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4 Science-based versus traditional ethics

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In an environmental development ethic, do science-based values occupy a privileged position as criteria against which traditional cultural values are to be tested? Since science-based values are themselves plural, and traditional values even more so, no simple answer is possible. The cases that follow cross a spectrum from conflict through complementarity to criticism. As we travel through them, we will be forced to reorient ourselves repeatedly, ending with an overview suggesting that authentic human life, to be fully developed, must revise both traditional culture and science as presently understood. Our aim is to move beyond instrumentalist models of sustainable development in quest of a global ethic. Respect for the community of life on Earth — ecologically and culturally— is the test of an ethic for the world.

The end of development, the end of ethics, is more life. A development and conservation ethic must be *true to life.* In that sense, *true* development must correspond to the highest human activity that most deeply values life, Humans should be *true to* the Earth, 'their' Earth, in the sense that it is their home, their niche, but not theirs alone. In a traditional biblical phrase, ecumenically and globally applied, humans have to enter the 'promised land', to inherit the Earth. In a scientific phrase, they must know their 'ecology', the logic of their home.

Conflict: Traditional values challenged by science-based values

At one extreme, science-based values clash with values expressed in folklore, or, more pejoratively, in superstition. Ginseng, *Panax quinquefolius,* a once common Appalachian plant, is much sought in the belief that its powdered roots prolong virility and vitality. The Orientals had already eradicated a prized Asian ginseng when a Jesuit priest in Canada in the early 1700s found the American plant. Many tons were shipped to Asia, and ginseng became known as 'Appalachian gold'. Now nearly extinct, ginseng sold in the last decade for about US$70 per pound of roots. The available evidence from scientific investigation suggests that its medical powers belong firmly in the realm of folklore,

A conservation biologist values ginseng for entirely different reasons. It is an unusual plant, a member of the family *Araliaceae,* which has few representatives

in the Appalachian forests. With rather precise habitat requirements, ginseng filled a distinctive niche, though its absence has produced no measurable shifts in the ecosystems it once inhabited. Still, it adds diversity, interest, and richness to the woods, for in this species nature has given expression to a modest but noteworthy development not elsewhere attained.

The present trade in roots is nothing more than a catering to mistaken superstition — which conservation biologists deplore. Can there be any compatibility between ginseng as desired in Chinese folklore and *Panax quinquifolius* as a desired component of the Appalachian hardwoods ecosystem? The extinction of the traditional cultural value is preferable to the extinction of the plant. Chinese folk beliefs exploiting ginseng are not true, and those who hold them do not know the biological truth about how to appreciate the world they inhabit.

Rhinoceroses have large horns that are greatly desired for daggers and prized as symbols of masculinity in the Middle East. Black rhinoceroses, which formerly ranged from Kenya to South Africa, are now extensively poached; their horns, worth US$5,000 each, are sawn off and their carcasses left to rot. Just as Europeans came to judge as unconscionable the trade in feathers that took place in the early part of this century (in the single year of 1914 over 20,000 birds of paradise, 40,000 humming birds, and 30,000 other birds were slaughtered to supply London ladies with feathers for fashion), so this deplorable traditional value ought to be replaced with a scientifically based appreciation of the rhinoceros in its ecosystem. What now seems insensitive feminine vanity and unacceptable profit making is parallel to the insensitive masculine vanity that drives a market which contributes to the destruction of the rhinoceros.

Often, however, quite serious human desires — not just vain or superstitious ones — conflict with wildlife. The mountain gorilla, *Gorilla gorilla beringei*, survives in a population of about 240 animals in the Parc National des Volcans, a 30,000 acre national park in Rwanda. This small country has the highest population density in Africa, a population expected to double by the end of the century. About 95 per cent of its people subsist on small farms that average 2.5 acres per family. The park has already been shrunk by 40 per cent to bring land into cultivation, yet there are pressures to reduce it more. Elimination of the park could support perhaps 36,000 persons at subsistence level, only 25 per cent of one year's population growth. Most persons in Rwanda have little interest in wildlife; some poach gorillas to make skulls and hands into souvenirs for tourists or to use the testicles, tongues, and ears for their magical power over enemies.

