Thinkpiece

PLACING OURSELVES

by George W. Fisher

Abstract. This essay set the stage for the 2003 Star Island conversation on "Ecomorality" by remembering the cosmic, geological, and ecological context in which we live. It reflects on the immense journey that matter and life have traveled from the beginning and reminds us that, throughout that journey, all that was and is emerged from a fertile mix of individual well-being and reciprocity. But to sense the meaning of the story and to know our place in it takes more than hearing its broad outline. We need to remember the individual actors who have gone before us; to read their stories in particular places, like the rocks and ecosystems of Star Island; and to listen carefully for the meaning to be found in those actors and those places. Those stories, actors, and places invite us to sense the sacredness of our time and place and to reconsecrate our selves and our energies to developing an ethic that honors our common ancestry.

Keywords: cosmic story; Earth Charter; ecosystem; environment; ethics; evolution; globalization; justice; moral discernment; place; policy; population; resources; sustainability.

The human evolutionary journey is fast approaching a critical transition. During the next half century, the world population is expected to level off at approximately 9 billion people, and the economic worldview, long grounded in assumptions of growth, will need to shift to a model of sustainability.

Most discussions of sustainability focus on the need to maximize access to the resources that sustain Western civilization. We must, of course, do

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what we can to find resources, to use them efficiently, and to avoid disrupting the Earth system as we do so. But it is very unlikely that the resource base can accommodate the unfettered demands of 9 billion people for energy, water, industrial materials, or the capacity to absorb waste products. Consequently, we will have to allocate resources between competing needs—between human needs and those of the ecosystems that sustain us, between present human needs and those of future generations, and between the legitimate needs of developing countries and the expectations of wealthy nations. Decisions about how best to make these allocations will obviously require sound scientific, economic, and political input. But they also will require moral discernment and so can help to ground the topic of our conference, "Ecomorality."[1]

The Earth Charter outlines many elements of these decisions and calls all of us, as people of Earth, to "declare our responsibility to one another, to the greater community of life, and to future generations" and to accept the preservation of "Earth's vitality, diversity, and beauty [as] a sacred trust" (Earth Charter Commission 2000). Most of us at this conference would probably affirm those commitments as a kind of creedal statement. But, important as that is, we must go beyond simply assenting to the intellectual validity of the Earth Charter and begin to incorporate the principles it expresses into the decisions we make daily about the products and foods we buy, the political decisions we make, and the policies we urge our governments to adopt. To do that—to change the ways in which we live—we need to understand this sacred trust in ways that go deeper than intellectual affirmation, ways that go to the core of our being. Thinking of Earth as sacred is not enough. We must also *feel* its sacredness deep in our souls.

That is not easy. Feeling Earth's sacredness involves the kind of knowledge that philosophers call knowing by acquaintance—the way that we know and love a close friend or a familiar place (Stump 2000).[2] That kind of knowledge is grounded in compelling personal experience of a person or place, and, unfortunately, many of us in the developed world are so isolated from Earth and its creatures by the trappings of civilization that we have little real experience of Earth as it really is. We are insulated from nature by grocery stores that offer fresh strawberries all winter, by air-conditioned homes that banish the summer heat, and by irrigation systems that allow lush lawns even in Arizona. We move so frequently that we never come to know even a small patch of land well enough for it to feel sacred to us. Many of us live in suburban neighborhoods barely distinguishable from one another and have little sense of what it means to feel rooted in community. Few of us spend enough time in other cultures to know the men and women of those societies as friends. Even fewer of us have the experience of getting to know animals in the wild.

So how can we come to know this Earth, other creatures, and our fellow humans well enough for their welfare to matter deeply to us? Part of the

answer is to find places where we can experience Earth as it is: places where we can hear the waves crashing on the rocks; places where we can see plants and trees struggling to survive wind and wave; places where we have to be sparing in our use of water. I sense that many of you have come to know this place, Star Island, as sacred in precisely these ways.

But placing ourselves spatially is not enough. We also need to place ourselves in time, to remember the events that have brought us to this place and this time. I invite you to listen to the story of our evolutionary journey and to reflect on it in ways that go beyond intellectual understanding—the dates, the places, the names of species that have come and gone. I invite you to reflect on the story in ways that will help you to know the creatures whose lives individually and collectively *are* that story.

