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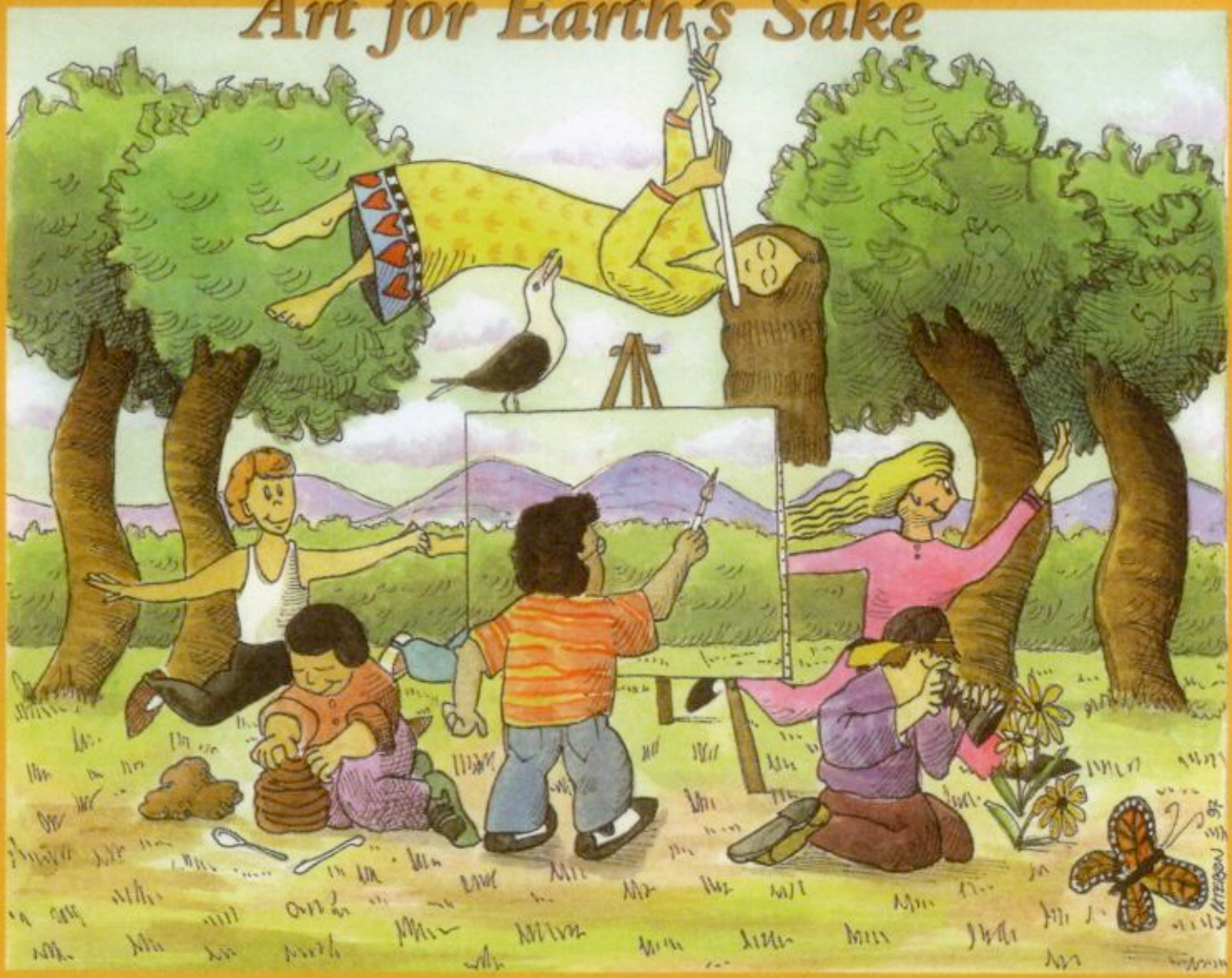

