Ethics & the Environment

Editor,
VICTORIA DAVION, University of Georgia

INDIANA

eProof

Ethics & the Environment

the

Environment

Editor,
VICTORIA DAVION, University of Georgia

ETHICS & THE ENVIRONMENT

Victoria Davion
Editor
University of Georgia

Melissa Link
Managing Editor

EDITORIAL BOARD

R. J. Berry
University College, London

J. Baird Callicott
University of North Texas, Denton

Claudia Card
University of Wisconsin–Madison

Chris Cuomo
University of Georgia

Frederick Ferré
Carlisle, Pennsylvania

Greta Gaard
University of Wisconsin–River Falls

Lori Gruen
Wesleyan University

Carolyn Merchant
University of California–Berkeley

Mary Midgley
Newcastle on Tyne, U.K.

Bryan A. Norton
Georgia Institute of Technology

Holmes Rolston, III
Colorado State University

Kristin Shrader-Frechette
University of Notre Dame

Deborah Slicer
University of Montana

James P. Sterba
University of Notre Dame

Noël Sturgeon
Washington State University

Karen J. Warren
Macalester College

Laura Westra
Maple, Ontario

Clark Wolf
Iowa State University

The Sheridan Press
eProof

Aleph

Historical Studies in
Science & Judaism

Aleph אך

Historical Studies in Science & Judaism
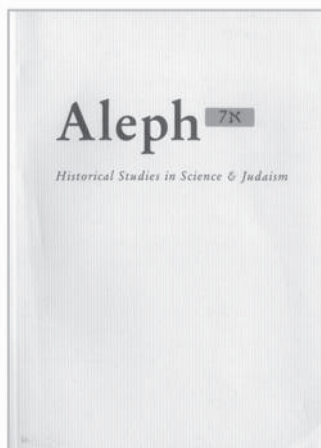
EDITED BY GAD FREUDENTHAL

Aleph explores the interface
between Judaism and science and
studies the interactions between
science and Judaism throughout
history. It also includes studies
on related subjects that allow
a comparative view, such as
the place of science in other
cultures. It regularly includes
full-length articles and brief
communications, as well as notes
on recently published books.

SUBSCRIBE **http://www.jstor.org/r/iupress**

J
STOR

For more information on
Indiana University Press
http://www.iupress.indiana.edu

CONTENTS

ETHICS & THE ENVIRONMENT
Volume 16, Number 1   Spring 2011

TABLE OF CONTENTS

e-Service Journal

A Journal of Electronic Services in the Public and Private Sectors

Electronic services are at the forefront of the delivery and collection of information that impacts diverse facets of society

e-Service Journal provides an important forum for innovative research on the design, delivery, and impact of electronic services via a variety of computing applications and communications technologies. It offers both private and public sector perspectives and explores new approaches in e-business and e-government.

TAMING GROWTH AND ARTICULATING A SUSTAINABLE FUTURE

THE WAY FORWARD FOR ENVIRONMENTAL ETHICS

PHILIP CAFARO

The overarching goal of environmentalism as a political movement is the creation of sustainable societies that share resources fairly among people, and among people and other species. The core objectives of environmental philosophy should include articulating the ideals and principles of such just and generous sustainability, arguing for them among academics and in the public sphere, and working out their implications in particular areas of our environmental decision-making. That means challenging the goodness of endless economic growth and helping other environmental thinkers specify plausible and appealing alternatives to the economic status quo. It means ending our failure to honestly address population issues. It means committing to living according to our own environmental ideals. Interestingly, the mainstream philosophical tradition has some important, underutilized resources that, combined with new and creative thinking, can help us achieve these goals and keep ethical philosophy relevant to meeting the challenges of the 21st century.

The future of environmental ethics will be what environmental ethicists make of it. Since the field encompasses widely divergent philosophical

orientations, talents, particular interests, and intuitions about the way forward, that future will be pluralistic. I believe this to be a good thing. But it is also helpful to step back from time to time, reflect on where we want to go, and ask whether we are leaving any essential tasks unaddressed.

I take the overarching goal of environmentalism as a political movement to be the creation of ecologically sustainable societies, which both preserve the biosphere's regenerative capacities and share resources fairly among people, among people and other species, and between current and future generations. Whatever else we do, environmental philosophers' core tasks include articulating and defending such ideals of generous and just sustainability, and working out their implications for particular areas of our environmental decision-making. Because the main impediments to creating sustainable societies are excessive and growing human populations and consumption levels, we must grapple with these issues. Arguably, environmental philosophers' commitment to sustainability necessitates that we advocate an end to the endless growth economy and work to specify economic alternatives that will reduce human demands on the Earth (and not merely slow the growth of those demands, or mitigate some of their worst effects). Anything less does not appear up to our environmental challenges or the demands of morality.

I believe environmental philosophers have important contributions to make to environmentalism as a political movement; indeed, that we are particularly well-placed to specify some key aspects of sustainability and press for their adoption. I explore these themes below. First, though, and perhaps more parochially, I consider some possible contributions our field might make to general ethical philosophy.

THE WAY FORWARD FOR ETHICAL PHILOSOPHY

Ethical philosophers generate and debate theories, but the ultimate goal of ethical philosophy is practical. Ethics should provide concrete guidance for living well. It should help us give the best possible answers to questions such as "How should I live?" "How should I treat others?" and "What sort of society should we strive to create?"

Note the "us" in that definition. Ethics, when it is useful, speaks to particular people facing particular choices. The choices we are most interested in, rightly, are our own choices. For one thing, we and our children will have to live with their consequences. Even discussion of the perennial

ethical issues that people face generation after generation, age after age, needs to be related to contemporary particulars if it is to bear fruit in practical guidance, improved decisions, and better lives—which are the point, once again, of ethical reflection.

For the first half of the 20th century, philosophical ethicists did not even attempt to discharge this primary responsibility. Instead they engaged in general theorizing with no clear practical implications (indeed, academic ethicists during this time often insisted on the sharp separation of their theoretical deliberations from any such implications). Philosophers mostly treated the discipline of ethics as just another area to work out puzzles from "more central" areas of philosophy, such as epistemology or philosophy of language. I am told I take an overly negative view of this work, but if so, it isn't because I haven't found some of it interesting and illuminating. Epistemology, metaphysics, and philosophy of language are indeed important areas of philosophy. But so is ethics. And during this period, in my view, the discipline of ethics essentially disappeared (at least in Anglo-American philosophy departments). Rigorous and sustained reflection on the actual choices faced by individuals, communities and societies largely vanished from philosophy departments during the decades immediately before and after World War II.[1]

The growth of applied ethics, starting in the 1960s and 1970s, began to remedy this neglect. Peter Singer's *Animal Liberation* was as much a challenge to philosophical ethics as it was to society's treatment of animals. Early writings in environmental ethics, medical ethics and other areas didn't just broaden the scope of acceptable topics in philosophical ethics, but also called into question the value of armchair ethical theorizing divorced from any sustained attempt to apply it to life's practical problems.

The further development of applied ethics since that time has been good for ethical philosophy in two ways. First, it has brought ethics back to its central issues—How should we live? How should we treat others?—and given useful guidance in answering these questions in particular areas of our lives. Singer's and Tom Regan's work has better prepared us to treat animals justly; Holmes Rolston's and Bryan Norton's work has better prepared us to manage natural areas to preserve the human and nonhuman values found within them. This is not to make any claims about how well people have followed these philosophers' advice! I do claim, however,

that we have better frameworks for thinking about such decisions and a fuller sense of what is at stake in them than we would have had without their work. Thanks to these philosophical efforts, we have the potential to choose more wisely and live morally better lives.

Second, the development of applied ethics has made it harder for "mainstream" ethicists to ramble on about highly general problems without relating them to real-world decisions about how people should live. Contemporary Kantianism is stronger because Christine Korsgaard (2004) feels compelled to address our treatment of animals. Contemporary eudaimonism is stronger because Martha Nussbaum (2000) applies Aristotelian insights to development ethics. Because of these efforts, we have a better understanding of the meanings of these particular theories and their strengths and weaknesses. We are beginning to recover a better understanding of the purpose of ethical theorizing and its natural limits, an understanding we could never have achieved in a thousand years of stand-alone meta-ethical theorizing.

So the growth of applied ethics has improved the quality of "mainstream" ("general theoretical") ethics. Today the discipline of philosophical ethics is much more diverse than fifty years ago, with lots of interesting work being done from various perspectives and at various levels of generality. What specifically can environmental ethicists bring to the current mix?

First, we bring our environmental concerns, which are worthy of discussion in their own right. With sober scientists seriously debating the likelihood of global ecological catastrophe if humanity continues on its present economic course, I think these concerns merit careful ethical examination. Second, in the course of addressing these concerns, environmental ethicists often challenge dogmas of mainstream ethics that, if not wrong, at least deserve serious scrutiny. These include the belief that human beings are all that matters in making ethical decisions; and that individuals, not larger wholes, should be our sole loci of value and concern. Third, as discussed above, environmental ethicists insist that ethics address practical issues. This continues to be a salutary message for the discipline.

In the past, environmental ethics, as a largely self-contained sub-discipline, provided this "relevance" message mostly indirectly. Ron Sandler's recent book on environmental virtue ethics, *Character and Environment*

(2007), is a fine example of how environmental ethicists can do this more directly. It gives mainstream ethicists what they require to recognize a work as "real philosophy"—first, a theory; second, sustained engagement with the theoretical preoccupations and main protagonists currently writing on virtue ethics. Because *Character and Environment* provides this, mainstream philosophers are more likely to engage with it than they have been with previous book-length treatments of environmental virtue ethics (Wensveen 2000, Cafaro 2004).

At the same time, Sandler challenges the mainstream, by reminding the theorists that they cannot ignore the practical implications of their theories:

> Ethical theories must be assessed on their theoretical and practical adequacy with respect to all aspects of the human ethical situation: personal, interpersonal, and environmental. To the extent that virtue-oriented ethical theory in general, and the version defended here in particular, provides a superior environmental ethic to other ethical theories, it is to be preferred over them not just as an environmental ethic but also as an ethical theory. (Sandler 2007, preface)

While I expect that many mainstream ethicists will continue writing footnotes on Kant, Mill, and Aristotle (or on McDowell, Brandt, and Foot: footnotes on footnotes), those ethicists who still remember the point of ethics hopefully will recognize the justness of Sandler's claim here and engage environmental ethics accordingly. They will be much more likely to do this, however, if we meet them halfway.

The benefits of engaging mainstream philosophical ethics flow both ways, as we can see again from *Character and Environment*. Through his sustained engagement with mainstream virtue theory, Sandler has brought new rigor to efforts to articulate an environmental virtue ethics. This has helped him push that work forward; regarding a fuller specification of environmental virtue, for example, or a clearer understanding of how virtue ethics can guide our environmental actions. Similar remarks on the mutual benefits of applied ethicists rigorously engaging ethical theory could be made regarding Dale Jamieson's (2003) work and utilitarianism, or James Sterba's (2004) work and general value theory.

In their initial development, environmental ethics and other areas of applied ethics probably benefitted from the benign neglect of our fellow philosophers. This allowed us to think freely and creatively about new

issues, rather than force discussion into then-acceptable categories. But now that the field has matured and mainstream ethics is more open to new issues and approaches, I think there is more room for integration. We (environmental ethicists) would benefit from theorists' skeptical critiques of our particular assertions; general theorists would benefit from broader notions of value and the challenge to relevance.

I'm haunted here by the vision of a richer, more integrated ethical philosophy. One that is saner, wiser and more useful. One that is less prone to barking after every metaphysical or epistemological puzzle that pops up and better able to keep its eyes on the prize: guidance for right living. I imagine a rich, supple way to speak about our choices in life, giving guidance and upholding our nobler ideals. An ethics which doesn't spend ninety percent of its time debating the merits of universalism versus relativism, or realism versus constructivism, but which instead helps us, our students and our societies better recognize real values in the world and think more intelligently about where we are going.

To be clear: I have no objection to philosophers devoting themselves to meta-ethical reflection, and I'm happy to consider what practical implications, if any, their insights may have for actual ethical questions. I just don't want to confuse ethics—the search for rational guidance regarding our practical decisions—with metaphysics, epistemology, or anything else. Nor is this a matter of keeping ethics pure from these other disciplines. I merely wish to keep ethics from disappearing, as it is wont to do—for instance, in introductory ethics classes.

Stephen Toulmin's (2003) writings on behalf of casuistry are suggestive in this regard; so are some recent pragmatist efforts. But more valuable than general accounts of what such an ethical philosophizing might look like are examples of the thing itself. Peter Singer's more recent, popular writings show one likely way forward. I'm thinking of *One World: The Ethics of Globalization* (2002) and *The President of Good and Evil* (2004), the latter of which relates President Bush's personal ethics to his administration's policy agenda. These works tackle important ethical and political questions, and engage the larger culture. They put philosophical distinctions to good use, but are never more theoretically sophisticated than they need to be. They are widely read, by philosophers and the general public, and I believe they help both groups think more clearly about these issues.

Starting from the other, "journalistic" end, for the past twenty years Bill McKibben has been writing exemplary popular environmental philosophy. While most environmentalists and environmental philosophers strenuously avoided the topic, he tackled population issues in *Maybe One: A Personal and Environmental Argument for Single-Child Families* (1998). His recent book *Deep Economy* (2007) argues that Americans can live better lives by consuming less and focusing instead on improving our relationships, building stronger communities, and connecting to the places where we live. Here and elsewhere, McKibben tries to show what *living* a strong environmental philosophy might look like and works to expand his readers' sense of the possible. He has done more, perhaps, than any credentialed environmental philosopher to bring the ideals many of us espouse to a wider public. Stephanie Mills provides another fine example of public environmental philosophy, in her book *Epicurean Simplicity* (2003).

I'd like to see more such popular, useful books. Environmental ethicists—working on important issues of wide public interest, often politically-engaged and knowledgeable about the public debates on these questions—are among the logical people to write them. Given the continued dominance of theory in the world of academic philosophy, such applied efforts can play an important role in testing our ethical theories in life (Appiah 2008). They can also widen their readers' spheres of ethical choice and improve the choices they make—the real payoff. If the insights of environmental ethicists are ever to make an important difference in the world, it will probably be through such popular efforts.

THE WAY FORWARD FOR ENVIRONMENTALISM

Let me turn now to my second organizing question: what is the way forward for environmentalism as a political movement? After all, most of us want to see environmental ethics contribute to environmentalism's practical success. Since many of my readers are Americans, I'll focus the discussion by asking: what is the way forward for American environmentalism?

Clearly environmentalism has stalled in the United States. I would say our last big victory, at the national level, was passing important revisions to the Clean Air Act back in 1990—over twenty years ago (US Congress 1990). On many key issues related to developing sustainable societies,

particularly those concerning reducing consumption, northern Europe has taken the lead. Even worse, America has been the main drag on international efforts to avert catastrophic global climate change, perhaps the most important environmental challenge of the 21ˢᵗ century.

The reasons for the premature senescence of American environmentalism are no doubt complicated (for one influential discussion, see Schellenberger and Nordhaus 2007). My own view is that a big part of our problem is that we have failed to identify and fully confront what is driving environmental destruction. Given that, we cannot hope to halt this destruction, no matter how many fine attitudes we strike, or how often we sound the alarm.

Studies such as the Millenium Ecosystem Assessment (Reid et al. 2005) and the 2007 assessment reports from the Intergovernmental Panel on Climate Change, state unequivocally: environmental destruction is driven primarily by economic and demographic growth. *More* people consuming *more* goods and services per capita generate *more* pollution. They use *more* land, *more* water and other resources, leaving *less* suitable habitat and *fewer* resources for other species (Czech 2002, Speth 2009). Every major environmental problem around the world is driven primarily by human economic and demographic growth.

In the case of global climate change, the recent "Mitigation" report from the International Panel on Climate Change (IPCC) states this clearly: "GDP/per capita and population growth were the main drivers of the increase in global emissions during the last three decades of the 20th century…. At the global scale, declining carbon and energy intensities have been unable to offset income effects and population growth and, consequently, carbon emissions have risen" (IPCC 2007a, 107). Here are the numbers, again from the IPCC:

> The global average growth rate of CO_2 emissions between 1970 and 2004 of 1.9% per year is the result of the following annual growth rates:
>> population +1.6%,
>> GDP/per capita +1.8%,
>> energy-intensity (total primary energy supply (TPES) per unit of GDP) –1.2%,
>> and carbon-intensity (CO2 emissions per unit of TPES) –0.2%. (Ibid.)

Crucially, the IPCC's projections for the next three decades see a continu-

ation of these trends. More people living more affluently means that despite technical improvements in efficiency, greenhouse gas emissions will continue to rise.

Preventing catastrophic global climate change (sufficiently "mitigating" it, in the IPCC's terminology) therefore almost certainly depends on ending human population growth and either ending economic growth or radically transforming it, so that *some* economic growth in *some* sectors of the modern economy can be accommodated without radically destabilizing Earth's climate. All the technofixes we can muster will probably be necessary to enable this transition to a post-growth future—not as an alternative to it (Cafaro 2011). By and large, however, Americans can't even imagine such a future, much less rationally consider whether it might be required by morality or prudence.

For Americans, economic growth is not one goal among many, or a byproduct of some more fundamental goal. It is the primary goal of our society, organizing much of our activity, individually and collectively. Every major-party candidate for President, for at least the past eighty years, has run on a pro-economic growth platform. Every major-party candidate for Congress in 2008 and 2010 did likewise. One hundred and sixty three billion dollars in advertising were directed at the American public in 2006—almost half the total world advertising budget—in order to keep Americans consuming at high levels (World Advertising Research Center 2007). We have harnessed science to ever more intimately manipulate nature, in order to create new products to consume.

In the face of this vast system in the service of economic growth, environmentalism is a puny force indeed. The wonder is not that it has accomplished so little, but that it has accomplished anything at all.

In order for environmentalists to win our important battles—not just lose a little more slowly, but win—we must end the endless growth economy as we know it. Among other things, it appears to me this will have to involve:

- An acceptance of "slow growth" and "no growth" areas of the economy (Daly and Cobb 1989, Hardin 1993, Daly 2007).
- Curtailing some economic freedom (you *will* recycle, whether you want to or not; you will *not* be able to buy a Hummer, no matter how much money you have).

- Stabilizing and then decreasing human populations; hence, in America, a reduction in current immigration levels (Cafaro and Staples 2009).[2]
- American environmentalists will have to defeat the ideology of "growthism" in the marketplace of ideas, including the belief that increased wealth and economic activity are good in themselves, or even the chief goods in life. We will have to combat the common view that economic growth is necessary for moral progress (Friedman 2006, McClosky 2006). Above all, we will have to propose a plausible, appealing alternative to a society organized around endless economic growth.

These are daunting challenges; perhaps they will prove impossible to meet. But it seems to me that they are the challenges before us. If we fail to take them up, environmentalists concede defeat in advance on every cause we hold dear.

Such societal changes might sound impossible, but if so, we need to ask why they sound impossible. After all, accepting economic and demographic limits is certainly possible for *individuals*. Me, for instance. I have two children—replacement rate—and I don't expect to ever make much more money than I do right now. But I'm no saint. If I can accept these limits with equanimity, I don't see why most people, or peoples, can't do the same. After all, in most places for most of human history, such acceptance must have been the norm.

Moreover, we can point to whole nations which are much closer to a sane view of growth than we are in the United States.[3] France, for example, whose citizens work less, eat better (but are less fat), and generally enjoy life more than Americans do. Or Norway, which, in the midst of pumping its North Sea oil bonanza, maintains some of the highest gasoline prices in the world, and which has done more to reduce greenhouse gas emissions than most other countries.

These are nations of grownups. Their existence suggests that Americans, too, may one day grow up and put economics in its proper place in our lives. Obviously, a lot will have to change for this to occur. But my contention is that such a fundamental economic reorientation must occur, or environmentalism is a dead letter. Americans will never preserve

generous amounts of our remaining wildlife habitat, or do our part to meet the challenge of global warming, or achieve any other important environmental goals, in the context of ever more people consuming ever more stuff. It just won't happen. The same holds true for other nations, and at the global level.

THE WAY FORWARD FOR ENVIRONMENTAL PHILOSOPHY

Given the foregoing, a primary goal of environmental philosophy should be to help individuals live economically sane lives and encourage contemporary industrial societies to make the transition to post-growth economies. So far, environmental philosophers have contributed relatively little to such efforts, but we are well-placed to do so. After all, as philosophers, we are heirs to a long tradition of advocating non-materialistic conceptions of the good life, putting economics in its proper place, and showing how these two efforts are necessarily intertwined.

Consider Aristotle, on the proper place of economic activity in a complete human life:

> With expertise in business there is no limit with respect to the end, [which] is wealth and possession of goods. But of expertise in household management (*oikonomia*) as distinguished from expertise in business there *is* a limit, for that is not the work of expertise in household management…. Some hold that [business expertise] is [true] expertise in economy (*oikonomia*), and they proceed on the supposition that they should either preserve or increase without limit their property in money. The cause of this state is that they are serious about living, but not about living well; and since that desire of theirs is without limit, they also desire what is productive of unlimited things. (*Politics*, book 1, chapter 9*)*

Here as elsewhere in Aristotle's practical writings, we find the notion that economic consumption and the pursuit of wealth have clear limits, set not by the exigencies of "the economy," but grounded rather in the pursuit of human flourishing.[4] Aristotle clearly believes that getting right on economic matters is one key to living well. We need sufficient material resources to provide for our wellbeing, but also temperance to use such resources wisely, and justice and generosity to share them and maximize their benefits to ourselves and to others.

Similar discussions on the proper roles of wealth, work, consumption

and other key economic matters are found among all the leading schools of ancient ethical thought, East as well as West. Here is Epicurus:

> Natural wealth is both limited and easy to acquire. But wealth as defined by groundless opinions extends without limit. (*Principle Doctrines*, maxim XV)

> Becoming accustomed to simple, not extravagant, ways of life makes one completely healthy, makes man unhesistant in the face of life's necessary duties, puts us in a better condition for the times of extravagance which occasionally come along, and makes us fearless in the face of chance. So when we say that pleasure is the goal we do not mean the pleasures of the profligate or the pleasures of consumption, as some believe. ("Letter to Menoeceus")

And here is Seneca, on many issues so opposed to Epicurus, but not in this:

> In the case of human beings, it is wholly beside the point how much land they have under plough, how much money they have invested, how many people pay their respects, how expensive are their couches or translucent their cups, but how good they are. ("Letters to Lucilius," letter 79)

> Luxury has turned her back on nature, daily urging herself on and growing through all the centuries, pressing men's intelligence into the development of the vices. (letter 79)

> The life that is happy is in harmony with its own nature. This can only come about when the mind is in a healthy state and in permanent possession of its own sanity, robust and vigorous, capable of the noblest endurance, responsive to circumstances, concerned for the body and all that affects it but not to the point of anxiety, conscientious about the other accoutrements of life without being too enamored of any one thing, ready to make use of the gifts of fortune without being enslaved by them. (letter 90)

Recent scholarship on Hellenistic ethics has tended to ignore such passages (for example Nussbaum 1994, Striker 1996, Becker 1998, Long 2006). Anciently, such economic views were seen as central to these ethical philosophies, as shown in their prominence and the care with which they were debated. Grappling successfully with economic issues was seen, correctly, as central to living a good life.

This general approach to economics was taken up and further developed in the Christian philosophical tradition:

> External riches are necessary for the good of virtue: since by them we support the body, and help others…. Now, things directed to an end, must take their measure from the exigency of the end. Wherefore riches are good forasmuch as they serve the use of virtue: and if this measure be exceeded, so that they hinder the practice of virtue, they are no longer to be reckoned as a good but as an evil. (Thomas Aquinas, *Summa Contra Gentiles*, chapter CXXXIII)

Such views gained much of their authority, of course, from the many clear statements on the unimportance of wealth and the dangers of mammon-worship repeated throughout the Gospels. Appealing to such passages is one way to try to sway believing Christians to support progressive environmental and economic policies.

Similar quotations from the tradition could be multiplied many times over.[5] And when we shift focus from the anthropocentrism/non-anthropocentrism divide to economic matters, note how easy the transition to modern *environmental* philosophers. Here is Henry Thoreau:

> Most men appear never to have considered what a house is, and are actually though needlessly poor all their lives because they think that they must have such a one as their neighbors have…. It is possible to invent a house still more convenient and luxurious than we have, which yet all would admit that man could not afford to pay for. Shall we always study to obtain more of these things, and not sometimes to be content with less? (Thoreau 1971, 35-36)

> When [a person] has obtained those things which are necessary to life, there is another alternative than to obtain the superfluities; and that is, to adventure on life now, his vacation from humbler toil having commenced. The soil, it appears, is suited to the seed, for it has sent its radicle downward, and it may now send its shoot upward also with confidence. Why has man rooted himself thus firmly in the earth, but that he may rise in the same proportion into the heavens above? (Thoreau 1971, 15)

> There is no more fatal blunderer than he who consumes the greater part of his life getting his living. (Thoreau 1973, 160)

And here is Aldo Leopold:

> The whole world is so greedy for more bathtubs that it has lost the stability necessary to build them, or even to turn off the tap. Nothing could be more salutary at this stage than a little healthy contempt for a plethora of material blessings. (Leopold 1949, xix)

> The 'key-log' which must be moved to release the evolutionary process for a land ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and aesthetically right, as well as what is economically expedient. 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. (Leopold 1949, 262)

Considering our tradition, philosophers seem particularly well-placed to lead the push for putting economics in its proper, limited place, and hence toward ecological sanity. These two efforts are really one, to a degree that perhaps has not yet been sufficiently appreciated. In addition to those efforts already mentioned, the push toward economic and ecological good sense should include:

- Puncturing the ideology of "growthism," in part by laying it out fully, along with all its ugly ramifications. For example, if economic growth commits humanity to continuing to cause Earth's sixth mass extinction, then that should be part of the discussion of whether or not to continue to grow economically. One can read the full Millennium Ecosystem Assessment (Reid et al. 2005) and never find an explicit explanation for why its authors—many of them biologists!—don't consider any future scenarios in which humanity does not extinguish a large percentage of the world's species. In discussing this failure with several of the MEA's authors, the reason appeared to be that they couldn't imagine a future without endless economic growth. Here is proof that this failure of economic imagination severely limits our ability to imagine a sustainable future.
- Specifying alternative visions of flourishing human lives and societies based on the full development of our human capabilities, rather than on ever-increasing wealth (Cafaro 2001, Gambrel and Cafaro 2010). Here philosophers can link up with some very interesting work being done by positive psychologists like Tim Kasser (2003), Richard Layard (2005) and Ed Diener (Diener and Biswas-Diener 2008), who have marshaled impressive empirical evidence that a material-

istic approach to life undermines human health and well-being. Environmental philosophers should know and use this work. It helps make the case that much growth-fueled environmental degradation does not improve people's lives, even in the short-term, and hence could be done away with relatively painlessly (Andreou 2009). It also suggests the rudiments of an appealing human future which does not overwhelm the rest of creation.

- Spelling out the proper role of economic activity (necessary, but limited) in living good lives and creating good societies. The goal is not to de-emphasize economics, but to give it the attention it deserves—and no more. For as Henry Thoreau wrote in the first chapter of *Walden* (titled "Economy"): "Economics is a subject that can be treated with levity, but it cannot so be disposed of" (Thoreau 1971, 29). Most of us living in the overdeveloped world are wealthy enough today to treat economic matters with appropriate "levity," in both of Thoreau's senses. First, by not taking them too seriously; for example, not assuming that anything very important hangs on whether the Dow Jones Index goes up or down today. Second, by using our economic resources and activities as springboards to achieve higher goals, and engage in more important activities.

- Explaining the essential, irreplaceable role preserving nature plays in enabling human flourishing. This must include a full account of natural values, from the life-support values provided by basic ecosystem services to the scientific, aesthetic and spiritual opportunities provided by wild nature (Rolston 1986).

- Identifying the kinds of character traits we will need to possess in order to achieve sustainable societies and flourish within them (see Cafaro and Sandler 2010, for recent work along these lines). Also, exploring how best to cultivate these ecological virtues in ourselves and our children. Here again, much valuable empirical work has been done by positive psychologists investigating virtues such as temperance and gratitude (see Peterson and Seligman 2004, for a recent overview).

Such efforts will involve plenty of hard, yet exciting, academic work. In addition, I'd like to see environmental philosophers explore these issues in as many arenas as possible—scholarly books and papers, but also popular books and magazine articles, radio talk-shows, newspaper op-ed pieces, all our classes (not just environmental ethics classes), League of Women Voters panel discussions, Rotary Club meetings, county Democratic and Republican party committee meetings, and more.

Developing and advocating a sane, alternative economic vision centered on the attempt to live good lives will help environmental philosophers keep our own work relevant and focused. We are academic philosophers, after all, prone to the disciplinary sins of chasing after tangents and logic-chopping. I submit that this post-growth, pro-life economic message is one our own societies very much need to hear.