Retracing Our Evolutionary Journey

In trying to experience the evolutionary story, the immense sweep of time involved poses a problem. The age of the cosmos is measured in billions of years, a time span so far beyond our own experience that we cannot grasp it. It may help to visualize the cosmic story as a physical journey, one in which we move just one millimeter each year, one meter each millennium. I'm now 66 years old, so on that scale my life would be represented by a journey 66 millimeters long. Retracing our steps to the discovery of America five hundred years ago would take a journey of half a meter. Going back to the time of Christ would take two meters, roughly the span of my arms, stretched wide. Returning to the time of the Sumerian city-states would take seven meters, roughly the distance from this podium to the fifth row of chairs.

Journeying at that rate back to the origin of Earth 4.6 billion years ago would take us all the way across the United States, from here on Star Island, New Hampshire,[3] to San Francisco, California. Going back to the Big Bang 13.7 billion years ago on a great circle route would take us on across the Pacific, all the way to Australia's Great Barrier Reef.

Let's now reverse course and retrace our steps from the Big Bang on the Barrier Reef to the present, represented by this podium.[4] It all began in a cauldron of creativity from which space, time, the physical constants that govern everything, and all the matter in the cosmos flashed into being in just four seconds. At first that matter was a plasma so hot that only solitary particles could exist, but as the brew expanded, it cooled and condensed—first into simple atomic nuclei, then into atoms of hydrogen and helium—all within a few hundred thousand years, when our journey from the Great Barrier Reef has taken us less than a kilometer, barely beyond the surf zone.

Over the next nine billion years—traveling nine thousand kilometers across the Pacific, millimeter by millimeter—increasingly complex atoms emerged from reactions in dense stars and supernovae. Carbon was especially

tricky. Had the universe emerged with even slightly different values of the physical constants, carbon could never have formed, and carbon-based life could never have emerged.

As atoms became more diverse, they combined to make molecules—first sulfides, oxides, silicates, and simple organic molecules such as methane, then the more complex organic molecules needed for life. Those early organic molecules contained the promise of life, at that point a mere possibility latent in those fertile atoms and molecules and in the physical constants which made them possible, a possibility waiting for a moment and a place that might nurture life into being. That place began to emerge 4.6 billion years ago, as our journey reaches San Francisco, and Earth began to form by condensation of the solar nebula into small chunks of rock. Those chunks gradually grew by attracting others to form larger meteorites and eventually the earth, moon, and other planets. That process of accretion took a little more than half a billion years and left a landscape pocked with craters, very like the lunar surface today.

But there was a crucial difference. Earth had a gravitational field strong enough to retain an atmosphere, and, once the surface was cool enough, water began to condense into warm, salty oceans as our journey approaches Salt Lake in Utah. Those oceans provided just the conditions for life to emerge from the organic molecules deposited on Earth during the bombardment, and a biosphere capable of photosynthesis began to take shape almost immediately after the bombardment ended.

For more than three billion years, the time it takes us to travel from Salt Lake to Buffalo, New York, life consisted mostly of single-celled organisms such as bacteria and algae. A little more than half a billion years ago, as we cross the Niagara River at Buffalo, we meet an astonishing variety of multicellular organisms. They emerged during a period of rapid fluctuation in the chemistry of both seawater and atmosphere. It is not yet clear whether these environmental changes triggered a spurt of rapid evolution or whether the appearance of these novel organisms changed the environment. However they emerged, these organisms were much more diverse than earlier life forms, and their diversity required them to form rich, complexly connected ecosystems, making real community possible for the first time.

Those first ecosystems that sustained multicellular organisms were confined to the oceans. It took another 130 million years—the journey from Buffalo to Syracuse, New York—for plants to venture onto the land, making a terrestrial biosphere possible. But sustaining terrestrial ecosystems is not easy. Erosion is constantly reshaping the landscape, removing the soil and with it the carbon and nutrients stored there. Over the years those nutrients are carried to the oceans and buried out of the photic zone and out of the reach of photosynthesis. If not somehow compensated, erosion would render the continents infertile, and terrestrial life would cease to be. Fortunately for you and for me, that does not happen, because both conti-

nental and oceanic crust are constantly stirred by convection currents in Earth's mantle, the thick layer of hot, sticky rock between the crust and the core. Those convection currents shift the continents and fold the sediments deposited in the ocean basins into the mantle, where they are melted and reborn as volcanic material to be erupted onto the continents. That slow, majestic drumbeat of mantle convection—visible in the rhythmic opening and closing of the Atlantic ocean basin every 200 million years or so—is a vital part of the Earth system that sustains life as we know it.

