ECOLOGICAL ETHICS IN ACADEMIA: A PROPOSAL FOR TEACHING SURVIVAL

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ABSTRACT

In this paper[1] I start with an introduction to ecology and ecological ethics (eco-ethics) then, I address eco-ethical issues in the classroom. Second, I propose a framework to narrow the field of eco-ethics into manageable topics. Through this framework, I explore what should be taught in eco-ethics, how it should be taught, and why it is important to teach it. Finally, I conclude this paper by discussing the advantages of the proposed framework of eco-ethics in academia. My objective here is to focus the topic, yet maintain its essence and its purpose. At the end, few relevant resources are also given as appendix.

RÉSUMÉ: *Cet article souligne l'importance de l'écologie en tant que matière interdisciplinaire et propose aux enseignants une sorte de cadre didactique qui pourra leur faciliter l'enseignement de l'écologie au niveau universitaire. Les lecteurs trouveront en annexe une documentation utile et intéressante sur les différents aspects du sujet.*

1. INTRODUCTION

1.1. Ecology: Meaning and Definition

In many ways, ecology is an interdisciplinary scientific study of the interrelationships between organisms and their environments. Environment is the physical and biological characteristics and factors of a certain region that effect an organism's life. In this sense, ecology is a unified science, an integrated area of study concerned with the structure and the function of nature and how the inhabitants of this planet interrelate with each other and their environment in an ecospheric context. Implicit in the study of ecology is the need to holistically preserve such structural and functional interrelationships in their optimum state of natural equilibrium. This holistic definition that sees ecology as the study of the structure and function of na-

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ture is extended to include all aspects of the ecosphere, or Gaia (Odum 1975). This explanation looks at the nature of the ecosphere as the total sum of its parts including the way these parts are organized and function holistically. This definition assumes that nature is like a living organism; or using Plato's words "a living creature, one and visible, containing within itself all living creatures" (cited in Naar, 1990). The message of ecology is one of synthesis and balance. It tells us that "everything we touch is hooked up to everything else; a fact that forces us to reckon with the roots of our ailments, not just with their symptoms" (Orr,1992, p. 88).

In the search for better understanding of the interconnectedness between the environment and the activities of its inhabitants, ecologists use descriptive, analytical, experimental, and comparative approaches, and employ sophisticated laboratory, field, and remote sensing techniques as well as computer models (Lubchenco et al., 1991). The ecologist's work helps, for example, a conservation planner to figure out where to focus his or her efforts in impending extinction and biodiversity. The ecologist credits and assists those who push for practical conservation measures needed to protect species threatened by loss of habitat. Furthermore, the ecologist's view most likely does not change with political climate or the so-called "politically correct views."

In differentiating between the terms "ecological" and "environmental," Vallentyne (1988, p. 409) aptly draws a compelling distinction in asking us to consider these terms in the way we consider the difference between "house" and "home." "House" he sees as being "external and detached" while "home" is "something we see ourselves in even when we are not there." We might also think of "house" as the structure in which we live--a physical description only; but "home" as meaning something more, since it also speaks of comfort, warmth, and safety--something we care profoundly about. Earth is our chosen home that we share with vast curious life forms. Furthermore:

> the environmentalist places primary emphasis on the environment. . . . the environmentalist might prefer to leave the oil beneath Alaska's north slope untouched so the wilderness environment can be preserved. The humanist. . . . gives the highest priority to human needs. . . . the humanist would speed the development of Alaska's north slope because of the jobs and economic benefits to be gained. The ecologist would attempt a rational consideration of these viewpoints and might recommend a cost-benefit analysis, so we could accurately weigh the environmental costs against the economic benefits. Like the environmentalists, ecologists would

take every reasonable step to protect the environment, but they would not deny the value of practical human concerns. (Southwick, 1976, p. xiii).

2. ETHICS AND ECOLOGICAL ETHICS

Ethics deals with normative questions about the way we conduct our daily lives. To behave ethically is to ". . . ask and try to answer questions regarding what action is right; or in ethical terms, what is the ought behavior" (Kieffer 1979, p. 177). Eco-ethics is concerned with the relationship between ecological concepts and human values. Since what is of "value" for all living organisms involves putting resources into acquiring needed things (Kaufman, 1995), then, eco-ethics involves difficult value judgments and decisions about the environment, comprising a complex mix of social, economic, political, philosophical, and scientific arguments (Van Hulst, 1986). This means that:

> ecological ethics is something significantly "new"--and it will require significant reconceptions of the ethical task on everything from the definition of values and "moral clients" (or who counts for moral consideration to the nature of rights and duties. It means, for example, asking if moral concepts of justice are applicable to human interactions with nonhuman life forms and their ecosystems. It means thinking of the human overpopulation problem not only as a form of imperialism which is destroying the space and sustenance of other life forms . . . . Ecological ethics is a relevant revision and extension of our moral values and norms, applied to a context that includes moral problems of humans with all other humans and also with all other creatures and elements. It deals with the responsibilities arising from the fact that humans are both social and ecological animals. . . . Indeed, ecological ethics is not even a branch of ethics; it is not an additional sub-discipline like medical ethics or business ethics. Instead, it is an expansion of every branch of ethics; it is the context in which every branch of ethics must do its reflections. Business ethics, for example, must now think not only socially and economically but also ecologically--considering moral responsibilities to other life forms in economic activity. Henceforth, all ethics must be ecological ethics, or else it will be truncated ethics (Nash, 1995, p. 9).