It also appears to be the necessary complement to some of the strongest scholarly work we have done so far. I think that Holmes Rolston (1988), Nicholas Agar (2001) and others have made the best case possible for nature's intrinsic value. Combining this with the best case possible for a non-materialistic conception of the good life will, it seems to me, provide the strongest philosophical justification for environmental protection and sustainability. In combination, this one-two punch both highlights the need to preserve wild nature and undermines the justification for ever more economic development. It brings together altruism and self-interest, "Christian self-abnegation and pagan self-assertion" (Mill 1859, 112), in order to help save that nature which we all love. And this effort, of course, lies at the heart of environmental ethics.

COMMITTING TO PHILOSOPHY

Let me close with a final immodest suggestion to my fellow environmental ethicists. It is that we more fully commit ourselves to *living* our environmental philosophies—and to better integrating our practical efforts with our philosophizing. I think this will make us more effective environmentalists and better philosophers.

In a recent article titled "Environmental Virtue Ethics," Rosalind Hursthouse makes the case for an approach to environmental ethics which links an appreciation for nature itself, a concern for human flourishing, and environmental protection. She goes on to ask:

Suppose that being rightly oriented to nature is pre-eminently the rel-

evant [environmental] virtue. This virtue is not a character trait we see manifested by any academic philosophers who, inevitably, lead lives of standard Western, materialistic comfort, driving to shop at their supermarkets, buying new clothes, listening to opera on their CD players, dining in restaurants, writing their books and articles on computers, jetting to international conferences to present their views on environmental ethics, and teaching them to their students in large, land-occupying buildings. (Hursthouse 2007, 168)

What we need, Hursthouse goes on, are good environmental exemplars. But she sees none to hand and pins her hopes squarely on the future. "The very next generation may start to show us the way," she writes. "It may be that [our children] will choose to live in ways rather different from our ways, and that *their* children will choose to live in *very* different ones" (170).

Yes, all this may happen. It is devoutly to be wished. But then again, the little stinkers may not come through. They are more likely to come through, it seems to me, if we do all we can to set them good examples. So my suggestion is that *we* make the effort to lead exemplary lives.

Not only will this help us raise better children, it will also make us more effective teachers. Over the years, I have had countless students tell me that they took my environmental ethics class more seriously because they saw me riding my bicycle to school. Now perhaps when they say this, I should explain that the *ad hominem* fallacy remains a fallacy even when it is deployed favorably (also, that I don't live very far from the university). But I don't. I think my students are right to see some kind of connection between how I behave and how seriously they should take environmental ethics. I think the real fallacy, the real contradiction, comes in saying "these things are important" and living an average American life.

Students respond positively when I discuss the practical environmental decisions my wife and I have made, such as what kind of furnace to put in our house, or whether to buy a second car. Even though we aren't environmental saints, by any means, the fact that we are (sometimes) willing to put our money where our mouths are makes an impression. Our compromises and failures, too, are grist for the debating mill. Discussing them reassures students. "Yes, it is hard to do the right thing. It takes time, effort and money. But it is worth making the attempt. At least, here is an authority figure who thinks so, and who feels its importance enough to be ashamed of his failures and proud of his successes."

So there is practical value in wedding theory to practice. But I also think it has theoretical value, because engaged practice is an important avenue for achieving ethical knowledge (Dewey 1948, Appiah 2008). Here, once again, I'm getting into deep philosophical waters, without a clear sense of where the shore lies. Yet it seems to me that ethical truth is found, ultimately, in life, not in words; or perhaps, in that area of interpreted life that we call "experience."

There is ethical truth in Holmes Rolston's article "Can and Ought We Follow Nature?" (Rolston 1986); his careful analysis of the different things we mean when we speak of "following nature" and when it might be appropriate ethical advice. But there is also ethical truth to be found, by each of us, in trying to follow nature, or know nature, or "live in harmony" with nature, ourselves. That is why Henry Thoreau went to live by the pond; and why he had something useful to say when he came back; and why we can't be sure, really, which is the good advice and which is the nonsense in *Walden*, just by reading his book. Thoreau's suggestions, like Rolston's suggestions, need to be tried in life (for further discussion of Thoreau's own experimental approach to ethics, see Cafaro 2004, 222–26).

When John Stuart Mill, in *On Liberty* (1859), insists that society provide the widest possible scope for "experiments in living," he does this partly to facilitate the finding of ethical truth; in particular, the truth about which really *are* the best human lives: the happiest, most fulfilling, most emotionally satisfying and rationally justifiable. Rosalind Hursthouse (2007) suggests, plausibly, that we will need to live radically different lives if we hope to avoid ecological disaster. Evidence for this conclusion accumulates steadily (Reid et al. 2005, IPCC 2007b). From both theoretical and practical perspectives, then, the need for experiments in living seems clear.

But who better than environmental philosophers—lovers of wisdom *and* of nature—to conduct such experiments? Who should be more inspired to undertake them, or better able to report their results? If not us, who? If not now, when?

It's important to realize that Hursthouse is mistaken when she writes: "[environmental] virtue is not a character trait we see manifested by *any* academic philosophers who, *inevitably*, lead lives of standard Western, materialistic comfort" (emphases added). First, that word 'inevitably'

needs to go. It is too convenient. If we environmental philosophers are lazy hypocrites, such sloth and hypocrisy are not inevitable. We *can* lead more environmentally responsible lives, if we choose to do so.

Second, we should replace "*any* academic philosophers" with "*most* academic philosophers," since there are in fact philosophers who walk their talk; if not always, then often and seriously enough to make a difference. I know a philosopher, living in a big city, the father of two young children, who committed to not driving his car for any trips within a ten mile radius of his house (walking or bicycling only). We should all be interested in the results of his experiment. I know other environmental philosophers who have sworn off all air travel (well, almost all); others, formerly devoted carnivores, who have become vegetarians; another who took a semester off to work to elect a green political candidate.

Then there is Holmes Rolston, who used the money he received for winning the Templeton Prize for Progress Toward Research or Discoveries about Spiritual Realities in 2003 to endow a chair in philosophy at Davidson College, his *alma mater*. I could multiply examples of Rolston's temperance, frugality, justice and generosity, and his many efforts on behalf of environmental protection and other good causes. But my main point is simply that he provides a great example of someone *living* a philosophical life (Preston 2009): a life dedicated to the pursuit of knowledge and right living, and their harmonious integration; a life which puts economics in its proper place. Holmes Rolston's life is itself an argument for the truth of his environmental philosophy. And so could yours be, or mine, if we lived our lives as we should live them.

NOTES

1 One reviewer of this essay suggests, plausibly, that a similar skewing occurred in metaphysics, epistemology and other areas of philosophy during this same time. He writes: "the normative [and descriptive] side of philosophy generally receded during the first half of the last century," with a corresponding emphasis on meta-reflection.

2 Canada, Australia, France, the United Kingdom and other developed countries face a similar choice, between continuing high immigration levels or stabilizing their populations. Environmentalists in the U.K. and Australia are much further along in addressing this issue than their counterparts in the U.S. For example, recently a leading Australian environmental group formally nominated population growth as a "key threatening process" to Australian biodiversity under the country's Environment Protection and Biodiversity Conservation Act. See Australian Conservation Foundation (2010).

3 Closer to a sane view, but not, I think, completely sane. Northern European nations have done a better job than the United States of setting economic policy so as to further their inhabitants' happiness; they also consume fewer resources and generate less pollution per capita. In these ways, they are closer to creating sustainable societies. But they are still far from living within their ecological means, or from ending their dependence on continued economic growth. In addition, European populations remain extremely dense, and Europeans long ago reduced their continent's biodiversity to a pathetic, highly-managed remnant of what it once was. For these reasons, it may be doubted whether generous sustainability, meaning an economic order that sets aside fair resources for other species, is even possible in most European countries.

4 How could I have studied Aristotle's ethics for a full semester, with one of the leading Aristotle scholars in the world, without ever discussing this passage? The answer, I suppose, is that my professor viewed "ethics" as a place to exhibit scholarly rigor and engage in intellectual puzzle-solving, rather than a place to search for practical guidance in meeting the main contemporary challenges to living well. That our classroom practice contradicted Aristotle's own view of the purpose of ethics (*Ethics*, book 2, chapter 2) was passed over in silence.

5 I think there is an alternative history to be told about philosophical ethics, as a series of answers to the question: how should we live our economic lives?

REFERENCES

Agar, Nicholas. 2001. *Life's Intrinsic Value: Science, Ethics, and Nature*. New York: Columbia University Press.

Andreou, Chrisoula. 2009. "A Shallow Route to Environmentally Friendly Happiness: Why Evidence That We Are Shallow Materialists Need Not Be Bad News for the Environment(alist)." *Ethics, Place & Environment* 13: 1–10.

Appiah, Kwame. 2008. *Experiments in Ethics*. Cambridge: Harvard University Press.

Aristotle. 1985. *The Politics*. Translated by Carnes Lord. Chicago: University of Chicago Press.

Aquinas, Thomas. 1974. *Summa Contra Gentiles*. Translated by A.C. Pegis. Notre Dame, IN: University of Notre Dame Press.

Australian Conservation Foundation. 2010. "Population growth a threat to biodiversity." News release, March 23, 2010. Accessed February 18, 2011 at www.acfonline.org.au/articles/news.asp?news_id=2749.

Becker, Lawrence. 1998. *A New Stoicism*. Princeton: Princeton University Press.

Cafaro, Philip. 2001. "Economic Consumption, Pleasure and the Good Life." *Journal of Social Philosophy* 32: 471–86.

———. 2004. *Thoreau's Living Ethics: Walden and the Pursuit of Virtue*. Athens, GA: University of Georgia Press.

———. 2011. "Beyond Business as Usual: Alternative Wedges to Avoid Catastrophic Climate Change and Create Sustainable Societies." In *The Ethics of Global Climate Change*, edited by Denis Arnold, 192–215. Cambridge, UK: Cambridge University Press.

Cafaro, Philip, and Winthrop Staples. 2009. "The Environmental Argument for Reducing Immigration into the United States." *Environmental Ethics* 31: 3–28.

Cafaro, Philip and Ronald Sandler (eds.). 2010. *Virtue Ethics and the Environment*. Dordrecht, Netherlands: Springer-Verlag Press.

Czech, Brian. 2002. *Shoveling Fuel for a Runaway Train: Errant Economists, Shameful Spenders, and a Plan to Stop them All*. Berkeley: University of California Press.

Daly, Herman. 2007. *Ecological Economics and Sustainable Development: Selected Essays of Herman Daly*. Cheltenham, UK: Edward Elgar.

Daly, Herman, and John Cobb. 1989. *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future*. Boston: Beacon Press.

Dewey, John. 1948. *Reconstruction in Philosophy*. Boston: Beacon Press.

Diener, Ed, and Robert Biswas-Diener. 2008. *Happiness: Unlocking the Mysteries of Psychological Wealth*. New York: Wiley-Blackwell.

Epicurus. 1993. *The Essential Epicurus: Letters, Principal Doctrines, Vatican Sayings, and Fragments*. Translated by Michael O'Connor. Amherst, NY: Prometheus Books.

Friedman, Benjamin. 2006. *The Moral Consequences of Economic Growth*. New York: Vintage Press.

Gambrel, Josh, and Philip Cafaro. 2010. "The Virtue of Simplicity." *Journal of Agricultural and Environmental Ethics* 23: 85–108.

Hardin, Garrett. 1993. *Living Within Limits: Ecology, Economics, and Population Taboos*. New York: Oxford University Press.

Hursthouse, Rosalind. 2007. "Environmental Virtue Ethics." In *Working Virtue: Virtue Ethics and Contemporary Moral Problems,* edited by Rebecca Walker and Philip Ivanhoe (eds.), pages 155–71. Oxford: Oxford University Press.

Intergovernmental Panel on Climate Change (IPCC). 2007a. "Technical Summary." In: *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: IPCC.

———. 2007b. *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: IPCC.

Jamieson, Dale. 2003. *Morality's Progress: Essays on Humans, Other Animals, and the Rest of Nature*. New York: Oxford University Press.

Kasser, Tim. 2003. *The High Price of Materialism*. Cambridge: MIT Press.

Korsgaard, Christine. 2004. "Fellow Creatures: Kantian Ethics and Our Duties to Animals." Delivered as the Tanner Lecture on Human Values at the University of Michigan, Ann Arbor, February 6, 2004.

Layard, Richard. 2005. *Happiness: Lessons from a New Science*. New York: Penguin.

Leopold, Aldo. 1970. *A Sand County Almanac: with Essays on Conservation from Round River*. New York: Ballantine Books.

Long, A.A. 2006. *From Epicurus to Epictetus: Studies in Hellenistic and Roman Philosophy.* Oxford, UK: Oxford University Press.

McClosky, Deirdre. 2006. *The Bourgeois Virtues: Ethics for an Age of Commerce*. Chicago: University of Chicago Press.

McKibben, Bill. 1998. *Maybe One: A Personal and Environmental Argument for Single Child Families*. New York: Simon and Schuster.

———. 2007. *Deep Economy: The Wealth of Communities and the Durable Future*. New York: Henry Holt.

Mill, John Stuart. 1859. *On Liberty*. London: John Parker and Son Publishers.

Mills, Stephanie. 2003. *Epicurean Simplicity*. Washington, DC: Island Press.

Nussbaum, Martha. 1994. *The Therapy of Desire: Theory and Practice in Hellenistic Ethics*. Princeton: Princeton University Press.

———. 2000. *Women and Human Development*. Cambridge, UK: Cambridge University Press.

Peterson, Christopher, and Martin Seligman. 2004. *Character, Strengths and Virtues: A Handbook and Classification*. New York: Oxford University Press.

Preston, Christopher. 2009. *Saving Creation: Nature and Faith in the Life of Holmes Rolston III*. San Antonio: Trinity University Press.

Reid, Walter, Harold Mooney, Angela Cropper, Doris Capistrano, Stephen Carpenter, Kanchan Chopra, Partha Dasgupta, Thomas Dietz, Anantha Kumar Du-

raiappah, Rashid Hassan, Roger Kasperson, Rik Leemans, Robert May, Tony McMichael, Prabhu Pingali, Cristián Samper, Robert Scholes, Robert Watson, A.H. Zakri, Zhao Shidong, Neville Ash, Elena Bennett, Pushpam Kumar, Marcus Lee, Ciara Raudsepp-Hearne, Henk Simons, Jillian Thonell and Monika B. Zurek. 2005. *The Millennium Ecosystem Assessment: Ecosystems and Human Well-being: Synthesis*. Washington, DC: Island Press.

Rolston, Holmes. 1986. *Philosophy Gone Wild*. Amherst, NY: Prometheus Books.

———. 1988. *Environmental Ethics: Duties to and Values in the Natural World*. Philadelphia: Temple University Press.

Sandler, Ron. 2007. *Character and Environment: A Virtue-Oriented Approach to Environmental Ethics*. New York: Columbia University Press.

Schellenberger, Michael and Ted Nordhaus. 2007. *Breakthrough: From the Death of Environmentalism to the Politics of Possibility*. New York: Houghton Mifflin.

Seneca. 1970. *The Epistles of Seneca*. Cambridge: Harvard University Press.

Singer, Peter. 2002. *One World: The Ethics of Globalization*. New Haven: Yale University Press.

———. 2004. *The President of Good and Evil: Questioning the Ethics of George W. Bush*. New York: Plume Books.

Speth, Gustave. 2009 *The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability*. New Haven: Yale University Press.

Sterba, James. 2004. *The Triumph of Practice over Theory in Ethics*. New York: Oxford University Press.

Striker, Gisela. 1996. *Essays on Hellenistic Epistemology and Ethics*. Cambridge, UK: Cambridge University Press.

Thoreau, Henry. 1973. *Reform Papers*. Princeton: Princeton University Press.

Thoreau, Henry. 1971 [1853]. *Walden*. Princeton: Princeton University Press.

Toulmin, Stephen. 2003. *The Uses of Argument*. Cambridge, UK: Cambridge University Press.

U.S. Congress. 1990. *Clean Air Act Amendments of 1990*. Senate Bill 1630.

Wensveen, Louke van. 2000. *Dirty Virtues: The Emergence of Ecological Virtue Ethics*. Amherst, NY: Humanity Press.

World Advertising Research Center. 2007. "World Advertising Trends: Ad Spending by Country." Accessed September 2008, www.warc.com.

IJfab

INTERNATIONAL JOURNAL OF FEMINIST APPROACHES TO BIOETHICS

"... the journal's vivid descriptions bring theory to life."*

*http://www.libraryjournal.com

. . . provides a forum within bioethics for feminist thought and debate.

EDITED BY MARY C. RAWLINSON

The *International Journal of Feminist Approaches to Bioethics (IJFAB)* provides a forum within bioethics for feminist thought and debate. Sponsored by the International Network on Feminist Approaches to Bioethics, *IJFAB* includes feminist scholarship on ethical issues related to health, health care, and the biomedical sciences. *IJFAB* aims to demonstrate clearly the necessity and distinctive contributions of feminist scholarship to bioethics.

SUBSCRIBE   http://www.jstor.org/r/iupress

For more information on Indiana University Press
http://www.iupress.indiana.edu

STOR

INDIANA UNIVERSITY PRESS
INDIANA UNIVERSITY

IUP/*Journals*

601 North Morton Street, Bloomington, Indiana 47404-3797 USA

ETHICAL RESPONSE TO CLIMATE CHANGE

DENNIS PATRICK O'HARA
AND ALAN ABELSOHN

The attitudes that have contributed to climate change are the same attitudes that are retarding an adequate ethical response to that crisis. With a growing understanding of the planet as a self-contained and evolving ecosystem, we realize that we are derivative from and inescapably dependent upon Earth's ecological systems, that it is not possible to have healthy humans on a sick planet. Putting the health of the planet in peril endangers our own survival. While this new awareness encourages a less anthropocentric and more Earth-friendly human culture, vestiges of the thinking that created climate change continue to guide most of our responses to this global problem. This paper will consider ethical principles that might guide effective responses to climate change as well as certain responses to that crisis that are either misguided or inadequate.

The same attitudes that allowed a significant increase in the anthropogenic greenhouse gas (GHG) concentrations that are causing climate change are the same attitudes that are retarding an adequate ethical response to the impact that climate change is having on both human populations and the rest of the planet. The industrialized nations of the West paid little attention during the past three centuries to the impacts that their economies and cultures were having on the environment, both locally and globally. There was an underlying belief that the planet could indefinitely absorb the wastes of manufacturing, and the natural resources that were

fuelling industrialization were seemingly endless if not actually infinite. But with a growing understanding of both evolution and the planet as a self-contained ecosystem, we have begun to realize that we are derivative from and inescapably dependent upon the ecological systems of the planet. We are recognizing that it is not possible to have healthy humans on a sick planet. To put the health of the planet in peril is to subsequently endanger our own survival.

Yet, while this new awareness heralds an understanding of human culture that can purportedly be less anthropocentric and more Earth friendly, the vestiges of the same thinking that created the crisis of climate change still continue to guide most of our responses to this global problem. Even today, we continue to reject actions that favor the health of the planet if these entail a cost to our own national economies as if we and our economies could survive on a devastated planet. Since we need to understand and correct the global impact of our local actions, we cannot rely on the attitudes and ethics that allowed for the creation of the problem. Since we need to address a planetary problem, we need ethical principles that guide not only our local but also our global responses to climate change. Furthermore, we need a better understanding of the magnitude and dimensions of the problem. Accordingly, this paper will consider the ethical principles that might guide an effective response to climate change as well as certain responses that are either misguided or inadequate. It will consider the impact of climate change on human health so that we can better understand the scope and severity of the crisis.

ETHICAL PRINCIPLES TO GUIDE A RESPONSE TO CLIMATE CHANGE

In 2000, in what was considered a conservative study, excluding many of the more indirect effects of climate change on health, climate change "was estimated to have caused 150,000 deaths and 5.5 million DALYs [disability adjusted life years]" (World Health Organization [WHO] 2003, 31). The majority of these effects are being felt in developing countries, due to increasing incidence of diarrhea, malaria and malnutrition (McMichael 2004). As the effects of climate change continue to grow, the incidence of death and disease have likely increased from the levels of 2000 (Intergovernmental Panel on Climate Change, Working Group II [IPCC WGII] 2007). In fact, in a recent report by the Global Humanitarian Forum, Kofi

Annan stresses that climate change is "the greatest emerging humanitarian challenge of our times" (Global Humanitarian Forum 2009, 2). The report estimates that over 300,000 lives are lost each year due to climate change, with the annual death toll estimated to reach 500,000 by 2030, and that "climate change today seriously impacts on the lives of 325 million people" (Global Humanitarian Forum 2009, 9, 11, 13). Due to indirect effects, climate change not only threatens each person's fundamental and inalienable "right to life, liberty, and personal security" as guaranteed by the Universal Declaration of Human Rights (United Nations 1948, Article 3), it is already responsible for considerable death and enormous hardship. The factors that cause climate change, and the efforts to both mitigate and adapt to it, raise ethical issues that require ethical responses.

Four principles central to a discussion of an ethical response to climate change are:

1. the principle of non-maleficence, sometimes stated as *primum non nocere* (firstly, do no harm);
2. the principle of equity;
3. the principle of retributive and distributive justice;
4. the principle of free and informed consent.

These four principles will be applied to the issue of climate change and coupled with a less anthropocentric and more ecocentric perspective on ecosystem health in order to provide ethical challenges to four excuses commonly proclaimed by Western governments in order to delay effective responses to climate change, viz.:

1. reducing GHG production will significantly harm a nation's economy;
2. while uncertainty about climate change continues to exist, it is more prudent to delay any response;
3. until all governments agree on targets and goals for GHG emissions there is no obligation to act, or at the very least, it is strategically imprudent to do so;
4. since future technologies will more effectively resolve the climate change issue, it is best to wait for technological fixes to arrive before acting.

1. The Principle of Non-Maleficence: Primum non nocere (firstly, do no harm)

The notion that each person has a fundamental and primary obligation to avoid doing harm to others was recalled in the 1992 Rio Declaration on Environment and Development. This declaration stated that while states may develop their own resources for their own benefit, they also had "the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction" (United Nations 1992a, Principle 2). In that same year, the nations who ratified the United Nations Framework Convention on Climate Change (UNFCCC) agreed to the "stabilization of green house gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (United Nations 1992b, Article 2). The signatories to these agreements not only reaffirmed the universal moral norm that we are obliged to act in ways that are not harmful to other people, but they also agreed to act in ways that were not harmful to the Earth's ecosystems, and this duty of non-maleficence was recognized as owing to both current and future generations (United Nations 1992a, Principle 3; 1992b, Article 3).[1]

2. The Principles of Equity and Distributive Justice

The principle of equity and the principle of distributive justice are closely related. Both deal with the fair and just distribution of benefits and burdens within a society, and both can be the subject of many complex and subtle distinctions. For our purposes, they will be considered together.

The principle of equity is often associated with Aristotle's principle of formal equality which can be summarized as "treat equals equally and unequals unequally" (Beauchamp and Childress 2001, 227). For instance, all things being the same, if two people are equally in need of food, then an equal distribution of food to each person would be fair. On the other hand, if two people have a different need for food, it would generally be assumed that it would be fair to give the person with the greater need the greater share of the food, especially if this could be done without harming the other person. Furthermore, if it is accepted that all people are equal, then it can generally be said that all people have an equal claim on that

which is held in common; none should enjoy a disproportionate share especially if this inequitable distribution would either deny others their fair share or place a burden on them. A sense of fair play also dictates that those who create a problem should be held responsible for rectifying the problem while the innocent should not suffer so that others may prosper at their expense (Beauchamp and Childress 2001, 226–30, 234–9). These common ethical maxims inform two approaches for dealing with the equity and justice issues associated with climate change, namely, the contraction and convergence approach, and the greenhouse development rights framework approach.

Recalling that there is only one planetary atmosphere held in common, and that the atmospheric commons has a limited carrying capacity for GHGs above which the consequent rise in global temperature would wreak ecological havoc, it can be argued that all people have a right to an equal but limited portion of the Earth's ability to absorb GHGs (Baer et al 2000, 2287) or, stated another way, each person has an equal but limited entitlement to emit GHGs (Ikeme 2003, 201). Unlike mineral resources which can be claimed as property by a particular person, company or nation, no single nation, company or person can claim ownership of the atmosphere or any part of it; the atmospheric commons is owned by all people. Similarly, when any single person or nation discharges greenhouse gases into the atmospheric commons, the potential climate effects will be experienced by all. And since the ability of the atmospheric commons to absorb GHG emissions is limited, and since exceeding that limit puts all life at risk (and not just the life of the one who exceeds the limits), each person has an obligation to avoid adding GHG emissions to the atmospheric commons in excess of their fair share.

Not surprisingly, this argumentation has more often been advanced by developing nations rather than developed nations since the latter are generally acknowledged to have utilized more than their fair share of the atmospheric commons. The developing nations argue that national allocations of GHG emissions should be based on per capita. They note that the developed nations have utilized more than their fair share of GHG emission entitlements not just since 1990 (the baseline year used in the Kyoto Protocol) but since the start of the industrial revolution in the late eighteenth century. Distributive justice demands that this disproportionate and prolonged over-utilization of per capita entitlements must be considered

when calculating an equitable distribution of the costs and benefits associated with climate change since this excessive appropriation of per capita GHG entitlements has both contributed more to the adverse effects of climate change while also permitting the developed nations to accumulate their wealth and higher standard of living (Ikeme 2003, 201–2). If the limited GHG absorption capacity of the atmospheric commons has been disproportionately consumed by the developed world, and if little reserve capacity remains, then it can be argued that not only does a much greater portion of the remaining capacity belong to the developing world (assuming there is no need to reduce GHG atmospheric concentrations significantly below current levels) but the developed countries also owe an ecological debt to the developing nations.[2] Accordingly, the developed countries are obliged to transfer wealth to the developing countries or pay for the latter's costs of climate change adaptation in proportion to their excess utilization of the atmospheric commons.[3] This is especially the case, according to this line of reasoning, since some developing countries, which have not remotely utilized their fair share of the GHG emission entitlements, would need to significantly increase their GHG emissions just to meet their basic needs for shelter, food and security, let alone achieve the level of prosperity enjoyed by the developed countries (Shue 1999).

In response, some developed nations have argued that a baseline of 1990 is reasonable since it represents a time from which there are reliable climatic measurements and a time when global awareness of the negative effects of climate change was emerging. Prior to this time, according to this line of reasoning, the industrialized nations were not aware that their actions were so harmful, and present generations should not be held responsible for the ignorance of their ancestors either with regard to the negative effects of industrialization or their excess utilization of the limited atmospheric commons. Any debt associated with the actions of earlier generations died with them (Ikeme 2003, 201). Furthermore, they argue, current emission levels should be recognized as entitlement levels based on past use (Brown et al. 2006, 20).

But, it can be argued, if current generations in the developed countries claim sole ownership to the assets that they have inherited from prior generations, then they are also owners of the liabilities associated with those assets, and they are accountable for the excess use of the atmospheric commons by prior generations. As Bhaskar notes, "if I take an object, not

knowing that it belongs to you, and give it to my daughter, you are surely entitled to reclaim it, even though neither my daughter nor I may be a thief" (1995, 116). Similarly, when one discovers that one has taken more than one's fair share, one is expected to make some form of reparation to the party or parties who were disadvantaged. Past practices of utilizing more than one's fair share of a common trust is not justification for continued bad behavior.

To resolve these tensions, the contraction and convergence (C&C) response to climate change challenges seeks a global agreement on the concentration of atmospheric GHGs below which the planet's temperature will not rise more than two degrees Celsius, whether that concentration is set at 350, 400 or 450 parts per million of CO_2. When this benchmark is set, the planet's carrying capacity for that concentration of GHGs can then be allocated to nations on a per capita basis. Those countries that are presently emitting more than their allotment (primarily the developed, industrialized countries) will be required to reduce their emissions (contraction) while those countries who are presently emitting less than their share (primarily developing countries) will be temporarily permitted to grow their emissions until, by an agreed date, all countries have reached their equal per capita entitlement (convergence)(den Elzen et al 2005). Developing countries might sell their surplus GHG shares during the adjustment phase which would presumably be completed by 2050 (Global Commons Institute 2008).

For the C&C approach to become operational, the signatories to the UNFCCC must agree on a safe concentration of atmospheric GHGs, the proportional allocation of this limited capacity based on national populations, the fair assessment of current levels of emissions, targets for contraction of those national emissions that exceed allocations[4] and the concurrent temporary increase in emissions for those countries which have not utilized their full allocation – an enormous undertaking that has thus far been elusive (Bows & Anderson, 2008).[5] Nevertheless, the proponents of the C&C approach argue that it can provide an equitable and just response to the climate change challenge that can win the support of the developing world since it both protects their ability to develop and obligates the developed world to reduce its excess emissions (Global Commons Institute 2008). They further argue that the date of convergence should be realized as soon as possible since the most vulnerable and

least responsible for climate change are currently bearing a disproportionate and unjust burden created by those who have utilized more than their fair share of the atmospheric commons, and justice demands that this be resolved as soon as possible.