After another 200 million years, as we reach Albany, New York, dinosaurs begin to dominate terrestrial systems. They were part of a well-adjusted ecosystem that lasted roughly 150 million years until it was disrupted by a catastrophic meteorite impact 65 million years ago, as our journey reaches Manchester, New Hampshire.

That calamity was one of five major extinctions within the last half billion years. It is the best-known extinction but not the most intense; that honor belongs to an extinction that occurred 250 million years ago and eliminated about 80 percent of the species then living. Most species have proven to be rather transient. Estimates vary, but roughly 99 percent of the species that have emerged are now extinct. That was tragic for those species. The animals, at least, wanted to live. They suffered when they died. Some died trying to protect their young. The message of evolution, of course, is that we are their progeny, the beneficiaries of their struggle.

That, perhaps, gives us a sense of just how sacred a trust we hold, how hallowed the ground we walk. I am reminded of Lincoln's words at Gettysburg. Paraphrasing slightly: "In a larger sense, we cannot dedicate, we cannot hallow this ground—the brave creatures, now dead, who struggled here, have hallowed it far above our poor power to add or subtract."

Despite the pain and the suffering that individual animals experienced, the biosphere as a whole—life—survived those extinctions, always finding new ways of flourishing, always finding some way for novelty to emerge.

The disappearance of dinosaurs 65 million years ago and the emergence of mammals shows the profound effect that chance events like a meteorite impact can have on the course of evolution. Mammals had lived as marginal members of the global ecosystem for 150 million years; had we been there, we never would have expected them to dominate the scene. But in just ten million years, they diversified to fill the ecological space vacated by the dinosaurs. Tiny at first, they became larger and more specialized over time, and eventually our species emerged from the primate line.

Seen from the perspective of the journey from the Great Barrier Reef, the human story seems almost an afterthought. The first tool-using hominids emerged as our journey takes us past Appledore Island, barely two kilometers west of here. We meet the Cro-Magnon cave artists of Southern France outside on the porch, just thirty meters from the podium. And all of human history, from the Sumerian city-states to the present, fits

within the first five rows of chairs in this room. The entire span of modernity and the rapid population growth that accompanied it is a mere half-meter, roughly the size of the podium from which I am speaking. That is a humbling realization. Ecologically, it is also a warning. Species that take over a landscape quickly often disappear as rapidly.

Sacredness, Creativity, and Reconciliation

Other speakers this week will explore details of the way in which novelty has emerged; help us to know hawks, baboons, and gorillas; think about the grounds of ethical principles that transcend human welfare; and help us to nurture the empathy within us. Even the rocks that we walk over as we wander the island have a story to tell. Some were deeply buried and complexly deformed during the last closing of the Atlantic, others were once hot magma injected into fractures formed when mantle convection reversed and the present Atlantic basin began to open. In that contrast, we can sense the insistent rhythm of mantle convection that has sustained terrestrial life for 400 million years. And everywhere on the island, we will hear the quiet, insistent sound of the waves, reminding us that oceans have nurtured life on Earth for nearly four billion years.

As we explore these elements of the Earth story, we must watch for the glimmering of insights that can help us to understand the sacred trust with which we are charged, the sacred places in time and space from which we can draw wisdom about how we might learn to live in our time and place.

At every stage of this evolutionary journey, we find complexity and diversity emerging from simple beginnings. Physics and chemistry first gave us atoms, then molecules. Biology first gave us single-celled organisms, then multicellular organisms, then integrated ecosystems. That process of stepwise emergence was the key to the evolutionary dynamic. At each stage, possibilities remained latent until conditions were ripe for the emergence of novel features that enabled a breakthrough to a new frontier of complexity and creativity. At each level, novelty emerged out of fertile relationships among already existing ingredients—particles, atoms, or genes—through a sort of tinkering that stirred, mixed, and rearranged those ingredients in new ways, some of which turned out to be fertile ground for the emergence of yet more novelty, yet more creativity.

I can sense the sacredness in that creativity in the diverse ecosystems that support us—in the fecundity of old-growth forests of the Pacific Northwest, in the plants that somehow find water in the cliffs and canyons of the Colorado Plateau, and in second-growth hardwood forests mantling Appalachian ridges, taking back abandoned pastures, even coal mines. In those places I can almost touch the quiet, serendipitous creativity that lies at the base of all that is.