Within the human species alone, which evolved during earth's greatest period of biological diversity (Wilson, 1989), the cultural diversity is immense,

for there are numerous belief systems and the inherent values of these belief systems differ vastly from one culture to another (Kazepides, 1979). By "culture" we mean those socially transmitted patterns of behavior, thought, feeling, perception, and expectation, which are gained through forms of learning and communication. The beliefs that different groups of people hold about themselves and their world generally come from what they think about nature and the origin of humans. These beliefs shape our ethics and values which, in turn, generate needs to be fulfilled--needs which may vary in priority from culture to culture, and from geographical region to region.

Despite its complexities, there are justifiable reasons for integrating the teaching of eco-ethics into the academic curriculum, simply because it:

> provides both principles to follow and ends to be achieved in any role that may be imagined for man [sic.] It offers a basis for the development of a higher individual and public morality in such diverse matters as the exercise of responsibility, the size and distribution of the world's population, the nature of human settlements, the design and quality of artifacts, workmanship, the management of natural resources, the maintenance of the full spectrum of plants and animals, the handling of pollutants and the allocation of social costs where they arise from private use of the environment (Morse, 1986, p. 19).

Hence, the development of skills and the capacity to make informed, considered, non-self-centered eco-ethical decisions must be given highest priority in all school science programs (McCormack, 1983). A science curriculum aimed at any level should incorporate moral, aesthetic, and ethical principles in the presentation of the scientific concepts of ecology (Moore, 1971). By integrating eco-ethics into the science education curriculum, we may be able to develop desirable human characteristics (such as ecological accountability, and integrity) that allow political, social, and economic institutions to function ecologically and to remain functional over time (see Adjibolosoo, 1995). In doing so, we may be able to cultivate long-term survival interests in upcoming generations.

3. ADDRESSING ECO-ETHICAL ISSUES IN THE CLASSROOM

There are two major concerns in dealing with eco-ethics in the classroom: what to teach and how to teach it. These two concerns present a challenging task to instructors and curriculum developers simply because eco-ethics is new and different from all other branches of ethics (Nash, 1995) and because

it requires strategies drawn from outside conventional teaching techniques (e.g., McClaren, 1987; Cherif & Pye, 1990; Cherif, 1992). Teaching ethics goes beyond the conveying of facts and concepts to include exploration, discussion, and clarification of beliefs, attitudes, and emotions (Downie & Alexander, 1989). Indeed, eco-ethics is a value-laden topic that many instructors prefer to avoid (Kieffer, 1979, p. 177).

Unfortunately, all too often, common teaching models lead to formulaic teaching that lacks vitality and relevancy. A more effective teaching approach is to encourage learning materials in "living ways" so that students' activities andinitiatives can be mobilized. "Living ways" include role playing, debates, mock court systems, discussion webs, classroom meetings, awareness training, jurisprudential inquiry, social inquiry, real cases and policy issues, group investigation, and futures forecasting. Teaching approaches and techniques such as these facilitate the development of desirable human characteristics such as ecological responsibility and commitment among students.

Effective teaching takes place when the students learn to think critically, distinguish intelligently, communicate effectively, and develop self-understanding, self-discipline, and a commitment to life-long self-education. Teachers should integrate knowledge of human history, cultural evolution, and population dynamics with ecological and biological knowledge in their teaching of eco-ethics, as well as concepts such as "economic growth," "sustainability"--living within the carrying capacity of the biosphere, "development"--the expectation of more, and "carrying capacity"--the ability of biosphere to "assimilate waste, provide food and supply other resources" (Chirase, 1993, p. 71). This information provides relevant background for students so that they may understand the roots of their contemporary ethical responsibility and their relationship to the natural world.

While it is important to teach students to be well informed about themselves and their relationships with other people and nature, we should also provide them with useful criteria to examine given values, teach them how to apply those criteria in value selection processes, and show them how to make a choice that is biologically, environmentally, and morally acceptable. When we engage in this sort of teaching, we empower students by giving them the opportunity to openly debate the values that underlie our approach to the natural world, and consequently they can begin to take responsibility for making decisions that affect our environment. Thus, making the right ecological choice requires a well developed ecological personality, responsibility, and a commitment on part of human individuals and human societies.

4. NARROWING THE FIELD OF ECO-ETHICS INTO A MANAGEABLE TOPIC

The first step in helping students to develop ecologically ethical behavior is to provide them with the content of the unique environmental relationships among humans, culture, biological communities, and nature. Students should learn how such relationships have evolved and how changes in lifestyles and or survival mechanisms reverberate throughout our ecosystem. Learning relationships and concepts that help us to determine which ecological acts are "good" and "bad" for living communities provides one basis for eco-ethics. The skills and techniques of critical thinking, which are necessary for value judgment and decision-making, are a second consideration.

