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## Scientific Ecology and Deep Ecology

Diamondback (pseud. for Reed Noss)

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"Ecologist" means different things to different people. Strictly speaking, an ecologist is a scientist (usually a biologist) who studies the interrelationships between organisms and their environments. "Deep ecologists," on the other hand, may or may not be scientifically trained, and their topic is not ecology *per se* but rather developing a harmonious relationship with Nature, and defending the Earth against human-generated threats. Scientific ecologists, to the extent that they want to appear respectable, may be quite anthropocentric in their day to day behavior; deep ecologists, on the other hand, are explicitly biocentric (or at least they try to be). To many people, an "ecologist" is simply an environmentalist, or someone who (unlike Hayduke) picks up bottles and cans along roadsides (I've seen garbage trucks labeled "Ecology Dept."). Some self-labeled environmentalists have added to the confusion by misinterpreting what ecology fundamentally means, and using it as a buzzword for various political goals.

More distributing to me, as a professional ecologist sensitive to people's lack of appreciation of ecology, is that environ-

mentalists are often antagonistic toward science and scientists in general, not just toward manipulative science and technology. Some openly suggest that scientists are the enemy, and have nothing positive to offer the environmental movement. For example, in planning a recent Green Conference in Florida, organizers went out of their way to assure that no scientific ecologists were involved. When I criticized the program of the conference (which featured anti-deep ecologist Ynestra King as a keynote speaker) and asked why no ecologists had been invited to speak, the conference organizer responded that if I meant, by "ecologist," the "progressional, biological scientist type," then he saw no need for that kind of person to speak at a conference for activists.

I admit I feel a little uneasy about being called a scientists...somehow that label conjures up images of little men in white lab coats playing with test tubes and DNA. But a woman or man crouched in the forest, keying-out (and admiring) a fungus or recording details of bird behavior, is every bit as much of a scientist as the experimenter in the laboratory. And the lab scientists, too, may contribute invaluable information toward our understanding of how Nature works. I suggest that science phobia is often misguided, and that ecological science is a constructive approach to knowing Nature. By itself, science may be neither necessary nor sufficient to understand Nature, but it is one of the best tools we have. Deep ecologists and other environmentalists would do well to consider more thoughtfully what the Way of Ecology offers, both as a science and as a worldview.

The science of ecology developed from natural history, the lore of Nature. Since Charles Darwin, this lore has been unfused with concepts of interdependence, interrelationship, and co-adaptation—indeed, it was Darwin's thoroughly scientific theory of evolution that made ecology possible. Evolution made sense out of natural history; facts heretofore disconnected became interacting components of general patterns

Most scientists don't want to think (or, at least, talk openly) about such things or feel they cannot do so without jeopardizing their scientific credibility and, therefore, their careers. Jobs and money are scarce for ecologists, and appearing radical or unscientific is usually a one-way ticket to poverty and obscurity. This does not excuse ecologists from active involvement in defending the Earth, but their hesitation is understandable. Deep ecologists must encourage scientific ecologists to get involved in saving that which they study. The battle to defend the Earth needs warriors who specialize in determining what the war is being fought over, what it takes to save what we have, and how we might be able to put it all back together again.

it would behoove them to explore natural history, evolution, and ecology. You don't need a college degree to be a good ecologist, though it helps, because it compels exposure to the cumulative knowledge of others through textbooks, journals, and symposia. But the best ecology is learned in the field from observation and reflection on why Nature works the way it does; and from just being there, out of doors and away from the human-dominated world.

It is no accident that many ecologists and field biologists are somewhat crude, wild-eyes, and uncivilized, or to put it simply—"earthy." As John Steinbeck, who was trained in zoology, noted in *Log from the Sea of Cortez*, "What good men most biologists are, the tenors of the scientific world—temperamental, moody, lecherous, loud-laughing, and healthy...The true biologists deals with life, with teeming, boisterous life, and learns something from it." The message of the ecological worldview, in its fullest expression, is this: Get out into the woods, the mountains, the deserts, the swamps. Feel it, explore it, examine it, think about it, understand it. Rational analysis and direct intuition do not conflict—you need both and your brain is built by natural selection to do both. It is your Nature.

If science, in the form of the "new sciences" or ecology, evolutionary biology, and quantum mechanics, is capable of reinserting humans into Nature by enlarging the self to include the whole biosphere—"the world is my body" (Alan Watts)—then perhaps we have come full circle. We began as primitives, relatively un-self-conscious and inseparable from the ecosystem; we evolved into calculating, rational beings, becoming more and more alienated from our real home; we developed otherworldly religions to place us above other life-forms, and dualist reductionist science to ascribe mechanism to all of Nature; but then we developed new forms of science that put us, surprisingly but objectively, right back where we began and where we belong: as Earth-animals.

that should be explained in a rational and convincing way. Furthermore, elements in Darwin's theory were empirically testable—the hall-mark of science.

