

Redecorating Nature: Reflections on Science, Holism, Community, Humility, Reconciliation, Spirit, Compassion, and Love

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Abstract

Numerous humans - in my opinion, far too many - continue to live apart from nature, rather than as a part of nature. In this personal essay I discuss various aspects of traditional science and suggest that holistic and heart-driven compassionate science needs to replace reductionist and impersonal science. I argue that creative proactive solutions drenched in deep caring, respect, and love for the universe need to be developed to deal with the broad range of problems with which we are confronted. Simply put, I have had enough. I want the world to be a better place for all of its inhabitants and time is not on our side. I feel a deep sense of urgency and passionate impatience. We are worrying about wildness as it is disappearing right in front of our eyes - as I write and we discuss. Thus, I am willing to open myself to criticism, to be vulnerable for expressing views that are not part of main-stream science. Rather than take a doomsday view that the world will not even exist in 100 years if we fail to accept our unique responsibilities, it is more disturbing to imagine a world in which humans and other life coexist in the absence of any intimacy and interconnectedness. Surely we do not want to be remembered as the generation that killed nature. To illustrate some of my points, I discuss various aspects of translocation studies in which animals are moved about from one place to another in humans' attempts to "redecorate" nature. In these projects interdisciplinary collaboration is necessary and disciplinary boundaries must be trespassed. I also emphasize the importance of teaching children well for their and our futures rest on their developing a deeply-rooted caring ethic. My vision is to create a worldwide community in which humans perceive themselves as a part of nature and not apart from her, in which humans who are overwhelmed and whose spirits and souls have been robbed and squelched by living in and amongst steel, concrete, asphalt, noise, and a multitude of invasions of their private space reconnect with raw nature - with the wind in their faces, the odors of wild flowers, and the sounds, sights, odors, and touch of other animals and inanimate environs. A world in which sensing is feeling. Nature is our unconditional friend and reconnecting with nature can help overcome alienation and loneliness. The power of love must not be underestimated as we forge ahead to reconnect with nature.

Keywords: science, nature, holism, compassion, social responsibility

"My prayer is that we 'center down,' for the sake of all the relations, for all of us. To be perfectly honest - and there can be nothing less - my prayer is that we get down, that we get down and dirty. I pray that we lose ourselves while lovemaking with dirt, with the rocks and streams, the salmon who swim there, the coyotes and 'coons, the water bugs and snakes - with the fertile ground of wherever we may be."

(Sewall 1999, 274)

"The earth is, to a certain extent, our mother. She is so kind, because whatever we do, she tolerates it. But now, the time has come when our power to destroy is so extreme that Mother Earth is compelled to tell us to be careful. The population explosion and many other indicators make that clear, don't they? Nature has its own natural limitations."

(His Holiness The Dalai Lama 1999, 197)

"Like human mothers, nature has always evoked ambivalent emotions. She is beautiful, fertile, nurturing, benevolent and generous. But she is also wild, destructive, disorderly, chaotic, smothering, death dealing . . ."

(Sheldrake 1991/1994, 9)

"Why say 'fantastic' when you mean 'Scientific'?"

(cummings 1953, 105)

Resisting Narrow Science, Reconnecting with Nature

"Back off man, I am a scientist." This bumper sticker has been percolating in my brain for many years. Here is why.

I am a scientist. Because I study animal behavior and behavioral ecology and am interested in the health and integrity of individuals, populations, species, communities, and ecosystems, some of my colleagues may scoff at my declaration of being a scientist, for all I do is watch animals go about their daily activities. Because I have a dream of reconnecting humans with the lives, souls, spirits, and hearts of other animals, and also with inanimate landscapes, and

because I work with philosophers, some of my colleagues think I am a bit bizarre and that my science is too “soft.” Because I am a sentimentalist, some think that my science is flawed — too subjective — with little or no hope for redemption. I believe science needs to be more open to individuals’ worldviews. There are so many diverse problems it is unlikely there is only one sound scientific method.