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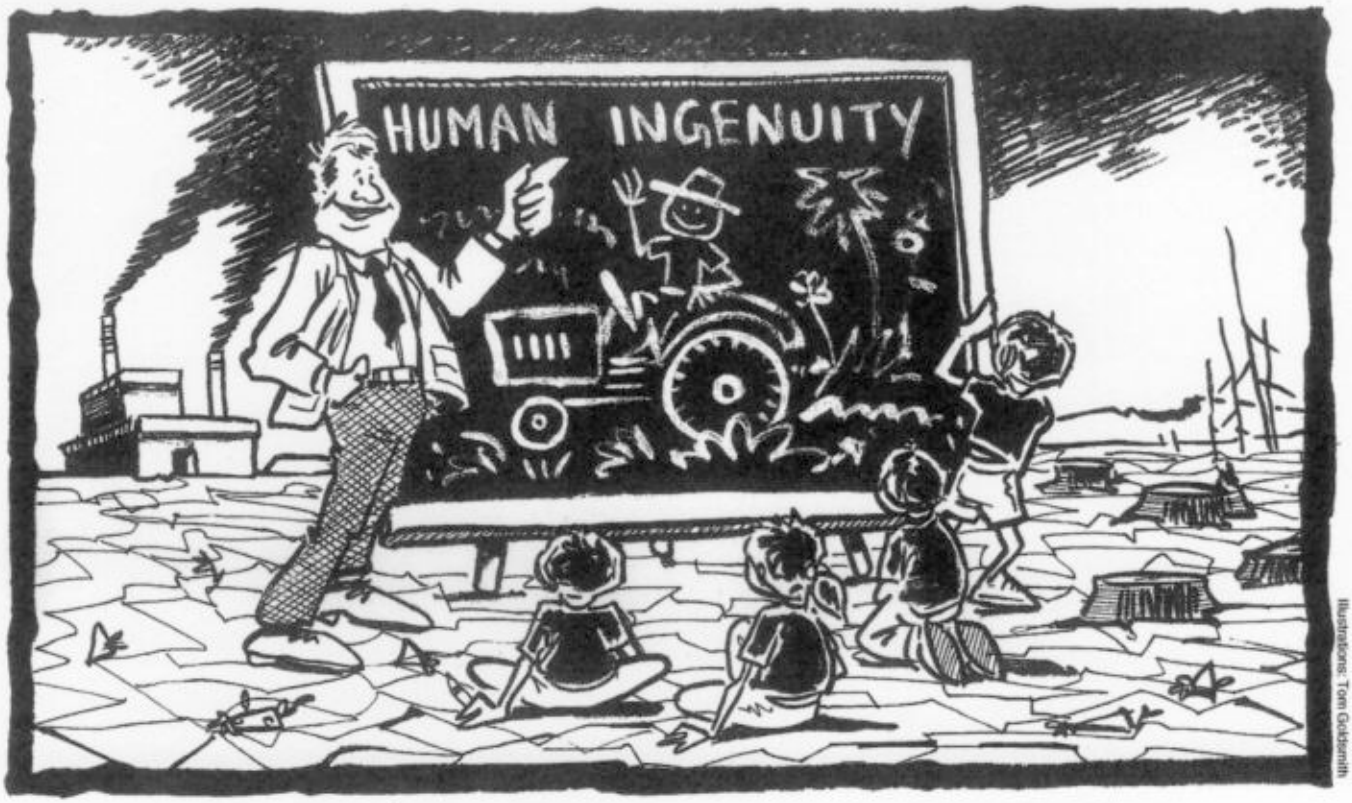

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Paradigms Lost

And the Myths We Teach Our Children

by **Mark W. McElroy**

A SIXTH-GRADE social studies book used in many elementary schools in North America offers the following brief history of farming techniques in Latin America:

> They learned to plant corn in the desert. They learned to irrigate, or bring water to their fields, by building dams across their streams. They controlled the flow of water by raising or lowering gates made of reed matting. When these early farmers needed still more water, they built still more canals from the Gila river to their fields 30 miles (48 kilometers) away. Over a quarter of a million acres (1,000 square kilometers) were watered by these canals.
>
> In the high Andes, other farmers found ways to work the lands on the sides of mountains. They built steplike fields known as terraces on steep mountain slopes. Stone fences were built to keep the soil from washing away.[1]

Now, listen to how the same story is told in the recently published *State of the World 1997*:

> A major threat to the economic well-being of many countries is land degradation — principally through the plowing of highly erodible land, the salinization of irrigated land, the overgrazing of rangelands and the loss of arable land, rangeland and forests to expanding urban and industrial needs.
>
> . . . . . .
>
> Because of population growth and unequal land distribution, large numbers of small peasants are cultivating highly fragile areas, such as steep hillsides and patches cleared out of rainforests, that are easily susceptible to erosion and the soils of which are quickly exhausted.[2]
>
> . . . . . .
>
> Harvard biologist Edward O. Wilson calculates that the rich fabric of life that makes up the Earth's ecosystems is now being ripped up at the rate of 30,000 species a year. Tropical rainforests and other natural ecosystems are being extinguished wholesale by expanding agriculture and human settlements and by water diversions and pollution.[3]

The differences between these two accounts of the same story are striking. While the textbook does a superb job of describing the evolution of ingenious farming methods in Latin America, it completely fails to associate them with a serious environmental problem of global proportions: the present-day mass extinction of species. Over half of the world's species live in the tropics, but dozens disappear

every day as a result of human development in that part of the world. Given the magnitude of the problem, and its disturbing implications, one has to wonder how an issue so critical to the future of life on Earth could be omitted from a textbook in wide use today. Moreover, whether the omission is intentional or merely a careless oversight, could it be symptomatic of a deeper problem that underlies much of mainstream curricula? Is it possible that we are literally shielding children from the truth about how environmentally destructive human activities have become? And are we, in the process, unwittingly teaching anti-environmental values?

The Power of Myth

THAT THE sixth-grade textbook essentially glorifies farming technologies but fails to link these farming practices with the extinction of species may well be a reflection of our society's tendency to propagate one of its most pervasive myths: that humans are somehow endowed with the right to rule the natural world. In considering the "man was meant to rule" idea and other such myths, Paul Cummins makes the following observation:

> Most people, most teachers and students do not critically examine these myths and their underlying assumptions and guidelines. They are considered givens. The function of schools — all too often — is simply to inculcate these givens. Thus, from elementary school through to graduate schools, while in increasingly complicated presentations, certain basic myths are taught, retaught, ingrained, solidified, and celebrated.[4]

While many schools are doing very positive things to teach about the environment and foster an appreciation of nature, the overwhelming bias of most school curricula is still very anthropocentric.

Cummins evokes the vision of a society methodically and deliberately teaching its youth the prevailing worldview so that they might assimilate, intellectually, into the world in which they were born and will succeed as adults.

But what if it were possible to demonstrate that the prevailing paradigm in our own culture is self-destructive in practice; that what we teach our children about humanity's place in the world is fundamentally wrong? After all, the mass extinction of species caused by unsustainable human development and expansion cannot be good for any of us in the long run. And yet by continuing to place our educational focus on conventional economics and training for careers in industry, we do nothing but reinforce the very system that wreaks havoc in the world. Perhaps it's time we took a fresh look at the assumptions underlying our curriculum.

More Evidence

LET'S CONSIDER another example, from a text currently used in elementary school geography. In a chapter called "How People Use The Land," the authors present the following discussion of strip mining:

> Much of the coal in North America is found just below the earth's surface. Each year, large quantities are strip-mined. It is quicker, easier, and cheaper than underground mining. But, the land that is left is wrecked.
>
> However, most of it could be restored. While the land is being mined, the layers of topsoil, clay, and rock should be taken off separately. After mining, these layers should be put back where they were before. Then, the area should be graded back to its original shape. Then, trees and grass could be replanted. However, it might take 20 to 40 years or even longer to completely restore the land to what it was before.[5]

This passage suffers from a bad case of cognitive dissonance. To its credit, it accurately points out that strip mining wrecks the land. But just when common sense would therefore condemn the practice, the authors go on to assert that all we have to do is put it back together again and all will be well.

The unspoken endorsement of strip mining as an environmentally acceptable practice is dubious at best. Mining has long been recognized as one of the most environmentally destructive forms of human economic activity. The 1995 edition of *State of the World* put it this way:

> Of all the economic activities in the world's mountains, nothing rivals the destructive power of mining. Environmental impacts include habitat destruction, increased erosion, air pollution, acid drainage, and metal contamination of water bodies.... [6]

And today's strip mines do not just stop at the surface. In describing the damage done by an open-pit copper and gold mine in Papua New Guinea, the same report states that "By the time the mine closes, the 2,330-meter mountain will have been virtually leveled."[7] Would we really have our children believe that this kind of damage can be reversed? Exactly how does one restore a 2,330-meter mountain?