As the planet continues to warm, carbon sinks will decline and more CO_2 will be released. That is, as climate change continues due to the GHGs that have already been released into the atmosphere and which will continue to affect the climate since the lifetime of CO_2 in the atmosphere ranges between 4 to 200 years (IPCC 2001, 38), the ability of Earth's systems to absorb anthropogenic GHG emissions will correspondingly decrease (Friedlingstein 2006). Perhaps at no other time in human history have we become so aware of our profound dependence on and our place within Earth's ecological dynamics. Due to this decreased absorption capacity, the rate of contraction will undoubtedly need to be periodically readjusted. Shifting population sizes will also precipitate calls for allocation adjustments. Although global emissions are allocated on a per capita basis to nations based on their existing populations, future adjustments to such allocations necessitated by shifting populations should not automatically be increased for nations whose populations have grown.[6] Population growth stresses the limited capacity of the planet, and efforts to reduce the causes and effects of climate change should reward behavior that promotes planetary health and deter that which is potentially problematic (Speidel et al 2009).

Rather than appealing to the notion of a shared atmospheric commons, others have preferred the notion that all have a right to develop and flourish. In keeping with principles of equity and distributive justice, the United Nations Framework Convention on Climate Change (UNFCCC) asserts that the parties to that agreement are bound to protect the environment for the sake of humanity, present and future, "on the basis of equity and in accordance with their common but differentiated *responsibilities* and respective *capabilities*. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof" (United Nations 1992b, Article 3, emphasis added). The UNFCCC also requires the more developed nations to assist developing countries with adaptive responses to the adverse effects of climate change, including the transfer of technologies (United Nations 1992b, Article 4(1)(c), 4(1)(e)). Any approach is not likely to be accepted by the developing countries if efforts to reduce global GHG emissions do not concur-

rently permit developing nations to increase their GHG production while stipulating that the developed countries which have already profited from economies that have produced excess amounts of GHGs will bear a comparable cost of mitigation.

The Greenhouse Development Rights (GDR) framework described by Baer et al (2008a) is guided by these UNFCCC directives and seeks to define the capabilities and responsibilities that would satisfy the requirements of justice. It argues that all people have a right to development in order to realize human flourishing, and that it is possible to define a development threshold[7] below which people should not be required to bear the costs of responding to climate change since the primary focus of these impoverished people is on survival and achieving a modicum of development in order to overcome the malnutrition, high infant mortality, abbreviated education, and a disproportionate expenditure on food that characterize their impoverished state (Pritchett, 13–17). Furthermore, it is unlikely that they have contributed to climate change in any significant way. Those who have already exercised their right to development and have consequently derived incomes that exceed the development threshold, usually as members of industrialized (Annex I) societies, have an obligation both to preserve the development rights of those who have not yet exercised them (i.e., non-Annex I or developing countries) as well as to bear the costs of climate change mitigation from the wealth (capability) that they have gained while they were adding to the GHG burden of the planet. As Baer et al note, "They must, as their incomes rise, assume a steadily rising share of the costs of curbing the emissions associated with their own consumption, as well as the costs of ensuring that, as those below the threshold rise toward and then cross it, they are able to do so along sustainable low-emission paths" (2009, 1124). All people who have incomes above the development threshold bear these obligations, whether they live in Annex I or Non-Annex I countries. The sum of this income, which excludes income used to attain the development threshold, becomes the nation's aggregate capability, while the nation's responsibility for climate change is derived from the cumulative emissions, beginning from an agreed starting date, that would exclude emissions resulting from efforts to attain the development threshold.[8] The further a nation's income and emissions exceed the development threshold, the greater is its emission reduction obligations and the greater is its share of the global mitigation requirements. These mitigation requirements can be met both

through domestic reductions as well as through "cap-and-trade" agreements with other nations (Baer 2009, 1126–33). For instance, non-domestic mitigation could also be achieved by claiming reductions in other countries that are "supported and enabled by technology, financing and capacity-building [from the developed country] in a measurable, reportable and verifiable manner" (UNFCCC 2007, 1(b)(ii)). The significant domestic reduction of GHG emissions required of wealthier countries would theoretically liberate some of the limited GHG carrying capacity of the planet for the use of non-Annex I countries, while the transfer of both technology and financial support from industrialized to developing countries could ensure that development happens in a sustainable way that dramatically reduces carbon emissions (i.e., in ways that are mutually enhancing for both humans and the rest of Earth's ecosystems since human flourishing is impossible without Earth's flourishing).

Ikeme argues that the developed nations should "transfer wealth, relevant technologies, scientific knowledge, management and adaptation skills" to the less developed nations that are adversely affected by climate change as an act of charity; the rich are morally obligated to help the poor (Ikeme 2003, 203). However, developing nations are just as likely to respond that such transfers are not a matter of charity but a matter of justice; the developing nations are only claiming what is rightly owed to them; they need not wait for the largesse of developed countries. Their claim seeks retributive justice, not just distributive justice. It seeks proportionate compensation for the injustices of the past and present. It requires that "the polluter should, in principle, bear the cost of pollution" (United Nations 1992a, Principle 16). Those who cause harm are responsible in proportion to the harm that they have caused. However, since the emitters of GHGs are not presently compelled either to bear the costs associated with their GHG emissions or to pay compensation to those who are harmed by climate changes, there is no economic incentive for them to mitigate their GHG emissions (Stern 2006, 24).

Regardless of whether one prefers a contraction and convergence approach, or a greenhouse development rights framework, or some other approach for fashioning a just response to climate change,[9] certain positions remain ubiquitous. For instance, vulnerability to the health effects of climate change is a function of three factors: the existing sensitivity of the population, the exposure of the population to climate related health

risks, and the adaptive capacity or the ability to manage these risks (Kovats 2003, 16). Adaptive capacity is governed by income, equality, type of health care system, and the ability to rapidly access information (Menne 2006, 421). Regrettably, in our present circumstances, those who have contributed the most to climate change are those who are the least vulnerable (least sensitive and least exposed) and the best able to adapt to the impacts of climate change (with, for example, heating and air conditioning, dikes, irrigation, increased health care), while those who have contributed the least are the most vulnerable and the least able to adapt to the consequences of climate change (e.g., drought, desertification, flooding, extreme weather patterns) (Stern 2006, 37). The 2007 Intergovernmental Panel on Climate Change (IPCC) report noted that "poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies" (IPCC WGII 2007, 9). Furthermore, the 2007 UN Human Development Programme (UNHDP) report noted that climate change will bring about "unprecedented reversals in poverty reduction, nutrition, health and education" as the limited resources of vulnerable nations are used to mitigate the droughts, floods and other environmental stressors of climate change rather than dealing with social needs (UNHDP 2007, 16, 18) and is likely to displace hundreds of millions, creating environmental refugees and perhaps leading to conflict (Costello 2009, 1708).

Justice demands that the distribution of limited resources and opportunities for development be guided by either need or merit. The developed nations have the least need for GHG emission allocations and their past behavior of causing harm to the most vulnerable does not demonstrate merit (Brown et al. 2006, 21). Countries with the greatest need should receive new allocations of GHG emissions first and at a level that at least permits them to reach the development threshold. Their circumstances should certainly not be worsened by any international allocation agreements (Rose 1998).

3. The Principle of Free and Informed Consent

It follows from the principle of non-maleficence that no country may put another country or its peoples at grave risk without the consent of the latter. The actions of developed countries are primarily responsible for the

adverse effects of climate change that are being endured disproportionately by the developing countries. To date, the developing countries have generally shared only in the costs of these actions, not the benefits. The developing countries did not consent to being burdened with these adverse effects, nor did they cede their portion of the atmospheric commons to the developed countries that used it for their own ends. Those who acted against the best interests of the developing countries did not seek the latter's informed consent nor did the developing countries give it.[10]

Even as efforts are made to rectify excessive GHG emissions, the principle of free and informed consent is still not being sufficiently respected. People and countries that are at risk due to the effects of climate change have a right to participate fully in discussions that determine not only acceptable and unacceptable risks, but responses to deal with the same. Since global emissions of GHGs will probably need to be reduced by 60 to 80 percent from current levels (Stern 2006, xxiii), the methods and interim targets to meet that goal must be decided by all of the stakeholders but particularly by those who are most affected by the adverse effects of climate change. All parties must agree on a fair and equitable distribution of the costs of climate change and any entitlements to emissions of GHGs. However, to date, the developing nations have had less influence than the developed nations when formulating the analysis and response to the causes of GHGs. For instance, these nations have tended to be underrepresented on the IPCC and during the formulation of the UNFCCC (Ikeme 2003, 202). Nor have they had access to the same level of expertise to acquire and analyze data, and to formulate responses that best protect their particular interests.

If all have a right to an equal but limited access to the atmospheric commons, then all should equally participate in the development of adaptation policies either through their own initiative or through the work of NGOs or governments that that they have sanctioned to speak on their behalf. The poorest and most marginalized peoples, including those in prosperous countries, must have a voice in formulating responses to climate change issues (Human Rights and Equal Opportunity Commission 2008, 15). Their informed participation, which may require the assistance of expert advisors funded by developed countries, can promote their free and informed consent to emerging responses to climate change issues even if they did not consent to the actions that first brought these adverse ef-

fects into their lives. The developed nations who are causing the adverse effects of climate change cannot formulate responses in isolation from those who are affected by their actions. Actions that have a global impact require global consent.

Article 2 of the seldom referenced United Nations International Covenant on Civil and Political Rights (UNICCPR) notes that when a nation ratifies an international human rights treaty, the nation must ensure that the rights and obligations declared in the treaty are upheld within its territory or by those within its jurisdiction. Furthermore, the UNICCPR also stipulates that a nation must respond to threats to human rights and "must ensure that individuals also have accessible and effective remedies to vindicate those rights" (United Nations 1966, Article 2). Ultimately, as a recent UN commentary on the UNICCPR notes, "cessation of an ongoing violation is an essential element of the right to an effective remedy" (United Nations Human Rights Committee 2004, para. 15). In other words, those whose rights have been threatened or violated have a right to accessible and effective remedies, and when they lack sufficient means to defend their rights, wealthier nations have an obligation not only to assist their defense but to facilitate the cessation of the offense itself. Accordingly, developing countries can rightly demand that the developed countries should not only honor the United Nations agreements pertaining to climate change that they have signed but they should also assist the developing world with their own efforts to defend themselves. As a quote from Archbishop Desmond Tutu in the United Nations Human Development Programme Report for 2007/2008 observes:

> No community with a sense of justice, compassion or respect for basic human rights should accept the current pattern of adaptation. Leaving the world's poor to sink or swim with their own meager resources in the face of the threat posed by climate change is morally wrong. Unfortunately, as the *Human Development Report 2007/2008* powerfully demonstrates, this is precisely what is happening. We are drifting into a world of 'adaptation apartheid.' (UNHDP 2007, 181)

Of course, Earth has obviously not consented to human practices that have seriously altered the climate systems of the planet, nor could it possibly grant such consent. It would be an extreme form of anthropomorphism to attribute human self-consciousness to the planet itself. However, we are the creature whose profound intellect and self-awareness allow

it to grasp and reflect upon its past, present and future, and to fashion adaptations that allow us to supersede the limitations of our genetic coding and environs. We are not only the species with the greatest freedom of choice when it comes to deciding our present and future, we are the species that can most imperil our future and the future of the rest of the planet (Berry 1999). Accordingly, we are obligated to inform our decision-making and to make choices that do not threaten either our own existence or the existence of the rest of Earth's ecosystems (Wilson 1994).

LETHARGIC RESPONSES TO CLIMATE CHANGE

The lethargy of developed nations to honor their moral and legal responsibility to reduce GHG emissions is arguably assisted by four popular disclaimers that hinder effective responses to climate change. Each of these disclaimers will be examined.

1. Economic Harm

The administration of President George H.W. Bush insisted at the 1992 Rio Earth Summit that since the reduction of GHGs could inflict harm on nations' economies, efforts to reduce GHG emissions should be delayed until such time as it was clear that economic interests would not subsequently suffer (Sussman 2006, 14). This position was defended even while the scientific community was asserting that climate change was increasingly having severe adverse effects on the health of both humans and the planet. As the scientific community's warnings have become even clearer and stronger, this hesitation becomes even more indefensible for at least four reasons (IPCC 2007b; American Association for the Advancement of Science 2007).

Firstly, during this stage of inaction or delayed action, basic human rights to life, health and security are being significantly compromised. As has been noted by the UN Office of the High Commissioner for Human Rights, nations do not have an option to protect these rights, but are compelled to act to protect them (United Nations Office of the High Commissioner for Human Rights 2008). Inaction or inertia is unacceptable, especially since the effects of climate change is "estimated to have caused 150,000 deaths and 5.5 million DALYs [disability adjusted life years]," annually, since 2000 (World Health Organization 2003).

Secondly, the cost to polluters should not determine if or to what ex-

tend polluters must take remedial action. That is, the requirement to act is not dependent on the ability or desire of polluters to bear the economic costs associated with their harmful acts, but is determined by victims' rights to life, health and security (United Nations 1948, Article 3). Using "willingness-to-pay" as a criteria or determinant for action devalues the lives, health and security of those who have unwillingly been placed at risk by climate change. Admittedly, economic cost can be utilized to determine the most cost effective response but it cannot be used to determine if one is obligated to respond at all (Brown et al. 2006, 31).

Thirdly, the argument that one should delay responding to climate change until such time as it will not harm a nation's economy reverses two concepts. A society constructs economic structures to promote the flourishing of humans. That is, economics is a means while human flourishing is an end. The "economic harm" argument for delaying responses to climate change reverses this order since tolerance for continued human suffering becomes the means to achieve the goal of economic prosperity. But no country or company has the right to use other nations or people as a means for achieving economic goals, nor may they endanger the life of others for that same end (Human Rights and Equal Opportunity Commission 2008, 14). Furthermore, prioritizing economic prosperity over human flourishing also favors the human economy over Earth's economy. But since humans are derivative for Earth's evolutionary processes and remain inextricably dependent on them, and since human economic activity is derivative from and dependent upon Earth's economy, it is not possible to have a flourishing human economy on a devastated planet any more than it is possible to have healthy people on a sick planet. Earth's economy is primary while humanity's economy is derivative, not the reverse (Berry 2009).

Fourthly, as the Stern Report has noted, "the evidence shows that ignoring climate change will eventually damage economic growth.…Tackling climate change is the pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or poor countries. The earlier effective action is taken, the less costly it will be" (Stern 2006, ii). Delaying action to reduce GHG emissions will actually be more costly to economies in developed countries both in the near and long term. The "economic harm" argument is a misguided and ill-informed prioritization of current investors' interests at the expense of

the welfare of future generations. Ironically, when President H.W. Bush addressed the Rio Earth Summit on June 15, 1992, he noted that, "It's been said that we don't inherit the earth from our ancestors, we borrow it from our children" (Bush 1992). Regrettably, this insight did not inform his response to climate change.

2. Lack of Scientific Certainty

Another disclaimer that has been used to justify delayed and inadequate responses to climate change argues that until there is scientific certainty about the causes and required responses to climate change, nations are not obliged to act. However, as early as 1990, the scientific evidence collected by the IPCC had determined that "emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases…" (IPCC 1990, ix). The scientific consensus of the first IPCC Report (1990) has been repeatedly validated and strengthened as successive reports (1995, 2001, 2007) used increasingly confident language concerning the anthropogenic causes of climate change. Using the strongest language thus far, the most recent IPCC report declares that "warming of the climate system is unequivocal," and "most of the observed increase in globally-averaged temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG concentrations" where the words "very likely" were defined as an assessed probability of occurrence of >90% (Intergovernmental Panel on Climate Change 2007b, 72, 39, 27). Such scientific consensus has not only been forged in the IPCC reports but has also been confirmed by other research bodies, such as the National Research Council (USA) and the American Association for the Advancement of Science.[11]

With this in mind, the argument that developed nations need not act while scientific uncertainty concerning climate change exists can be discredited on two levels: the degree of scientific certitude needed before action is required, and the different roles for science and ethics. The inevitable vicissitudes of daily living require humans to make the best decisions possible given the best information available; almost none of our decisions are made in the context of total certitude. For instance, we do not wait for certitude when formulating a medical diagnosis or prescribing treatment since such delays could lead to the demise of patients. We act with the best knowledge at hand, especially when a preponderance of evidence favors a particular course of action and indicates that there is an urgent need to

act. Nor do we need to know the exact weight that a baby will have when it is born in order to agree that a woman is presently pregnant (McKibben 1989, 29). Although we do not know the fetus's eventual birth weight, we deny neither its present development nor the mother's pregnancy. When the vast majority of credible experts who have studied climate change unanimously agree that anthropogenic GHGs are directly related to climate change, those who wish to argue otherwise must provide a comparable level of evidence to support their contrary position, especially when current evidence indicates that delays in resolving climate change issues are associated with human mortality and morbidity. To delay an effective response to the adverse effects of climate change until absolute certitude exists and until every climatic mechanism is understood is to demand an unprecedented level of certitude. Given the deaths and DALYs attributable to climate change, advocating delay is both immoral and perverse.

Furthermore, while science determines when a risk is imminent, ethics decides if that risk is acceptable and if a response to the risk is obligated. Waiting for science to resolve all uncertainty related to the risk not only delays any response, it also shifts the decision-making solely to scientists, away from those who are either affected by the risk or are properly equipped to resolve moral questions. Moreover, scientific uncertainty does not absolve the agent from responsibility for the consequences of the action to which some uncertainty is associated. Since humans universally reject actions that seriously endanger basic human rights to life, health and security, the duty to refrain from activities that endanger these rights, including via climate change, is sufficiently strong that appeals to scientific uncertainty cannot overrule the duty to avoid harm.[12] An agent has a duty to avoid harm in direct proportion to the harm that could result from the action of the agent, especially when the consequences will be significant and will be borne by those who have not consented to be put at risk, as is the case with climate change (Brown et al. 2006, 27). Accordingly, the United Nations Framework Convention on Climate Change asserted that the Parties to that agreement should "take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures…" (United Nations 1992b, Article 3).

Developed nations have significantly increased GHG emissions that increase the risk to others—they can no longer claim ignorance, nor have

they been able to do so since the late 1980s. Therefore they are account-able to those who have been harmed, and they must not only provide reparation but also cease causing further harm. They may not demand a level of certitude that significantly exceeds the certitude that we encounter in the rest of our lives. Indeed, the very planetary dynamics that formed the Earth and us, and which continue to evolve and to provide a context for our existence, are characterized by chance and uncertainty (Gould 2002). To demand certitude, scientific or otherwise, contradicts the very pattern of our existence.

3. Lack of Global Consensus

The leaders of some countries—for example, Canada and the USA—have maintained that until all governments agree to reductions of GHG emissions, including in particular the developing countries of China and India, no country is obliged to reduce their GHG emissions. This argu-ment is indefensible for several reasons. Firstly, it ignores the historical pattern of GHG emissions in the developed countries that have permitted them to grow wealthy economies while harming the planet, and would deny that same route to prosperity to developing countries while not resolving the fiscal inequity. Their current approach of maintaining the status quo perpetuates existing inequities and ignores the harm that the more vulnerable countries endure due to the adverse effects of climate change. Secondly, since the developed countries have benefited from their over-utilization of the atmospheric commons, and since they are better able to adapt to climate change and undertake mitigation efforts, the UN-FCCC noted that the signatories to that convention "should protect the climate system for the benefit of present and future generations of hu-mankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof" (United Nations 1992b, Article 3(1)). The developed countries should not wait until the developing coun-tries can match their response to climate change, nor should they support a status quo that maintains inequitable burdens on the more vulnerable nations (Ikeme 2003, 200). They are in a better position to act since they have greater wealth and technology, the acquisition of which has hastened climate change. Countries like Canada and the USA must defend their

failure to honor the conventions which they have signed, and explain why they maintain practices that harm other countries. The aggrieved are not likely to find comfort in the argument that nations need not cease practices that are harmful to the victims as long as other nations continue to cause similar harm. Nations are accountable for their own actions and may not deflect that accountability with the claim that others are also culpable, as if to say that if many are culpable then none are culpable. Another's immoral activity does not sanction one to engage in the same immoral activity any more than a murderer's crime gives permission or impunity for one to murder.

However, since developing countries will soon surpass developed countries in total GHG emissions—although on a per capita basis developed countries will continue to emit more GHGs—developing countries should endeavor to control their GHG emissions and should receive assistance from developed countries to do so (Brown et al. 2006, 33). But while it is important to measure and manage each country's production of GHGs, this accounting must be scrutinized within the context of the atmospheric commons and the health of planetary climate systems. National production of GHGs does not occur in isolation from planetary systems, and should not be evaluated as if it did. Doing so ignores the serious and negative impacts of humans on the planet as well as the urgency of the environmental crisis. Waiting for human consensus settles for inertia and does not provide an effective way forward. Awakening to the ways that Earth is already critically engaged in responding to climate change, even while we dither, could be a starting point from which to fashion a useful response.

4. Wait for Better technologies

The fourth popular disclaimer used by developed nations to justify a reticence to honor moral and legal requirements to reduce the adverse effects of climate change asserts that until more cost effective technologies are available—and they are expected to be available in the near future—there is no current obligation to mitigate GHG emissions. However, since people and climate systems are presently being harmed, the most effective response currently available must be utilized. Even if more effective technologies might become available in the future, there is a moral obligation to minimize all present harm, now, to the best of our abilities.

Furthermore, since it is generally conceded that the polluter should pay for the harm caused and being caused, as well as all future harm, any delay in mitigating harmful activities only adds to the penalty that must be paid (Brown et al. 2006, 34–5).

CONCLUSION

The causes and challenges associated with climate change are multiple and complex. Efforts to fashion effective and sustainable solutions that neither repeat nor exacerbate the mistakes of the past would be aided by a clear understanding of the relevant ethical principles and a renewed appreciation of the interrelationships between humanity and the rest of the environment.

NOTES

1. Not only nations, but individuals and corporations also have ethical obligations to reduce activities that are contributing to climate change. For instance, see: the World Business Council for Sustainable Development (http://www.wbcsd.org/) and the Global Reporting Initiative's Sustainability Reporting guidelines (http://www.globalreporting.org) as well as the World Watch Institute (http://www.worldwatch.org/), as examples.
2. As Patz notes, "Just as nations often borrow financial resources from the future, creating a national debt, they also essentially borrow assimilative capacity from the future by emitting pollutants faster than Earth can assimilate, creating a 'natural debt'. As with national debt, a bit of natural debt is perhaps not much of a problem, but when it becomes too large, natural debt compromises the capability of future generations to take care of themselves." (Patz et al. 2007, 401)
3. Such wealth could take the form of allocation of monies, forgiveness of debts, transfer of technology and/or expertise.
4. For an evaluation of the mitigation costs associated with the developed countries' contraction of their GHG emissions, see Hof et al (2010) and den Elzen et al (2008).
5. This list is by no means the total sum of the challenges that will need to be overcome if we are to come of a consensus on how to respond to climate change. Some question if it is even possible to fashion an effective response while "fossil fuel capitalism" remains the dominant economic system of the planet. See, for instance, Storm (2009), Markandya (2009), and Li (2009).
6. In the C&C model, the world's population would be stabilized at an agreed size prior to the convergence date in the expectation that this would reduce any incentive for some nations to increase the size of their respective popu-

lations in order to concurrently increase their emissions allocations. This is another area of controversy about which there is no consensus (Bows and Anderson 2008, 284).

7. For a description of how a development threshold might be calculated, see Baer et al (2009, 1124–6).

8. Baer et al (2009) estimate that the United States bears 29.1% of the global burden of responsibility (excess emissions) and capability (income derived from those excess emissions). Assuming that the global climate transition costs to achieve a stable concentration of GHGs that do not threaten the ecological systems of the planet are distributed according to responsibility and capability, and assuming that those costs would represent 1% of gross world product, "the average cost per person above the development threshold in the US would be less than US$ 3/day. Plainly the rich and the relatively well-off can easily afford to shield the poor from the costs of combating climate change; they can, in other words, afford to honor a meaningful right to development (Baer et al 2009, 1128–9).

9. For a comparison of approaches, including the Multi-Stage approach, the Brazilian Proposal approach, and the C&C approach, see: den Elzen et al (2005), den Elzen (2008), Hof et al (2010).

10. Many countries have banned smoking in public places in order to protect people from involuntary exposure to second-hand cigarette smoke. Such legislation acknowledges that people have a right to be protected from harmful exposure when they have not consented to such exposure. Patz draws a parallel between involuntary exposure to second-hand smoke and involuntary exposure to the effects of climate change. He notes that "climate change, as an environmental hazard operating at the global scale, poses a unique and 'involuntary exposure' to many societies, and therefore represents one of the largest health inequities of our time…. In the same vein as cigarette legislation whereby smokers are restricted from harming nonsmokers, countries burning fossil fuels and emitting greenhouse gases must consider the negative health impacts imposed on countries burning far less." (2007, 398)

11. For example, the National Research Council in the USA noted that "The IPCC's conclusion that most of the observed warming of the last 50 years is likely to have been due to the increase in greenhouse gas concentrations accurately reflects the current thinking of the scientific community on this issue. The stated degree of confidence in the IPCC assessment is higher today than it was 10, or even 5 years ago…" (CSCC 2001, 3). The American Association for the Advancement of Science in a statement released in 2007 asserted that: "The scientific evidence is clear: global climate change caused by human activities is occurring now, and it is a growing threat to society.… The pace of change and the evidence of harm have increased markedly over the last

five years. The time to control greenhouse gas emissions is now" (American Association for the Advancement of Science 2007).

12. For instance, we will charge a driver with impaired driving even if the driver has not yet collided with pedestrians or other vehicles.

REFERENCES

American Association for the Advancement of Science. "AAAS Board Statement on Climate Change 2007." Accessed August 7, 2008. www.aaas.org/news/press_room/climate_change/mtg_200702/aaas_climate_statement.pdf.

Baer, Paul, John Harte, Barbara Haya, Antonia V. Herzog, John Holdren, Nathan E. Hultman, Daniel M. Kammen, Richard B. Norgaard, Leigh Raymond. 2000. Equity and greenhouse gas responsibility. *Science* 289, no. 5488: 2287.

Baer, Paul, Tom Athanasiou, Sivan Kartha, and Eric Kemp-Benedict. 2008a. *The Greenhouse Development Rights Framework: The right to development in a climate constrained world*, 2nd edition. Berlin: Heinrich Böll Foundation.

Baer, Paul , Glenn Fieldman, Tom Athanasiou and Sivan Kartha, 2008b. Greenhouse Development Rights: towards an equitable framework for global climate policy, *Cambridge Review of International Affairs,* 21: 649–69.

Baer, Paul, Sivan Kartha, Tom Athanasiou and Eric Kemp-Benedict. 2009. The Greenhouse Development Rights Framework: Drawing Attention to Inequality within Nations in the Global Climate Policy Debate. *Development and Change* 40: 1121–38.

Beauchamp, Tom L. and James F. Childress. 2001. *Principles of Biomedical Ethics*. 5th edition. New York: Oxford University Press.

Berry, Thomas. 1999. *The Great Work: Our Way in the Future*. New York: Bell Tower.

Bhaskar, Venkataraman. 1995. Distributive Justice and the Control of Global Warming. In *The North, The South and The Environment: Ecological Constraints and the Global Economy*, edited by Venkataraman Bhaskar and Andrew Glyn. London, UK: Earthscan Publications.

Bows, Alice and Kevin Anderson. 2008. Contraction and convergence: an assessment of the *CCOptions* model. *Climate Change* 91: 275–90.

Brown, Donald, Nancy Tuana, Marilyn Averill, Paul Baer, Rubens Born, Carlos Eduardo Lessa Brandão, Robert Frodeman, Christiaan Hogenhuis, Thomas Heyd, John Lemons, Robert McKinstry, Mark Lutes, Benito Müller, José Domingos Gonzalez Miguez, Mohan Munasinghe, Maria Silvia Muylaert de Araujo, Carlos Nobre, Konrad Ott, Jouni Paavola, Christiano Pires de Campos, Luiz Pinguelli Rosa, Jon Rosales, Adam Rose, Edward Wells, and Laura Westra. 2006. White Paper on the Ethical Dimensions of Climate Change: Rock Ethics Institute, Penn State University.

Bush, George H.W. 1992. *Address to the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil*. The Museum at the George

Bush Presidential Library. Accessed August 1, 2008. http://bushlibrary.tamu .edu/research/public_papers.php?id=4417&year=1992&month=6.

Committee on the Science of Climate Change. 2001. *Climate Change Science: An Analysis of Some Key Questions*. National Research Council. Accessed August 7, 2008. http://www.gcrio.org/OnLnDoc/pdf/ClimateChangeScience.pdf.