So, I do not wear a lab coat, work in a laboratory, deal with fancy gadgetry, and do not perform sophisticated experiments. Nonetheless, the magnificent and awe-inspiring world is my laboratory and I love what I do; it is fun. So, “soft” or “hard,” I do some sort of “science.” But, I do not take a reductionist and impersonal scientific view of the world in and around me. I am, indeed, in awe of how much nature has to offer to all of us, scientists included, when we open our hearts to her boundless and breathtaking splendor, her innumerable messages, her beneficence, her generous invitation to join her. (Recently, an editor of a major journal told me that most people feel that “sheer fun . . . has to be purged from papers before they are regarded ‘objective’ enough for publication.”)

My vision is to create a community in which humans perceive themselves as a part of nature and not apart from her, in which humans who are overwhelmed and whose spirits and souls have been robbed and squelched by living in and amongst steel, concrete, asphalt, noise, and a multitude of invasions of their private space reconnect with raw nature — with the wind in their faces, the odors of wild flowers, and the sounds, sights, odors, and touch of other animals and inanimate environs. A world in which sensing is feeling. Nature is our unconditional friend and reconnecting with nature can help overcome alienation and loneliness.

In this essay I discuss various aspects of traditional science, suggest that holistic and heart-driven compassionate science that is infused with love needs to replace reductionist and impersonal science, and discuss some aspects of translocation studies in which animals are moved about from one place to another in humans’ attempts to “redecorate” nature.

Stepping Back from Science

*“What do scientists do when they do science? According to the advertisement at the beginning of *The Double Helix*, J. D. Watson’s account of how the structure of DNA was discovered, doing science includes politics, sex, wine, movies, teamwork, rivalry, genius, stupidity, and virtually everything else that makes life in the lab and out something less than perfect and a great deal more than dull.”*

(Grinnell 1987, 1)

It often is valuable to step back and take a look at whatever it is we do. Asking questions about science can be useful for learning about science and scientists. These sorts of queries are referred to as second-order or meta-queries for they deal with the science of science, or how science is conducted.

Science supposedly tells us why things are the way they are. However, science is not value-free. Numerous prejudices are embedded in scientific training and thinking. Scientists, as humans, have individual agendas — personal, social, economical, and political (for a discussion centering on humans and nature, see Wilkinson 1998).

Basically, science is an enterprise not unlike many other businesses. In his book, *The Unheeded Cry*, Rollin (1998) notes that the training of most scientists is grounded in the “common sense of science” in which science is viewed as a fact-gathering, value-free activity in which individual values and subjectivity play no role. Only later in their careers do many scientists discover that the trappings of their education, (that science is value-free and objective), have precluded more pluralistic views of the nature of science and squelched creativity. I certainly fit into this scenario (Bekoff 1998a).

There is a structure to doing science to which I, and most of my colleagues adhere, no matter how different are our inquiries. We ask questions, design research projects to answer these questions as unambiguously as possible, analyze data, see how well our results fit our predictions, generalize to other situations, write up papers, deliver presentations, make errors, and go back to the drawing board to design future work. Basically, science proceeds by a combination of supporting predictions, making errors, discovering new connections and patterns among variables, and then designing future projects. Scientists, like other humans, are fallible. Indeed, it is our fallibility that keeps us in business.

Social Responsibility

“Ultimately, scientists have a responsibility to engage in public debate about the state of the environment, so that people can make informed decisions about the kind of world they are creating.”

(Mackey 1999, 248)

For many decades, science and scientists have been held in high esteem and placed on a pedestal by non-scientists and scientists themselves. Numerous scientists had an arrogant attitude about their self-worth, an attitude that did not serve science well (e.g., Mares 1991). Most scientists work in a safe, insulated microcosm. Scientists were trusted, their authority was unquestioned, and those who questioned it

were considered to be members of fringe groups, perhaps even Luddites, who were anti-science or anti-intellectual. Scientists were generally autonomous and a monologue generally went from science to the rest of society with little exchange or interaction. After all, scientists busily discover cures for countless diseases, the structure of the human genome, how to make weapons for global destruction, ways to get to the moon and elsewhere, how to generate and process information faster, how to engineer better food, how animals behave, and how nature works — alas, how to make our lives longer and presumably better. And indeed science has chalked up innumerable successes. But it can do better.