This third case advances the argument because now we mix folklore with basic subsistence needs. A conservation biologist will deplore the killing of gorillas to make charms of their organs, claiming that superstition ought to be replaced with an appreciation of the zoology and ecology of gorillas. But the conflict of gorillas versus subsistence farmers is more difficult. Surely, by any calculus, the rights and values of 36,000 humans override the rights and values (if such there are) of 240 gorillas. When devising an ethic of appropriate development, one seems torn between enriching the human community by converting the forests to maximum agricultural yield through the use of appropriate technology, and preserving the biotic community — a few gorillas for the price of tens of thousands of impoverished humans.

But an ethic that seeks to sustain life by taking a global view can reverse the presumptions and reply that the lop-sided score in fact favours the gorilla minority, a relict population and the last of an endangered species, against the human majority, of whom there are 3 billion in the world. Further, these 36,000 humans do not now own any rights to this land; the gorillas live there. Indeed, only some of these humans are alive now as subsistence farmers elsewhere; in most cases these humans are as yet unborn. Although humans are individually valuable after they exist, like an additional child in a family, an additional human in a society is not always an appropriate development. Rwandan development pits 240 existing gorillas, the last of their kind, against 36,000 largely potential humans, an excess of their kind. Rwanda already has too many humans, and to sacrifice a species to make place for a quarter of one year's population growth is only to postpone a problem. Such development is not sustainable, and even if technology could make it so, it would not be appropriate because it would not sustain life in the biotic sense. The gorillas would be a casualty of human inability to control cultural development. The global community would be poorer.

Add many negative effects of development — increased erosion from clearing high mountain soil, the loss of revenue from tourism and zoo sales, the unlikelihood of a just distribution of the benefits from clearing the forests — and the trade-offs begin to figure in a different gestalt. Still, saving the gorillas will involve suppressing Rwandan traditional values, their magical folklore, and their desires for new farmland.

Those who advocate preserving gorillas will be genuinely concerned for the good of the Rwandans. But their hidden agenda will be saving the gorillas for reasons that, from the viewpoint of concerned Western scientists, are really science-based. The gorilla will be admired for its biological characteristics, its highly developed social life, its intelligence, its intrinsic value, and as an object of scientific study that can teach humans something about their own evolution.

Tropical forests in the Amazon are being cut at a rate of 5,000 square miles per year, with 125,000 square miles already lost, to make land available for the landless poor. At least so goes the argument — perhaps political rhetoric, since, once it becomes infertile after a few years, the cleared land tends to become grassland suitable mostly for cattle-ranching and is picked up by large ranchers. The landless poor move elsewhere, often to newly cut forests, and the cycle starts again.

Biogeographers believe that certain areas in these forests are 'refugia', historic centres of plant and animal dispersal that continue to restock surrounding areas. Since it seems impossible (and also unwise, given Brazilian needs for development), to save all the rainforests, conservation biologists sometimes argue that it is of special importance to save refugia. Unless this is done, the natural history of the Amazon basin can perhaps never be known. Furthermore, if these are critical areas for restocking fauna and flora, then any tropical forests saved without them will be insecure and subject to catastrophic collapse.

The problem is *how.* How do we combine, honestly and humanely, biologically-based valuations with culturally based valuations? What do peasants care about refugia? The *caboclos* rural farmers of Indian descent, limit their use of the forests for fear of spirits, and *de facto* biological reserves created as a result of this superstition dot the Amazon landscape. A simple way to protect the forest would

be to leave the forest enchanted.[1] This would be false, but effective. Commercial development interests know nothing of refugia; they view the forests simply as natural resources. What care the politicians trying to protect vested interests while saving (in rhetoric or in reality) the plight of the peasant? Even among biogeographers the idea of refugia is debated, and it may prove less important than some advocate.

Perhaps pragmatic conservationists can try to align enlightened Brazilian beliefs and interests so that they coincide with science-based values. We can argue that the rainforest is an ecosystem with nutrients locked into the trees, not the soil, and that the cleared soil, further leached by heavy rains, is too nutrient-poor to support sustained crop agriculture. We can point out the repeated failures of colonization programmes owing to multiple factors: poor land, weak government guidance, and rich, powerful corporate interests anxious to convert the peasants' deforested, defaulted lands into ranchland. We can add that the refugia are likely to be important sources of genetic material for industrial, agricultural, and medical purposes.