We can sense the workings of that creativity in the patterns of ecological development. The energy for life comes from the ability of plants to use

solar energy to produce energy-rich biomolecules from atmospheric carbon dioxide, water, and nutrients. That chemical energy and those nutrients are then cycled through the food chain, moving from plants to herbivores and to one or more levels of carnivores. But the system doesn't stop with the "top" carnivores. The entire biochemical system is closed to everything except energy and must recycle everything else—carbon, nutrients, and water. Plants and animals produce a lot of waste organic matter, and if that waste were allowed to accumulate, the carbon and nutrients in that waste would be lost, and the system would gradually cease to function. Microorganisms, fungi, and bacteria play a crucial role by consuming dead organic material and converting the carbon and nutrients back into a form in which they can be endlessly recycled.

Healthy ecosystems are communities in which all of the species are mutually dependent. Every species depends on other species to consume the waste products that it produces and to supply the carbon, water, energy, and nutrients that it needs. The evolutionary success of a species depends not just upon its ability to reproduce but also upon its ability to function as part of an integrated community of organisms.

A careful look at how ecosystems sustain themselves in ways that turn out to be so creative reveals four key principles (Fisher 2002):

1. Every healthy ecosystem is an integrated community in which each organism has a role to play. No complex organisms can live alone. Like healthy families, in which individuals are both self-differentiated and mutually dependent, species constituting healthy ecosystems flourish by a balanced combination of individual well-being and fruitful relationship with one another—a fertile mix of individuality and reciprocity.

2. The continued health of every ecosystem depends on its ability to recycle energy and nutrients and to continue doing so despite shocks to the system by changes in the environment or even loss of a species or two. It is the system's resilience, its ability to respond creatively to change, that counts in the long run.

3. The entire system is intensely opportunistic. Whenever there is an opportunity to use waste energy or nutrients productively, changes tend to occur. New species emerge, or existing species adapt to use the waste. As they do, they forge another link for circulating energy or nutrients, and so contribute greater resilience to the system as a whole.

4. Processes of change tend to be highly contingent. The precise way in which the system responds to opportunity can depend very much upon what species or even what individuals happen to be on hand when opportunity emerges and upon how those particular organisms respond to the opportunities that they sense before them.

We are often told that the evolutionary dynamic is grounded in competition and that if we want to live naturally we must live out of radical individualism. But if we look closely at healthy ecosystems, we see that

individualism is always tempered by reciprocity. Many ecologists argue that symbiosis and mutualism are actually more common than purely competitive relationships.

We in modern times seem to have taken the notion of individualism too far. We have missed the importance of reciprocity and the joy of living in balanced relationship. Our communities have become untangled, perhaps most obviously in the failure of our cities to work as they might. We have become estranged from one another and from nature.

I am much taken with a book by the Jesuit Philip Sheldrake, *Spaces for the Sacred: Places, Memory, and Identity* (2001). Sheldrake writes beautifully about the relationship between place and sacredness in place and in community and suggests that we see our task as one of reconciliation—as he puts it, the task of reconsecrating desecrated places. He invites us to look again at relationships, memories, and identities and to sense the sacred in all.

That, for me, is the invitation of this week: to take the time to sense the sacredness in this time and this place, in the relationships that connect us to one another and to the land.

But Sheldrake also warns us not to succumb to the temptation merely to bask in the satisfying glow of the sacred, in the richness of relationships with nature and with one another. When we leave this place and this time, we must be prepared to devote the energy gained here to the hard work of a reconciliation that continually seeks to go further and deeper—a reconciliation that will be profoundly costly but infinitely worthwhile, because in that reconciliation we will at last come to know our place in the cosmos.

NOTE

1. A version of this essay was presented at the fiftieth annual conference of IRAS, "Ecomorality," Star Island, New Hampshire, 26 July 2003.
2. The distinction between intellectual knowledge and knowing by acquaintance is clearer in the languages of continental Europe than it is in English, which lumps both kinds of understanding into the single noun *knowledge*. French, for example, makes a clear distinction between the noun *savoir*, which represents intellectual knowledge, and the noun *connaissance*, which represents knowing by acquaintance.
3. Star Island is about 16 kilometers (10 miles) off the Atlantic coast at Portsmouth, NH.
4. The version of the cosmic story that follows is adapted from a version published in the *Encyclopedia of Life Support Systems* (Fisher 2002).

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