview of the universe story and a comprehensive global ethics that embraces the Earth community.

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