In short, we can make the claim that development based on deforestation is not sustainable. An ethic that bases its decisions on the claim of sustainability does not say anything incorrect or insincere to Brazilian citizens. In fact, culturally based values that run contrary to science-based knowledge will not prove sustainable over time. Unprotected, the ginseng and rhinoceroses will soon be gone, and human desires for virility cannot be met in ignorance of what the Appalachian and African ecosystems can support. Those who care nothing about learning how mountain gorillas are specialized to their ecosystems, or about refugia as propagating centres, are likely to modify those ecosystems in misguided ignorance. The Brazilians and the Rwandans will simply lose their gorillas and their soil (as well as their spirits), leaving their social problems unsolved. Even those who only seek to exploit a resource have, sooner or later, to align with the realities of ecosystems. So far as science discovers the way the world is and can be, it constrains human options about what it ought to be.

Further, science uncovers our illusions, and no one is really made worse off after his illusions are removed. If ginseng, rhinoceroses, and Amazon forests are no longer exploited, sellers will lose their already dwindling income, and buyers their fancied increase in sexual virility. Young princes will no longer have their prized daggers, superstitious Africans their charms from gorilla testicles, nor wealthy Europeans ashtrays made from gorilla feet, and forest ogres will no longer serve as supernatural game wardens. But, in a deeper sense, if those involved could come to the truth of the matter— that the ginseng trade is a rip-off, the daggers only a symbol to flatter masculine vanities, the charms worthless, the ashtrays silly, and the ogres fantasy—they would be better off, more excellent persons. They would understand ginseng, rhinoceroses, and Amazon forests for what they are biologically. More truth about the good life on Earth would surely be an authentic development.

Landless Brazilians and Rwandan farmers have illusions about what the future holds, in terms of what both their soil and their societies will support, Eliminating such illusions would be painful, but it cannot be harmful. To care about persons morally is to want them to know the truth about themselves, their society, and their illusions, as well as about the fauna and flora that surround them.

Complementarity: Traditional values reassessed in light of science

Further along a spectrum from conflict to complementarity, consider the belief in karma and reincarnation, widely present in Eastern religions. Karma is a belief in the persistence of moral value, thought to be covertly present as a determinant in animal as well as human life. Animals, with less good karma than human lives and to that extent of less value, are in fact beings that once were and may again be human beings, and so are of high value. All life is kindred. Daisaku Ikeda, a Japanese Buddhist keenly interested in biological conservation, says that the doctrines of karma and reincarnation make all living beings 'blood relations'.[2] The first Buddhist commandment is that one should harm no living thing, that one should practice non-injury, *ahimsa,* reverence for all life.

A conservation biologist will puzzle whether this oriental belief is friend or foe. At first it seems to complement biologically-based values. Darwinians find in evolution evidence that we are all blood relations. If Buddhists can come by this belief from religious sources, then Western science and Eastern metaphysics will simply reinforce one another. Reverence for life, although a feeling known by conservation biologists almost universally, is rather hard to derive from pure biology; natural selection is a competitive struggle, and the survival of the fittest requires the early deaths of most individuals and has resulted in the extinction of 98 per cent of all previously existing species. Deriving from religion a reason for valuing life can only enhance biological conservation,

But conservation biologists are not really interested in valuing zoological lives metaphysically as once-human, transmigrating souls. At least *qua* biologist, a wildlife biologist's admiring respect for a bull snake cannot be based on the religious belief that it has been or might be reincarnated as someone's grandmother. Conservation biologists want to value snakes, bats, and worms as the causal products of evolutionary forces, not as unsolved moral problems of human life. Animals need to be valued intrinsically for what they are, and instrumentally for the roles they play in ecosystems.

Environmental ethicists and conservation biologists regret the loss of vital information when species become extinct; they worry about shutting down the speciation processes that have been so prolific in India and Africa, the cradles of dispersal and creation. They worry about stability and balance, resilience and diversity in ecosystems. They want a valuing system that yields admiring respect for alien life forms, such as jumping spiders and voles, not just a respect for kindred souls trapped in transient animal life. They may want to value gorillas because they are next of kin to humans, but they also want to value rhinoceroses in their wild integrity as forms of life beyond sympathetic ken, with modes of perception and experience remote from that of humans. What is it like to be a sloth or an ostrich? In these life forms nature has explored unique ranges of experience and potential. Is it not an injustice to interpret them as determined by karma imported from previous human lives?