This leads to the second problem in this textbook discussion: its claim that the replacement of soils and other surface and subsurface materials can actually "restore the land to what it was before." Assuming "the land" includes the ecosystem on and around it, even amateur ecologists know that this can never happen. A series of well-known studies carried out in the early 1990s, in which attempts were made to reconstruct ecosystems, both in the wild and in computer simulations, confirmed this to be true. Researcher Stuart Pimm of the University of Tennessee dubbed the inability to reconstruct ecosystems as the "Humpty Dumpty effect."[8] Putting an ecosystem back together again requires not just knowledge of which species occupied the former system, but also an understanding of the historical sequence and timing of the entry of species into the system and how they interacted with one another. Even Pimm's computer simulations yielded different results when repeatedly presented with the same set of assumptions.

One last, ubiquitous example: Could there possibly be anyone alive today who was not exposed during grade school years to those natural resource maps showing the precise location and economic value of forests and minerals in faraway lands? Teaching children to view the world in terms of its resource extraction value provides lasting evidence that our school systems were born of, and still serve, the industrial complex.

We encourage and expect children to think independently, and we hope that they will reach adulthood with a respect for the natural world. But by the time they're old enough to make their own decisions, their minds have already been made up for them, thanks to our curricula. The paradigm we teach is, not surprisingly, the paradigm we get in the long run.

The Teaching of Myths

IN 1962, Thomas S. Kuhn of the University of California at Berkeley published *The Structure of Scientific Revolutions*,[9] a brilliant essay that became a profoundly influential landmark of 20th century thinking on the history of science. In it, Kuhn coined the term "paradigm shift," defining a paradigm as an "entire constellation of beliefs, values, techniques, and so on shared by the members of a given community." Although it was the scientific community that Kuhn had in mind, today the term is used quite commonly in many different contexts, including technology, economics, politics and, increasingly, ecology.

In *The Web of Life*, physicist and eco-philosopher Fritjof Capra describes the existing, outgoing paradigm as an anthropocentric one, a worldview in which human-centered values dominate conduct in science and society in general. By contrast, he sees emerging an ecocentric paradigm, or Earth-centered view, one that "does not separate humans — or anything else — from the natural environment.... recognizes the intrinsic value of all living beings and views humans as just one particular strand in the web of life."[10]

Clearly, this kind of thinking runs counter to our society's prevailing worldview, thanks in part to many of our religions, which frequently depict humanity as endowed with either the divine or natural right to rule the world. All of our mainstream social, political, and economic institutions are predicated on this perspective. And every one of them relies on the reinforcement they receive from the myths we teach our children.

The health and stability of paradigms depend heavily upon how well their central tenets are passed on from one generation to the next. And, indeed, every incumbent paradigm has a unique story to tell about humanity's place in the world, a story that, above all, is intended to rationalize our behavior. Often expressed as myths, these stories attempt to explain the great mysteries of life: where we came from, what we're doing here, how we should live, and our moral obligations to each other and to the natural world. In other words, a paradigm provides us with the story that explains our place in the world, a story that we can teach our children.

Our culture's present story is beautifully laid out in Daniel Quinn's book *Ishmael*, a work of fiction that may very well go down as the definitive incumbent paradigm-killer. Quinn skillfully prosecutes western society's reckless anthropocentric worldview and its devastating effect on the environment. According to Quinn, western civilization breeds contempt for the environment in unspoken ways that for most of us are imperceptible. As the character Ishmael explains, "That's because there's no need to hear of it. There's no need to name it or discuss it. Every one of you knows it by the time you're six or seven."[11]

If, as Quinn suggests, the rules and principles endemic to a culture's prevailing paradigm are taught to children in subliminal ways, then an anthropocentric, human-dominated worldview may very well engender the teaching of anti-environmental values. Not surprisingly, this disturbing thought has caught the attention of environmental educators.

. . . by continuing to place our educational focus on conventional economics and training for careers in industry, we do nothing but reinforce the very system that wreaks havoc in the world.

Correcting the Course

WHILE MANY schools are doing very positive things to teach about the environment and foster an appreciation of nature, the overwhelming bias of most school curricula is still very anthropocentric. As a result, most school systems in North America are teaching children anti-environmental values which are later put into practice when our kids reach adulthood. The textbook examples cited above show how this can happen in insidious ways. By not telling the whole story, or by telling the story in terms that speak only of human benefits and human ingenuity, we encourage children to respect and repeat environmentally destructive behavior that can only work against them in the long run.