According to Morse (1986, p. 24), the components of developing environmentally ethical behavior should at least involve the following: "(1) the development of a conception of human himself (sic); (2) the acceptance of certain principles respecting the relation of human to human; and (3) the development of an approach by which to judge the acceptability of environmental use, the relation of human to nature." Morse's views about humanity's relationship to the environment are shared by numerous scientists including Iltis (1966), Dasmann (1976), Schumacher (1977), Wilson (1978), and Berry (1988). For example, Schumacher argues that to know the meaning of living and to enjoy a relationship with the world, a person must fulfill his or her obligations to oneself, to other humans, and to the planet earth. Iltis (1966, p. 19) argues that without a clear understanding of our interdependent relationship with ecology, we cannot "change the understanding of others . . . . that will eventually result in intelligent . . . . new ecologically-oriented human society of the future." This will be possible only if human beings are able to develop the human characteristics that allow political, social, and economic institutions to sustain an ecologically responsible commitment. Figure 1 shows the relationship of these principles to each other.

When teaching eco-ethics, instructors have to be careful to not impose a particular set of values on students. Such an imposition will not help students learn to make responsible personal and/or ecological value choices (e.g., Hardin, 1977; Barman, 1980). Livingston (1981) and Van Hulst (1986) claim that we have a moral duty to not foreclose options on behalf of future generations by placing limits on creative possibilities in our students. Rather, our duty is to maximize present and future choices for those generations. Hurd (1986) reminds us that our objective is not to teach students a prescribed set of values. "Rather, the aim of teaching value-enhancing science is to provide students with opportunities to integrate valid science information into the making of ethical judgments." (pp. 354-355). However, instructors will not be able to do so unless they themselves believe in eco-ethics and

desire to promote it through schooling and education.

Figure 1

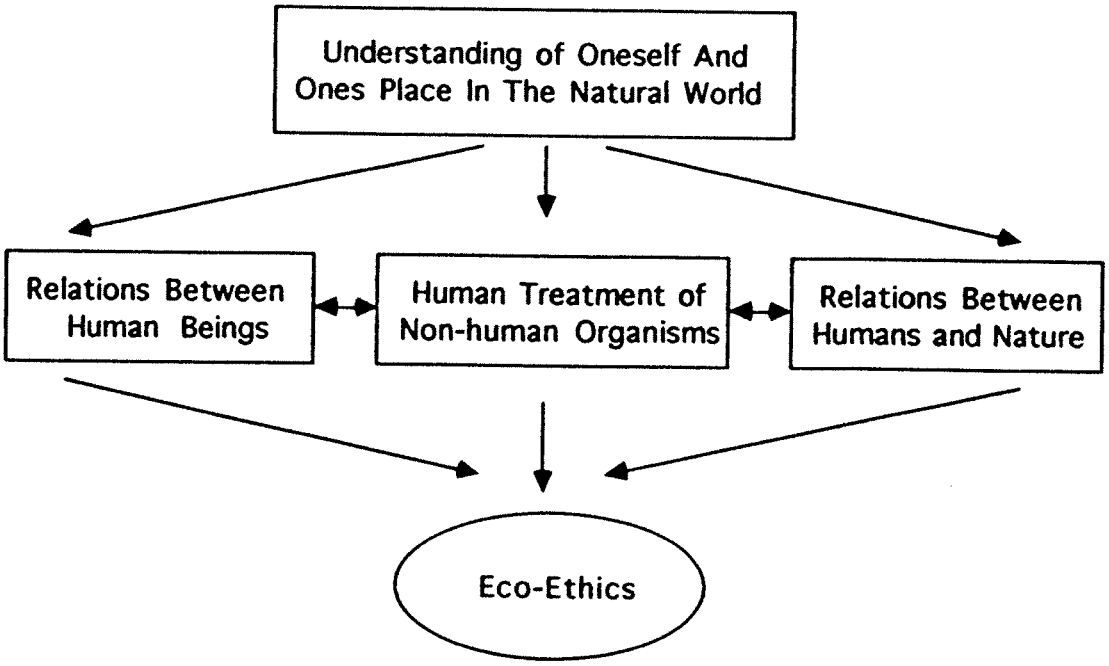

Figure 1 shows the relationship between developing eco-ethics and the understanding of the relationship among humans, human treatment of non - human organisms, and the human relationships with nature. Ecological ethics demand constant consideration for living thins for their own intrinsic value as well as for their unique contribution to the flow of energy within the planet earth.

4.1. Developing an Understanding of the Self and the Place of the Self in the Natural World

The usual definition of the environment is the total set of physical, biological, social, and cultural conditions and circumstances that surround individuals and communities, and which ultimately affect their growth, development, behavior, and survival. Many theorists have argued that although humanity is, of course, biologically "human," social development is crucial to developing true "personhood" in the communities of humans. For the purpose of this paper, we will call this culturally developed personhood "becoming human" (e.g., Farb, 1978; Kazepides, 1979; Barash, 1986). In this journey of

becoming human (see Figure 2), many factors--biological, social, cultural, geographical, physical--play an important role in the development, the speed and the quality of becoming an active member of one's culture, as well as the kind of moral sense and ethical responsibility we develop along the way with nature, fellow beings, non-human life, and the non-living earth.