The East's injunction to reverence for life, *ahimsa,* is initially impressive. But when scientists realize the nature of the religious beliefs about the animals which command non-injury, they wonder whether the doctrine of *ahimsa,* disenchanted and demythologized, can remain an effective force in biological conservation. Does it complement or does it conflict with a science-based value theory? If an

account is really true to developments in evolutionary natural history and to human development, it will avoid projecting human moral development onto non-human beings. Perhaps there is some account yet to be found that retains a karma metaphysics consistent with and complementary to biological integrity. That discovery could be an authentic development toward a global ethic.

To take another example, when ecologists speak of equilibria, hydrologic cycles, nutrient cycles, food pyramids, homeostasis, recycling, renewable resources, and the like, they frequently find nodding approval from oriental listeners. Western ecological theory seems to match the Eastern law of binary complementarity, the oscillating yang and yin. The way of the Tao, and the concept expressed in the Tao Te Ching (stanza 40), 'in Tao the only motion is returning', parallels scientific insight recently reached in ecological theory.[3]

Paired oppositions are impressively present in nature, and many at everyday levels were noticed by the Chinese Taoists. There is the oscillation of hot and cold, summer and winter, sun and moon, wet and dry, growth and decay, waxing and waning. There are mountains and valleys, males and females. Biologists can add that the male-female dichotomy permeates higher plants as well as cryptogams and algae, and that genes come in pairs. Meteorologists find warm and cold fronts. Ecosystems undergo successions from pioneer to climax communities, recommencing after outbreaks of fire, flood, and disease. It would seem that we have found a fortunate complementarity between Western science and Eastern classical culture. Conservation biologists want to preserve the natural rhythms as much as Taoists, and if the former come to value these cycles from their science and the latter from their religious philosophies, so much the better.

Indeed, scientists have lessons to learn from the East. Taoism is a model of authentic development. True to nature and human nature, it blends yang and yin in its sustainable, steady state. The teaching about the Tao is not merely a description of the way biosystems work; it is a prescription for human behaviour. Huston Smith, born and bred in China and long the resident religious philosopher at the Massachusetts Institute of Technology, finds the root of the ecological crisis in the wild 'yang trip' of Western science and so 'Taoism throws its ounces on the side of yin, but to recover the original wholeness'.[4] The ecological crisis resulted from too much machismo. The West needs a recovery of the feminine; we need to flow with nature in order properly to attune ourselves to its rhythms. The Tao, descriptive of nature, becomes prescriptive for human behaviour.

As before, there are second thoughts. There is nothing particularly binary about long-term evolutionary histories, about the storied developments from protozoans to persons, about biogeographical distribution patterns of plants and animals, about speciation and extinction patterns, or about Mendelian genetics. In ecosystems, returning is not the only motion. Ecosystems irreversibly evolve, and they can be pushed by human development into degenerating spirals. From extinction there is no returning, just as from development there is perhaps no holding back. Taoists find natural systems ever the same; historical science finds them never the same.

The Taoist way is an ethic of minimal intervention, *wu-wei*, action by inaction, in the belief that things will take care of themselves. They may in spontaneous

natural systems when uninterrupted by human activities, but in India, China, Japan, and Africa today, if biological conservation is to succeed at all, one needs active environmental managers and wildlife professionals. One needs studies of where the DDT is going in food chains, what the minimum thresholds of viable breeding populations are, what damage is done by exotic parasites and feral animals, how much the water table is failing, and what drought will do to grasslands and ungulate populations.

To plan authentic human development, we need to know about those world markets which force natives to modify their traditional cultures, to know what the potential for tourist income is if the wildlife is preserved as a visitor attraction. We need studies about tolerable pollution levels and rates of soil erosion. The call for more yin may result in doing too little too late because of ignorance of the real causes of the loss of biological diversity. We may fail to exploit possible commercial forces for recovery, blinded by the belief in the resilient powers of spontaneous nature. Taoism may have its contribution to make but, followed uncritically, it is no certain path either to the conservation of nature or authentic human development.