Nowadays more people, including some scientists, question science. Increasingly science is not seen as a self-justifying activity, but as another institution whose claims on the public treasury must be defended. Non-scientists are generally more aware and more inquisitive, and society is more complex. There also needs to be a new social contract between science and society that is characterized by two-way dialogue (Gibbons 1999). Science will continually have to be legitimized. Thus the dialogue will have to go two ways - science to society and society to science. Scientists have numerous and deep social responsibilities that can no longer be ignored (Mackey 1999). Those who question science are not being anti-science or anti-intellectual. Rather, there is increasing skepticism because they feel that given the enormous amount of money that is gone into various scientific endeavors, science hasn't delivered, few final and irrefutable answers are available. Many are also concerned with the politics, economics (rush for patents, financial gains), and arrogance of science. And, while we are certainly making some progress in living in harmony with other animals and inanimate landscapes, we are nowhere near to achieving a grade of A in these situations.

Fragmenting the Universe: Creating Holes in Wholes and Reducing Multidimensional Terrain into Unidimensional Flatlands

What about science and nature? While we have learned much about nature, one reason traditional science often falls short is that it fragments the world. It forces a separation between the seer and the seen — how the world is felt and sensed (see also Martin 1992, Abram 1996, Sewall 1999). Reductionistic science sorts and filters reality, dissects, disembodies, and splits wholes into parts; it makes holes in wholes. It produces linear, mechanistic views of the universe and objectifies and devalues animals and nature. It reduces the multidimensionality of our interactions with other animals and nature into dimensionless and static flatlands rather than stimulating the development, understanding, and appreciation

of variegated landscapes. After much is learned about how various components of whole systems work, and the time seems right, scientists then try to reconstruct the wholes that they have scissored apart. However, we are not very good at reassembling the wholes — we cannot put Humpty Dumpty back together once he has been dissected apart. Despite good intentions, we often discover that the whole is greater than the sum of its parts and we are unable to understand how whole systems emerge from complex interdependent interactions among their constituents. The system that emerges from reconstructing the whole is a rather mysterious one.

So, in the end, breaking down wholes into parts can present a simplistic view of how systems function, how each part interacts with each and every other part, and how a whole system emerges from these complex interactions. Macroecology and the Biosphere project are good examples of large scale holistic thinking. Laudably, the National Science Foundation now supports a program in biocomplexity. (Recently I attended a wonderful meeting at the National Center for Ecological Analysis and Synthesis at the University of California, Santa Barbara, to discuss a new holistic framework for science and how humans might go about reintegrating themselves back into nature and ways to make science more socially responsible.)

Science and Control

Science also is concerned with control — controlled experiments and often control of the world. Many scientists feel uncomfortable when they cannot control variables, when unexplainable phenomena trip them up despite their conducting carefully controlled experiments. Scientists want certainty, they want to be able to establish causal relationships even when it is clear that these sorts of exercises fail as often (or more often — has anyone kept track?) as they succeed for large-scale multidimensional problems such as those resulting from human interactions with, and our influences on, nature. A concern for control might be helpful in some situations, but it can also obscure complex interactions among variables that, while difficult to tease out, are essential to understand.

In my field, animal behavior, one illustration of a concern for undercontrol is found in the excellent fieldwork of Cheney and Seyfarth (1990) on the behavior and minds of vervet monkeys. In their studies of the attribution of knowledge by vervets to each other, Cheney and Seyfarth played back vocalizations of familiar individuals to other group members. These researchers were concerned about their inability to eliminate “all visual or auditory evidence of the [familiar] animal's physical presence” (Cheney and Seyfarth 1990, 230). Actually, this inability may not be problematic if the goal is to understand “how monkeys see the world.”