Costello, Anthony, Mustafa Abbas, Adriana Allen, Sarah Ball, Sarah Bell, Richard Bellamy, Sharon Friel, Nora Groce, Anne Johnson, Maria Kett, Maria Lee, Caren Levy, Mark Maslin, David McCoy, Bill McGuire, Hugh Montgomery, David Napier, Christina Pagel, Jinesh Patel, Jose Antonio, Puppim de Oliveira, Nanneke Redclift, Hannah Rees, Daniel Rogger, Joanne Scott, Judith Stephenson, John Twigg, Jonathan Wolff , and Craig Patterson. 2009. Managing the health effects of climate change. *Lancet*, 373:1693–733.

den Elzen, Michel, Paul Lucas and Detlef van Vuuren. 2005. Abatement costs of post-Kyoto climate regimes. *Energy Policy* 33: 1238–51.

den Elzen, Michel G., Paul L. Lucas and Detlef P. van Vuuren. 2008. Regional abatement action and costs under allocation schemes for emission allowances for achieving low CO_2-equvalent concentrations. *Climate Change* 90: 243–68.

Friedlingstein, P., P. Cox, R. Betts, L. Bopp, W. von Bloh, V. Brovkin, P. Cadule, S. Doney, M. Eby, I. Fung, G. Bala, J. John, C. Jones, F. Joos, T. Kato, M. Kawamiya, W. Knorr, K. Lindsay, H. D. Matthews, T. Raddatz, P. Rayner, C. Reick, E. Roeckner, K.-G. Schnitzler, R. Schnur, K. Strassmann, A. J. Weaver, C. Yoshikawa, and N. Zeng. 2006. Climate-Carbon Cycle Feedback Analysis: Results from the C[4]MIP Model Intercomparison. *Journal of Climate* 19: 3337–53.

Global Commons Institute. 2008. Carbon Countdown: The Campaign for Contraction and Convergence. London, UK. Accessed June 15, 2010. http://www .gci.org.uk/documents/Carbon_Countdown.pdf

Global Humanitarian Forum. 2009. *Human Impact Report. Climate Change. The anatomy of a silent crisis*. Accessed May 29, 2009. http://assets.ghf-ge.org/ downloads/humanimpactreport.pdf.

Global Reporting Initiative. Accessed June 30, 2009. http://www.globalreporting .org/Home.

Gould, Stephen Jay. 2002. *The Structure of Evolutionary Theory*. Cambridge, MA: Harvard University Press.

Hof, Andries F., Michel G. J. den Elzen and Detlef P. van Vuuren. 2010. Including adaptation costs and climate change damages in evaluating post-2012 burden-sharing regimes. *Mitigation and Adaptation Strategies for Global Change* 15: 19–40.

Human Rights and Equal Opportunity Commission. 2008. Human Rights and Climate Change. Government of Australia. Accessed July 17, 2008. www. hreoc.gov.au/human_rights/climate_change/index.html.

Ikeme, Jekwu. 2003. Equity, environmental justice and sustainability: incomplete approaches in climate change politics. *Global Environmental Change* 13:195–206.

Intergovernmental Panel on Climate Change. 1990. Climate Change: The IPCC Scientific Assessment. Cambridge: Cambridge University Press. Accessed August 1, 2008. www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_full_report .pdf.

———. 1995. IPCC Second Assessment: Climate Change. Accessed August 1, 2008. www.ipcc.ch/pdf/climate-changes-1995/ipcc-2nd-assessment/2nd-assessment-en.pdf.

———. 2001. Climate Change 2001: The Scientific Basis. Cambridge: Cambridge University Press. Accessed August 1, 2008. www.grida.no/publications/other/ipcc_tar/.

———. 2007a. Climate Change 2007: Synthesis Report: Summary for Policy Makers. Cambridge: Cambridge University Press. Accessed August 1, 2008. www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

———. 2007b. Climate Change 2007: Synthesis Report. Cambridge: Cambridge University Press. Accessed June 30, 2010. www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf.

Intergovernmental Panel on Climate Change, Working Group II. 2007. Fourth Assessment Report Climate Change 2007: Climate Change Impacts, Adaptations and Vulnerability: Summary for Policymakers: Summary Report. Cambridge: Cambridge University Press. Accessed August 1, 2008. www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf.

Kovats Sari, Kristie L. Ebi, Bettina Menne. 2003. *Methods of assessing human health vulnerability and public health adaptation to climate change*. World Health Organization, Health Canada, World Meteorological Association, United Nations Environment Programme. Accessed August 1, 2008. www.euro .who.int/document/e81923.pdf.

Li, Minqi. 2009. Capitalism, Climate Change and the Transition to Sustainability: Alternative Scenarios for the US, China and the World. *Development and Change* 40: 1039–61.

Markandya, Anil. 2009. Can Climate Change be Reversed under Capitalism? *Development and Change* 40: 1139–52.

McKibben, Bill. 1989. *The End of Nature*. New York: Random House.

McMichael, Anthony J., Diarmid Campbell-Lendrum, Sair Kovats, Sally Edwards, Paul W. Wilkinson, Theresa Wilson, Robert Nicholls, Simon Hales, Frank C. Tanser, David Le Sueur, Michael Schlesnger, and Natasha Andronova. 2004. Global climate change. In *Comparative Quantification of Health Risks: Global and Regional Burden of Disease due to Selected Major Risk Factors*. Edited by Majid Ezzati, Allan D. Lopez, Anthony Rodgers and Christopher J.L. Murray, 1543–649. Geneva: World Health Organization.

Menne, Bettina, and Kristie L. Ebi. 2006. Climate Change and Adaptation Strategies for Human Health. World Health Organization. Darmstadt, Germany: Steinkopff Verlag.

Patz, Jonathan A., Holly K. Gibbs, Jonathan A. Foley, Jamesine V. Rogers, and Kirk R. Smith. 2007. Climate Change and Global Health: Quantifying a Growing Ethical Crisis. *EcoHealth* 4:397–405.

Pritchett, Lant. Who is *Not* Poor? Dreaming of a World Truly Free of Poverty. *World Bank Research Observer* 21(1): 1–23.

Rose, Adam. 1998. Burden-Sharing and Climate Change Policy beyond Kyoto: Implications for Developing Countries. *Environment and Development Economics* 3:352–358.

Shue, Henry. 1999. Global Environment and International Inequity. *International Affairs* 75:531–45.

Speidel, J. Joseph, Deborah C. Weiss, Sally A. Ethelston and Sarah M. Gilbert. 2009. Population Policies, Programmes and the Environment. *Philosophical Transactions of the Royal Society* 364: 3049–65.

Stern, Sir Nicholas. 2006. Stern Review: The Economics of Climate Change: Office of Climate Change, HM Treasury, GB.

Storm, Servaas. 2009. Capitalism and Climate Change: Can the Invisible Hand Adjust the Natural Thermostat? *Development and Change* 40: 1011–38.

Sussman, Glen. 2006. The Environment as an Important Public Policy Issue. *Quest* 9(2):12–14.

Swimme, Brian and Thomas Berry. 1992. *The Universe Story*. San Francisco: Harper.

United Nations. 1992a. Rio Declaration on Environment and Development. Accessed July 30, 2008. www.un.org/documents/ga/conf151/aconf15126-1annex1.htm.

———. 1992b. United Nations Framework Convention on Climate Change. Accessed July 16, 2008. http://unfccc.int/resource/docs/convkp/conveng.pdf.

United Nations Framework Convention on Climate Change. 2007. Decision COP13: Bali Action Plan. Accessed June 15, 2010. http://unfccc.int/files/meetings/cop_13/application/pdf/cp_bali_action.pdf.

United Nations, General Assembly. 1948. Universal Declaration of Human Rights.

———. 1966. International Covenant on Civil and Political Rights. Accessed July 16, 2008. www.unhchr.ch/html/menu3/b/a_ccpr.htm.

United Nations Human Development Programme. 2007. Human Development Report 2007/2008: Fighting Climate Change: Human Solidarity in a Divided World. Accessed July 16, 2008. http://hdr.undp.org/en/media/hdr_20072008_summary_english.pdf.

United Nations Human Rights Committee. 2004. General Comment No. 31 [80] Nature of the General Legal Obligation Imposed on States Parties to the Covenant. Accessed July 17, 2008. www.unhchr.ch/tbs/doc.nsf/(Symbol)/CCPR.C.21.Rev.1.Add.13.En?Opendocument.

United Nations Office of the High Commissioner for Human Rights. 2008. What are Human Rights? Accessed July 17, 2008. www.ohchr.org/EN/Issues/Pages/WhatareHumanRights.aspx.

Wilson, Edward O. 1994. Biodiversity: Challenge, Science, Opportunity. *American Zoologist* 34: 5–11.

World Business Council for Sustainable Development. 2010. Private Sector and the UNFCCC: Options for Institutional Engagement. Accessed Sept. 10, 2010. www .wbcsd.org/web/energyclimate/WBCSD%20Ecofys%20ClimateFocus%20 Final%20Report.pdf.

World Health Organization. 2003. Climate Change and Human Health: Risks and Responses. Accessed March 2, 2008. www.who.int/globalchange/environment/ en/ccSCREEN.pdf.

World Watch Institute. Accessed June 30, 2009. www.worldwatch.org/.

ENVIRONMENTAL PRAGMATISM, ADAPTIVE MANAGEMENT, AND CULTURAL REFORM

WILLIS JENKINS

In defending a problem-based strategy of ethics against cosmological strategies, environmental pragmatists have presented ecological management as a model of adaptive social learning. However, management frameworks appear incapable of critiquing and changing moral culture in the ways that seem necessary for confronting difficult sustainability problems. I show how a problem-based approach to sustainability challenges can create a productive relation between science-based management programs and cultural reform processes, if it admits roles for ontological arguments and attends to minority moral communities. In order to respond to the sustainability crises, ecological managers must become skilled participants in moral culture, facilitating the inventiveness of agents who can make moral inheritances support new strategies of action.

The field of environmental ethics hosts a debate between competing strategies of practical reason. Both sides of the debate share a commitment for ethics to address environmental problems, but strategies diverge over notions of what an ethic must accomplish in order to do so effectively. Should ethics critique the cultural worldviews that give rise to en-

vironmental problems and propose alternative environmental values, or should it develop practical responses to problems from broadly available cultural values? That initial question of strategy seems to force a practical dilemma: choosing (what I will call) a cosmological strategy allows one to critique the depth of problems, but at the cost of distance from the moral imagination and political values of most citizens; while choosing a pragmatic strategy allows one to appeal to mainstream values to support specific policy solutions, but at the cost of constraint to policies those values permit. At the heart of the choice among strategies is a question of cultural reform: how much must societies change to meet sustainability problems, and how does that ethical change happen?

When overwhelming sustainability problems make it appear that moral culture must change extensively, then a cosmological strategy in which innovative ideas can lead to new patterns of cultural action will seem most attractive. However, some environmental pragmatists have been modifying their strategy of practical reason in order to show how problem-based approaches can also generate capacities of cultural reform. By using ecological management as an instrument of social learning, this approach supposes that a pragmatic ethic can help forge policy resolutions from broadly available cultural values, and that those values can be revised as a civic community learns from the management process. This approach thus attempts to overcome the strategic dilemma by making a problem-based approach function as a site of ethical reconstruction. The success of this approach, and of the pragmatic strategy in environmental ethics, depends on how well it meets the most difficult and important sustainability problems, for which a deep range of cultural reform seems needed.

I argue here that a pragmatic strategy working on a model of adaptive ecological management can indeed help facilitate cultural reform sufficient to respond to difficult sustainability problems, but that doing so requires incorporating elements of a cosmological strategy. A problem-based strategy depends on having decent problems on which to work, and for complex sustainability issues, that requires a facility to turn inchoate ecological threats into manageable cultural problems. That is an interdisciplinary interpretive task in which cosmological ideas can prove very useful. More importantly, generating responses to problems that threaten the integrity or endurance of a society depends on processes of cultural inven-

tion, in which agents make their moral inheritances support new patterns of action to solve new problems. Value theories, worldview criticism, and other exotic ontological fare can play important roles in sustaining those processes of cultural invention. Marginal moral communities may play important roles by making visible the inadequacies of the cultural mainstream, by inventing new capacities from cultural inheritances, and by enacting the possibilities of cultural reform those inventions make possible.

Environmental pragmatists tend to disdain cosmological approaches because they seem to abstract from actual problems and tend to ignore marginal protest communities because they seem to impede agreement on policy directions. Pragmatists acknowledge cosmological theories as part of moral culture, but criticize the theorists cultivating and enacting them. While agreeing that some of the pragmatist criticism is warranted, I argue that a pragmatic strategy needs the inventive work of moral innovators in order to address the sort of sustainability problems that outstrip current cultural competencies.

For addressing sustainability problems, a pragmatic strategy may at times rely on agents pursuing cosmological strategies because it needs the facility for cultural reform that a cosmological strategy cultivates as its objective. Complex eco-social threats such as climate change or biodiversity loss become intelligible problems susceptible of management only through new cultural ideas capable of interpreting them. Cosmological strategies center around ideological inventions that summon cultures to reinterpret their context and their problems. Their work makes a pragmatic strategy possible for the "wicked problems" that would otherwise frustrate adaptive management frameworks constrained to the moral mainstream of available cultural values. For the most important and complex ecological problems, therefore, a pragmatic ethic of adaptive management must incorporate facilities of a cosmological ethic of cultural reform. If it can, a pragmatic strategy could then argue that environmental ethics should begin from problem-solving efforts, not only when the problems have obvious policy solutions to which ethics might rally shared moral resources, but also when they do not, thereby challenging moral cultures to invent new possibilities of understanding and acting.

PRAGMATISM: MAKING ETHICS PRACTICAL

Pragmatists often introduce their strategy of practical reason with an opening complaint that cosmological strategies of environmental ethics have not proven their practical worth. That complaint about effectiveness introduces a pragmatic proposal for less metaphysical debate and more attention to creating broad agreement on policy responses to practical problems. The editors of the anthology *Environmental Pragmatism* thus set the scene:

> On the one hand, the discipline…has produced a wide variety of positions and theories in an attempt to derive morally justifiable and adequate environmental policies. On the other hand, it is difficult to see what practical effect the field of environmental ethics has had on the formation of environmental policy. (Light and Katz 1995, 1)

Ben Minteer and Robert Manning blame the field's ineffectiveness on its cosmological innovations: "urgent calls for new environmental worldviews and radically revised ontological schemes, rather than leading to improved environmental solutions and conditions, only lead ethicists' attention away from the resources already present within our shared moral and political traditions." In consequence, the field exhibits a "conspicuous silence regarding concrete solutions to real world environmental dilemmas" (2003, 319). Minteer and Manning follow the problem-solving approach opened by Bryan Norton, who contrasts his authentically "practical philosophy" with "axiological" value theories that, in his view, have narrowed topics of discussion, reduced possibilities for interdisciplinary collaboration, and led to a communicative breakdown between science and society (2003, 47–63). For Norton, sustainability depends on an integrative, adaptive ethos developed from science-based responses to specific problems (2005).

Pragmatists thus present their ethic of contextual problem-solving by pressing the dilemma between radical cosmological change and practical political engagement. Pragmatists expect environmental ethics to be practical in two ways: (1) by working with available moral resources, (2) for the sake of resolving specific policy problems. With both elements working together, they say, ethics can help achieve effective social response to environmental problems. Andrew Light thus asks ethicists to attend to cultural contexts by trying to "work within traditional moral psychologies and ethical theories that people already have" in order to create links

between existing moral priorities in specific communities and the ends of environmental concern (2003, 235). Practical ethics requires, he says, a "practical anthropology," attentive to the environmental interests and commitments that people hold, with a view toward "generating creative ways to persuade a variety of people" to adopt environmental solutions (2003, 241).

Persuasion focuses not on changing the values citizens hold but on solving the problems they face. Ethics works when it helps civic communities resolve their problems of environmental decision-making. If we begin with environmental policy dilemmas, say Minteer and Manning, we can appeal "in experimental fashion, to the tools of ethical theory in achieving a resolution" (2003, 321). On this "toolkit" view, ethics can deploy moral values as instruments effective for creating civic agreement on environmental resolutions. The adequacy of those values are measured by the ability of an ethical strategy to put them to work for "the practical dilemmas of forming a moral consensus around environmental issues" (Light 2003, 233).

However, organizing ethics around resolving policy problems and measuring it by the consensus it creates stands vulnerable to the other horn of the practical dilemma: resolutions seem limited by mainstream cultural values and predetermined by the way problems come framed through policy dilemmas. What if a culture's moral inheritances can no longer be trusted to guide its response to new problems? What if policy dilemmas arrive into debate ideologically distorted by social institutions resistant to change? A pragmatist attempt to mediate among poor alternatives would then miss the political powers driving the moral drama and unwittingly perpetuate structural injustice. "Approaching environmental problems and conflicts with the open-minded, respectful, and practical disposition suggested by pragmatists," says Robyn Eckersley, "can be positively foolhardy when there are more powerful forces arrayed around the negotiating table" (2002, 58).

Worse, it may suppress the fundamental criticism needed to adequately understand ecological problems. What if our received moral traditions constrain us from understanding the real character of ecological problems because those traditions are themselves at the root of the problems? If the problems warrant fundamental questions about inherited cultural worlds, then a problem-solving ethic must admit them. But pragmatism tends "to take too much as given, to avoid any critical inquiry into 'the big picture'

and to work with rather than against the grain of existing structures and discourses" (Eckersley 2002, 65). Such criticism points to a different sort of ethical strategy; for if our moral culture is dysfuntional, then ontological reflection and a new worldview would seem requisite, while contextual problem-solving would appear complicit with catastrophe.

Pragmatists employ three kinds of response to questions about cultural competencies—two unconvincing and one very promising. First, they may try to vindicate optimism in current moral culture. Minteer and Manning, for example, conduct a survey of environmental values in Vermont's citizenry in order to show the convergence of a wide range of values on acceptable forest management policies. They can then appeal to John Dewey's "faith in the capacity of the intelligence of the common man to respond with common sense to the free play of facts and ideas" in order to suppose that a pluralist moral culture can yield decent environmental policies (2003, 325). Those who do not share faith in common sense or the free play of facts, however, will find the appeal unconvincing. Vermont's forested landscape may inspire confidence, but not Appalachia's mountain-top moonscapes or Mississippi's cancer alley. Even if the public's range of environmental values really do converge on shared policies, what if those policies lead to ecological collapse or social injustice?

Vermont's exceptional civic attachment to its landscape makes destruction of its forests unlikely, but it is conceivable that a majority of reported environmental commitments would prove too weak to support effective climate policies. If only the marginal views—perhaps those most shaped by ecocentric cosmologies—supported adequate policies, what then would be the ethicist's task? The point is demonstrated by observing how easily exceptional civic attachment to a landscape can lead to social injustice. Environmental justice projects offer an important challenge to the ethics of contextual consensus. Although usually focused on specific problems of particular communities, they often appeal to a foundationalist principle (the justice protected by a human rights worldview) in order to protect persons from the toxic landscape outcomes of mainstream common sense. When a state is 96 per cent white, as is Vermont, appealing to "intricate portraits of the region's complex and evolving moral geography," as do Minteer and Manning (2009, 78), could mean legitimizing the morality of a landscape that can exclude strangers and export toxic wastes. The structural racism in American landscapes of toxic risk

and environmental privilege warn of the weakness of appeals to local moral geography before localist drifts toward "ecofascism" (see Zimmerman 1997). When Norton roots his contextual sustainability ethic in a community's impulse to perpetuate "place-based values" as a "community performative act" of political identity and self-definition (2005, 334–8), what prevents sustainability from illiberal exclusion?

Pragmatists sometimes meet the difficulty of unpalatable moral values with a second tactic: narrowing the range of citizens included in their ethic. Norton's convergence hypothesis stipulates that it is the values of "environmentalists" or of "the environmental community" that will converge on shared policy objectives (Norton 1991). Light sometimes refers to "the environmentally concerned" as participants in moral culture who matter (2003, 234). When faced with objectionable moral values, then, a pragmatic ethic can rule them out of the culture from which citizens solve problems together—as Light does for fascism and Norton does for narrow anthropocentrism. Holmes Rolston rightly objects that this tactic vindicates a pragmatic strategy by selecting only approved participants in pluralist problem-solving—those who are politically reasonable and environmentally sensitive. Such narrowing begs an account of environmental sensitivity, and Rolston argues that Norton seems to import ecocentric ideas as criteria for admissible problem-solvers (Rolston 2009). So pragmatism seems to use moral ideas produced by the cosmological strategy that it rejects. Even if that borrowing can be defended, how does this smaller community of environmental decency persuade the rest of moral culture?

The pragmatists offer a third, more interesting way of answering criticism that their strategy cannot generate ethical reform: sometimes they suggest that the exercise of solving problems itself generates better relations of nature and culture. Perhaps the exercise of confronting problems cultivates environmental responsibility. Norton provides the most robust account of this claim by presenting adaptive management as a process that generates both the descriptions and values needed to continue resolving problems: "the epistemology of adaptive management thus provides for gradual progress and improvement of both our belief system and our preferences and values, by using experience to triangulate between temporarily accepted beliefs and values" (2005, 151). Perhaps the political process of managing ecological problems can also function as a process

of social learning, wherein agents come to more reliably understand how humans do and should participate in ecological systems. If so, then the process of confronting ecological problems can generate the cultural reform needed for eventually successful resolutions.

ADAPTIVE MANAGEMENT: MAKING ECOLOGY ETHICAL

Within ecology, adaptive management (AM) usually refers to an integration of experimental research and experimental management, such that researchers investigate ecological systems in concert with management policies that influence how they work. It is often called "learning by doing," and may simply refer to using management policies as a tool for researching complex ecological systems (Walters and Holling, 1990). Policies may be crafted with experimental controls (e.g., using several management schemes at once) in order to let scientists assess how ecological systems function under different conditions of human influence (see Schmitz 2007). In its usual sense, AM allows managers to find policies effective for achieving social goals in contexts of complexity and uncertainty. But pragmatic ethicists invoke AM in a broader sense, as a model for adapting the social goals of policy as well. For Norton, AM functions as a site not only of scientific learning but also social learning, such that AM can produce an ethic of sustainability from the process of solving problems (rather than cosmological principles).

Norton calls AM a "practical philosophy," that begins from "the necessity of acting" imposed by some real management dilemma and develops a contextual strategy of response. Within the scale of the community at issue, it "begins with a problem-oriented approach, focuses on a few illustrative cases, and then works inductively toward a general theory of environmental values." That general theory then works as something like a fallibilist ontology of social learning; it describes human participation in ecological systems based on previous successful policy resolutions, but always open to more useful description. Theory and values come into social reflection as generated by successful solutions to science-based descriptions of problems, such that scientific descriptions and ethical arguments are warranted by their capacity to clarify and resolve debate in a wider political community (2005, 149–53).

An ethic of AM confounds any "applied" view of ethics and science, wherein ethicists supply values and scientists supply facts, with policymakers then using those supplies to resolve dilemmas. Instead, decision-

makers learn and revise both ethical guidelines and scientific description through policy responses to problems. They discover more adequate guidelines and descriptions over time, as they learn from successes and failures. For Norton, that makes AM a "mission-oriented science" that produces information relevant to socially important goals while also providing the context to justify or reconsider both those goals and the information (2005, 294). The point is not to make ethical theory more ecological, but to make the practice of ecology a form of ethics. "Environmental ethics," he hopes, "may someday be seen as an important subfield of adaptive management science" (2005, 120).

Can ecological management function as an environmental ethic? Consider the problem of invasive non-native species (INS), which has received heated attention in recent exchanges among philosophers and scientists. Philosopher Mark Sagoff claims that undefended cultural values have driven research and management of INS, which are not nearly the ecological threat that society supposes (Sagoff 2005). Biologist David Simberloff retorts with research showing that INS increase extinction risks and degrade ecosystems (Simberloff 2005). In the background lies a debate about relations of cultural values and scientific research in setting policy goals. How could ecological management function to resolve the dilemma?

A public AM process that develops INS control policies through broad participatory dialogue about research results can help a civic community clarify how its imagination shapes its interaction with biotic communities (see Evans et al. 2008). While not arguing for the sort of AM ethic that Norton has in mind, philosopher Kristen Shrader-Frechette and biologist David Lodge support a casuistic approach, in which ecologists help communities understand that making policy decisions about INS depends on incomplete scientific facts as well as independent cultural values. With moral intuitions and scientific uncertainty acknowledged, a civic community can work to develop policies responsive to accurate research and expressive of shared values (Lodge and Shrader-Frechette 2003). That seems to vindicate Norton's view that in the process of managing, societies can revise and improve their moral interpretation of the problems they face.

Perhaps reasoning from the cases of ecology can generate its own ethic. Ben Minteer and James Collins propose to introduce case-based moral reasoning into the professional training of ecological scientists and managers, with a view toward creating a custom ethical toolkit (2005a,

2005b). Ecology clearly lies entangled with moral culture in management dilemmas like INS, they observe, but the field of environmental ethics has been so preoccupied with changing worldviews that it is irrelevant to the practical problems faced by scientists and managers. Norton's work lets them suppose that the practice of ecological management can produce the ethics it needs. Writing in journals of the Society for Conservation Biology and of the Ecological Society of America, they argue that environmental professionals should have ethical training, which could be developed inductively from standard cases deliberated within the guild of researchers and managers. That professional community could then inductively build its own integrative framework for identifying and resolving the moral problems that arise in ecological management. Those cases and the inductive framework they support then offer "a new conceptual and analytical toolkit for ecologists and biodiversity managers that will help them deal with the moral questions raised by their work" (2005a, 1810). Minteer and Collins think that this problem-focused, practice-generated approach differs so much from environmental ethics that it opens a new field of applied ethics that they designate "ecological ethics." Recognizing a separate field, they argue, will allow for a disciplinary specialty constructed around the problems that managers and researchers face, thus developing custom tools for their professional toolkit. They call for institutional development of ecological ethics, incorporating its case-studies into professional education and its practical reasoning into research projects and the relevant codes of professional ethics.

Insofar as their proposal invites ecological scientists and managers to think through the ethical dimensions of their work and to more effectively participate in public policy deliberations, it is surely welcome and sorely needed. Indeed, it seems consistent with the many calls for more interdisciplinary ethics preparation in science education and with the recovery of humanities in other professional educations (e.g. medicine). However, their argument for a distinct field of applied problem-solving, distinguished from the theoretical pluralism of other fields and possessed of a custom toolkit, raises some questions. While helpful for INS cases, can an ethic developed from such cases confront the most important and complex problems? How should this professional ethic interact with wider moral cultures when those cultures seem incompetent for addressing sustainability challenges?

WICKED PROBLEMS

When Minteer and Collins call for a field constructed from and for the dilemmas of management science they appeal to the model of biomedical ethics—an independent discipline conceptually and institutionally oriented to the problems encountered in a discrete set of professional practices. However, biomedical ethics is a troubling model for two reasons. First, its very success in becoming an independent discipline institutionally oriented to the problems encountered in a discrete set of professional practices has sometimes threatened its credibility. An applied ethics that focuses on resolving the dilemmas created by contemporary health care practices may cede leverage to critique the context in which those dilemmas arise. Constructing ethics to solve professional problems can make the discipline captive to the ideologies and practices that produce its dilemmas. Overemphasis on cases, especially if deliberated among a narrow community of professionals, can blinker interpretive criticism of the problems it considers.

Biomedical ethics avoids blinkered captivity to professional cases because its problems receive attention from diverse theoretical perspectives, creating lively interdisciplinary exchanges that keep moral inquiry open. Religious ethicists have been particularly active, inquiring into implicit narratives of life and death, dominant metaphors of care-giving and researching, and ideologies underwriting the unjust distribution of health care. Biomedical ethics succeeds, it seems, precisely because it is not a management subfield but rather a formal intersection of disciplinary inquiries, shaped around practical responses to specific problems yet continually inviting modes of theoretical intelligence beyond the inductive reasoning of its own professionals. The teaching of ethics to medical students, moreover, has moved beyond supplying ethical tools, and now often includes a normative cultivation of ethical intelligence.

Robert Frodeman's response to the project described by Minteer and Collins is important here (2008). Frodeman-welcomes the general "policy turn" he sees in their proposal, which shifts the role of ethicists from writing for other ethicists to participating in research and projects. He describes the field-work training in the environmental philosophy program at his University of North Texas as illustrative of what Minteer and Collins propose. However, Frodeman observes an important difference: "the approach taken by UNT philosophy sees the goal of achieving policy

relevance as being tied to developing new institutional types of knowledge production….This will require the development of a critical theory of interdisciplinary knowledge, and a self-conscious research program on the relationship between knowledge production and its use (604–5). Frodeman's view of ethics in ecology suggests that creating a separate professional field for problem-solving could diminish the kind of knowledge production needed to reflect on responses to the most complex problems. Frodeman names climate change as the kind of problem requiring ongoing knowledge production and a live connection to our most important cultural resources.

The climate change example demonstrates a second trouble: biomedical ethics and ecological ethics sometimes face disanalogous problems. Shrader-Frechette and McCoy point out that in biomedical ethics the problems are more contained because the range of objectives for practicing and researching health care limits the complexity at issue (1993, 101–2). Environmental problems seem more open to interpretive and normative variety, and problems such as climate change are especially difficult to describe because they involve multiple units and scales of vulnerability, do not present themselves within a discrete set of professional practices, and involve a wider controversy of objectives. Moreover, environmental problems may pose basic threats to human societies in ways that biomedical problems generally do not.