Figure 2

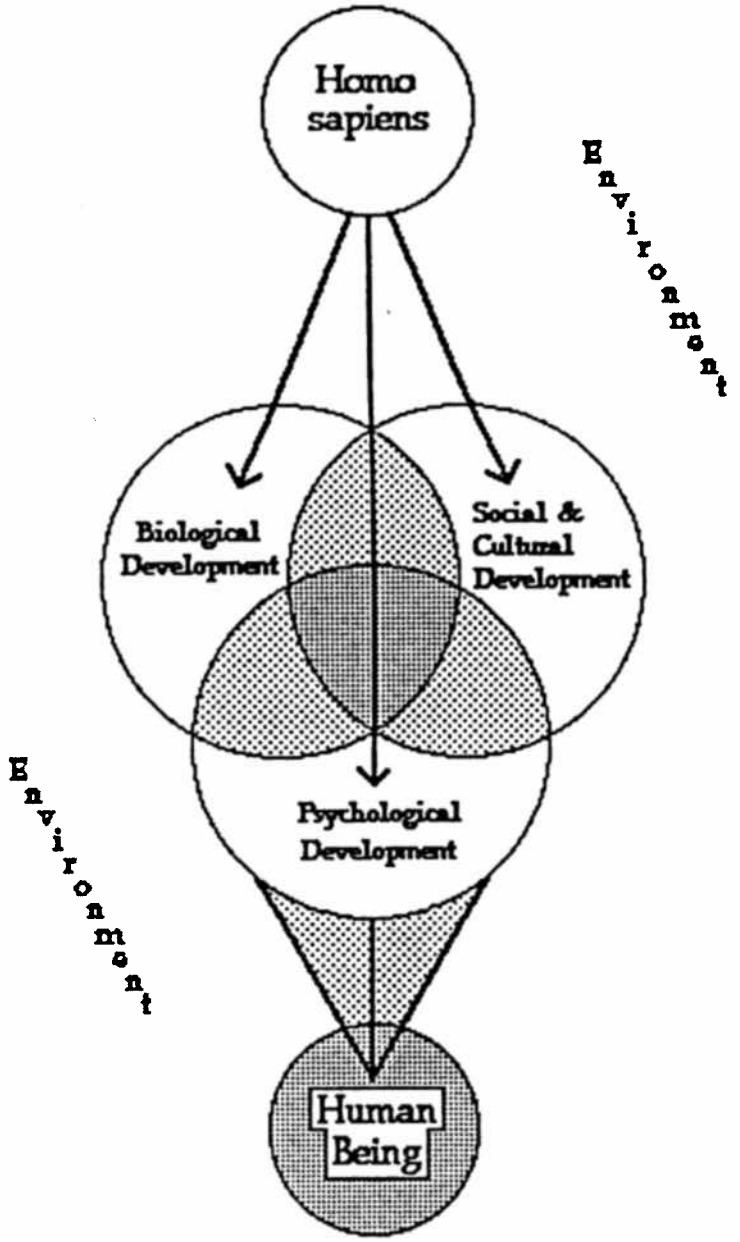

Figure 2: The understanding of oneself Biologically, behaviorally (psychologically) socially and culturally), is a crucial element in understanding the principles of eco-ethics. Human beings are biological, social/cultural and technological species with unique capacity for learning, changing, and interacting with the environment. Learning to be accountable, and responsible with a sense of commitment and integrity is a part of becoming human.

Developing a spectrum of human characteristics such as integrity, responsibility, and accountability, are among the factors that influence our understanding of self and the place of self in the natural world (see Adjibolosoo, 1993, 1994, and 1995 for detailed discussions on human characteristics).

Unfortunately, generally speaking we have largely forgotten our species-connected relationships with nature. Moore (1987, p. 450) wrote in his remarkable article, "Understanding Nature--Form and Function," that

> it is not surprising that *Homo sapiens,* nature's dominant heterotroph, has had an ongoing interest in the animals and plants of his environment. It cannot be otherwise. To be sure the level of interest was and continues to be higher in those individuals of our species who secure their food directly from the environment. The historically recent breaking of that direct contact has had enormous consequences. . . . life takes on new directions and new meaning when human beings no longer have the possibility of obtaining their food directly. When that happens, one of their most basic requirements for life is at risk.

Consistent with Moore's view, Tivy's and O'Hare's (1981) approach to studying the role of humans in the ecosystem is useful in understanding oneself and one's place in the natural world. Tivy and O'Hare define humans in a variety of ways, as: "the ecological dominants," "tool making animals," "robber animals," "agents of evolution," "dirty animals," and as "animals with a sustained rate of population growth." Their emphasis is on the first stage of the model in Figure 1: that of understanding oneself and the human place in the natural world.