Typically, in most social situations the physical presence of individuals and access to stimuli from different modalities may be important to consider. Vervets, other nonhumans, and humans may attribute mental states using a combination of variables that are difficult to separate experimentally. Negative or inconclusive experimental results concerning vervets' or other animals' attribution of mind to other individuals may stem from impoverishing their normal environment by removing information that they normally use in attribution.

In the study of behavior, insistence on absolute experimental control that involves placing and maintaining individuals in captivity and getting them accustomed to test situations that may be unnatural and may greatly influence results. In this and other fields, we need to learn to deal with the complexities of the situation at hand and not oversimplify complex interactions among variables. The study of humans and nature provides as challenging a field as there is in terms of the complexity of the innumerable connections among different variables. Causal relationships often are difficult to establish, and it is necessary to accept the challenge that faces us.

It is important to know about some features that characterize traditional science. This is not to condemn science for science does deliver some very useful information that makes our lives and those of other animals better. Science also helps us learn about how our activities can lessen our impact on other humans, other animals, and inanimate environs. But science can detach people from truly sensing and feeling the wondrous world within which we live, and this tendency must be countered.

Science as Play, Science as Fun: Multidimensional Musings

"I study foxes because I am still awed by their extraordinary beauty, because they outwit me, because they keep the wind and the rain on my face . . . because it is fun."

(Macdonald 1987, 15)

Doing science, like playing, should be fun. Indeed, if we want students to choose scientific careers we need to show them that it is fun, that doing science is a challenging adventure in which individual creativity is rewarded. There are numerous examples in the history of science of what we call the "aha phenomenon" — when someone sees how to solve something because they have removed the restraints of traditional scientific linear thinking and allowed themselves to engage in multidimensional musings that are challenging and fun. Many report that these creative solutions come to them when they are "just out there doing something else and having fun."

Science and Pluralism

There are so many diverse problems with which we are faced that it is unlikely that there is only one reliable scientific method. Some good examples that are relevant to the discussions about holism in which we are engaging center on the creative and controversial work of Rupert Sheldrake (1991/1994). Sheldrake does hard and rigorous science but is not afraid to take on such problems as the miraculous homing behavior of pigeons and dogs, or dogs who know when their human companions are coming home even if the human's return is irregular and unpredictable (Sheldrake 1999). Sheldrake's ideas of morphic fields and the organization of self-organizing systems may explain such coordinated behaviors as the rapid movement of fish within schools without collisions and the coordinated change in direction shown by large flocks of birds. To date, some of Sheldrake's explanations based on collective morphic fields seem to be as reliable as those traditional explanations that are more palatable to scientists. While some people dismiss Sheldrake as a flaky scientist — his science has gone to the dogs — I believe that he is a bold and creative thinker who is forcing people to expand traditional science. His views of nature and of human interactions with nature and other animals are expansive and can lead to new investigations that may shed light on phenomena that have defied traditional explanations. Even if Sheldrake is only correct one tenth of the time or less, he will have made important contributions for forcing us to think outside of traditional paradigms. Pluralism is an essential ingredient for good science. Normative thinking can be stifling.

Reductionism, Holism, and Heart: Towards a Compassionate Science

Reductionist science also misrepresents the world. This has serious consequences for the quality of knowledge we gather and for how we interact in and with nature (see, for example, Berkes 1999 and references therein). Reductionism promotes alienation, isolation, and disconnection. It forces a separation between the seer and the seen — a false dualism. Science often impedes our truly sensing, feeling, and understanding the scope of the amazing world within which we live. We live as if we know with great certainty how whole systems work but our knowledge is far from infallible.

Reductionism can also easily lead us away from viewing animals' worlds as they view their own worlds and lead to rampant and destructive anthropocentrism. Reductionism reinforces alienation, isolation, and disconnecting. Science can indeed make nature less majestic and less magical.

Holistic and more heart-driven science is needed, science that is infused with spirit, compassion, and love. Closet holists need to emerge and offer their heretical views.