A metaphysically-based, culturally derived value that runs *contrary* to science-based values will not be intellectually sustainable over time. Thus it will not be socially functional either. To survive, values must be made *complementary* to the facts of science. If from biology we learn that the various species are what they are primarily as a result of biological determinants, then those with oriental or native philosophies will have to decide what the operational value of their metaphysics is. How far are their views testable against science? How far are they claims about realms to which science has no access? How far do they yield an ethic for the environment? For authentic development?

Despite the karma belief that moral force is conserved through reincarnations, is not something lost in extinction? Before the extended evolutionary natural history, is the Tao enough explanation? What do we wish to sustain for the future, and how much yang or active intervention is required?

Questioning may yield a revised account of karma, reincarnation, the yang and the yin — a deeper account in which the noumenal metaphysics is clearly distinguished from the empirical, phenomenal claims, yet clearly related to them. Made congruent with science and congenial with conservation biology, those classical views will have become more mature. We do no favour to believers to protect their beliefs from the forces of critical selection, any more than we do species a favour by removing them from the forces of natural selection.

Questioning will compel a clearer account of reincarnation, karma, the Tao, and *ahimsa*, one that can be set beside or beneath science, and if none is forthcoming, then these beliefs are illusory and ought to be abandoned. Where there are illusions or inadequacies of belief, no one will be harmed (though they may be troubled) by such beliefs collapsing or reforming under critical pressures, This is the only path to authentic, true human development.

Criticism: Science-based values challenged through dialogue

There is another possibility. This encounter of science with alien metaphysical

systems may expose the metaphysics that drives *science.* Science may need altering. It may have a loaded metaphysical agenda, may focus on some aspects of experience and obscure or distort others. Science may be infected by *hubris,* by desire for power and domination; it may serve a *praxis* that looks to satisfy human thirsts.

Likewise traditional views, elsewhere made light of, may render perceptible something authentic in nature to which science blinds us, and traditional cultures, being sensitive to this, can prove superior to ours. Remember: no one is the worse for having his or her receptive faculties increased —whether by science, religion, art, philosophy, myth, or whatever.

Science comes in two parts: evolutionary ecoscience, which describes the way nature operates; and technological science, which permits humans to prescribe the uses to which nature will be put. The former describes what *is* the case in nature; the latter requires judgments concerning what developments *ought* to be. These are connected. What we believe about the world licenses and constrains our uses of it. The axiology with which we interpret natural history interlocks with the axiology that drives our cultural development.

Science has discovered the community of life on Earth in ways not known to classical cultures — through microscopes, explorations around the globe, fossil evidence, and the labors of taxonomists with their phylogenetic insights, But the same science that, theoretically and descriptively, has revealed the extent of biological diversity has, practically and prescriptively, often pronounced nature to be valueless, except in so far as it can be used instrumentally as a human resource. Knowledge is power, and biological knowledge has fuelled technology, agricultural development, the control of disease organisms, declines in infant mortality, lengthening spans of life, the elimination of predators, and the exploitation of genetic resources. Culture has exploded with escalating demands on ecosystems. The logic at the bottom of all this is that a valueless nature can be put to any cultural use we please; humans are constrained only by prudence and regard for our fellow humans.

The greatest of the science-based values, if we may put it so, is exploitative resource use. This value is based both on applied, technological science and on a theoretical, evolutionary ecoscience that seems to conclude that nature is intrinsically valueless. The believed absence of any intrinsic value and the enormous possibility of instrumental value couple to produce a single conclusion: The only reason for biological conservation is human welfare. In a blunt metaphor, Paul and Anne Ehrlich claim that biological species are important because they are rivets in the aeroplane in which we humans are flying. In the words of Norman Myers, humans care about 'conserving our global stock'.[6] That seems pragmatic, sensible, humane — quite concerned about people in non-Western, lesser-developed countries. It can even seem a global ethic for sustaining life.

But is this the last word? Exploiters do not really live in an environment. They only have resources, something like the way in which slaveholders, as such, do not have friends, only slaves. Even the most enlightened exploiters, *qua* exploiters, do not live as selves in a society; they are not citizens of a world, only consumers of materials. They reduce their environment to food or faeces, to resource and sink. The environment must be this much, of course, but it can be much more, and

proportionately as the instrumentalist development ethic increases, the environment is reduced to little more than resource.