Writing in the *Annual Review of Ecology and Systematics*, Donald Ludwig, Marc Mangel, and Brent Haddad (2001) argue that some environmental problems are "wicked problems." Because they have "no definitive formulation, no stopping rule, and no test for a solution," (the criteria from Rittel and Weber 1973) these problems escape the disciplinary competence of ecological science, and thus "involve a host of traditional academic disciplines that cannot be separated from issues of values, equity, and social justice" (482). Ludwig et al. specifically criticize AM projects that attempt to solve wicked problems from within disciplinary boundaries (498). It may work for resolving INS dilemmas, but not for generating meaningful responses to more complex threats like climate change.

In "Deconstructing Adaptive Management" (2006), Gregory et al. agree that AM will not permit learning about problems with extensive spatio-temporal scales, high uncertainty, multiple social objectives, or unstable political support. While excellent for discretely defined problems

such as tree-fertilization trials, AM seems untenable for assessing effects of climate change. While more urgent for sustainability policies, the cultural complexity that very urgency entails, along with the excessive scales and uncertain objectives, makes climate change impossible to frame as a proper problem. If ecological ethics responds by narrowing the range of problems it can consider—or by "waiting for a more respectable form of a problem," as Stephen Gardiner puts it (2004, 565)—that just makes it irrelevant to society's most important challenges.

If the success of environmental pragmatism depends on excluding problems it cannot handle, that would not undermine the entire strategy, but it would limit its operational scope (and deflate its polemic against cosmological approaches). For a pragmatic strategy to meet the social challenges of sustainability, it must be able to turn wicked ecological threats into manageable social problems of the sort that generate science-based cultural reform. A pragmatic strategy, that is, must not only rally political responses to problems by appealing to the available moral resources; it must also use cultural resources to invent new moral resources.

Reflecting on the practice of ecology in the context of climate change, Ludwig et al. argue that "the next generation of ecologists" must recognize that "traditional disciplines and training are inadequate for wicked problems involving the interaction of humans with their environment" (2001, 497). Addressing ecological problems, they say, requires ecologists who can learn from history, economics, and philosophy, among other disciplines. So trained, they may come to better understand their research problems by criticizing ideologies such as economism or scientism, recognizing cultural values such as consumerism, or by understanding religious worldviews. Those interdisciplinary capacities of cultural criticism can help generate more productive, more practical approaches to difficult problems. "Wicked environmental problems require not only innovative policy responses but also innovative methods of arriving at responses" (Ludwig et al. 2001, 506).

For a pragmatist strategy to succeed, its problem-solvers must be adept participants in moral culture. Their participation must include knowing how to generate the moral innovation needed by wicked problems and promised by cosmological approaches. Creating adequate responses to sustainability crises requires managers who can help make moral culture function in new ways. Cosmological approaches pursue a strategy that

supposes cultural action will change when worldviews change. Pragmatic management can seem insipidly weak on this view, generating inevitably ineffective solutions to ecological crises because the roots of sustainability problems lie in the moral culture from which the solutions are drawn. For a pragmatic strategy to work for wicked problems, it must demonstrate how an ethics of AM can produce cultural reforms adequate to meet unprecedented sustainability challenges, and that requires an account of how ecological problems relate to some view of moral culture.

PROBLEM-SOLVING AND CULTURAL REFORM

Aldo Leopold wrote that "no important change in ethics was ever accomplished without an internal change in our intellectual emphases, loyalties, affections, and convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that philosophy and religion have not yet heard of it" (1966, 246). Now that philosophy and religion have heard of conservation, perhaps they should take the lead in creating ethical change? Ethicists who emphasize the strategic task of changing worldviews answer affirmatively but, as we have seen, pragmatists worry that ethics then drifts away from specific problems, from broadly motivating civic values, and from the ecological sciences. Pragmatists worry, in other words, that cosmological approaches miss how ethical systems really function in practical life. The important question for the field's strategic debate then is: can ethics transform the "foundations of conduct" while working from available values and concrete problems?

A broad adaptive management frame provides an intellectual model for supposing that it might. Norton and Minteer argue that environmental values can improve as communities integrate science and ethics to learn from the problems that they face, and both appeal to Leopold's practice as exemplar of the process (Minteer 2006, Norton 2003). The question is whether the model holds up in the face of sustainability problems that seem to exceed the competency of our sciences and threaten the foundations of our patterns of culture. Some threats seem to outstrip cultural capacities for even recognizing a problem—the prerequisite for a pragmatic strategy to get underway. So how can management communities invent new ethical capacities in order to meet new problems?

Answers to that question depend on assumptions of how moral culture relates to social problems and how it shapes changes in cultural ac-

tion. Sociologist Ann Swidler provides an account of culture that allows pragmatists to suppose to that cultural reform happens as agents redeploy their moral inheritances to invent new strategies of action (1986, 2001). Swidler thinks that moral culture can indeed drive social change "but not in the way conventional sociological models suggest" (2001, 80). Conventional models suppose that moral culture supplies the values which guide action by setting its goals, such that reform requires replacing those values. That sort of view often informs strategies focused on transforming worldviews. In Swidler's view, culture works on action "not through values but by furnishing a repertoire of capacities for action that can be mobilized to achieve new objectives" (2001, 82). Values and cosmologies still matter as part of a "'tool kit' of symbols, stories, rituals, and worldviews which people may use in varying configurations to solve different kinds of problems" (1986, 273). The ethical meaning of the moral tools in a cultural toolkit thus amounts to the strategies of action they are used to sustain, and so is shaped to the sort of problems cultural agents imagine themselves confronting.[1]

Ethical change thus happens as agents deploy a culture's symbols and worldviews in new ways, so as to organize action differently in response to unresolved problems. We should therefore expect intense cultural experimentation and invention in perceived gaps between the capacities of cultural action and the challenges of new problems. Cultural reform happens as communities redeploy their moral inheritances to solve new problems with new strategies of action. Swidler's analysis thus implies that moral culture is inherently dynamic and problem-focused, and therefore susceptible to change by the agency of skilled, innovative participants. What changes, however, is not necessarily the cosmology, but how a culture's toolkit is used.

This view of cultural action rescues the culture-transforming promise of an ethic modeled on AM, but it also intensifies the role of managers. With a problem-solving account of cultural production, pragmatists can suppose that a wide social process of responding to complex ecological threats should produce all sorts of more and less successful experiments, each seeking to make a varied cultural inheritance capable of new things. Ethical problem-solvers must do more than assess the diversity of cultural values in order to find support for policies; they must create conditions for diverse cultural agents to make those values do new things. Participants in

ecological problem-solving, this view suggests, must do more than survey stakeholder viewpoints because what is important is the understanding of what those values *can* do. Problem-solvers must then become skilled and creative participants in moral culture, capable of recognizing and stimulating the inventive processes by which agents make moral culture capable of meeting new problems. In order to create cultural conditions for better understanding difficult ecological problems, managers and ethicists must understand how moral symbols function to sustain broader patterns of cultural action, and anticipate how they might function differently. The management task now includes dimensions of social criticism, requiring agents capable of making problems matter within a particular community's background beliefs in such a way that the problems begin to unsettle, challenge, and change those beliefs (King 1999).

Participating in moral culture on this model opens the concept of adaptive management to a much wider, more pluralist, and more chaotic arena of cultural experimentation. For a problem like climate change, the relevant management team extends beyond policy-makers, climate scientists, and "the environmental community," to all the actors using climate change as a conceptual space to create new capacities from cultural inheritances. Pragmatists must understand how alternative worldviews, ontological value theories, and new ecological cosmologies function within that space as incubators of moral culture. Rolston (2009) argues that environmental pragmatism has already been shaped by the ecocentric theories it disdains, borrowing from the moral capital generated by agents of worldview change. He calls on pragmatists to honestly admit the cultural effect of ecocentric cosmological ideas.

From a different margin of mainstream moral culture, consider the importance of environmental justice projects. They often distrust a dominant culture's perception of a problem as well as mainstream political processes for resolving it. Resisting environmental hazards imposed by political disempowerment and social bias, they have reason to doubt that mainstream moral culture will converge on fair outcomes for disempowered citizens or marginal communities. Environmental justice advocates often begin, therefore, by redescribing a community's problems with an alternative moral framework. Recasting a civic dispute over waste disposal as a contest of environmental racism, for example, can make a zoning disagreement susceptible to the interpretive power of civil rights ideas

(Bullard 2000). Redeploying the civil rights framework allows participants to resist initial management framing of the problem and reinterpret it terms of justice and human dignity.

Reframed by ideas of racism and justice, the toxins management problem questions the ability of mainstream civic culture to achieve a decent resolution while deploying minority moral resources to invent and propose new cultural capacities (environmental rights, perhaps). Moreover, as sociologist Dorceta Taylor observes, environmental justice advocates sometimes draw on alternative moral cosmologies that reconceptualize nature and offer a counter-narrative of human relations to their landscape in order to critique dominant environmental management patterns (Taylor 2000). The first principle of environmental justice declared by the 1991 National People of Color Environmental Leadership Summit "affirms the sacredness of Mother Earth, ecological unity, and the interdependence of all species, and the right to be free from ecological destruction" (quoted in Pellow 2007, 245). Cosmological reimagination can empower communities attempting to contest the framing of ecological problems or the interpretation of policy options.

Constructing alternative metaphors and proposing revisionary narratives sometimes may prove crucial for adequate modeling of a difficult problem. Writing in response to the Minteer and Collins proposal, the usually managerial Norton seems to vindicate something like a cosmological proviso for pragmatic approaches to wicked problems. When facing "messy problems, often involving conflicts among conflicting goods," says Norton, there are "varied complaints and varied explanations of what the problem is, often associated with varied value positions and perspectives." That is just when a pragmatist might want to reduce conflict to policy agreement. "But," surprises Norton, "it is in this messy dialogue about goals and aspirations that metaphors and similes allow the reconstruction of a problem." A process open to reframing a problem, he writes, "encourages 'social learning' at the deepest, metaphorical level—the kind of social learning that can 're-model' complex and wicked problems and improve communication by disentangling messes into addressable problems" (2008, 590–1).

Norton thus shows that a pragmatist strategy might accommodate alternative models of practical reason, suggesting that cosmologies and worldviews may sometimes offer an important cultural "tool" for making

sense of problems. Cosmologies are unique cultural tools, however, for when deployed rightly, they have the facility to question the management framework itself. Norton and Minteer use management metaphors as overarching frames for organizing deliberation, but if Norton is right that wicked problems call for broad iterative reconceptions, then problem-solvers might propose an alternative metaphor of cultural agency. Rolston wonders, "why not, for instance, think of ourselves as authors who are writing the next chapters, or residents who are learning the logic of our home community?" (1994, 226). Management metaphors, worries Rolston, can excuse agents from personal change and insulate moral cultures from the claims of the non-human world (1994). Management metaphors of knowledge production may be ineffective or dysfunctional in regard to some problems. When a management frame obscures how humans participate in ecological destruction or social injustice they make problem-solving processes captive to dominant ideologies. Cosmological reframing can at least raise that question. So a critical minority working with an alternative worldview may be important for making "management" the scene of ongoing interdisciplinary inquiry about how to best intepret the human experience of evolutionary and ecological participation.

Norton's interest in deep metaphorical reframing from pluralist dialogue suggests that, in the interest of better understanding the problems, skilled cultural negotiators should avoid—rather than promote—"collapsing" moral pluralism into a weak anthropocentric management agenda (Minteer et al. 2004, 134). For wicked problems, a search for policy consensus may stymie the pluralist moral experimentation needed to invent new cultural capacities. When facing sustainability problems that frustrate mainstream cultural competencies, ethicists might look away from the moral mean and its common sense, and instead pay special attention to peculiar imaginaries and marginal projects of response.

PROPHETIC PRAGMATISM?

Minority moral strategies may, of course, themselves prove dysfunctional in regard to ecological problems. My argument merely suggests that, despite pragmatist disdain, cosmological arguments and marginal moral proposals can sometimes make moral culture function in new and better ways. Researching and responding to wicked ecological problems depends on stimulating capacities of cultural reform, and those reforms

are sometimes facilitated by counter-cultural narratives or cosmological imaginaries, or by alternative notions of nature and humanity. Resolving wicked problems sometimes depends on the ontological ideas deployed by communities trying to invent new possibilities from their moral inheritances.

I have argued here for a kind of pragmatism committed to working on specific problems with moral culture as it finds it, yet not content to let societies flounder incompetently before complex threats. This is a pragmatism restless for reform, attentive to minority moral strategies, and critically inventive. It stands near to what Cornel West calls "prophetic pragmatism": a "quest for wisdom that puts forth new interpretations of the world based on past traditions in order to promote existential sustenance and political relevance" (1989, 230). Ecological sustenance is not quite what West has in mind there, but his view of tradition and change works toward a similar goal: skilled cultural actors can help create new capacities from moral inheritances that in turn enable communities to take responsibility for society's deepest and most difficult problems.

Ecological problems with planetary scales and unprecedented involvements of human power in life processes seem incomprehensible apart from questions of how to understand humanity's place on this planet. Cosmological interpretations can offer a cultural tool for reckoning with wicked problems by surfacing and hosting the unavoidable background questions that attend our interpretation of those problems and of our possibilities of response. This remains a pragmatic strategy because it remains disciplined to specific problems and seeks cultural reform through the process of responding to them. However, when faced with wicked problems like climate change or pervasive toxic exposures, participants in problem-solving should solicit multiple iterations of the problem, attending especially to minority moral communities, and should communicate in ways apt to stimulate cultural reform.

Regarding climate change, involvement from prophetic pragmatists seems especially important as research consortiums communicate dramatic findings with only implicit moral arguments (see Brown et al. 2006). Ruling out cosmological or marginal approaches may ignore how cultural actors are responding to climate change by redeploying their cultural toolkits to support new patterns of cultural action. Adaptive responses must learn to admit comprehensive questions that question the compe-

tency of our moral culture without fearing that the questions will close down practical, science-based adaptation. When questions of cultural transformation are raised from within specific processes of confronting problems, they can stimulate the deliberative public on which such a process depends.

Some of the scientists and policy-makers working on climate change agree with philosopher Dale Jamieson, who claims that climate change raises "fundamental questions," about "how we ought to live, what kinds of societies we want, and how we should relate to nature" (quoted in Gardiner 2004, 575). Recognizing such questions can help sustain a practical, science-based process of developing relevant responses. When fundamental questions are raised from within experimental processes for confronting problems, they can stimulate the deliberative public on which such a process depends. Ethicists may have a unique role to play here; not as academic moralists proposing or rearranging free-floating cosmologies, but by helping specific moral communities reckon with comprehensive questions at stake in confronting difficult problems.

The possibility for an adaptive science of sustainability thus lies in making problems stimulate cultural reform. Constructing an ethics that supports innovative approaches to wicked problems requires bringing together problem-solving and cultural reform in such a way that communities learn from their most difficult problems as they adapt to them. Working from specific problems with the moral values resident in a community (the pragmatist counsel) need not rule out transformative cultural reform (the cosmological hope). Indeed, as communities attempt to make sense of the predicaments they face, they may discover or invent new practical capacities from their moral inheritances. Understanding and responding to atmospheric climate change requires an accompanying cultural climate change, which happens as cultural actors make moral inheritances respond to unprecedented problems. Resolving problems depends on inventions of cultural hope.

NOTES

1. A similar view of culture is provided by Pierre Bourdieu, whose *habitus* works similarly to Swidler's strategies of action, but Bourdieu allows less anticipation of innovation and social change (see Bourdieu 1990).

REFERENCES

Bourdieu, Pierre. 1990. *The Logic of Practice*. Translated by Richard Nice. Stanford: Stanford University Press.

Brown, Donald, John Lemons, and Nancy Tuana. 2006. "The importance of expressly integrating ethical analyses into climate change policy formation." *Climate Policy* 5: 549–52.

Bullard, Robert. 2000. *Dumping in Dixie: Race, Class, and Environmental Quality*. Boulder, CO: Westview Press.

Eckersley, Robyn. 2002. "Environmental Pragmatism, Ecocentrism, and Deliberative Democracy: Between Problem-Solving and Fundamental Critique." In *Democracy and the Claims of Nature*, edited by Ben Minteer and Bob Pepperman Taylor, 49–70. Lanham: Rowman and Littlefield.

Evans, Jason, Ann Wilkie, and Jeffrey Burkhardt. 2008. "Adaptive Management of Nonnative Species: Moving Beyond the 'Either-Or' Through Experimental Pluralism." *Journal of Agricultural and Environmental Ethics* 21: 521–39.

Frodeman, Robert. 2008. "Redefining Ecological Ethics: Science, Policy, and Philosophy at Cape Horn." *Science and Engineering Ethics* 14:597–610.

Gardiner, Stephen. 2004. "Ethics and Global Climate Change." *Ethics* 114: 555–600.

Gregory, R., D. Ohlson, and J. Arvai. 2006. "Deconstructing adaptive management: criteria for applications to environmental management." *Ecological Applications* 16: 2411–25.

King, Roger J. H. 1999. "Narrative, Imagination, and the Search for Intelligibility in Environmental Ethics." *Ethics and the Environment* 4: 23–38.

Leopold, Aldo. 1966. *A Sand County Almanac, with essays on conservation from Round River*. New York: Oxford University Press.

Light, Andrew. 1997. "Materialists, Ontologists, and Environmental Pragmatists." In *The Ecological Community*, edited by R. Gottlieb, NY: Routledge: 255–69.

———. 2003. "The Case for a Practical Pluralism." In *Environmental Ethics: An Anthology*, edited by Andrew Light and Holmes Rolston, 229–47. Malden, MA: Blackwell.

Light, Andrew, and Avner De-Shalit. 2003. *Moral and political reasoning in environmental practice*. Cambridge, MA: MIT Press.

Light, Andrew, and Eric Katz, eds. 1995. *Environmental pragmatism*. New York: Routledge.

Lodge, David, and Kristen Shrader-Frechette. 2003. "Nonindigenous species: ec-

ological explanation, environmental ethics, and public policy." *Conservation Biology* 17: 31–7.

Ludwig, Donald, Marc Mangel, and Brent Haddad. 2001. "Ecology, Conservation, and Public Policy." *Annual Review of Ecology and Systematics* 32: 481–517.

Minteer, Ben, and James Collins. 2005a. "Ecological ethics: Building a new tool kit for ecologists and biodiversity managers." *Conservation Biology* 19: 1803–12.

———. 2005b. "Why we need an 'ecological ethics.'" *Frontiers in Ecology and the Environment* 3: 332–7.

Minteer, Ben, Elizabeth Corley, and Robert Manning. 2004. "Environmental ethics beyond principle? The case for a pragmatic contextualism." *Journal of Agricultural and Environmental Ethics* 17: 131–56.

Minteer, Ben, and Robert Manning. 2003. "Pragmatism in Environmental Ethics: Democracy, Pluralism, and the Management of Nature." In *Environmental Ethics: An Anthology*, edited by A. Light and H. Rolston, 319–30. Malden, MA: Blackwell:

———. 2009. "Convergence in Environmental Values: An Empirical and Conceptual Defense." In *Nature in Common? Environmental Ethics and the Contested Foundations of Environmental Policy*, edited by Ben Minteer, 65–80. Philadelphia: Temple University Press.

Norton, Bryan. 1991. *Toward Unity Among Environmentalists*. New York: Oxford University Press.

———. 2008. "Beyond positivist ecology: Toward an integrated ecological ethics." *Science and engineering ethics* 14: 581–92.

———. 2003. *The Search for Sustainability*. Cambridge: University of Cambridge Press.

———. 2005. *Sustainability: A Philosophy of Adaptive Ecosystem Management*. Chicago: University of Chicago Press.

Pellow, David Naguib. 2007. *Resisting Global Toxics: Transnational Movements for Environmental Justice*. Cambridge: MIT Press.

Rittel, Horst and Melvin Webber. 1973. "Dilemmas in a General Theory of Planning." *Policy Sciences* 4: 155–69.

Rolston III, Holmes. 1994. *Conserving Natural Value*. New York: Columbia University Press.

———. 2009. "Converging versus Reconstituting Environmental Ethics." In *Nature in Common? Environmental Ethics and the Contested Foundations of Environmental Policy*, edited by Ben Minteer, 97–117. Philadelphia: Temple University Press.

Sagoff, Mark. 2005. "Do non-native species threaten the natural environment?" *Journal of Agricultural and Environmental Ethics* 18: 215–36.

Schmitz, Oswald. 2007. *Ecology and Ecosystem Conservation*. Washington, DC: Island Press.

Shrader-Frechette, Kristen, and Earl McCoy. 1993. *Method in Ecology: Strategies for Conservation*. New York: Cambridge University Press.

Simberloff, David. 2005. "Non-native species do threaten the natural environment!" *Journal of Agricultural and Environmental Ethics* 18: 595–607.

Swidler, Ann. 1986. Culture in Action: Symbols and Strategies. *American Sociological Review* 51: 273–86.

———. 2001. *Talk of Love: How Culture Matters*. Chicago: University of Chicago Press.

Taylor, Dorceta. 2000. "The Rise of the Environmental Justice Paradigm." *American Behavioral Scientist* 43: 508–80.

Walters, Carl, and Crawford Stanley Holling. 1990. "Large-Scale Management Experiments and Learning by Doing." *Ecology* 71: 2060–8.

West, Cornel. 1989. *The American Evasion of Philosophy*. Madison: Univ. of Wisconsin Press.

Zimmerman, Micheal. 1997. "Ecofascism: A Threat to American Environmentalism?" In *The Ecological Community*, edited by R. Gottlieb, 229–54. New York: Routledge.
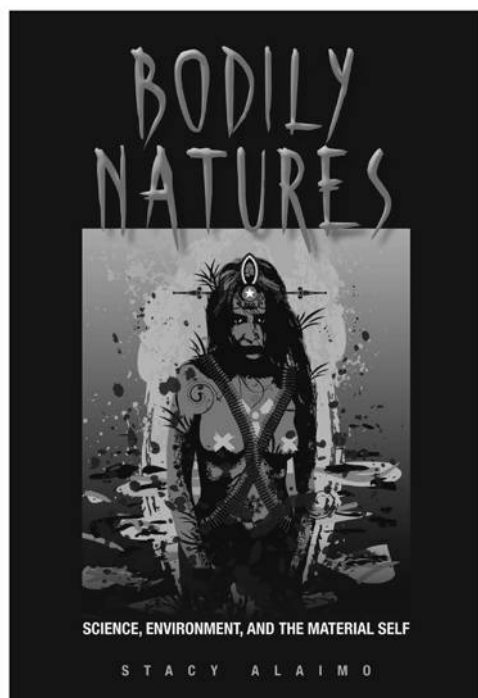
Bodily Natures

Science, Environment, and the Material Self

STACY ALAIMO

Drawing on feminist theory, environmental studies, and the sciences, Alaimo looks at a broad range of creative and philosophical writings, illuminating how science, politics, and culture collide, while considering the closeness of the human body to the environment.

"This impressively researched and vigorously argued study will be of the first importance to all environmental humanists, especially for its deeply-informed and subtle account of the 'trans-corporeality' of the human self."
—Lawrence Buell, Harvard University

paper $24.95 cloth $70.00

INVASIVE SPECIES AND THE LOSS OF BETA DIVERSITY

SARAH WRIGHT

Why should we avoid introducing invasive species? In this paper I argue that in addition to the more ordinary and visible types of harm that invasive species cause, they also cause a reduction in a particular kind of biodiversity—that of beta diversity. Rather than simply measuring the number of species found in a particular region, beta diversity measures the differences in the species found between regions. This difference between regions can be measured by comparing neighboring regions (local beta diversity) or by comparing distant regions (global beta diversity). Both types of beta diversity are reduced by the introduction of invasive species. I further argue that beta diversity is an important part of our concept of biodiversity and of what we value about the natural world. Thus the tendency of invasive species to reduce beta diversity gives us a substantial reason to avoid introducing them.

As I travel the highways of Georgia, I am regularly appalled by the ubiquitous presence of kudzu. It covers trees, telephone poles, open swathes of land, and old houses, making many locations indistinguishable from one another; all I can see from the road is a wave of green covering any formerly distinctive markings. Thinking back to the intentional introduction of kudzu to the American southeast, I recognize that those individuals who encouraged the planting of kudzu made a serious mistake.[1] Their introduction of an invasive species has produced real harms to my local ecosystem.

In this paper I will argue that the introduction of invasive species

should be avoided, not only because it may directly interfere with human interests and local ecosystems, but also because it reduces biodiversity. Rather than focusing on the type of biodiversity captured in species counts and directly affected by extinction and extirpation, I will focus on a type of diversity not often considered in the philosophical literature—beta diversity. Beta diversity is the target of a growing number of studies in ecology, and is the primary measure used to evaluate the phenomenon of biotic homogenization. Biotic homogenization occurs when different local environments become more like their neighboring environments. Beta diversity is a measure of differentiation between environments, and when these areas become more homogeneous, beta diversity is reduced. I argue that this reduction in beta diversity is just as harmful as the reduction of other sorts of diversity. The value of this type of diversity has been overlooked, in part because it is hard to conceptualize and measure, and because what is lost is a pattern, and not an individual entity, or the group of entities that make up a species. Nonetheless, beta diversity is worth preserving.

To begin this discussion, we need to have a clear understanding of what counts as an invasive species. As I will use the term, an invasive species is any non-native species that is flourishing in its new environment, such that it does not need to be continually propagated by humans. Following Ned Hettinger (2001), I define non-native species as any species that are not yet part of the ecological assemblage of a local region—those species that have not yet had an evolutionary impact on, nor been impacted by, the local ecosystem. This definition of invasive species does not require that these species have been introduced by humans; however we will be considering why we ought not to introduce invasive species, and so the human element is contained in the action considered.[2]

Before we deal with the more esoteric harms of invasive species, we can begin by considering the harms that invasive species directly cause to the communities in which humans live. These harms have convinced people to designate some species as noxious weeds and led to prohibitions on the planting of those species. Kudzu is an example of this category. These species are targeted because of the direct harm that they do to human communities and to the crops upon which we depend. The harm here may be as direct as reducing the amount of land available for crop production. Plants that are classified as weeds often out-compete crop species, and

their presence necessitates the introduction of weed control mechanisms.[3] Or an invasive species may be an animal or insect that eats a crop species. Golden apple snails are an example of this. They were introduced into Asia to serve as an additional source of protein. However, they grow on rice plants and have endangered many acres of this crop (Vitousek et al. 1996). The harm caused by an invasive species may simply be that the species is a nuisance to human communities. Kudzu is a clear example here, as it frequently invades areas used for recreation and decoration (like lawns) and its removal requires a great deal of labor. Zebra mussels are another example of a species that has a direct human impact. These mussels are an invasive species in the Great Lakes, and millions of dollars are spent every year scraping these mussels off of infrastructure such as intake ports for water treatment plants (Vitousek et al. 1996; Van Driesche 2000).

   Considering only these harms, we can say that those who introduced kudzu did something that they had a reason not to do. Their action imposed a harm and a cost on future generations. Perhaps we can mitigate this blame to some extent by pointing out that those who introduced kudzu did not know that it would become as robustly invasive as it did. (Though they chose kudzu because it is an aggressive groundcover plant, and so perhaps should have foreseen that it might have harmful effects.) But in cases where it is not known what harm the introduction of a species might cause, a risk is run.[4] Given this risk of harm, there is a compelling reason to avoid introducing new species to an area.

   In addition to direct harms to human interests, invasive species also cause harm to the ecosystem as a whole. This happens by way of many mechanisms that are interconnected. One is that invasive species prey on native species, causing extirpation and sometimes extinction. An example of this is the brown tree snake, which was accidentally introduced to the island of Guam. These snakes entered an environment full of bird species that were unused to snake predation; as a result these birds had not adapted any snake-avoidance behaviors. Since the introduction of the brown tree snake to Guam, nine of the thirteen forest bird species native to the island have been extirpated, and the remaining species are severely threatened (Burdick 2005). So invasive species can directly eliminate local populations of native species. Invasive species also endanger local species by causing a change in ecosystem variables and altering the local environment in ways for which native species are unable to adapt. The invasion

of buffelgrass in the Sonoran desert in Arizona is a clear example of an invasive species that has changed an ecosystem function (Niibus 2007; Bufflegrass Working Group 2008). Buffelgrass, having evolved in Africa, is well suited to the desert environment of the Sonoran desert. It grows readily in these harsh conditions, and as a result is pushing out native species, particularly by outcompeting the very youngest of trees and cacti. Buffelgrass grows quickly during the rainy season, but for the rest of the year it is composed mostly of very dry, thin stalks that burn easily and at a high temperature. Buffelgrass's susceptibility to fire contrasts with that of native desert plants, like cacti. During the dry seasons, the cacti, which act like huge sponges, shrink the size of their tissues. But they are not susceptible to fire; in fact the native plant configurations are considered to be "fireproof." The introduction of buffelgrass increases both the chance and the intensity of fires. This increased flammability poses a hazard to people living in these environments, but it also poses a risk to the saguaro cacti in the desert. Buffelgrass fires can scar and kill these very slow grow-ing cacti, and fast-growing buffelgrass vegetation can inhibit new cactus growth. Thus the presence of buffelgrass increases the risk of extirpation of the saguaro cacti from the region. Yet the Sonoran desert is the only place saguaro cacti grow—if they are extirpated from this habitat, they will also be extinct.