Holistic heart-felt science reinforces a sense of togetherness and relationship, family and community, and awe. It fosters the development of deep and reciprocal friendships among humans, animals, and other nature. It helps us resonate with nature's radiance and lessens our tendency to think, egocentrically, that we are at the center of everything. Thomas Berry (1999) stresses we should strive for a benign presence in nature. Native Americans are proud to claim that "animals are all our relations." Animals and inanimate landscapes need to speak for themselves. And we must listen to their messages very carefully. Trees and rocks need love too.

Holism is a welcomed addition to reductionism and can help us along immeasurably. Sheldrake's concept of morphic fields may indeed be instrumental in facilitating reconnecting humans to nature (even if he is wrong), or at least open our eyes to new ways of viewing our complex and reciprocal relationships with nature. We will never have a true sense of the beauty and magnificence of the world unless we adopt a holistic/global picture.

Redefining and Expanding Science: Science with a Heart

" . . . insisting that every scientific episode must end in success seriously biases our understanding of science."
(Hull 1996, ix)

Science remains a very powerful and influential enterprise. We need to be careful about how science is conducted, how information is disseminated, who has access to it, and what is done with it. And while there are many certainties associated with the result of scientific inquiries, I think that paying attention to all of the uncertainties of science will make for better science. We need to redefine science to include hard data infused with stories, anecdotes, and down-home common sense. Perhaps even non-scientists can be called on to help design scientific research. Their (supposedly) naive views might provide refreshing and enlightening insights. Scientists need to have more open exchanges with society, step down from their pedestals and stop preaching to the converted (their colleagues who have the same world view). Removing ourselves from the trappings of traditional science will open the door to new and exciting discoveries. We need also to make science more accessible to non-scientists and cut down on unnecessary jargon.

One road to travel would reinforce creative, passionate, and bold dreaming, and resist narrow thinking that claims there is only one way to do "good" science. We need to imagine the unimagined. Allowing individual idiosyncrasies, interdisciplinary collaborations, holism, and heart to inspire science will make it more exciting, creative, attractive to students, and likely better. The renowned scientist, Frederick

Seitz, recently lamented how disturbing it is to learn that few scientists under 50 years of age have much interest outside of their discipline (Seitz 2000). Scientists need to stop stepping on their own feet and hindering the development of their own fields (Mares 1991). They must step out of the narrow confines of their disciplines, and scientists and non-scientists must talk to one another and respect each others' views. Seitz (2000) concluded his concern of the loss of generalists by answering with an emphatic "yes" the question of whether ". . . it [is] desirable that we have a significant group of generalists in all cultural fields."

It seems that all scientists should be open to change. But some still resist the notion that science is value-laden and some do not want to impregnate science with feeling. Nonetheless, the Nobel prize winning geneticist, Barbara McClintock, stressed that scientists should have a feeling for the organism with which they worked, and she worked on corn! Fumento (1993, 366) notes that some scientists "do not want to see a 'blend[ing of] the natural sciences, values, and social sciences,' because inevitably this leads to the subjugation of scientific truth."

We need science with a heart — a compassionate science. Solid science can be driven by one's heartstrings — solid science can be done even if one goes to the beat of a different drummer. Saturating science with spirit and compassion will help bring science, nature, and society together into a unified whole. Questioning science will help insure that we will not repeat past mistakes, that we will move towards a world in which humans and other animals share peaceably the beneficence of nature. Magnificent nature — the cacophony of her deep and rich sensuality — will be respected, cherished, and loved.

Redecorating Nature: Translocating Animals and Trespassing Disciplinary Boundaries

Some of the above ideas find a home in some of my own interests in conservation biology. Indeed, these are interdisciplinary questions with few simple answers. These big questions require broad, not reductionist, views of science. I have been long interested in humans' attempts to manage — control — nature, and some of the associated ethical and biological questions that demand serious discussion (Bekoff 2000a). Ethics and science are embedded and not juxtaposed against one another. Interdisciplinary input from biologists, ecologists, philosophers, sociologists, economists, lawyers, and political scientists is essential to deal with the problems at hand and to develop creative and broadly synthetic proactive solutions to difficult problems. Thus, boundaries between these different disciplines must melt away, for all are important. There is no room for territorial defense. The

arena within which we work becomes an exciting and challenging multidimensional terrain rather than a misleading and boring flatland.