Though traditional cultures do not have ecology as a science, they often have what ecology means etymologically: a logic of a home. They have world views in which they are meaningful residents in a meaningful world. It can hardly be said that science has yet given us a world view in which we readily find ourselves at home. The West with its growth ethic has tended to replace ecology, the logic of a home, with economics, a logic of efficient resource use. That growth will be claimed realistic, and pragmatic, for the poor and hungry must eat, and we need commodities before amenities. The logic can be science-based: does not every creature act as an imperialist, taking over as much of the world as it can? Playing by the same rules, humans maximize their niche in the world.

Such an ethic of dominance in the only moral creature becomes one of arrogance, an Earth-eating mentality that has become consumptive and no longer resides in any place in peace. We begin to wonder whether those who espouse such science-based values have forgotten what traditional cultures know about the intrinsic worth of these neighbouring forms of life, about how culture ought to be of a piece with the whole. In this perspective, the military-industrial-agribusiness nation-states in the modern West, which think themselves so cosmopolitan, can in fact be quite provincial cultures, more so than the tribes and kingdoms of traditional societies.

Compared with the 'traditionalists' who believe that the myriad natural kinds all have a place under the sun, that creation is divinely created and good, that a spiritual integrity places claims on human conduct, we 'moderns' are the ones who seem axiologically naive. Perhaps we are on a wild yang trip. We see more comprehensively than they biologically; but sometimes they see more comprehensively than we axiologically. They have a global ethic that we have not yet attained. Not always, of course, for doctrines about the dominion of man often originated in the same context as those about the goodness of all created things. Teachings about reverence for life mingle with contradictory abuses. Meanwhile, those of us who embrace the modern scientific and technological world view have little to brag about in our untempered anthropocentrism.

The developmental view that triggered the great losses of biological diversity in this century did not arise from traditional cultural values, either classical or primitive. These losses began when science-based models were exported to traditional societies, The damage done within primitive and classical cultures (which was sometimes considerable) pales beside damages done in our own century when these cultures are 'opened up' for development, when they get entangled in world markets and military alliances, when they aspire to Western standards of living, and when they are secularized. The American consumer mentality (that can sacrifice a relict wilderness for molybdenum to make electric carving knives) needs to reform its values as much as do the foolish folk who desire ginseng or rhinoceros horn daggers. In a world without value except by human preference assignments, science-based values are not part of the solution; they are the root of the problem.

At an elevation still to be attained, science can help provide a clearer vision. Humanity cannot return to superstitious folklore; most contemporary men and women do not live in an enchanted world. It is unlikely that we can lift intact from

traditional cultures any pre-scientific, mythological way of valuing nature. But partly as a result of our dialogue with these cultures, we might accept our non-human neighbours on Earth for what they are in themselves, not as rivets in spaceship Earth or global stock. Perhaps we can begin to see ourselves not so much as maximizers of human development but as fellow residents in a global community of life. Using traditional values as a catalyst, we might draw our model of Earth from ecology, rather than from physics, chemistry, computing, or mechanics. No model of development can be 'right' in terms of inter-human justice unless it is 'right' in terms of adapted fit to the land, We reach the conclusion that science-based and traditional cultures alike need a revised environmental ethic.

Notes

1 Nigel Smith, 'Enchanted Forest', *Natural History* 92 no. 8 (August 1983): 14-20.
2 Aurelio Peccei and Daisaku Ikeda, *Before It Is Too Late* (Tokyo: Kodansha International, 1984), 65.
3 Arthur Waley, *The Way and its Power (*London*:* George Allen & Unwin, 1934, 1965).
4 Huston Smith, 'Tao Now' in Ian Barbour, ed., *Earth Might Be Fair* (Englewood Cliffs, New Jersey: Prentice Hail, 1972), 80.
5 Paul R. Ehrlich and Anne H. Ehrlich, *Extinction* (New York: Random House, 1981).
6 Norman Myers, 'Conserving Our Global Stock', *Environmental* no. 9 (November 1979): 25-33.