These examples illustrate some mechanisms by which invasive species can cause native species to be extirpated from the regions they invade. On a more general scale, it is estimated that the presence of invasive species is one of two major causes of extinctions, the other being the reduction in available land for wild species (Wilcove et al. 1998, 2000).[5] Extinctions are a clear harm to the biosphere, and extirpation is a clear harm to an ecosystem. As evidence that the elimination of species is generally thought to be harmful, we need only look to the endangered species act, which clearly marks the extinction of a species as an outcome to be avoided. In addition, there are many different arguments offered by philosophers to support the claim that the extinction of a species is an outcome that we ought to avoid.[6] If any of these arguments work, we are provided with a reason to avoid importing invasive species, since their introduction tends to lead to extinction.

The two considerations offered so far give us two different reasons not to introduce invasive species. The first reason depends directly on our

human interests. Insofar as we (and our future generations) would like to have cleared fields, we should not introduce kudzu. Insofar as we would like to protect our food crops, we should not introduce invasive species that either compete with them or feed on them. The second argument depends on the way that the introduction of an invasive species can interrupt the functioning of an ecosystem, leading in some cases to the loss of species, either locally or globally.

But what about invasive species that do not have these obvious harmful effects? Some species may thrive in a local environment without either directly interfering with human interests or putting local species and ecosystems at risk.[7] There are other, more complex, ways that invasive species can harm ecosystems, including the reduction of beta diversity.

WHAT IS BETA DIVERSITY?

Beta diversity is best explained by contrasting it with two other measures of diversity: alpha diversity and gamma diversity.[8] Imagine that we are focusing on the trees in a given forest, and within that forest we have many single hectare plots that have been marked off. When we look in the first plot we find examples of six different species of trees, call them species A, B, C, D, E, and F. The second plot also contains six different species of tree, but some are different from those in the first plot. In addition to containing species F, the second plot also contains species G, H, I, J, and K. Finally there is a third plot containing species G, H, I, J, and K, which overlap with those in the second plot, and in addition samples of species L and M for a total of seven species.

Alpha diversity is an inventory type measure and it is applied to each small plot. Alpha diversity measures the number of species appearing in each plot—a species count.[9] In the example above, the alpha diversity of the first two plots is the same, since each of these two plots contains samples of six different species. The third plot however has higher alpha diversity, since seven species are represented there. Gamma diversity is also an inventory measure, but it is applied not to the smaller plots, but to the whole forest. In the example above, the forest contains thirteen different species of tree (A–M), and this count determines the gamma diversity of the region.

Beta diversity is a different sort of measure from alpha and gamma diversity because it focuses not only on counting species within a plot but

Species	Plot 1	Plot 2	Plot 3
A	X		
B	X		
C	X		
D	X		
E	X		
F	X	X	
G		X	X
H		X	X
I		X	X
J		X	X
K		X	X
L			X
M			X

also on comparing the species counts between the different plots in the forest. Beta diversity is a between-plots measure.[10] To find the beta diversity between the first and the second plots, we need to look for the species found in the first plot but not found in the second plot (A, B, C, D, E), and the species that are in the second plot which are not represented in the first plot (G, H, I, J, K). We then compare this to the number of species that are found in both the first and second plots, in this case only one, species F. This results in a higher measure of beta diversity than that between the second and third plots—many more species are unique to only one of the two plots than are common to the two plots. When we move to measuring the beta diversity between the second plot and the third, we note that the second plot has only one unique species (F) and the third plot has two (L, M). Compared to the large number of species that the second and third plots have in common (G, H, I, J, K), this yields a low beta diversity between the second and third plots. Thus, the beta diversity between the first and second plots is higher than the beta diversity between the second and third plots. This is true even though the third plot contains more species than either of the other two plots.

Each of these types of diversity can be measured over time. Here we can see the effects of invasive species. Imagine that an invasive species X is introduced into the forest. It takes root and thrives in all three plots. It

competes directly with species A and eliminates it from the forest. Once invasive species X has entered the forest and had its effects, the beta diversity between the different plots in the forest has been reduced. The first plot is now more like the second plot than it was before. They now share another species (X) and the first plot has lost a unique species (A). Thus, even though the number of species found in the first two plots taken together remains the same, the difference between them has been reduced. The beta diversity between the second and third plots has also been reduced, even though neither of these plots has lost any species. While no species have been lost, there is now one more species (X) in common between the second and third plots and this also results in a reduction in the beta diversity between the second and the third plots. When the beta diversity between the different plots in the forest has been reduced in this way, we will also say that that forest as a whole has lost beta diversity. Thus we can characterize this example as an instance in which the introduction of an invasive species reduces the beta diversity of a forest.[11] Call this a reduction in local beta diversity, because the compared plots are local to each other; they are all within the same forest. Looking at change over time, a reduction in beta diversity will also be called biotic homogenization, since this type of change results in a local environment that is more homogenous than it was previously.

Moving from a focus on the plots within a small region like a forest, we can also think about the beta diversity between plots that are far away form each other. For example, we might compare a plot in Japan with a plot in the United States. As the two countries are so far apart and isolated form each other over evolutionary time, it is unlikely that there will be much overlap between the species found in the plots in Japan and the US. However, one species might be found on both species lists—kudzu. Compare this to the species that would be found in each location before the introduction of kudzu as an invasive species. Since these plots now share a species that they did not share previously, the beta diversity between these two plots would be higher in the past than it is currently. Thus we can say that the introduction of kudzu reduced the beta diversity between these two far-flung plots. There is no forest, or other local eco-region that encompasses these two plots, and so we will count this as a reduction in global (rather than local) beta diversity.[12]

When discussing biodiversity, we do not often make distinctions between alpha, beta, and gamma diversity. But philosophical arguments for

the preservation of species and against human-caused extinctions are related to concerns about gamma diversity. In most applications of gamma diversity, the regions considered are local ones. When a species is eliminated from a local region—when it is extirpated—there is a reduction in local gamma diversity. It is also possible to consider the gamma diversity of the whole planet, to consider all the species that would be listed in a global census. I will call this the measure of global gamma diversity. We can then interpret the extinction of a species as a reduction in global gamma diversity—when a species becomes extinct, the species count for the worldwide region is decreased by one. A consideration of this relation between extinction and global gamma diversity allows us to see the arguments that are raised for the preservation of species as likewise arguments against the reduction of global gamma diversity.

HOW DO INVASIVE SPECIES AFFECT BETA DIVERSITY?

Invasive species reduce global beta diversity

We have already seen one example in which the introduction of an invasive species reduces global beta diversity—that of the introduction of kudzu. The effect of invasive species on global beta diversity is very direct. When a species that is native to one area thrives in a different area where it is not native, the beta diversity of regions containing both areas is diminished. This is true because the invasive species is now present in the two compared areas, whereas before it appeared in only one. When taking a beta diversity measure between these two plots, there is one less species that is unique to a single plot, and thus beta diversity is reduced. When we take the region in question to be the entire planet, and thus consider global beta diversity, we can see that the spread of invasive species will always be a threat to global beta diversity.

This is doubly true when we consider an invasive species that has been introduced to more than one region in which it is non-native. The golden apple snail is native to Argentina. It was originally introduced into Taiwan, but when it failed to take off as a popular food crop there, the same species was introduced in other regions of Asia. It can now be found in regions of the Philippines, Indonesian, Malaysia, Thailand, China, and Japan. If we could compare plots in each of these countries to plots in Argentina, both before and after the invasion of the golden apple snail, we would find that plots in these southeast Asian countries are now more

similar to the plots in Argentina than they were before. This reduces global beta diversity. In addition, since the same invasive species was introduced to each of these southeast Asian countries, they are also more similar to each other than they were before. Thus, when the same invasive species are introduced into a wide range of new locations, global beta diversity will be further reduced.

Invasive species reduce local beta diversity

The relation between invasive species and local beta diversity is a more complicated one. However the overall trend indicates that invasive species tend to reduce local beta diversity, at least once the invasive species have been given time to establish their ranges. At first, the presence of an invasive species increases local beta diversity (McKinney 2004). If a recently introduced species appears only in one plot within the local region, local beta diversity is increased. However as an invasive species becomes more and more pervasive, it reduces the beta diversity of the region. One mechanism by which this may happen is that an invasive species is intentionally introduced. Those species that are chosen for introduction in one region are likely to be the same ones chosen for introduction in another region. The same game fish are introduced in many regions in the US. Thus the introduction of brown trout into a new river tends to make that river more like other rivers in the region and more like other rivers throughout the country. Even without direct and intentional introduction, the same species may tend to thrive throughout the region into which they are introduced. They may spread by natural propagation, or, if introduced accidentally, they may be re-introduced through the same accidental mechanism in multiple locations. Local beta diversity is reduced as the same invasive species are introduced throughout a local region. The effect of invasive species in reducing beta diversity has been noted in freshwater fish (Rahel 2000, 2002), saltwater flora and fauna (Piazzi and Balata 2008), vascular plants (Qian 2005), and North American flora (Rejmánek 2000). A similar effect has been found when considering a more general type of homogenization, a homogenization in traits rather then just a homogenization in species (Smart 2006).

BETA DIVERSITY: VALUED AS PART OF BIODIVERSITY.

Having demonstrated that the introduction of invasive species will tend to reduce both global and local beta diversity, we can now turn to the issue of the value of beta diversity, and questions about why it ought to be preserved. I answer this question by arguing that beta diversity is an essential part of biodiversity, and ought to be preserved.

How to define biodiversity

"Biodiversity" is a term that has only recently entered our language. Despite its recent introduction, it does not have a clear and precise meaning, as some purely stipulated terms do.[13] Rather 'biodiversity' is a term that is fixed in part by biological facts and fixed in part by what we value. Bryan Norton has argued that the term biodiversity should be defined in a way that makes it useful both in ecology and in public policy discourse, since the term has an important role to play in each realm. The method he suggests to reach this goal is that

> [W]e can state a clear definition for policy contexts: biodiversity should refer to those aspects of natural variety that are socially important enough to obligate protection of those aspects for future generations. (Norton 2006, 53)

This value-oriented approach to biodiversity will have the added feature that it does not require any further arguments regarding the definition of biodiversity in order to show that biodiversity as defined is also something we ought to value. Buy aiming to include what we value in the definition of biodiversity, we can begin with a term that is already agreed upon as characterizing (at least some of) what we value in the natural world. Developing our concept of biodiversity in this way, we can now focus on beta diversity. Is beta diversity a valued part of biodiversity?[14]

Interest in local species

One very simple way to illustrate the value people assign to beta diversity is to look at the species in which they take special pride. Local pride in different areas leads people to value rare species and particularly those that are found only in the local area. This explains, for example, the pride that Tucsonans take in saguaro cacti. Many local businesses in Tucson incorporate the saguaro into their names, and others use the iconic form of the saguaro as part of their logos. Bumper stickers reading "Saguaro you

today?" are found on more than a few cars. Why do locals take pride in the saguaro rather than, say, the more common prickly pear cactus? One reason is that it is a unique feature of the desert surrounding Tucson—the saguaro cannot be found anywhere else. If uniqueness leads Tucsonans to value the saguaro, their value is tracking beta diversity. A plant that is only found in one region increases the beta diversity between that region and all others. Thus the uniqueness of the saguaro serves to increase beta diversity, and the pride and emphasis we place on unique species like the saguaro reflect a value that we place on difference. This reveals an interest both in local and global beta diversity, insofar as people take pride in their region's differences from both neighboring regions and far distant ones.

The anthropogenic blender

Moving from the case of pride in local species, we can move on to a more general question: what is wrong with an overall reduction in global beta diversity? One way to illustrate this issue is with the idea of the anthropogenic blender and concerns about our movement towards an era of the homogecene.[15] The idea of the anthropogenic blender is that humans, by their repeated introduction of non-native species, are serving as an agent of homogenization in the natural world. The endpoint of this metaphor is to imagine that the ecosystems of the earth are completely blended; this is the coming homogecene that ecologists warn us about. Imagine that there is no differentiation left between ecosystems, but rather all organisms appear everywhere (to the extent that this is climactically possible). This type of completely "blended" world is also what authors are worrying about when they warn that we are moving towards a "planet of weeds,"[16] After imagining this world, we can ask ourselves if this blended world is more or less valuable than our current more heterogeneous world. Even though we might imagine a case in which all species are preserved, the homogecene still seems to be impoverished because it is lacking in an important type of biodiversity. It seems less biodiverse than our world in which there are marked differences from one ecosystem to another; this is because the homogecene lacks beta diversity. Thus truly robust biodiversity is not consistent with the removal of beta diversity. These thought experiments initiated by ecologists lead us to the conclusion that beta diversity matters—it is an important part of the biodiversity that we think ought to be protected. This intuition is shared by ecologists and laypeople alike.

The role for science in the definition of biodiversity

Norton's suggestion of how to reach a useful definition of biodiversity may start with an exploration of what we value, but it does not end there. 'Biodiversity' also needs to be a scientifically respectable term. To reach this goal, our understanding of biodiversity must be informed by ecological science. Sahotra Sarkar (2004) argues that our scientific concept of biodiversity is not a simple one and there can be no simple metric to measure it. He suggests that, in the absence of a single simple measure, we can understand biodiversity by looking for what ecologists try to preserve and restore. This approach is parallel to a view about the difficult-to-define concept of human health. There is also obviously no single metric to evaluate human health, and the standards that we use for health change over time as we make medical discoveries. Instead of looking for a fixed standard of human health, we might define health as whatever doctors are trying to preserve and restore. We start off with a shared common notion of health, and this notion is evaluative. Doctors, with their specialized medical training, come to better understand what makes up human health, and may add elements that are not in the common conception, based on their medical findings. For example, having a low cholesterol level is not part of our intuitive concept of health. However as scientists discovered the role that cholesterol plays in cardiovascular problems, the concept of health expanded to include low cholesterol levels. Using parallel reasoning, we may ask if ecologists treat beta diversity as an important element of ecosystem health or of overall biodiversity.

What do healthy ecosystems look like? They will tend to have high beta diversity as the result of natural evolutionary pressures. For example, species packing is a natural process that produces beta diversity.[17] Species arrange themselves along any gradient of change. Take, for example, the gradient of available sunlight. For different amounts of sunlight, there are species that are better adapted to that amount. As time progresses, there is a tendency for new species to emerge which are adapted to take advantage of a particular spot on the resource gradient. When this happens the new, specifically adapted species "squeezes" into the resource gradient at a particular place. Thus, over an evolutionary time scale, there will tend to be an increase in species, and also an increase in beta diversity. Since new species will be adapted for more specific environments, they will not be found everywhere, but only where they are most efficient at taking advan-

tage of the resource gradient. This will produce beta diversity as species cluster together in areas that best suit their adaptations.

Species packing is the result of changes over an evolutionary time scale. Over a shorter span of time, we might consider the way a local environment responds to disturbances. Floods and fires are examples of disturbances that might be regularly expected in a particular area. After a fire, the first plants to colonize an area will be those that grow quickly and are adapted to growing in areas with high sun exposure. After this first wave of colonization, plants that are not adapted to quick colonization but are more long-lived will move in. Eventually all of the original colonizers may be pushed out of a particular area. This pattern, repeated over time, gives us a picture of what a healthy landscape will look like. Norton summarizes developments in the theory of succession in this way:

> The picture that emerges from this modified theory of succession is that of a patchy landscape. Because disturbances occur at irregular intervals and affect areas of varied sizes, and because recolonization will be affected by random factors of dispersal, the result will be a harlequin environment varying in species makeup across space and time. (Norton 1987, 52)

Thus a landscape that has successfully responded to disturbances will have high beta diversity.

Beyond being the result of disturbances, beta diversity also helps an ecosystem respond to disturbances (Norton 1986, 129). To see the importance of beta diversity, imagine an environment that is not patchy, but rather consists only in climax species. These are species that do well in a stable environment, outcompeting their fast-growing rivals over time. If there is a fire in this region, it will not be able to recover from the disturbance quickly. If all of the fast-growing species have been pushed out, then the job of recolonization will have to be carried out by the slow-growing species. But slow-growing species are ill-adapted to colonization, and may also not do well in environments that have not already been inhabited by opportunist species. Thus we can see that beta diversity is both the result of natural processes and an important element that assists those natural processes. In both capacities beta diversity has the kind of value that ecologists aim to preserve. Losing this beta diversity will count as a loss of heath of the ecosystem.

Seeing the loss of beta diversity as a loss of ecosystem health also

helps to explain why ecologists hold a restoration in beta diversity as a standard of success for some restoration projects.[18] If the goal of a restoration project is to undo a past harm, then the original loss of beta diversity must count as a harm to the ecosystem in order for the reintroduction of beta diversity to that environment to count as a restoration. Just as doctors often aim to restore the heath of their patients, ecologists often aim to restore the health of a local ecosystem. To do this requires the restoration of beta diversity, a central and valuable element of overall biodiversity.

A PROBLEM: BETA DIVERSITY IS UNLIKE OTHER TYPES OF BIODIVERSITY.

The examples above show that both our shared evaluative concept of biodiversity and our scientifically informed developments of the concept of biodiversity include beta diversity as a component. As a result we need to focus on preserving beta diversity and not just on preserving species and combating extinction. However as we include beta diversity in our concept of biodiversity, we may worry that it is not a good fit. For beta diversity is what Norton calls a difference definition of (a part of) biodiversity (2006).We noted above that the measures of alpha and gamma diversity were similar to each other; they are both what Norton calls inventory definitions of biodiversity (2006). As a difference definition, beta diversity may seem too different from inventory measures to be included in and valued as part of biodiversity.

This tension is highlighted when we contrast beta diversity, local or global, with global gamma diversity. A loss of global gamma diversity is equivalent to the extinction of one or more species. Thus when we say that global gamma diversity is valuable, there is an entity that can be the holders of that value—the species that makes up global gamma diversity. However there is no such analogue for beta diversity. Since it focuses on difference, beta diversity is a pattern not an entity. This means that some of the arguments for preserving species (and hence for preserving global gamma diversity) cannot be easily extended the case of preserving global (or local) beta diversity.

One type of argument that is an example here is the argument that Holmes Rolston III (1988) gives for preserving species. Even though species, genus, and family might seem to have the same general structure, Rolston argues that there is something special about species. Rolston

characterizes this difference by saying that species are "real historical entities, inbreeding populations," and "in this sense, species are objectively there as living processes in the evolutionary ecosystem—found, not made by taxonomists" (Rolston 20001, 407). This conception of species makes them more like individual organisms; they exist for a period of time, in a determinate place.[19] Once we conceive of species as extended historical entities, it becomes more plausible to think of species as having goods at which they aim. Rolston argues that species have their own good that is not simply made up of the good of its individual organisms. Predation by wolves on the weaker members of an elk herd is good for the species, because it helps to eliminate weaker genotypes and makes the species better adapted to its environment. But clearly predation by a wolf is paradigmatically bad for any individual elk. This example shows that species have goods that are independent of the good of their component organisms. Rolston then argues that respecting the good of the species gives us a reason to preserve that species, which is equivalent to preserving global gamma diversity (Rolston 1985, 1988, 2001).

Turning to a comparison of global gamma diversity with global beta diversity, we will notice a disanalogy. Unfortunately, beta diversity is not an entity surviving across time with its own potential goals, but is rather a pattern of distribution. We can emphasize this feature by noting that beta diversity could be captured in an instantaneous snapshot, and does not depend on the history of a region. Beta diversity captures the current arrangement of species geographically. As a result, beta diversity is not an entity extended over time with a good to be respected. Note that this disanalogy between Rolston's argument for preserving species and any arguments we can offer for the preservation of beta diversity is a general one. Any argument for species preservation that depends on treating a species as an extended entity will not be applicable to beta diversity.[20] Thus it seems that a number of arguments that might have motivated the preservation of beta diversity are eliminated.

THE SOLUTION: THE VALUE OF PATTERNS NOT ENTITIES

Fortunately there are arguments for species preservation that do not depend on treating species as an extended historical entity and instead show us that we sometimes value patterns, not just entities. Ben Bradley argues that we ought to preserve species because species have what he

calls contributory value (2001). To explain contributory value, Bradley makes a distinction between two different types of relational properties that might confer value. The first is familiar—instrumental value. If we value a hammer instrumentally we do so because that tool has particular causal properties, *vis*. the ability to drive in nails. But causal properties are not the only relational properties. There are also relational properties of a part to a whole, and it is here that we find contributory value. Bradley defines contributory value of a thing as, "the contribution it makes to the overall value of the world, less the intrinsic value of that thing" (2001, 50).[21]

After introducing the concept of contributory value, Bradley focuses on one specific way that a part can make the whole better. That is by contributing to the variety in it. In order for contribution to variety to be valuable, variety itself must be valuable. Bradley makes this case by looking back to Leibniz and Brentano and to the principle of *bonum variationis*. This principle holds that "other things being equal, it is better to combine two dissimilar goods than to combine two similar goods" (Chisholm 1986, 70–71, quoted in Bradley 2001, 51). This principle can be applied to objects of aesthetic appreciation, but Bradley argues that it can also be applied in the natural world. Thus, two worlds with the same number of organisms in each can vary in value. If one has more variety than the other (if it contains more species) then that world is more valuable. This value then gives us a reason to preserve species. For if we destroy a species, we lower the value of the world by destroying a little bit of its variety.

Considering the *bonum variationis* principle, Bradley's argument is tailor-made to be broadened to explain the value of beta diversity. Beta diversity is good because *all* diversity is good. And this argument does not depend upon a focus on species understood as super organisms. The principle of *bonum variationis* does not focus on the particular organisms or objects that make up the total variety. Instead the focus is on the differences between the kinds of organisms that exist. This focus fits perfectly with beta diversity, which is concerned only with differences. Therefore, some arguments for the preservation of species, such as that offered by Bradley, could be easily extended to include beta diversity as well. These extendable arguments are those that focus on patterns and their values and not directly on the value of entities extended over time.

CONCLUSION

There are a number of reasons why beta diversity ought to be considered an important part of biodiversity and, as a result, ought to be protected. Some arguments depend on the fact that people already seem to value beta diversity, as is illustrated by their pride in local organisms and the general intuition that the results of an anthropogenic blender would make the world a worse place. Other arguments look at our basic evaluative concept of biodiversity and examine how it is developed and extended by scientific discoveries. By this standard, beta diversity should also be included as an important component of biodiversity. For beta diversity is an essential pat of the processes by which the other measures of biodiversity are produced and sustained. Beta diversity is a product of the process of species packing, which produces environments that are maximally biodiverse. Beta diversity is also required in order to protect other kinds of biodiversity—beta diverse ecosystems will be more resilient to catastrophic events, such as fires, and will have the resources to recover more quickly. While there are disanalogies between global gamma and beta diversity, some arguments for the preservation of species can be extended to cover the preservation of beta diversity as well. These are arguments that do not depend on treating species as extended super-organisms, but rather focus on patterns and complexity in nature—such as Bradley's argument that is dependent upon the principle of *bonum variationis*.

Returning to the specific issue of invasive species, we can see that the preservation of beta diversity gives us a further strong reason to avoid the introduction of invasive species. Beta diversity at both the global and local levels is reduced when invasive species are introduced. This effect can be produced even when there is direct harm neither to human interests nor to the ecosystem in terms of species loss. Thus, because introducing invasive species can harm humans directly, harm the ecosystem through extinction or extirpation, and, as we have now seen, harm the ecosystem through a reduction of beta diversity, we have ample reasons to avoid the introduction of invasive species.

now, and especially to Vicky Davion, Chris Cuomo, and Nicole Hassoun for their generous feedback on earlier drafts of this essay. Thanks also to audiences at the ISEE meeting at the 2009 Central APA and at Ohio University.

NOTES

1. For information about how the planting of Kudzu was encouraged in the American south, see Blaustein (2001).
2. I will only consider the ethics of introducing invasive species. The complex interplay between the policies that would best prevent their introduction, the present methods to best control those invasive species, and the harm to those methods might impose is a task that goes beyond my present purposes. For a public policy approach to the benefits and costs of prevention, eradication, and biological control of invasive species see van Driesche and van Driesche (2000), Mack et al. (2000), and McNeely et al. (2001).
3. Invasive species may tend to out-compete native species because they have the advantage of having escaped their native biotic constraints, including native parasites and predators (Mack et al. 2000).
4. Simberloft (2005) argues that this risk is substantial, and we should form our policies to respect it.
5. This assessment of the causes of extinction has been questioned by Gureitch and Padilla (2004), however their methodology in raising this objection has been criticized by Clavero and Garcı́a-Berthou (2004) for counting as cases not involving invasive species all the instances in which there was no determined cause of extinction in the database.
6. Including Gunn (1980), Varner's (1987), Johnson (1992), Callicott (1986, 1987), Rolston (1985, 1988, 2001), and Bradley (2001).
7. It is the general claim that invasive species are harmful that is questioned by Sagoff (2005). Here he considers the possible harms to the environment to be only extinction and the reduction of local productivity. I argue below that there is another measure of harm that is missing in Sagoff's arguments.
8. These terms were introduced by Whittaker (1960, 1972), and developed by MacArthur (1965). This figure explaining the difference between them is adapted from an example in Meffe (2002).
9. Different measures of alpha diversity will be concerned not only with the number of species found but also with their relative distributions. While this more complex measure is clearly of ecological importance, I will focus on the simpler measure of species presence/absence because, as we move up to the level of gamma diversity, it more adequately captures the concerns about extinction. We are concerned with a species ceasing to exist, not with its relative distribution (except to the extent that the number of organisms may predict future extinction).

10. Norton (2006) characterizes alpha diversity as an inventory definition of diversity since it focuses on the inventory of species in a given area. He classifies beta diversity as a different definition, since it focuses not on pure inventories in a given area but on differences between areas. Gamma diversity (defined below) also turns out to be an inventory definition.

11. Even though the gamma diversity, or the number of species found in the whole forest, stays the same. Beta diversity is independent of alpha or gamma diversity.

12. There is some inconsistency between the way that beta diversity was originally defined by Whittaker and the way this concept is now used. Whittaker defines three measures of difference between plots, depending on the size of region that contains those compared plots. Whittaker defines these to be pattern, beta, and delta diversity. The only difference between these three is scale. Yet the scale that Whittaker gave does not really limit the way that ecologists talk about beta diversity today. Beta diversity is far more often used as a general measure of difference between plots regardless of the size of the region that contains them. So in this paper I will address only beta diversity.

13. See Takacs (1996) for an extensive survey of the way that the term 'biodiversity' developed and the many different meanings it has taken on.

14. Wood (1997, 2000) also answers this question in the affirmative, but his arguments do not depend directly on the value that we assign to biodiversity.

15. See Olden et al. (2004) and Olden (2006) for the original characterization of the anthropocentric blender. The terminology of a coming homogecene was introduced by E.O. Guerrant (1992).

16. David Quannen (1998) coined to term "planet of weeds."

17. This process is explained in Whittaker (1972).

18. See, for example Aronson et al. (1993), Finegan and Delgado (2001), Leanne Martin et al. (2005), and Lepori et al. (2005).

19. It may be difficult to determine the exact boundaries of a species—when one species ceases to exist and another species begins, which exact organisms make up the species. But similar concerns about organisms, and particularly about ourselves as humans, don't stop us from saying that the organisms, or ourselves, are discreet entities. See Johnson (1992) for a consideration of ways in which species, like organisms, are entities, despite having vague boundaries.

20. This will be true of a wide variety of arguments for the preservation of species including Gunn's (1980) argument based on the rarity of those species, Varner's (1987) and Johnson's (1992) more legalistic arguments that species have standing, and Callicott's (1986, 1987) argument for the value of species on the basis of bio-empathy.

21. This, of course, can't be quite right, since we should also eliminate the instrumental value that the thing brings to the world, so as to focus on contributory value alone.

REFERENCES

Aronson, J., C. Floret, E. Le Floc'h, C. Ovalle, and R. Pontanier. 1993. Restoration and Rehabilitation of Degraded Ecosystems in Arid and Semi-Arid Lands: A View from the South. *Restoration Ecology* 1: 8–17.

Blaustein, Richard. 2001. Kudzu's invasion into Southern United States life and culture. In *The Great Reshuffling: Human Dimensions of Invasive alien Species*, edited by Jeffrey McNeely, 55–62. Cambridge, UK: ICUN Publications.

Bradley, Ben. 2001. The Value of Endangered Species. *The Journal of Value Inquiry* 35: 43–58.