Unlike religious beliefs, scientific hypotheses are designed to be discarded if they no longer accord with observations. Much hogwash persists in science, but honest scientists do their best to weed it out. The subject of ecology is Nature, which has developed in all its beauty through organic evolution and is a vast web of interactions more complex than humans can ever fully comprehend. As ecologist Frank Egler has pointed out, "Nature is not only more complex than we think, but more complex than we can ever think." It is one intricate system composed of a hierarchy of nested subsystems, with structure flowing upward and constraints flowing downward. Although ecological complexity can never (and some would add, *should* never) be fully quantified, the study of complex interactions—ecology—produces overwhelming respect for the whole in all who approach it sensitively.

In becoming scientific, natural history does not denigrate into mechanism, but rather matured into holism while retaining the proven techniques of mechanistic science. Establishing facts through observation, experiment, and other reductionist methods, ecology unites them and integrates them into broad, general theories, into wholes greater than the sum of their parts. The wholes (theories) are there all along, of course, guiding the collection of data and providing context for facts. As Stephen Jay Gould has pointed out, facts do not speak for themselves, but are read in the light of theory. Perhaps most important to deep ecologists, ecology and evolutionary biology demonstrate unequivocally that humans are just one ephemeral component of an interrelated and interdependent biota. Ecology and evolutionary biology place us firmly within nature, not on top of it.

Natural science is explicitly non-anthropocentric, even though many of its practitioners are still stuck in anthro-

pocentric modes of thought. Scientists, such as Jared Diamond, who have become familiar with taxonomies developed by indigenous cultures (i.e., the way they separate and classify wild organisms into types) are generally impressed by the similarity of indigenous taxonomy to scientific taxonomy. "Primitive" people recognize mostly the same species in Nature as do modern scientists. The differences usually involve those plants and animals that are not used directly for food, clothing, ornamentation, drugs, and other human purposes. These "useless" species tend to be "lumped"; thus, fewer distinctions and fewer species may be recognized by indigenous cultures than by scientific taxonomists. Indigenous people, like everyone else, have a utilitarian bias that has been naturally selected to foster their survival. For this reason, they have developed a taxonomy that is anthropocentric compared to that of biology, which seeks to classify all organisms with equivalent precision, regardless of their utility to humans. This is not to deny that most research money in biology is channeled into anthropocentric research (e.g., medical science and genetic engineering), and that vertebrates and vascular plants have received more attention than "lower" forms.

Ecologists, as scientists, devote their lives to studying, and hopefully understanding, how Nature works. These people love the Earth. As the British entomologist Miriam Rothschild remarked, "For someone studying natural history, life can never be long enough." Other approaches to this same end (or to no particular "end") are also valid, and are not mutually exclusive. Direct experience, contemplation, meditation, and simply the ecstasy of being immersed in wilderness are equally viable approaches and, in fact, provide many ecologists with the inspiration they need to carry on. These spontaneous or mystical experiences are accessible to scientist and non-scientist alike. Nothing in my professional code of conduct as an ecologist says that I cannot run naked and whooping with joy through the desert, or sit all day and stare at a rock. When

I am actively engaged in research, of course, these particular activities may not be appropriate, but only because they may bias my results (for example, by scaring away all the fauna). A whole human being is one who is equally comfortable with rational and intuitive-spontaneous explorations of Nature—one who can deal with "hard facts" at one moment and be a wild animal the next. These two approaches, complementary and intertwined as yin and yang, are both essential to holistic understanding.

Aldo Leopold, my favorite deep ecologist, was able to carry his message so powerfully because he had the sensitivity of a poet and the objectivity of a scientist. He communicated in the hard, factual language of science, sprinkled with brilliant, experiential metaphors in the finest tradition of Nature essays. Virtually every faction within the environmental, ecosophical, and resource management fields claims old Aldo for its own, yet few people seem to comprehend the more radical, biocentric notions he developed gradually through his life, and articulated late in his career. Because he could write so damn well and is appreciated by so many people of such divergent world-views, Leopold provides deep ecologists with an avenue along which to lead others toward biocentric understanding.

If yin and yang, intuition and rationality, emotion and thought, right brain and left brain are complementary, then so too are deep ecology and scientific ecology. It may be that their relationship is mutualistic: they need each other. Don't judge scientific ecology from your experience that most ecologists (or scientists, generally) are anthropocentric jerks. Most philosophers, accountants, lawyers, farmers, and television repairmen are anthropocentric jerks, too. At least ecology, "the subversive science," has a biocentric, holistic underpinning, which cannot be said for most other disciplines. If most scientific ecologists are not deep ecologists, it is because they have yet to grasp the radical implications of their science. If most deep ecologists are not scientific ecologists, then perhaps