Most schools' curricula are badly in need of an environmental audit. By this I mean that all material that directly or

Four Common Anti-Environmental Myths

Myth	Counter-Myth
The Dominion Myth: A divine Creator has designated humans as the dominant species on Earth and made the natural world as a storehouse of materials for our use. The destruction of habitat and extinction of other species are regrettable but acceptable consequences of human affairs.	Humankind is one strand in a larger, interdependent web of life. All life is intrinsically valuable in and of itself. Humanity's assertion of the right of dominion over the natural world is self-imposed, arbitrary, groundless, and dangerous to our own long-term security.
The Civilization Myth: Western culture is enlightened and civilized; its technology, socio-economic values and way of life are ones that people in more primitive, "underdeveloped" lands would be better off embracing.	Culture reflects adaptations of humans to their environment over time. The imposition of western values, technology and capitalist economics more often than not leads to the suppression and ultimately the loss of ancient knowledge and traditions that ensured social stability and enabled people to live in harmony with the natural world.
The Growth Myth: There are no limits to growth in industry, economics or any other area of human affairs, nor should there be. Growth signals success; no growth or low growth is a sign of failure.	There are limits to growth because there are limits to the carrying capacity of the Earth. The growth of human population and expansion of human activity place an enormous strain on the intricate natural systems that regulate the chemical composition of the atmosphere, the hydrological cycle and climate patterns.
The Omnipotence Myth: Our ability to solve problems is boundless. Given our scientific methods and tools, and our intelligence and ingenuity, anything as readily observable as the natural world can be easily understood and managed when we need to.	The Earth's systems are too complex and too self-organized to be harnessed and controlled. The environment cannot be managed by the manipulation of its constituent parts because the whole is greater than the sum of its parts.

indirectly endorses environmental degradation as a consequence of human affairs should either be withdrawn or thoughtfully revised. New courses that explain the workings of ecosystems, the course of natural history, Gaia theory, sustainable economics, and the importance of environmental ethics should be added. In contrast to our current preoccupation with job training and consumer economics, this whole new curriculum would stress knowledge of and respect for the environment and focus on finding ways to live on the Earth sustainably.

I realize that these proposals may fall into the category of "easier said than done." And given the clearly unconventional nature of these ideas and the extent to which they conflict with the prevailing worldview, teachers might well be reluctant to approach their local school board, school administrators, or even their peers with this kind of thinking. Yet despite obstacles, the revision or replacement of curricula is a task that can be initiated by anyone concerned about the worldview we are passing on to children in our classrooms. Even if constructive progress comes only in small steps, it will be progress nonetheless. I encourage readers to consider the following approach.

In contrast to our current preoccupation with job training and consumer economics, this whole new curriculum would stress knowledge of and respect for the environment and focus on finding ways to live on the Earth sustainably.

Steps to a New Curriculum

IT SEEMS logical to assume at the outset that no progress can be made in resolving a problem of any kind unless there is agreement among the stakeholders that a problem does, indeed, exist. It is also safe to assume that there is no common awareness in most school communities of the anti-environmental subtexts of much of our curricula. This is because anti-environmental, anthropocentric values are taught in subliminal ways, largely by the propagation of myths that are rarely expressed in raw form. The initial strategy in any curriculum review should therefore be to create awareness of the problem by exposing the unspoken assumptions that underlie curricula, particularly those myths that assert humanity's right to dominate the natural world, and that extol the myriad ingenuous ways in which we do so.

The four steps outlined below offer a practical approach to developing more Earth-centered curricula. In brief, it is a process of: 1) gathering evidence of offensive content; 2) exposing the underlying myths; 3) establishing counter-myths and evaluation criteria; and 4) replacing or revising the current curricula.

1. Gather evidence

The first step is to gather evidence of lesson materials that either hide the truth, or worse, overtly encourage anti-environmental values. This step should also include careful analysis to trace the objectionable material to its basic principles. For example, in the textbook passage quoted at the beginning of this article, the conspicuous omission of linkage between Latin American farming practices and the mass extinction of species reveals a disregard for the existence, intrinsic value and rights of other species. It also reveals an alarming degree of ignorance about the role played by other species in making the world a comfortable place for humans. These underlying, anti-environmental dispositions need to be rooted out, or distilled, from the examples gathered from materials.