Buffelgrass Working Group. 2008. Southern Arizona Buffelgrass Strategic Plan. Accessed Feb 10, 2010. http://www.buffelgrass.org/pdf/buffelgrass_strategic_plan.pdf

Burdick, Alan. 2005. *Out of Eden: An Odyssey of Ecological Invasion.* New York: Farrar, Straus and Giroux.

Callicott, J. Baird. 1986. On the Intrinsic Value of Non-Human Species. In *The Preservation of Species*, edited by Bryan Norton, 138–72. Princeton, NJ: Princeton University Press.

———. 1987. The Conceptual Foundations of the Land Ethic. In *Companion to A Sand County Almanac: Interpretive and Critical Essays,* edited by J. Baird Callicott, 186–214. Madison, WI: University of Wisconsin Press.

Chisholm, Roderick. 1986. *Brentano and Intrinsic Value.* Cambridge, UK: Cambridge University.

Clavero, Miguel and Emili García-Berthou. 2005. Invasive species are a leading cause of animal extinctions. *Trends in Ecology and Evolution* 20: 110.

Finegan, Bryan and Diego Delgado. 2001. Structural and Floristic Heterogeneity in a 30-Year-Old Costa Rican Rain Forest Restored on Pasture Through Natural Secondary Succession. *Restoration Ecology* 8: 380–93.

Gunn, Alastair S. 1980. Why Should We Care about Rare Species? *Environmental Ethics* 2: 17–37.

Guerrant, E.O. 1992. Genetic and demographic considerations in the sampling and reintroduction of rare plants. In *Conservation Biology*, edited by Peggy L. Fiedler and Subodh K. Jain, 321–44. London, UK: Chapman and Hall.

Gurevitch, Jessica and Dianna K. Padilla. 2004. Are invasive species a major cause of extinctions? *Trends in Ecology and Evolution* 19: 470–74.

Hettinger, Ned. 2001. Exotic Species, Naturalisation, and Biological Nativism. *Environmental Values* 10: 193–224.

Johnson, Lawrence E. 1992. Toward the Moral Considerability of Species and Ecosystems. *Environmental Ethics* 14: 145–57.

Lapori, F., D. Palm, E. Brannas, and B. Malmqvist. 2005. Does Restoration of Structural Heterogeneity In Streams Enhance Fish and Macroinvertebrate Diversity? *Ecological Applications* 15: 2060–71.

Mack, Richard. N., Daniel Simberloff, W. Mark Lonsdale, Harry Evans, Michael Clout, and Fakhri A. Bazzaz. 2000. Biotic Invasions: Causes, Epidemiology, Global Consequences, and Control. *Ecological Applications* 10: 689–710.

McNeely, Jeffrey A., Harold A. Mooney, Laurie E. Neville, Peter Johan Schei, and Jeffrey K. Waage. 2001. *A Global Strategy on Invasive Alien Species*. IUCN Gland, Switzerland, and Cambridge, UK.

McKinney, Michael. 2004. Do Exotics Homogenize or Differentiate Communities? Roles of Sampling and Exotic Species Richness. *Biological Invasions* 6: 495–504.

MacAurthur, Robert. 1965. Patterns of Species Diversity. *Biological Review* 40: 510–33.

Martin, Leanne M., Kirk A. Moloney, and Brian J. Wilsey. 2005. An Assessment of Grassland Restoration Success Using Species Diversity Components. *Journal of Applied Ecology* 42: 327–36.

Meffe, Gary. 2002. *Ecosystem management: adaptive, community-based conservation*. Washington, DC: Island Press.

Niibus, Michelle. 2007. Bonfire of the Superweeds: In the Sonoran Desert, Good Intentions Combust. *High Country News,* 20 August 20. Accessed August 3, 2008. http://www.hcn.org/issues/352/17167

Norton, Bryan. 1986. On the Inherent Danger of Undervaluing Species. In *The Preservation of Species*, edited by Bryan Norton, 110–37. Princeton, NJ: Princeton University Press.

———. 1987. *Why Preserve Natural Variety?* Princeton, NJ: Princeton University Press.

———. 2006. Toward a Policy-Relevant Definition of Biodiversity. In *The Endangered Species Act at Thirty: Conserving Biodiversity in Human-Dominated Landscapes*, edited by J. Michael Scott, Dale D. Goble, and Frank W. Davis, 49–58. Washington, DC: Island press.

Olden, Julian D. 2006. Biotic Homogenization: A New Research Agenda for Conservation Biogeography. *Journal of Biogeography* 33: 2027–39.

Olden, Julian D., N. LeRoy Poff, Marlis R. Douglas, Michael E. Douglas, and

Kurt D. Fausch. 2004. Ecological and evolutionary consequences of biotic homogenization. *Trends in Ecology and Evolution* 19: 18–24.

Piazzi, Luigi and David Balata. 2008. The spread of *Caulerpa racemosa* var. *cylindracea* in the Mediterranean Sea: An example of how biological invasions can influence beta diversity. *Marine Environmental Research* 65: 50–61.

Qian, Hong and Robert E. Ricklefs. 2005. The role of exotic species in homogenizing the North American flora. *Ecology Letters* 9: 1293–98.

Quammen, David . 1998. Planets of Weeds: Tallying the Losses of Earth's Animals and Plants. *Harpers Magazine* 297: 57–69.

Rahel, Frank. 2000. Homogenization of Fish Faunas across the United States. *Science* 288: 854–56.

———. 2002. Homogenization of Freshwater Faunas. *Annual Review of Ecology and Systematics* 33: 291–315.

Rejmánek, Marcel. 2000. A must for North American biogeographers. *Diversity and Distributions* 6: 208–11.

Rolston, Holmes III. 1988. *Environmental Ethics: Duties and Values in the Natural World*. Philadelphia, PA: Temple University Press.

———. 1985. Duties to Endangered Species. *BioScience* 35: 718–26.

———. 2001. Biodiversity. In *A Companion to Environmental Philosophy*, edited by Dale Jamieson 402–16. Malden, MA: Blackwell.

Sagoff, Mark. 2005. Do non-native species threaten the natural environment? *Journal of Agricultural and Environmental Ethics* 18: 215–36.

Sarkar, Sahotra. 2002. Defining "Biodiversity"; Assessing Biodiversity. The Monist, 85(1): 131–55.

Simberloff, Daniel. 2003. Confronting non-native species: A form of xenophobia? *Biological Invasions*, 5: 179–92.

———. 2005. Non-native species *do* threaten the natural environment! *Journal of Agricultural and Environmental Ethics* 18: 595–607.

Smart, Simon M., Ken Thompson, Robert H Marrs, Mike G Le Duc, Lindsay C Maskell and Leslie G Firbank. 2006. Biotic homogenization and changes in species diversity across human-modified ecosystems. *Proceedings of the Royal Society B* 273: 2659–65.

Takacs, D: 1996. *The Idea of Biodiversity: Philosophies of Paradise*. Baltimore and London: Johns Hopkins University Press.

Van Driesche, Jason and Roy Van Driesche. 2000. *Nature Out of Place: Biological Invasions in the Global Age*. Washington, DC: Island Press.

Varner, G. E. 1987. Do Species Have Standing? *Environmental Ethics* 9: 57–72.

Vitousek, Peter M., Carle M. D'antonio, Lyoyd L. Loope, and Randy Westbrooks. 1996. Biological Invasions as Global Environmental Change. *American* Scientist 84: 468–78.

Whittaker, R.H. 1960. Vegetation of the Siskiyou Mountains, Oregon and California, *Ecological Monographs* 30: 279–338.

———. 1972. Evolution and the Measurement of Species Diversity. *Taxon* 21: 213–51.

Wilcove, David S.,.David Rothstein, Jason Dubow, Ali Philips, and Elizabeth Losos. 1998. Quantifying threats to imperiled species in the United States. *Bioscience* 48: 607–15.

Wilcove , David S., David Rothstein, Jason Dubow, Ali Philips, and Elizabeth Losos. 2000. Leading threats to biodiversity. In *Precious Heritage. The Status of Biodiversity in the United States*, edited by Bruce A. Stein, Lynn S. Kutner and, Jonathan S. Adams, 239–54. Oxford, UK: Oxford University Press.

Wood, Paul. 1997. Biodiversity as the Source of Biological Resources: A New Look at Biodiversity Values. *Environmental Values* 6: 251–68.

———. 2000. *Biodiversity and Democracy: Rethinking Society and Nature*. Vancouver, BC: University of British Columbia Press.

INTERSPECIES ETIQUETTE IN PLACE

ETHICAL AFFORDANCES IN SWIM-WITH-DOLPHINS PROGRAMS

TRACI WARKENTIN

Situated in the liminal spaces where marine and terrestrial worlds come together to form swim-with-dolphin programs, this paper examines impacts of place upon human-dolphin interactions. Motivated by a strong desire to get close to a dolphin, many people seek out opportunities to "swim with dolphins," but what is the nature of these programs and how are they actually experienced by participants? If people are seeking genuine contact with a dolphin, does context make a significant difference? Moreover, can and do swim-with-dolphin programs afford ethical ways of interacting with dolphins? These questions are addressed through examining three representative swim-with-dolphin programs. Comparative analysis further illustrates how place is vital to engagements of interspecies etiquette.

The places where humans meet other animals matter. This is especially true when considering encounters with animals in captivity. Myriad factors come into play in these instances, not the least of which involve the physical structures of each place and the kinds of organized activities that are offered, encouraged or discouraged there. Motivated by a strong desire to get up close to a dolphin, many people seek out tourism activities offering opportunities to "swim with dolphins." But what is the nature of

these swim-with-dolphin programs and how are they actually experienced by participants? If people are seeking genuine, spontaneous contact with a dolphin, does the place and activity of encounter make a significant difference in the experience? Moreover, can and do swim-with-dolphin programs offer ethical ways of interacting with dolphins, and what might that entail?

Situated in the liminal spaces where marine and terrestrial worlds come together to form swim-with-dolphin programs, this paper examines impacts of place upon human-dolphin interactions. I conducted fieldwork at a deliberate range of swim-with-dolphin sites, each chosen on the basis of: the arrangement of physical space, from open ocean to beach to enclosed lagoon to concrete pool; the relative amount of independence and freedom afforded to the dolphins; and, the types of activities offered and their degree of structure. For instance, at Dolphins Plus in Key Largo, Florida, I swam fairly freely with captive dolphins in an enclosed square cement pool filled with fresh seawater, while at Discovery Cove in Orlando, I participated in a comprehensive Trainer for a Day program, which included highly controlled encounters with dolphins in a chlorinated pool designed to look like a tropical lagoon. By contrast, in Rockingham, Western Australia, I joined a boat excursion and swam with free-living dolphins in the open waters of Rockingham Bay. Each of these places offered unique opportunities for interacting with dolphins, and varied significantly in terms of enabling the kinds of mutual and voluntary engagements necessary for ethical interactions.

CAPTIVE CONSUMPTION

With very few exceptions, human participants typically do not *swim* with dolphins in swim-with-dolphin programs.[1] It is quite a misnomer. Instead, human participants strike a series of poses in shallow or deep water, as the dolphin responds to the requests of the trainer to perform routine poses and movements of their own. From my experiences participating in and witnessing a variety of swim-with-dolphin programs, much of the time was spent waiting for my turn among a group of four to eight other participants.[2] When called upon, I stepped up, did what I was told, like "kiss the dolphin," waited as my photo was taken and stepped back to let the next person go. It felt like being on a kind of conveyor belt and going through the motions as per an intended script.[3] I was told exactly where to

stand, when and precisely how to perform actions, much like the practice of blocking used in acting. And like the purpose of hitting your mark, the precision of the swim interaction was mainly to ensure that the perfect photo was taken of each pose by the professional photographers on hand. The dolphin encounter felt like a staged photo shoot much of the time.

The scripting and blocking of the swim programs correspond with the construction of an idealized, generic tourist experience and the production and consumption of souvenirs. Indeed, multiple acts of consumption occur in various ways at the sites of human-dolphin encounter investigated in this study. They largely involved the objectification of the dolphins through the commodification of their bodies (Davis 1997; Desmond 1999) as they performed in shows and interactive programs for a paying public. Generally, tourists consume experiences, mainly the experience of getting close to and sometimes touching and feeding the dolphins, purchasing intimacy with dolphins via fish. Perhaps the most common form of consuming dolphin bodies is through photography (Desmond 1999). All of the captive swim-with-dolphin sites I visited had professional photographers shooting video and taking pictures that could be viewed on monitors and purchased.

Intriguingly, photographic images can serve as more than just mementos of tourist experiences; they actively produce experience by visually presenting ideal moments that visitors can then try to re-create for themselves. The images are key to the production of commodified experiences at each facility because they show the consumer exactly what they can expect (which is most often conveyed through television commercials, advertising on the internet, tourist pamphlets and billboards) and later provide a visual confirmation that these expectations were indeed met in the form of a personalized souvenir to take home. Commenting on these fascinating rituals in tourism, H. Peter Steeves states that, "a culture that consumes experience has turned it into a thing," which he suggests "ushers in a rather strange parallel between tourism and phenomenology" (2000, 164).

He explains that "both involve a shift in attention; both move from the world to our way of taking up the world, from experience to the experience of experience" (Steeves 2000, 164). His observation captures the somewhat paradoxical and multidimensional experience of tourist activities, such as a visit to Sea World, which is simultaneously and perceptually

authentic, artificial, presented, represented, produced, reproduced, objectified, scripted, spontaneous and predetermined. What is more, the staged predictability of the experience does not seem to diminish the average visitor's immediate enjoyment; rather, it appears to confirm for the tourist that they are indeed having the wonderful and memorable experience they had anticipated. As such, experiential acts of (re)creating and consuming the promotional images correspond with an internalization of the ideals and assumptions underlying them, an acting out of the expectations of the experience—what is going to happen, what is supposed to happen—and of the kinds of end products that are appropriate to capture the moment and be taken away afterward.

Beyond these overtly commercial modes of consumption, and the obvious commodification of whale and dolphin bodies, lay subtler appeals to the selling of more ephemeral, emotional aspects of the interactive and visual experiences. There are diverse and often conflicting dimensions of emotion involved in dolphin-human interactions, such as joy, happiness, and excitement. These can be mixed, for some, with sadness and guilt about captivity. Despite or perhaps because of this ambiguity, there appears to be a very common desire to get up close and personal with dolphins and other whales, and many people are willing and able to spend large amounts of money for the privilege of ever-greater intimacy. Tangled with the emotions we bring to the experience are the emotive and organizing effects, or, rather, *affects,* of the space itself. This can be described as the phenomenal experience of interacting with dolphins, how it feels, how being in the space influences how we—humans and dolphins—behave and move our bodies in response to one another. Such is the *sense* of place I strive to articulate through describing my participation in swim-with-dolphin programs in this paper. I concentrate on the more external elements of scripting as they affected, structured, and organized my experiences and ability to engage in ethical ways of interacting, via interspecies etiquette (Cheney and Weston 1999, Warkentin 2010), in the swim-with-dolphins programs.

CONTEXTUALIZING INTERSPECIES ETIQUETTE

Put succinctly, interspecies etiquette can be expressed through one's body and actions, or, in some cases, inactions. Each individual's ability to choose whether or not to interact is ethically imperative. It involves a con-

scious and deliberate bearing of openness to others while creating space for either engagement or avoidance (Behnke 1999; Cheney 1998; Cheney and Weston 1999, 126; Plumwood 2002, 175–76; Weston 2004, 32). A keen awareness of one's own body is needed, along with deft sensitivity to the bodies of others. In practice, this requires both an immediate, visceral attentiveness and an exercise of empathic imagination to approximate the perspective of another. Practical phenomenologists Kenneth Shapiro, Thomas Csordas and Elizabeth Behnke have each developed methods for applying these practices in real world situations, and they have fundamentally shaped my development of this praxis of embodying invitation and choice, and enabling reciprocity and mutual interest in interspecies interactions (see Warkentin 2010). In further fleshing out interspecies etiquette as it is affected by place, the addition of Lori Gruen's (2009) recent work on "engaged empathy" is particularly nourishing.

Quite unlike an appeal for sympathy, engaged empathy "involves a transfer of affect, and eventually, a cognitive engagement with the perspective of the "object" of empathy" (2009, 27). So defined, engaged empathy provides a basis for moral perception (Gruen 2009, 25), through which humans perceive other animals as morally considerable and are motivated to interact accordingly with deliberate care. Gruen calls this "cognitive empathy," in which "the empathizer is not merely mimicking or projecting onto the emotions of the object of empathy, but is engaged in a reflective act of imagination that puts her into the object's situation and/or frame of mind" (2009, 28-9). As a result, engaged empathy can both inform us of what is the right thing to do and motivate us to actually do it.[4]

Resonating strongly with Shapiro's (1985, 1990, 1997) "kinesthetic empathy," Csordas' (1993) "somatic modes of attention," and Behnke's (1997) "interkinaesthetic comportment," Gruen's engaged empathy is distinctly not mere contagion of mood, anthropomorphic projection, or assumption of feeling, but a tacitly informed approximation of what the other is experiencing.[5] It involves using judgment and assessing the full situation (Gruen 2009, 29). Elaborating, Gruen explains that "these judgments will involve *assessing the salient features of the situation* and require that the empathizer seek to determine what information is pertinent to effectively empathize with the being in question [emphasis added]" (Gruen 2009, 30). Such an assessment involves simultaneous visceral and cognitive awareness of a particular place, at a particular time, while engaging

in interspecies etiquette. Interactions do not take place in a vacuum; they are always context-specific.

Thus, vital to practicing interspecies etiquette in place is an added understanding of the perceptual abilities of an other, how that individual senses and makes sense of the world. Taking into account the specific context of the other in these terms, however, is no simple task, particularly across species. Fortunately, assistance is offered by the field of ecological psychology in the form of a notion of affordances. It draws our attention to the unique worlds of others and provides clues to how we might engage with them in ethical ways by providing an approach for understanding how their immediate environments appear to them and what kinds of opportunities are present.

SENSING PLACE AND ETHICAL AFFORDANCES

The places where we meet dolphins are made up of countless sensory cues. Simultaneously, we may perceive the briney smell of seawater or acrid fumes of chlorine, bright flashes of sunshine reflecting off the play of waves, medleys of clicks, squeaks and whistles, rough surfaces of concrete, smooth surfaces of glass. Smells, sights, sounds, flavors, and textures abound far in excess of what we can attend to at any given moment. In large part, the way any individual organism perceives and so experiences their environment is shaped by the physical and physiological make-up of that organism's body. Each being has particular sensory capabilities for detecting the parts of their world that have significance and for interacting with them in meaningful ways. For example, humans, being terrestrial mammals, rely predominantly on sight to navigate and perceive opportunities and dangers. By contrast, marine mammals, whose vision is often obscured in dark, turbid waters, largely use sound to sense their surroundings (Hughes 1999, Moore 1998). Known as echolocation, toothed whales, including dolphins, orcas and belugas, send out pulses of sound into the environment, which then bounce off other beings and material forms and return to create an acoustic image of that environment. In relative degrees, both dolphins and humans also employ their senses of smell, touch, and taste to explore and interact with their environments. Through all of these sensory capabilities, dolphins and humans can perceive opportunities for action in their immediate surroundings, such as food to obtain or obstacles to avoid. Such opportunities for action are what ecological

psychologists' James J. Gibson (1979) and Edward Reed (1988, 1996) call "affordances."

Affordances are resources, in the fullest sense, one perceives in an environment. Their meaning is ephemeral and yet somewhat durable as affordances are always present in the shared environment of many beings and come into specific instances of being in and through the business of living and interacting (Gibson 1979, Grene 1965, Reed 1988, 1996, Warkentin 2009). Although they are described as opportunities, affordances are not always favorable courses of action. In certain situations, some can inhibit action and others may need to be proactively avoided. Furthermore, indicating their potential as shared or intersecting resources, Edward Reed has developed notions of mutual affordances (Reed 1996) between beings and social affordances of propriety, in which one tempers their behavior in accordance with "the perceived need to present proper affordances to the other" (Reed 1988, 121). Propriety here also requires refraining from presenting inappropriate affordances. Affordances, so defined, arise in dolphin facilities and swim-with-dolphin programs in ways that can present opportunities for various kinds of interactions, between humans, dolphins and the physical space. And, we can recognize opportunities for interactions that embody the qualities of interspecies etiquette in the form of "ethical affordances."

Ethical affordances are thus opportunities for invitation, choice, reciprocity, and mutual interest in human-dolphin interactions. These are difficult, sometimes impossible, to find in captivity, so ideally interactions would occur between free-living dolphins and humans, although these are also fraught with the potential for harm and exploitation. As we shall see, however, there are degrees of invitation that can be extended even in restricted contexts. There can be opportunities for engaging dolphins and humans in ways that interest them both, such as through play and music. So let us now turn to actual places of encounter and specific swim-with-dolphin programs in order to examine the nature of the experience and whether and how they offer opportunities for interspecies etiquette in the form of these ethical affordances.

(RE)CREATING PICTURE PERFECT EXPERIENCES AT DISCOVERY COVE

Located just across the road from Sea World, Orlando, and operated by the same Busch Entertainment Corporation, Discovery Cove is a luxurious and elite facility, open only to people willing and able to pay upwards of four hundred US dollars per person for access to all that it offers. I participated in the Trainer for a Day (TFAD) program, which enabled exclusive privileges for interacting with dolphins, stingrays, sharks, birds, and many more individual animals, as well as behind-the-scenes activities. At that time, Discovery Cove employed ninety-nine trainers and housed thirty-five Atlantic bottlenose dolphins. The facility consists of an extensive series of interconnecting cement pools, built to resemble tropical lagoons with white-sand beaches, swaying palm trees, and lush foliage. It is entirely human made.

The first dolphin interaction of the TFAD program was with Rascal, a young male bottlenose dolphin. Before the activity, I had asked my guide if there was a particular way I should approach Rascal? I was told, "Well, you don't want to put your hands in the dolphin's face. You should only touch them behind the blowhole." This seemed like common sense and made me pause to realize that some people may not know this most basic of etiquette for interacting with any animal others. I was sorted into a group with nine other participants and we entered the main pool, which appeared wide but turned out to be relatively small, much smaller and more shallow than I had expected after having watched the promotional video clips on the Discovery Cove website. We were notified that each group would have two trainers, one female and one male, as well as a dedicated photographer and videographer, standing in the water nearby.

We walked into the clear blue water, which was waist deep for me, and were asked to squat down so that our faces were almost level with Rascal's. That way, we were told, we would not tower over him and he would be more comfortable. As I lowered my body, I inhaled the sharp smell of chlorine and felt a rush of cool water fill my wetsuit. The air was quite chilly that day, but the sun was bright and warm on my face. We were asked to keep our hands in front of us and tight to our bodies and not to reach out until Rascal's head and blowhole had passed by. We were allowed to stroke the top and side of his body from behind the blowhole to his tail as he swam by us, back and forth, several times.

Throughout the interaction, the trainers tended to phrase questions and speak in a tone as if we were all children (we were a group of eight adults and one child): "Now, can anyone tell me what Rascal feels like?" "Rubber!" I shouted. "That's right, very good." There was a lot going on around us in the pool; the air was filled with similar tones and questions posed to other groups, with 'oohs' and 'ahhhs,' trainers' whistles, splashes, and laughter. At one point, the male trainer pointed out a mother and calf near the back of the pool working only with trainers. He told us that they try to get the calves used to human interactions really soon after they are born.

Disappointingly, I found there was very little opportunity to directly interact with Rascal. The closest opportunity came when I was invited to approach him by myself to give him a kiss, but even then I was given detailed instructions by the trainers throughout the whole activity: "Cup your hands and place them just above the water, that's right, now he puts his rostrum into your hands, raise his head up a little and kiss the bottom of his rostrum, not the top because if he opens his mouth you'll be bonked, remember to hold the kiss for a minute so your picture can be taken, savor the moment, now you can stroke his back, from behind his blowhole, that's right." The trainer was beside me the whole time. She told me to look up for a photo, and then turn to look at Rascal for another photo, and so on. I kept trying to focus on Rascal, on my presence and actions, to be fully attentive to him, but my attention kept getting drawn back to the trainer and the cameras. I tried talking directly to him a little, but was feeling self-conscious. The photographers were just a few feet away, and I felt the weight of the cameras and everyone else's eyes upon me the whole time. I soon heard "Now back away please, next person come on up." The moment was over quickly.

After my turn with Rascal, I asked the female trainer how she communicates with him. Did she use gesture? She answered that yes, it was all hand and body cues, and she illustrated with exaggerated hand gestures. I asked if she really pays attention to Rascal's gestures and body movements. I asked if she is typically able to tell Rascal's moods. She said that was basically her main job, to come out in the morning and watch his behavior, to watch his body movements and try to sense how he is feeling and if he is going to cooperate that day. I asked if the dolphins have really individual personalities that she can tell apart. She answered, "Yes." I

asked if the dolphins have ever surprised her, doing something totally unexpected. She said, "Yes, it happens." She gave increasingly short answers to my stream of questions and it soon became obvious that my questions were somehow disrupting the orchestration of the program.

The session ended with each of us, in turn, being pulled through the water by Rascal. I was asked to swim out to the male trainer, who was about twelve feet away in the deeper water. Once there, I treaded water and was given instructions to hold on to the base of Rascal's dorsal fin (the fin on top of his back), and to relax my body while he pulled me back to the shallow area of the pool. Rather foolishly, I was concerned about the effort it might take for Rascal to pull me. It was easy to forget just how large and powerful he was when only his head was visible above the water. With apparent ease, Rascal allowed me to hang on to him while he dragged me through the water.

It took about ten seconds and was very awkward, both in the way I felt about it and in the way it felt between our bodies. I tried to just hang on and relax but quickly realized that I had to hold my legs away from Rascal's body to avoid getting in the way and being whacked by the pumping of his powerful tail. I still do not understand how this kind of activity, 'being pulled through the water by a dolphin,' constitutes 'swimming with a dolphin'? It felt contrived and more like a ride at a theme park, like a roller coaster where you just hang on and enjoy the ride, than an actual interaction with an individual dolphin. Immediately following the interaction with Rascal, the human participants in my group were guided up to the photo hut to view the pictures taken of our session on computers. There were a variety of purchasing options, from single photos to whole cds. I ordered a 5x7 photograph of Rascal and I for US$15.99 and a video of the session for US$59.99 as part of my data collection.

Later that day we were treated to a ride with two dolphins, Capricorn and Joe. This time, in addition to hanging on to the base of their dorsal fins, I was instructed to arch my back, keep my legs straight behind me and cross my ankles. I did this as Joe and Capricorn started to swim, but I could still feel their tails whacking into my shins and ankles. The ride lasted a few seconds, even shorter than my ride with Rascal. I closed my eyes tight for most of it because of the water rushing into my face and up my nose. The sensation was of their hard, energetic bodies, their tails pumping fast on either side of me. It was awkward and unpleasant.

I arrived at the awaiting trainers with a large gush of water as the two dolphins stopped and then veered off on either side of me. I was feeling embarrassed and self-conscious, pretending to have liked this ride.

The male trainer shouted 'How was that, was it GREAT!?' and handed me a couple of fish to give to Capricorn before I could answer. I took the fish, turned to Capricorn, tossed them into his mouth and said loudly "Thank you, Capricorn." I did the same for Joe, really trying to embody a thank you to them for lending their bodies to this perplexing activity.[6]

On the whole, the Trainer for a Day program at Discovery Cove was perfectly executed, from start to finish, to produce a memorable tourist experience. And, like any well-planned business, our program conveniently concluded with our arrival at the gift shop. Every moment of the experience was scripted and tightly controlled to reproduce the fun I was promised in the brochure. Subject to the meticulous commands of the trainers, neither I, nor the dolphins had the opportunity to exercise unmediated reciprocity or engage spontaneously in mutually interesting ways. Invitation was practically impossible; Rascal, Capricorn, and Joe had little choice but to interact, particularly if they were hungry for fish.

There was no doubt that at Discovery Cove, emphasis was placed upon the enjoyment and satisfaction of the human visitors. However, I found that this attitude was not true for all of the swim-with-dolphin programs I participated in, nor was it always the main purpose for the scripting and control which were exercised. The Rockingham Dolphin Swim in Australia expressed a significantly different attitude towards bottlenose dolphins and regarding appropriate human-dolphin interactions, which enabled certain ethical affordances to emerge.

MEETING HALF-WAY IN ROCKINGHAM BAY

The only non-captive swim-with-dolphins program that I participated in was in Western Australia. The Rockingham Dolphin Swim was quite unique in its approach to interacting with free-living bottlenose dolphins in the bay at Rockingham, located about an hour's drive from the capital city of Perth. The bay was far from scenic; the shoreline was dotted with factories and smoke stacks, evidence of the industrial activities that dominate the area. Thirty participants, including myself, boarded the boat for the Rockingham Dolphin Swim, which was staffed by nine men and one woman. We were given detailed instructions on what to do and what

not to do during the swim. Touching and reaching out to a dolphin was strictly forbidden. We were told exactly how to hold our bodies while in the water and that we would not actually be swimming. They had devised an elaborate method for large numbers of humans to be in the water during interactive swims in the ocean that was orderly and efficient and primarily devised for the consideration and interests of the dolphins.