Moving animals from one place to another — translocating them and redecorating various habitats — raises numerous questions concerning humans' relationships with nature. Relevant issues include the management and control of nature, efforts to restore or recreate ecosystems, increasing biodiversity (is more better?), animal protection, and anthropocentricity versus biocentricity. These big questions require broad, not reductionist, views of science. In addition, sociological, economical, political, and biological aspects (and agendas) demand close attention. Translocation projects involve capturing animals in one area and transporting and releasing them elsewhere. These events are psychologically and physically stressful to the animals who are moved about. Furthermore, the ecosystems from which the animals are taken and the ecosystem into which animals are placed undergo changes, but there have been few studies of what happens in each area. Most efforts concentrate on the fate of the (re)introduced animals in their new homes.

Jinxed Lynx?

A recent attempt to reintroduce Canadian lynx into Colorado rekindled much of my interest in this area, and I wrote a piece (Bekoff 1999a, 1999b) which raised many questions that center on the complex relationships between humans and nature. Lynx are now listed as "threatened" under the Endangered Species Act.

In Colorado, during the winter and spring of 1999, 41 Canadian lynx were reintroduced to areas where they once roamed (another 33 individuals were released in April 2000). Seventeen of those released in 1999 have died and eight are missing (early April 2000). This highly controversial project brings to light some concerns about reintroduction efforts and humans' role in trying to control nature. For example, it is not clear that species preservation and conservation have to be valued, why "more is better," why biodiversity should be conserved, or if we can truly improve nature. Reading and Clark (1996, 296) stressed in a recent review of carnivore reintroduction projects that "It is clearly desirable to improve approaches to reintroduction."

It is important to reassess what we are doing and why. Just because we can do something does not mean we ought to do it. Indeed, there are numerous factors beyond the control of scientists and others who so dearly want them to succeed. Recently, three biologists argued that personal attitudes, human shortsightedness, and greed, would with few exceptions be insurmountable stumbling blocks in attempts to manage animal populations (Ludwig, Hilborn and Walters, 1993).

Can We Achieve More by Doing Less? Faking Nature

I raise the questions I have, not because I am against all reintroduction and translocation programs. Indeed, some well-planned efforts look to be on the road to yielding sustaining populations (gray wolf recovery in Yellowstone National Park seems to be going faster than predicted; red wolves are doing well on the Alligator River National Wildlife Refuge in northeastern North Carolina) and they can serve as models for future efforts. Rather, I ask these questions because the issues are not as clear as some people want them to be. I deeply appreciate the good intentions and efforts of all involved, but sometimes good intentions are not enough. And, there is no room for failure for these highly visible projects continually come under careful public scrutiny.

I ponder these questions because the issues are not as clear as many people want them to be. Nature is complex, but many people want simple, quick solutions when tinkering with her. There are none. Successful proactive planning takes time. When trying to conserve species or restore ecosystems we must be concerned with all animals who are involved, not only human-centered goals. Many lives are at stake. Some "big" questions include: Should individuals be moved and perhaps suffer and die because of what we want? Should individuals be traded off for the perceived good of their species? Should populations and ecosystems that have developed and sustained themselves in the absence of predators be altered? What about other predators who might now experience increased competition for food? For example, reintroduced wolves and perhaps their offspring are killing numerous coyotes (more than 50%) in Yellowstone National Park (Crabtree and Sheldon 1999). Before the wolves were reintroduced, coyotes didn't compete with wolves. Why are wolves more valuable than coyotes? Are they? What about prey who now will be eaten when in the past, in the absence of wolves, they would not have been preyed upon?

It may turn out in some cases that it is impossible to regain what was lost. It may be infeasible to recreate what once existed because times have changed and we cannot recreate what once was. In the end we may simply be faking nature.