Indeed, we are uniquely aware of our power to domesticate the earth, but in the name of human development we consistently eliminate the panoply of life on earth and separate ourselves from nature with technological and social urban development. As a result of this, many societies have neglected to develop the human factor that is necessary for responsible and sustainable ecological and social development. Those who can truly understand themselves and their place in the natural world are aware of the consequences of their power. As poetically put by David R. Brower, chairperson of Friends of The Earth:

> I owe an allegiance to the planet that has made me possible, and to all the life on the planet, whether friendly or not. I also owe an allegiance to the 3 1/2 billion years of life that made it possible for me to be here, and all the rest of you, too. We have a

> responsibility to the largest population of all, the hundreds of billions of people who have not yet been born, who have a right to be, who deserve a world at least as beautiful as ours, whose genes are now in our custody. . . . (cited in Myers, 1984, p. 158).

Therefore, a call for informed compassion is a predominant theme in eco-ethics. Before we can collectively extend our interests to ecological issues, however, we must first extend a hand to the members of our own species.

4.2. Relationships Among Humans

If humans are unable to appreciate the rights of the members of their own species, it is unlikely that they will try to understand non-human species. In my own understanding, complete acceptance of one's fellow beings requires certain social and environmental circumstances, including developing among individuals the sense of accountability, responsibility, commitment, and integrity, as well as developing among human communities peace, justice, collaboration and friendship. Mucke (1988, p. 247) noted that "all humans should be respected for their essentially identical capacities to experience emotion-laden interactions with other humans and with their environment, and to experience emotional reward throughout life when they develop their aptitudes to skills and apply them to the benefit of other humans."

Many of us in the West are not taught that there might be a practical benefit from discovering the culture of other nations (e.g., Turnbull, 1984; Ornstein & Ehrlich, 1989; Goucher, 1989). Rather, we are inculcated with the notion that western ways are best for the rest of the world (e.g., Ehrlich, 1990). When we learn to respect and protect the rights and freedom of other people, regardless of differences in culture, religion, ideology, race, color, geographical location, or economic status, we might then begin to consider the importance and value of asking ourselves "What do we owe ourselves in planning for remote descendants," and in turn the importance and value of nature and its non-human organisms and non-living components. Schmookler (1984, p. 10) observed that:

> the survival of life forms depends on their ability to integrate into an evolving environment. The main characteristic of their process is not competition between species, but is the ability of the organism to integrate or fit within a particular ecological niche. This would also be true for human society, even with our ability to modify our environment [and the role which we play within our community].

Developing the truly human accountability and commitment among individuals is critical because relations among human beings are fundamental to human life on earth, both biologically and socially. The individual freedom that we prize, many have argued, should not connote freedom to abuse other people, just as it does not mean we have the freedom to misuse the earth (Hardin, 1972; Blackstone, 1974). Indeed, Hardin (1972) is right in saying that we become free when we recognize the necessity of the laws of nature and act accordingly. We become free when we know where and how to act in difficult situations, such as the present ecological crisis of our planet earth.

The realization of earth's limited resources requires us to make a major shift from our popular anthropocentric paradigm to an ecocentric one. Such a shift--a comparably seismic adjustment--requires nothing less than " . . . a total reorientation of the thrust of Western culture," along with a very different socioeconomic and ideological structure (George Sessions, cited in Sale, 1986, p. 28). Some people have already proposed steps to ecologically reform all our traditional religious faiths (e.g., Nash, 1991, 1995), to ecologically re-design our farms, houses, cities, technologies, and whole economies that do not fit harmoniously within their ecological context (e.g., Orr, 1995). Hence, change will not develop quickly, but the early stages of growth are cultivated within our young people--many of whom are already questioning how we (human) regularly violate the laws of nature.

4.3. Relations with Non-Human Organisms

Every living organism, whether human or fellow creature, has both intrinsic and instrumental value, and every living creature is both the means and the end in itself within a highly diversified, integrated, complex ecosystem. Because of this we have to extend our circle of informed compassion to include all living things. For example, while a number of us are convinced that animals have rights that are being systematically violated by human beings, few of us have been convinced that the absolute right to life is among these rights (Birch and Cobb, 1981). Nash(1977, pp. 3-4) notes that:

> the utility of environmental ethics is readily apparent from an examination of social ethics. The latter, however imperfect, permit human society to exist just as the social-contract philosophers have explained. Social ethics, and the laws arising from them, restrain the individual in his appetites. . . . . But the earth is. . . . beyond the limits of most Americans' ethical systems. Although a few prophets have tried to advance it, there is little general understanding that the concept of community and its attendant

ethics might include nonhuman life and the non-living earth.

There are biological reasons within the web of life and the complexity of ecosystems for every creature's right to survive and all species to proliferate as long as they do not upset the diversity, integrity, and complexity that are necessary for the stability of the ecosystem. Equally, one could argue that there are rational as well as biological reasons for the laws of nature and life, such as natural material recycling and energy flows, rivers and seas, etc., to be maintained for the sake of the homeostasis of ecosystems (e.g., Stone, 1974, 1987).