2. Expose the myths

The second step is to identify and name the myths that lie beneath the evidence found in step one. For example, the passage on farming in Latin America asserts what I call the Dominion Myth, the view that humankind's interests take precedence over the rest of the natural world. In essence, the Dominion Myth assures us that the unbridled expansion of human affairs into the wild is completely legitimate because humanity's needs must be met, regardless of the needs of other species. *[See sidebar for other examples.]*

3. Establish counter-myths

Once the underlying myth has been identified in step two, the third step is to develop thoughtfully worded guiding principles that can be used in the evaluation of alternative curricula or the remediation of current curricula. These environmental principles, or selection criteria, might include a deliberate bias in favour of curriculum materials that offer a fair and balanced handling of humanity's use of and impact on the environment. For example, materials that focus on natural resource extraction, modern farming technologies, and the emerging global economy should be expected to include frank discussions of how these human activities affect the natural world. These guiding principles might also be accompanied by counter-myths, or truths, new stories which assert a view opposite to those of the anthropocentric myths. For example, the antithesis of the Dominion Myth might be the Interdependency Truth, the true story of how humankind is really only one strand in a larger web of life.

Along with the development of selection criteria for curriculum materials, consideration may also be given at this point to the strategies that will be employed in teaching environmental values. An excellent guide in this process is Michael Caduto's *A Guide on Environmental Values Education*[12] which summarizes and discusses the pros and cons of various strategies, and provides examples of implementation methodologies and teaching exercises for each.

4. Revise or replace curricula

Finally, the fourth step is the application of all counter-truths and curriculum selection criteria in the adoption of new or the revision of current materials. Under this approach, two or more curriculum alternatives, judged as equals in how well they address curriculum content, could be miles apart in their handling of environmental issues. Only those that come closest to satisfying environmental criteria would make it to the final round. The final result should be curricula that satisfy not only content goals but also tough standards on environmental sensitivity and balance of treatment.

IN THE END, all I propose is that we simply look at what we're doing, and that we open our eyes and our minds to the truth. Are we doing all that we can to teach our children what we know about the environment, how it works, and what is happening to it? Are we sufficiently vigilant in our avoidance of material that might engender anti-environmental behavior? Do we ever even look at our curricula with these questions in mind? If not, why not?

We have reached a point in human history where these matters have become so crucial to the future of our world that the need to include them among the fundamentals of a sound education seems obvious.

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Notes

[1] Bert Bower, *Heath Social Studies, Exploring Canada and Latin America* (Lexington, Massachusetts/Toronto: D.C. Heath and Company, 1991), p. 60.

[2] Michael Renner, "Transforming Security," in *State of the World, 1997: Worldwatch Institute Report on Progress Toward a Sustainable Society*, ed. Linda Starke (New York: W.W. Norton, 1997), pp. 118-119.

[3] Christopher Flavin, "The Legacy of Rio," in *State of the World, 1997*, p. 13.

[4] Paul Cummins, "A New Cosmology: Honoring the Blue Planet," *The Trumpeter* 13:4 (1996), p. 155.

[5] D. Drummond and R. Drummond, *People on Earth, A World Geography* (Glenview, IL: Scott, Foresman and Co., 1988), p. 143.

[6] Derek Denniston, "Sustaining Mountain Peoples and Environments," in *State of the World, 1995, Worldwatch Institute Report on Progress Toward a Sustainable Society*, ed. Linda Starke (New York: W.W. Norton, 1995), p. 46.

[7] Denniston, p. 46.

[8] Pimm's study is cited by Richard Leakey, *The Sixth Extinction*, (New York: Anchor Books Doubleday, 1995), p. 167.

[9] Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

[10] Fritjof Capra, *The Web of Life* (New York: Anchor Books, 1996), p. 7.

[11] Daniel Quinn, *Ishmael* (New York, NY: Bantam/Turner, 1992), p. 36.

[12] Michael J. Caduto, *A Guide on Environmental Values Education* (Paris: Unesco-UNEP International Education Programme, 1985). This 106-page guide is available in English or Spanish for US$12 prepaid (includes shipping) from Michael J. Caduto, PO Box 1052, Norwich, VT 05055, (802) 649-1815.