Wholes and Holes: Emergent Complexity

Reintroduction projects involve moving animals from one place to another, redecorating, in a sense, a given area. As I noted above, there has been little attention paid to the effects of these removals — the holes that are made in wholes — on the flora and fauna of the areas from which animals are taken and placed. Consider carnivores, for example. These quotations come from a recent paper published by Terborgh, Estes, Paquet, Ralls, Boyd-Heger, Miller and Noss. (1999).

If, as we conclude here, top predators are often essential to the integrity of ecological communities, it will be imperative to retain top predators or restore them to as many parts of the North American community as practical. Failure to do so will result in distorted ecological interactions that, in the long run, will jeopardize biodiversity.

(Terborgh et. al, 40-41)

Top predators play structuring roles in many ecosystems.

(Terborgh et. al, 53)

From a conservation perspective, we are concerned about the destabilizing forces that are unleashed in ecosystems from which top predators have been eliminated.

(Terborgh et. al, 54)

Consider also this quotation from a recent paper by Berger (1999, 2261): “There are subtle, community-level modifications in terrestrial ecosystems where large carnivores no longer exist.” A fair general conclusion is that top carnivores play a top-down role in regulating prey populations — they stabilize the trophic structure of terrestrial ecosystems. Top carnivores play an irreplaceable regulatory role.

Obviously, carnivores are closely linked to the wholeness of many ecosystems. By paying close attention to what we do to them, and why we do what we do where and when we do it, we can help maintain the integrity and vitality of individuals, species, populations, and ecosystems (Bekoff 2000a). Given the importance of carnivores in various ecosystems, it is essential that we know about what effects removal and introduction have in the different areas. Removing individuals involves taking apart an ecosystem and when individuals are removed we change the relationships among those variables remaining. And when we (re)introduce individuals into an area we change relationships among variables at this location. So, a key question centers on how we deal with the emergent properties at both locations. This is not a trivial question or an easy one to solve. We deal with it every time we tinker with — redecorate — nature.

A Benign Presence

As I wrote above, Thomas Berry (1999) stresses that we should strive for a benign presence in nature. The following (oversimplified) matrix (where + = benefits, - = costs) helps me to organize my feelings on much of what I have written above.

	Animals -> Ecosystems	
	++	+-
Humans	-+	--

Benign presence, or having both humans and animals -> ecosystems benefit, is indicated in the cell “++”. My take is that most interactions of humans with animals -> ecosystems result in “+-” interactions (humans benefit and animals -> ecosystems sustain costs), where as few if any result in “-+” (humans sustain costs and animals -> ecosystems benefit), or “--” (both humans and animals -> ecosystems sustain costs). Indeed, I would argue that “++” is the situation for which we should always strive. Perhaps “-+” in which humans sustain costs and animals -> ecosystems benefit should also be more palatable.

The Re-Generation

In their interactions with nature, humans have, for the most part, been reactive rather than proactive. We rekindle, redefine, and reinvestigate our relationships with nature, reengage and reconnect with nature, reset boundaries, revisit important problems, regain our sensitivity to the planet’s problems, try to restore or recreate ecosystems, rehabilitate wildlife, reintroduce species, recover lost or dwindling resources, and reconcile with nature. As I wrote above, science certainly learns from its mistakes, and indeed it is our fallibility that keeps science afloat, but while there have been innumerable and monumental successes, there have also been numerous failures in our efforts to understand natural systems and how humans influence other nature. It is well and good that we want to reconnect with nature, but in the future proactivity must prevail.

Teach the Children Well

“Those who complain of the ‘inconsistencies’ of animal lovers understand neither the complexity of attitudes nor how rapidly they have developed.”

(Mighetto 1991, 121)

“Environmentalism means many things to many people, but — in the end — it means nothing if we are not willing to endow the concept and its myriad realizations with the broadest and most compassionate of biological possibilities.”