Birch and Cobb (1981) claim that if we could understand other species completely, we would want to minimize the rate of their disappearance from the face of the earth as well as to reduce the amount of suffering we regularly inflict upon them. Respect for other species based on real understanding rather than on ignorance or emotion can benefit our quality of life.

4.4. Relations Between Humans and Nature

As we know, every organism, in its own way does different things to overcome the universal tendencies toward disorder (entropy) and death. This means, in doing so, that every organism contributes to the overall homeostasis of a given ecosystem and in turn, the planet earth. Thus the destruction of the natural way of living of one species will alter the survival of other creatures, and by extension, affect the entire ecological system (e.g., Commoner, 1971; Wilson, 1984; Livingston, 1989), and in turn, our home, the planet earth.

A most dramatic example of the effects of species destruction is the deforestation of the Amazonian rain forests. Rain forests are the most diverse and complex ecosystems on earth, providing us with food, medicine, and new types of energy sources. They also work as one of the world's greatest climate cooling systems. Located on the equator, Rain forests are constantly circulating water between the earth and the atmosphere, thus affecting the climate of both the Northern and Southern hemispheres. Scientists worry that the mass destruction of the tropical forests might be connected with the drought and famine of the 1970s and 1980s in countries such as Ethiopia and Sudan (Clay, et al., 1988).

The exploitation of rain forests by multinational corporations, a practice that has reached significant proportions, for example, in many Latin American countries, denies the survival rights not only to most species living in the rain forests, but also to other living organisms throughout the world (including humans) those survival mechanisms depend on the physical existence of the rain forests. Within three or four decades, we may experience the highest

extinction rate among rain forest species since the origin of aerobic life on earth (e.g., Ehrlich, 1986; Simberloff, 1986; Slobodkin, 1988, Wilson, 1984; 1989, Lubchenco, et al., 1991).

Yet it seems unlikely that, for example, the rain forests will be saved without a collective acknowledgment that all living creatures have the survival right to flourish in their natural environment, and the people who inhabit these regions have the right to achieve a reasonable standard of life. Generally in North America, we enjoy material comfort and an abundant supply of food and energy. But the cost for this material well-being often results in air, water, and land pollution, causing destruction of forests and non-renewable resources, and resulting in birth defects, environmental illness, and the destruction of many plants and animals.

We exist in a world controlled by the laws of nature and within a thin band of atmosphere. Hence, we are truly restricted in our freedom of conduct and choice. Trying to escape the laws of nature, rather than to live with them, indicates a dangerous failure to understand nature and our place in the natural world.

5. CONCLUSION

The objective of this proposed framework of eco-ethics in education is to plant the seeds of ethical responsibility for the consequences of our actions within a holistic framework and to bind us all to other living species. Through a biological and cultural understanding of ourselves comes the realization that we are members of the life community, and hence are responsible for the consequences of our actions.

The objective of understanding oneself and one's place in the natural world is to develop a clear understanding that the very existence of living organisms depends "on the fundamental soundness and integrity of the biological system of nature" (Charles, 1986, p. 44). Understanding human treatment of non-human organisms develops an understanding that life in its totality is a complex and unified web of interdependent parts, each having its own unique ways of participating and maintaining life functions within the life support system. Since non-human organisms are incapable of protesting against their exploitation, developing respect for them requires, at this stage in our collective global consciousness, great altruism (Singer, 1975).

Understanding the relation between humans and nature exposes the fallacies that nature is indestructible and humanity is somehow separate from nature (e.g., Stone, 1974; Hardin, 1977; Wilson, 1984). Thus, we must develop the attitudes and behaviors appropriate to the wise use of the environment and natural resources. This is something that many claim would be hard, if not

impossible, to achieve without extending our own respect and moral responsibility for fellow human beings into all components of the natural world. Indeed, it is even harder to achieve without developing among individuals a sense of accountability, responsibility, commitment, and integrity that allow "political, social, and economic institutions to function [ecologically] and remain functional, over time" (see Adjibolosoo, 1994 and 1995; and also appendix 5 for further information about the human factor--HF).

This proposed framework for eco-ethics in academia meets the following:

First: In dealing with eco-ethics in academia, this proposed framework is consistent with various recommendations in the national reports for science education reforms. As restated recently by Hurd (1989, p. 343):

> [1] An education in biology should focus on understanding ourselves as human beings and the knowledge that is significant for assuring behavioral patterns favorable to our continuing evolution. [2] Cognitive skills limited to scientific inquiry alone are not sufficient for dealing with the optimal utilization of knowledge and for resolving problems of life, living, learning and working. These are skills associated with modes of making decisions, forming judgments, dealing with values and ethics, assessing the validity of information, thinking under conditions of uncertainty, thinking reflectively, or considering options that have varying degrees of risk and probability.