We were divided into six groups of five and given distinctively colored belts to identify one from another. Each group was then designated a staff member as their leader, who was equipped with a small motor for jet propulsion. Staggering our entry into the water from the back of the boat, we got into formation one just behind the other, making a line, and grabbed onto the belt of the person directly in front with one hand. We were told to keep our right arm pressed to our side at all times and not to kick our feet as our human chain would be pulled along the surface of the water by our motorized leader.

To participate in this program, I was challenged to overcome my fear of deep, open water, and had to force myself to hop off the boat when my turn came. I focused on getting in the proper formation to distract myself from my apprehension and from the shock of the cold, salty water. It was a bit clumsy at first, I was hit in the face by feet a few times, but my discomfort was soon forgotten when I put my head down into the water and caught a glimpse of several bottlenose dolphins swimming in the murky water right beneath me. My first thought was "wow, they're big!" My second was that they were free-living dolphins and were voluntarily interacting with us, and I swelled with elation at the honor of their nearness.

I can only imagine how strange we must have appeared to the dolphins, and assume their curiosity (or amusement) was partly why they came near us. There was a more alluring element, though. The Rockingham Dolphin Swim employed one person specifically to play underwater with the bottlenose dolphins, while the rest of us were towed around at the surface. This staff member was equipped with a motor and used it to perform all kinds of acrobatics underwater and to swim around and play with the dolphins who came near.

Throughout the experience I was impressed by the explicit respect for dolphin autonomy and the prioritization of their welfare by the staff of the Rockingham Dolphin Swim. They had a strict policy not to use fish to entice the dolphins to come near, and instead made an effort to engage

them with play. I observed that no food was involved at any time during the entire outing. They also demonstrated consideration by limiting the time we spent with each group of dolphins, so as not to take advantage of their willingness to engage, or to risk pestering them with too much attention. Studies have indeed shown that even the mere presence of boats can impact the behavior of free-living dolphins (Constantine 1999, 16; Constantine et al. 2004), and marine biologists suspect that the longer the time spent with the dolphins the greater the impact upon their normal routines of feeding, socializing, resting, and traveling (Constantine 1999, 22). They advise tour operators to err on the side of caution, as despite more than decade of research devoted to the impacts of whale-watching and swim-with-dolphin programs, "very little is known about the short- or long-term effects of tourism on cetacean behavior" (Constantine 1999, 299).

What leading scholar Rochelle Constantine has found, however, through her research on bottlenose dolphins and common dolphins in the Bay of Islands, New Zealand, is that free-living dolphins are more likely to swim with humans if they are given a choice. According to her observations of hundreds of swim attempts from boat tours, "if swimmers enter the water off to the side, dolphins can choose to come near the swimmers or not. The avoidance rate in this case is only 21 percent for common dolphins and 2 percent for bottlenose dolphins" (Constantine and Yin 2003, 259). Conversely, the dolphins show a tendency to avoid humans if that choice is not presented (Constantine and Yin 2003, 259):

> …if swimmers enter the water in the dolphins' path of travel, no matter how slow the dolphins are moving they will almost always change direction and avoid swimmers. For common dolphins this happens 86 percent of the time, and for bottlenose dolphins 77 percent of the time. (Constantine and Yin 2003, 259)

Notably, Constantine also points out "the risk for the humans in giving the dolphins a choice is that the dolphins do not always choose to interact," citing her findings that "when given the choice, bottlenose dolphins will approach swimmers 34 percent of the time; the rest of the time they will continue to engage in the activity prior to the swimmers' entering the water" (Constantine and Yin 2003, 259).

Her findings illuminate the pragmatism of the procedures employed by the Rockingham Dolphin Swim. Their method for keeping our human bodies controlled and as unobtrusive as possible demonstrated a serious

respect for the dolphins' autonomy and a keen awareness of their agency, particularly their ability to choose not to come near us. Our embodied actions necessarily communicated considerations of dolphins' desires and aversions and their power to assert them in these relations. The dolphins living in Rockingham Bay could have at any time lost interest or, for any reason, chosen not to engage with us. In fact, Constantine has documented aversion behaviors and "significant avoidance" by dolphins who have repeatedly come into contact with boat tours and swimmers who have chased, jumped on, and otherwise harassed them (Constantine and Yin 2003, 260). She notes that successful commercial operators "constantly modify their behavior to minimize their impact on the dolphins" since "their livelihood depends on this sensitivity" (Constantine and Yin 2003, 260). Interspecies etiquette in some cases, then, may be more a matter of practical necessity than anything else.

Nonetheless, the Rockingham Dolphin Swim had demonstrated and enforced respectful, voluntary engagement with the dolphins living in the bay and sincerely attempted to minimize the impacts of the interactions. It exemplifies how scientific knowledge and environmental ethics are vital to responsible tourism operations involving free-living animals, and how *in situ* tourism activities can contribute to ecological conservation if they are done well.[7] By refraining from using fish to draw the dolphins near, for instance, the Rockingham Dolphin Swim did not directly disrupt the ecological role the bottlenose dolphins perform as top predators in the food web of the bay. Moreover, the tour company contributes to employment and the local economy of Rockingham, providing an incentive for residents and other business owners to protect the dolphins and the bay. Thus, it is in everyone's interest for the Rockingham Dolphin Swim to behave responsibly and ethically toward the dolphins to ensure their continued participation.

Still, I was left wondering, if dolphins had no real choice in the matter, that is, if they were in captivity, would the same considerations of respect and autonomy be exercised? Unfortunately, I found only one example of similar practices and considerations in the captive swim programs.[8] The "natural swim" experience at Dolphins Plus was the only captive swim program to come close to affording a comparable kind of dolphin etiquette.

SCRIPTING FOR DOLPHIN ETIQUETTE AT DOLPHINS PLUS?

Located in Key Largo, Florida, Dolphins Plus is a very small facility made up of square cement pools separated by chain-link fencing. It was the most plain of all the sites I visited, deprived of aesthetic considerations regarding the shape and size of the pools, the nature of the materials, and landscaping or lack thereof. Fourteen bottlenose dolphins were living at Dolphins Plus, six of whom had originally been captured in the Atlantic Ocean somewhere between Sarasota and Tampa, Florida, and eight of whom were born in captivity elsewhere. The facility opened in 1979. At the time, no other aquariums would sell already captive dolphins to the owners because they wanted to start a swim-with-dolphins program, which was generally thought to be too dangerous for both people and dolphins. They were not dissuaded, though, and in 1980 Dolphins Plus began offering the "natural swim" program. They currently also include "structured swims" with bottlenose dolphins, dolphin-assisted therapy, as well as encounter programs with California sea lions.[9]

A friendly, down-to-earth young man led our natural swim and began with a thorough and candid orientation session. We were told details about how and what the dolphins were fed (capelin, smelt, and herring mainly) and how important the variety is to their physical and mental health, in that he thought the variety might make the food less boring. We learned that bottlenose dolphins, like other marine mammals, get all of their fresh water from the fish they eat, so they must eat the fish whole; if the fish's body breaks, the fresh water leaks out and salt water gets in. We were told how a dolphin must eat a fish head first so that the outer scales and spiky tail flukes would not scratch their throats, and how their tongues can seal off the throat and then push water out and suck down the fish at the same time to avoid drinking any salt water.

Most importantly, we learned about the rules regarding our bodies and actions during the swim: to always keep our hands by our sides and to never try to touch the dolphins. He emphasized and explained this rule through an analogy, asking us to imagine ourselves walking down a street and being approached by a stranger who then introduces themselves with their hand outstretched. At that point we have a choice to engage or politely walk away. Either response would be acceptable. "Now," he said, "imagine that stranger walking right up and groping, poking, rubbing your body, how would you like that?" We chorused that we would not

like that one bit and he said, "Right, so don't do it to the dolphins!" Most of the group nodded in agreement, but a couple of minutes later one of the younger men in our group asked, "So, can we touch them?" We were explicitly, and repeatedly, instructed to hold our arms at our sides or folded across our backs, and to swim by kicking our legs straight up and down using our flippers. And, no touching!

After the orientation session, we squeezed into our wetsuits, donned flippers, a mask and snorkel, and our group of seven got in the water for a thirty minute swim with four bottlenose dolphins: Samantha, Julian, Bob, and Cosmo. It was in a square cement pool about fifteen feet deep and the seawater, pumped in from the nearby Atlantic Ocean, was turbid and green. Visibility was low. The water was a cool 70 degrees Fahrenheit, or 21 degrees Celsius. I wore a half wetsuit and was shivering by the end of the thirty-minute swim. I felt very buoyant in the salty water and found it difficult to dive and swim under the surface for long. This contrasted with the heavy guilt I felt about participating in the program, complicit in the captivity and employment of these dolphins. Infused with these emotions was also my anxiety about getting into the water with Samantha, Julian, Bob, and Cosmo. They were big and strong beings and we would all be immersed in the same small enclosure.

Once I was in the pool, however, excitement replaced apprehension and I have to admit that catching a glimpse of them swimming a few feet away was incredible. They appeared to come so close that I thought we might bump into each other at some points, but we never did. Most of the time, they swam by underneath and looked up at me. They were usually swimming too fast for me to keep up and make eye contact, but they would sometimes slow for a split-second and really look. Only once did we end up swimming side by side making eye contact for a few seconds before they accelerated away with a few swift pulses of their tails. It was exhilarating for me, a feeling of connection, although I can only guess what meaning, if any, it had for them.

During the swim, the staff gave us toys to interest the dolphins and attract their attention. All seven of us pushed long poles in front of us so that Cosmo, Bob, Samantha, and Julian could surf the wave we created. Later on, I was given a large Tupperware lid to push and three of the dolphins did swim just in front of me a few times. In pairs, we were given an open wetsuit to stretch between us as we swam, which caught all four of the dolphins' interest for a few minutes. Other than the play objects and

instructions for using them, there was little mediation from the staff at Dolphins Plus during our natural swim interactions. They stayed on the platform beside the pool the whole time, just watching. The only exception occurred near the end of our session when one of the younger men chased the dolphins and I heard the staff reprimand him for trying to touch them.

CONCLUSION: AFFORDING DOLPHIN ETIQUETTE

Overall, Dolphins Plus was the most institutional looking and non-aesthetically pleasing of all of the swim-with-dolphin sites I visited. There was no pretense of ecological "naturalness" and a total lack of landscaping. It had the usual trappings of tourism, such as the gift shop and professional videographers, and yet it felt the least commercial of any of the captive sites. This may in part be due to their not having a show, but there somehow seemed to be more of an atmosphere of respect for the dolphins in the programs that they offered, in speech and deed. They appeared very serious about what they did, and insisted that the dolphins' needs and comfort always came first, much like the attitude expressed by the Rockingham Dolphin Swim. By contrast, at Discovery Cove the human experience was obviously privileged and stressed as the most important element to be accommodated at all times: the rules and instructions were couched and explained in terms of human comfort and safety, the quality of our vacation experience, and the availability of photo opportunities.

While the embodied etiquette employed in the swims at Rockingham and Dolphins Plus facilitated respectful and voluntary engagements and encouraged attentiveness to our own bodies in relation to those of the dolphins, the structuring and scripting at Discovery Cove worked to dissuade active attentiveness to the dolphins themselves and restricted spontaneous bodily engagements between human and dolphin participants. Moreover, I found that the interactive programs at Discovery Cove were scripted to strongly direct the emotional responses that participants were supposed to feel and express. As the trainers actively re-created scenes from the advertisements, they would prompt human participants for enthusiastic responses: "How was that, was it GREAT!?" In a way, they were training the human participants to respond to cues, much like when they would prompt the dolphins by asking: "Do you like that? Do you want a fish?" while simultaneously giving the hand gesture for the dolphins to nod their heads.

We find, then, that while Dolphins Plus and Discovery Cove shared similarities as captive facilities, the organization of bodies and the scripting of movements at the two sites were based upon opposite motivations and achieved quite different effects in the dolphin-human interactions. We can say for both that it is clear that captivity greatly diminishes ethical affordances. Confined to an enclosed pool and dependent upon humans for food and other necessities, the dolphins have little choice but to participate in the programs. Regardless of intention, the sincerity of any invitation to voluntary interactions in these cases is severely compromised. And yet, some degrees of ethical affordances may still emerge in subtle ways. For all of the swim-with-dolphin sites, no physical barriers divided human and dolphins. This created opportunities for the dolphins to approach the human participants underwater, even to touch us if they chose, and to use their echolocation to sense and examine us. Submersion also resulted in some vulnerability for humans, with our bodies exposed and accessible, and not as adept in the water.

Despite this, power remained dramatically unequal in captivity due to enclosure and the presence of the trainers. Trainers held the upper hand as they held the bucket of fish and represented the dolphins' sole source of food, thus compromising any attempts at inviting voluntary interactions and genuine reciprocity. A key factor of the activities at Discovery Cove is that they were highly structured by the trainers who gave a verbal play by play for what was to happen, while at the same time using food as a tool for directing exactly what the dolphins were supposed to do. The organization of the activity directed the attention of both the humans and dolphins away from each other and instead encouraged attentiveness to, and compliance with, the trainer. Neither the facility nor the activities offered at Discovery Cove afforded opportunities for the humans or the dolphins to engage in direct, spontaneous kinds of interaction or mutual play.

Conversely, the Rockingham Dolphin Swim brought humans out to where free-living dolphins were, to meet in their unpredictable element. We entered cold, deep waters for a chance to see them, knowing that they could easily avoid us, thus embodying a choice to interact voluntarily. Furthermore, play presented an invitation in meaningful terms for them. Engaging in playful underwater acrobatics evidently appealed to the dolphins and attracted their interest in our group. The strict omission of food from the activity fit the intentions that the offer was invitational rather

than coercive. Had they chosen to touch and investigate us, our physical presence in the ocean afforded the dolphins such opportunities. We were able to offer our vulnerability and ourselves as objects for the dolphins to look at. We offered reciprocity for the privilege of seeing the dolphins by being visible and acoustically available to them at a respectful distance from which they could use echolocation to check us out. We restricted our own movements and refrained from reaching out or touching them.

Likewise, Dolphins Plus insisted upon considerations of respect for the dolphins' autonomy and right not to be chased or touched. Ethical affordances were complicated and compromised, though, by the enclosure of the pool. While we could invite their interest to interact via play and strive to give the dolphins space as we swam in circles, confined to the pool they were never able to avoid us entirely. The lack of food helped to minimize coercion and the limited involvement of the trainers, who remained on the sidelines rather than in the water with us, enabled both humans and dolphins to act spontaneously and more freely.

Ultimately, comparative analysis of the three swim-with-dolphin sites shows that the swim programs were, quite consistently, tightly controlled and imposed restrictions upon each participant's comportment and bodily actions, some through basic rules, some through constant scripting of the experience. What is most interesting, however, is that the effects of this were quite different depending upon the context and specific nature of the program. At Discovery Cove scripting greatly diminished the interactive quality of the experience, transforming it into a generic and mechanical routine. The other two programs, Dolphins Plus and the Rockingham Dolphin Swim, however, effectively afforded engagements in a kind of interspecies etiquette. In these latter two sites, detailed rules about how one should and should not move their bodies in relation to the dolphins were concerned more with social considerations for the dolphins than with reproducing a generic tourist experience. Far from presenting solutions to the complicated issue of whether, where and how humans should meet dolphins, these examples can nonetheless be looked upon as fledgling attempts at ethical interspecies interactions and provide clues to the kinds of meeting places we might imagine and create with ethical affordances as our guide.

NOTES

1. The "natural swim" at Dolphins Plus, discussed in this paper, for instance.
2. The fieldwork this paper is based upon was conducted in Florida, USA, and Western Australia between 2003 and 2006. I conducted participant observations, documented with photos and video footage, of four swim-with-dolphin programs (Discovery Cove, Orlando, Florida; Dolphins Plus, Key Largo, Florida; Theatre of the Sea, Islamorada, Florida; Rockingham Dolphin Swim, Western Australia) and one wade-with-dolphins program (Theatre of the Sea, Islamorada, Florida). Additional fieldwork was conducted for the broader research project, which included touch-and-feed dolphin, orca and beluga encounters at facilities in Vancouver, British Columbia, Canada; Niagara Falls, Ontario, Canada; Orlando, Florida, USA; and Monkey Mia, Western Australia. They were: Beluga Encounter at Vancouver Aquarium and Marine Science Centre; Orca touch-and-feed at Friendship Cove and Beluga touch-and-feed at Arctic Cove, both in Marineland, Canada; Dolphin Cove in Sea World, Orlando; and, Monkey Mia on Shark Bay in Western Australia.
3. To clarify the term, I am using "script" in the sense of the Canadian Oxford Dictionary's definition of "a predictable or planned series of statements or actions" (Bisset, 2000, 929).
4. This bridging of knowledge and action, thought and feeling, is groundbreaking in environmental ethics, as she concludes: "engaged empathy thus involves both affect and cognition and will necessitate action" (Gruen 2009, 30). Like Gruen, I too am dismayed by the regularity with which "[s]tandard conceptions of rationality and universality fail to capture the full range and complexity of our ethical experiences and the full motivational structures that compel us to "do the right thing" (2009, 25) and am consequently interested in "how empathetic engagement might work in shaping moral perception and informing motivation" (Gruen 2009, 27). Specificity and situated knowledge, key elements of feminist philosophy and research, are vital to this project, hence the inclusion of empirical research to provide lived, sensory accounts of my participant observations and experiences in this paper. By giving readers a fuller sense of my experiences as a participant in swim-with-dolphin programs, through phenomenological and narrative description, I strive to engage embodied moral imaginations (Warkentin 2002) and inspire multiple layers of "engaged empathy" (Gruen 2009).
5. Projection is a serious concern, but it can be minimized, even avoided, by gathering specific information through direct engagement and observation,

as well as utilizing secondary sources, to generate knowledge about the individual other. For instance, Shapiro recommends that one's "sense of the animal's experience is critically informed by reflection on (1) social constructions, both popular and scientific, that might affect researcher apprehension and/or the animal's actual experience and (2) understanding of the history of the individual(s) under study" (1997, 292). I provide a more detailed argument for how we can avoid and mitigate personal and anthropomorphic projection in Warkentin 2010.

6. In my Gary-Larson-cartoon-inspired-imagination, Capricorn and Joe were rolling their eyes, thinking "whatever," and "here we go again" as they swam out to receive the next gangly human.

7. *In situ* here refers to tourism activities that take place where the animal actually lives, in this case, the bottlenose dolphins live in Rockingham Bay and tourists are taken there to see them. It contrasts with *ex situ* activities in which the public encounters an animal who has been removed from their natural habitat and put in captivity, such as a zoo or aquarium. These terms apply to conservation strategies, particularly in relation to ecotourism, designed to raise awareness and educate the public. For example, the public may encounter dolphins *ex situ* at an aquarium and learn about threats to their marine habitat through signage and narrative, or they can go on a whale-watching tour and actually see them *in situ,* in their ocean environment and get a better sense of their lives and the reality of issues that threaten their survival. There are many benefits of *in situ* activities, ecologically and in terms of the richness of the human and dolphin experience, including those identified in this paper. And, arguably, an *in situ* context will provide for a more powerful learning experience and encourage a conservation ethic, but we must keep in mind that *in situ* tourism must be conducted responsibly as there are too many examples of it being done poorly or ignorantly throughout the world. In short, responsible ecotourism requires an ecological understanding informed by science and guided by environmental ethics, but there are many more and complicated factors to be considered, which exceed the scope of this particular paper. For an in-depth study comparing *in situ* and *ex situ* ecotourism in fostering pro-conservation attitudes, please see Tisdell and Clevo (2001). For a more general discussion and critique of ecotourism as a tool for conservation, see Kruger (2005).

8. Please see Note 2.

9. Dolphin-assisted therapy is contentious in its own right, but appears to be very popular in many parts of the world. For a focused critical analysis of animal assisted therapy, see Zamir (2006). In conclusion, Zamir finds dolphin-assisted therapy morally objectionable according to a "liberationist perspective" in cases where dolphins are confined and/or captive. For a description and inspiring case study of dolphin-assisted therapy, from a human-centred perspective, see McKinney et al. (2001).

REFERENCES

Behnke, Elizabeth. 1999. From Merleau-Ponty's concept of nature to an interspecies practice of peace. In *Animal others: On ethics, ontology, and animal life*, edited by H. Peter Steeves, 93–116. Albany, NY: State University of New York Press.

———. 1997. Ghost gestures: Phenomenological investigations of bodily micromovements and their intercorporeal implications. *Human Studies* 20: 181–201.

Bisset, Alex, ed. 2000. *The Canadian Oxford paperback dictionary*. Don Mills, ON: Oxford University Press.

Cheney, Jim. 1998. Universal consideration: An epistemological map of the terrain. *Environmental Ethics* 20: 265–77.

Cheney, Jim and Anthony Weston. 1999. Environmental ethics as environmental etiquette: Toward an ethics-based epistemology. *Environmental Ethics* 21: 115–134.

Constantine, Rochelle. 2001. Increased avoidance of swimmers by wild bottlenose dolphins (*Tursiops truncatus*) due to long-term exposure to swim-with-dolphin tourism. *Marine Mammal Science* 17: 689–702.

———. 1999. *Effects of tourism on marine mammals in New Zealand*. Science for Conservation Series, 106. Department of Conservation, Wellington.

Constantine, Rochelle, Diane H. Brunton, and Todd Dennis. 2004. Dolphin-watching tour boats change bottlenose dolphin (*Tursiops truncatus*) behavior. *Biological Conservation* 117: 299–307.

Constantine, Rochelle and Suzanne Yin. 2003. Swimming with dolphins in New Zealand. In *Between species: A celebration of the dolphin–human bond*, edited by Toni Frohoff and Brenda Peterson, 257–63. San Francisco: Sierra Club Books.

Csordas, Thomas J. 1993. Somatic modes of attention. *Cultural Anthropology* 8: 135–56.

Davis, Susan. 1997. *Spectacular nature: Corporate culture and the Sea World experience*. Berkeley and Los Angeles: University of California Press.

Desmond, Jane. 1999. *Staging tourism: Bodies on display from Waikiki to Sea World*. Chicago: Chicago University Press.

Donovan, Josephine. 2006. Feminism and the treatment of animals: From care to dialogue. *Signs* 31: 305–29.

Eaton, Randall L. 1993. Orcas and dolphins in captivity. In *The animal ethics reader*, edited by Susan J. Armstrong and Richard G. Botzler, 447–51. New York: Routledge.

Gibson, James J. 1979. *The ecological approach to visual perception*. Boston: Houghton Mifflin.

Grene, Marjorie. 1965. *Approaches to a philosophical biology*. New York: Basic Books.

Gruen, Lori. 2009. Attending to nature: Empathetic engagement with the more than human world. *Ethics and the Environment* 14: 23–38.

Hughes, Howard C. 1999. *Sensory exotica: A world beyond human experience*. Cambridge, MA: MIT Press.

Kruger, Oliver. 2005. The role of ecotourism in conservation: Panacea or Pandora's box? *Biodiversity and Conservation* 14: 579–600.

McKinney, Alexis, Dan Dustin, and Robert Wolfe. 2001. The promise of dolphin-assisted therapy. *Parks and Recreation* 36: 46–50.

Moore, Patrick. 1998. Dolphin psychophysics: Concepts for the study of dolphin echolocation. In *Dolphin societies: Discoveries and puzzles*, edited by Karen Pryor and Kenneth S. Norris, 365–82. Berkeley and Los Angeles: University of California Press.

Plumwood, Val. 2002. *Environmental culture: The ecological crisis of reason*. London, UK: Routledge.

———. 2000. Integrating ethical frameworks for animals, humans and nature: A critical feminist eco-socialist analysis. *Ethics and the Environment* 5: 285–322.

———. 1993. *Feminism and the mastery of nature*. New York: Routledge.

Reed, Edward S. 1996. *Encountering the world: Toward an ecological psychology*. Oxford, UK: Oxford University Press.

———. 1988. The affordances of the animate environment: Social science from the ecological point of view. In *What is an animal?* edited by Tim Ingold, 110–26. London, UK: Unwin Hyman.

Shapiro, Kenneth. 1997. A phenomenological approach to the study of nonhuman animals. In *Anthropomorphism, anecdotes, and animals*, edited by Robert W. Mitchell, Nicholas S. Thompson, and H. Lyn Miles, 277–95. Albany, NY: State University of New York Press.

———. 1990. Understanding dogs through kinesthetic empathy, social construction, and history. *Anthrozoos* 3: 184–95.

———. 1985. *Bodily reflective modes: A phenomenological method for psychology*. Durham, NC: Duke University Press.

Steeves, H. Peter. 2000. A phenomenologist in the magic kingdom. In *Phenomenological approaches to popular culture*, edited by Michael T. Carroll and Eddie Tafoya, 163–86. Bowling Green, OH: Bowling Green State University Popular Press.

Tisdell, Clem and Wilson Clevo. 2001. Wildlife-based tourism and increased support for nature conservation financially and otherwise: Evidence from sea turtle ecotourism at Mon Repos. *Tourism Economics* 7: 233–49.

Warren, Karen J. 2000. *Ecofeminist philosophy: A Western perspective on what it is and why it matters*. Lanham, MD: Rowman & Littlefield Publishers, Inc.

Warkentin, Traci. 2010. Interspecies etiquette: An ethics of paying attention to animals. *Ethics and the Environment* 15: 101–21.

———. 2009. Whale agency: Affordances and acts of resistance in captive environments. In *Animals and agency: An interdisciplinary exploration*, eds. Sarah McFarland and Ryan Hediger, 23–43. Leiden: Brill.

———. 2002. It's not just what you say, but how you say it: An exploration of the moral dimensions of metaphor and the phenomenology of narrative. *Canadian Journal of Environmental Education* 7: 241–55.

Weston, Anthony. 2004. Multicentrism: A manifesto. *Environmental Ethics* 26: 25–40.

———. 1998. Universal consideration as an originary practice. *Environmental Ethics* 20: 279–89.

Zamir, Tzachi. 2006. The moral basis of animal-assisted therapy. *Society and Animals* 14: 179–99.

NOTES ON CONTRIBUTORS

Alan Abelsohn is an assistant professor in the Department of Family and Community Medicine, and the Dalla Lana School of Public Health and lecturer in the Centre for Environment, at the University of Toronto. While writing this article, he received financial support as a Fellow in the Institute of Population and Public Health, Canadian Institutes of Health Research, through the CIHR research grant of Dr. John Frank. E-mail: alan.abelsohn@utoronto.ca

Philip Cafaro is associate professor of philosophy at Colorado State University in Fort Collins, Colorado. His research interests center in environmental ethics, consumption and population issues, and wild lands preservation. He is the author of *Thoreau's Living Ethics* (University of Georgia Press) and co-editor of *Virtue Ethics and the Environment* (Springer-Verlag Publishers). He is co-editing a forthcoming anthology on environmentalism and population issues, to be published by the University of Georgia Press. E-mail: philip.cafaro@colostate.edu

Willis Jenkins is Margaret Farley Assistant Professor of Social Ethics at Yale Divinity School, with a secondary appointment to the Yale School of Forestry and Environmental Studies. Email: willis.jenkins@yale.edu

Dennis Patrick O'Hara is an assistant professor of ethics as well as the Director of the Elliott Allen Institute for Theology and Ecology at the University of St. Michael's College. He is also a member of the graduate faculty of the Centre for Environment at the University of Toronto. E-mail: dennis.ohara@utoronto.ca

Traci Warkentin, PhD, is an Assistant Professor in the Department of Geography at Hunter College of the City University of New York (CUNY), where she teaches in environmental studies and geography programs, and

is a member of the advisory board for the CUNY Institute for Sustainable Cities. Dr. Warkentin's current research on the relational spaces of whale-human interactions combines her interests in animal geographies, feminist environmental ethics, and experiential learning contexts. E-mail: twarkent@hunter.cuny.edu

Sarah Wright is an assistant professor of philosophy at the University of Georgia, where she is also on the faculty for the Environmental Ethics Certificate Program. Her research focuses on normative epistemology, particularly virtue epistemology, as well as on relations of epistemic normativity to other aspect of normativity. Her most recent publications have appeared in *Episteme*, *History of Philosophy Quarterly*, *Metaphilosophy*, *Acta Analytica*, and *The Southern Journal of Philosophy*. Email: sawright@uga.edu

ENVIRONMENTAL ETHICS

AN INTERDISCIPLINARY JOURNAL DEDICATED TO THE PHILOSOPHICAL ASPECTS OF ENVIRONMENTAL PROBLEMS

Appearing quarterly since 1947, *Pacific Science* is an international, multidisciplinary journal reporting research on the biological and physical sciences of the Pacific basin. It focuses on biogeography, ecology, evolution, geology and volcanology, oceanography, palaeontology, and systematics. In addition to publishing original research, the journal features review articles providing a synthesis of current knowledge.