(Tobias 1998, 204)

In my view we need to do much better when we interact with - control, dominate, manage - nature. We need to put

nature's interests ahead of our own and respect and love all life and inanimate landscapes. We need to learn as much as we can about other animals in their own worlds and respect them for who they are (Bekoff 1998b, 1998c, 2000b, 2000c, 2000d; Bekoff and Jamieson 1991, 1996). Proactive planning is key — we cannot always be putting out fires, and indeed this reactive strategy will likely not even be an option in the future. We are worrying about wildness as it is disappearing right in front of our eyes — as I write and we discuss.

Our big brains and intellect place us in a unique position in the world, and we must make the best of our capabilities. We are an integral part of nature and have unique responsibilities to nature, and they must not be taken lightly. Time is not on our side.

Children are inherently and intuitively curious naturalists. They are sponges for knowledge, absorbing, retaining and using new information at astounding rates. We all know this, but often we forget when we are helping to develop their roles as future ambassadors with other animals, nature and ourselves. Some are also future leaders on whose spirit and good will many of us will depend. They will be other animals' voices and our voices, indeed, voices of the universe. So, it makes good sense to teach children well, to be role models, to infuse their education with kindness and compassion so that their decisions are founded on a deeply rooted, automatic reflex-like caring ethic. If we do not, they, we, other animals, human communities and environments will suffer.

The bottom line is pretty simple: teach the children well, treat the teachers well, and treasure all. Nurture and provide the seeds of compassion, empathy, and love with all the nutrients they need to develop deep respect for, and kinship with, the universe. All people, other animals, human communities, and environments now and in the future, will benefit greatly by developing and maintaining heart-felt compassion that is as reflexive as breathing. Compassion begets compassion - there is no doubt about it.

Today's children will live and work in a world in which (as I noted above) science will increasingly not be seen as a self-justifying activity, but as another human institution whose claims on the public treasury must be defended. It is more important than ever for students to understand that to question science is not to be anti-science or anti-intellectual. Questioning science will make for better, more responsible science and help to insure that in the future we will not repeat the mistakes of the past, that we will move towards a world in which humans and other animals share peaceably the resources of a finite planet.

In the end, if we fail in our responsibilities to ourselves and our children and their children, then we will soon inhabit a severely impoverished world. Rather than take a dooms-

day view that the world will not even exist in 100 years if we fail to accept our unique responsibilities, it is more disturbing to imagine a world in which humans and other life coexist in the absence of any intimacy and interconnectedness. Science can no longer shirk its responsibilities and must not only take praise for its innumerable successes but be held accountable for its many failures to make this a better world for all of its inhabitants. We may indeed have to go back to basics and revisit areas in which we think we know much (May 1999), but if we then proceed with care, compassion, and a broad and socially responsible agenda, there is much hope for the future. The implications for science of crossing boundaries are boundless.

Humans can no longer be at war with the rest of the world, and no one can be an island in this intimately connected universe. Clearly, the challenges with which we are all faced are extremely difficult, numerous, and exciting, but the collective bodies of knowledge that are produced will certainly help us to become more responsibly proactive activists. And this agenda will help us to restore our own fragmented psyches as well as our relationships to nature (Sewall 1999). Surely we do not want to be remembered as the generation that killed nature.

When Animals and Other Nature Lose, We all Lose

My overall conclusion remains unchanged from that which I wrote a few years ago (Bekoff 1998b). Specifically, if we forget that humans and other animals are all part of the same interdependent world — the more-than-human world (Abram 1996) — and if we forget that humans and animals are deeply connected at many levels of interaction, when things go amiss in our interactions with animals, as they surely will, and animals are set apart from and inevitably below humans, I feel certain that we will miss the animals more than the animal survivors will miss us. The interconnectivity and spirit of the world will be lost forever and these losses will make for much loneliness in a severely impoverished universe. We must love the universe and all of its inhabitants — animate and inanimate. The power of love cannot, should not, be underestimated (Ehrenfeld 1981, Goodall 1999, Sewall 1999). In my humble opinion, it all boils down to a simple fact: When animals and other nature lose, we all lose.

Endnote

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Acknowledgments

I thank Gay Bradshaw and Laura Sewall for discussing many of these issues with me.

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