Second: The framework is also consistent with the four necessary conditions of awareness in the process of becoming educated citizens proposed by educational philosopher Robin Barrow (1981): (1) Historical awareness, a broad awareness of our place in history; (2) Awareness of individuality, the unique quality and the power of every individual; (3) Awareness of logical distinctions, the ability to understand and to distinguish questions such as empirical, aesthetic, moral, and so on; and (4) Awareness of one's capacity for discrimination, the capacity to discriminate precisely and in detail. Two more conditions could and should be added that being, (5) Awareness of where and "how to act or behave in difficult situations" (Cousteau, 1989, p.6); and (6) Self-awareness; awareness that the human being is a biological, social/cultural and technological species with a unique capacity for learning, changing, and interacting with the environment (cf., Ost and Yager, 1993).

Third: The proposed framework is consistent with most of what ecology has to tell us, as summarized by Commoner (1971): "Everything is connected to everything else; Everything must go somewhere else; Nature knows best; [and] There is no such thing as free lunch" (cited in Livingston, 1989, p. 129.

Fourth: This framework of eco-ethics is consistent with arguments which call for both a "return to basics" and for the development of in-depth meaningful understanding. Ornstein and Ehrlich (1989, p. 199), who call for a new curriculum extracted from the extensive body of literature on perception, argues that:

> a basic education should center not on memorizing Trivial Pursuit-like details of antiquated philosophies, nor a mass of cultural details, but on understanding the nature of humanity itself: our nervous system; our physiology; our evolutionary, as well as our recorded history; our relationships with the environment; our society; our moral judgments; our possibilities. And most important, we have to shift our understanding of ourselves as separate individuals, each seeking our own welfare, to an understanding of how we fit into social, biological, and physical environments. It is not that increasing scientific knowledge makes learning morals obsolete, but that the new world we've created makes the nature of moral choices unprecedented.

Fifth: This framework for eco-ethics does encompass moral choices, and can be used by teachers to help create an attitude of open-mindedness in the classroom, which subsequently initiates the development of critical thinking among students. Many have argued that critical thinking skills, which have become one of the basic goals in public education for the present decade, can be developed through teaching critical issues and moral dilemmas (Kornelly, 1988). This model can help students become critical listeners and inquirers, creative thinkers and problem solvers.

NOTE

1. I would like to take this opportunity to acknowledge the help of many friends and colleagues in a variety of ways. Specifically, I would like to thank Ms. Ivy Pye (writer and editor), Professor Fulton Fisher (Biologist), Professor Philip Hanson (Philosopher), Professor Marvin Wideen (Science Educator), Professor Robin Barrow (Educational Philosopher), and Professor Patrick Keeney (Educational Philosopher), Professor Sandra Steingraber (Ecologist), Professor Gerald Adams (Geologist), Mrs Zachia MiddelChild (Environmentalist & Artist), Ms. K. J. Zarker (writer and editor), and Ms Kristin Bair (writer and editor).

APPENDICES

RELEVANT RESOURCES

The following are a few relevant resources that teachers could use as a starting point in developing resources to help them in their implementation of this proposed framework.

APPENDIX 1

DEVELOPING AN UNDERSTANDING OF SELF AND OUR PLACE IN THE NATURAL WORLD

For more insights about "understanding oneself," teachers may want to look at Farb's (1978) *Human Kind*, Wilson's (1978) *On Human Nature*, Barash's (1986) *The Hare and The Tortoise*, Catton's (1982) *Overshoot: The Ecological Basis of Revolutionary Change* (chapters 6, 9, & 10), Kazepides' (1979) article "Human Nature in Its Educational Dimensions", and/or Cavalli - Sforza's (1986) article "Cultural Evolution." *The Hare and The Tortoise*, stimulates one to ask many questions and to examine the author's approach in dealing with some of the fundamental questions about the nature of human nature. Evernden's (1985) *The Natural Alien: Humankind and Environment*, raises fundamental questions about the underlying connections between humankind and nature as well as showing how we see ourselves fitting into the surrounding environment and the influences that shape those perceptions. It is also a significant book for those who are interested in promoting understanding of oneself and one's place in the world. For those who have time and enjoy challenging reading, Pfeiffer's (1982) book *The Creative Explosion: An Inquiry into the Origins of Art and Religion*, is beneficial for exploring the origins of the human spirit.

APPENDIX 2

RELATIONSHIPS AMONG HUMANS

In their latest book, *New World, New Mind*, R. Ornstein and P. Ehrlich (1989) argue that if humanity is to survive, we need to promote and develop a new consciousness. One of the many ideas that the authors suggest as a way out of our current planetary crisis is that we should understand and appreciate the need for cultural diversity and, in particular, understand that "other people

and other societies have their own sets of limited truths and needs, not necessarily `better' or `worse' than our own" (Ehrlich, 1990, p. 6). The authors maintain that such understanding could be learned in our schools, and they propose a detailed curriculum towards achieving this end. I concur entirely with the assessment of Professor Terrance Leighton from the University of California at Berkeley who wrote, "We will never look at our world and ourselves in the same way again after reading this book." In Augros & Stanciu's (1989) article "Then New Biology," the authors illustrate that nature is organized not by competition, but by cooperative mechanisms. They also argue that: "Nature knows that fighting is foolish--it wastes time, it wastes energy, it risks unnecessary injury, and it makes no sense" (p. 6). Braudel's (1981) historical book, *Civilization and Capitalism Fifteenth to Eighteenth Century*, provides essential background for those who want to understand how we have created our surroundings in the modern world. Teachers might also find Schumacher's (1977) *A Guide For The Perplexed*; Berry's (1988) *The Dream of The Earth*; Cavalli-Sforza's (1986) article "Cultural Evolution;" and Cherif's (1990) article "Mutualism: The Forgotten Concept in Teaching Science," helpful with inspiring a deep appreciation for ecology, cultural diversity, and understanding among students.

APPENDIX 3

RELATION WITH NON-HUMAN ORGANISMS

Teachers who are interested in learning about perceptions of and relations to the plant and animal world might look at *Animal And People Sharing The World*, edited by Andrew N. Rowan (1988), *The Case for Animals Rights*, by Tom Regan (1983), *Earth and Other Ethics: The Case for Moral Pluralism*, by Christopher Stone (1987), and Singer's (1971) paper, "Animal Liberation in *Moral Problems: Collection of Philosophical Essays*, edited by J. Rachels. Nash's (1977) article "Do Rocks Have Rights," is very educational. For enjoyable arguments about our obligation to future generations--both human and non-humans--teachers might recommend to their students Chapter 15 in *Ethics, Theory and Practice*, edited by M. Velasquez and C. Rostankowski (1985). The report from the Ecological Society of America, *The Sustainable Biosphere Initiative: An Ecological Research Agenda* (Lubchenco, 1991) provides useful guide and background for teachers who would like to teach eco-ethics in this proposed framework. Kellert's (1988) study, "Human-Animal Interactions: A Review of American Attitudes to Wild and Domestic Animals in the Twentieth Century," is another important resource. In this study, Kellert describes and differentiates the topology of ten basic attitudes

toward animals and the environment (Naturalistic, Ecologistic, Humanistic, Moralistic, Scientific, Aesthetic, Utilitarian, Dominionistic, Negativistic, and Neutralistic). He discusses the distribution ofthose attitudes in American society and among demographic groups such as age, education, race, and income.

APPENDIX 4

ETHICS, ENVIRONMENT, AND ENVIRONMENTAL ETHICS

Nash's (1977) article, "Do Rocks Have Rights," and Muecke's (1988) article, "A Biological Ethic for Mankind," are useful in helping both teachers and students understand the history of eco-ethics. For example, Nash argues that environmental ethics did not originate in the 1960s, as popularly believed. In this work, he exposes us to the intellectual roots of environmental ethics starting from St. Francis in the twelfth century to Aldo Leopold and many others in the twentieth century, passing through the thoughts of John Ray, John Bruckner, Charles Darwin, and others. He also explains the evolution of ethics as an important environmental trend and proposes an effective diagram based on the Aldo Leopold idea of sequential ethics. He provides alternative approaches to the rights of non-human life and methods that are very useful for teaching eco-ethics.

Also, teachers can refer to Singer's (1981) *The Expanding Circle: Ethics & Sociobiology*, in which he traces the origins of ethics by critically examining questions such as, "What is ethics?" and "Where do ethics standards come from?" The environmental philosopher Gary Varner (1988) has described four basic types of environmental ethics which philosophers have identified: (1)Anthropocentrism, (an ideology which places ultimate priority on human needs); (2) Sentientism (or the "animal rights" perspective, whereas all sentient creatures ought to be taken into consideration in making environmental decisions); (3) Biocentric individualism (meaning every living organism has interests which ought to be taken into consideration); (4) Holism (meaning the welfare of the biotic community (or ecosystem) taken as a whole ought to be the decisive factor when making environmental decisions).

I must also mention White's (1967) article "The Historical Roots of Our Ecological Crisis" and Hardin's (1961) article "The Tragedy of The Commons" as two important papers on the relationship of humans to our environment. Furthermore, Nash's (1995) article "The Ecological Reformation of Christian Traditions," is a significant resource for teaching eco-ethics. In this article, Nash goes beyond White's (1967) argument to argue that "all of our religious traditions have contributed in some significant

degree to three roots of the ecological crisis: (1) The failure to adapt to the limiting conditions of life (i.e., the carrying, regenerative, and absorptive capacity of nature); (2) The failure to recognize the intricate and inter-dependent relationships involving humankind and the rest of nature; and (3) The failure to respond benevolently and justly to the theological and biological fact of human kinship with all other creatures." (p. 8)

In Nash's views, "some traditional Christian beliefs will need to be cast away. But these are peripheral matters, and not part of the core of Christian faith. For example, the traditional idea that earth, or even the universe, was created solely for humans is, in our scientific age, sinfully arrogant, biologically naive, cosmologically silly, and therefore, theologically indefensible." (p. 8) He has proposed five main approaches to ecologically reform Christian traditions and to build ecological ethics through theological approach.

APPENDIX 5

THE ROLE OF THE HUMAN FACTOR IN SUSTAINABLE DEVELOPMENT

Teachers will also benefit from reading Adjibolosoo's theory of the human factor in social, economic, and political development; Mararike's (1995) article "The Role of Information in the Development of Human Factor in Africa; " as well as Ofori-Amoah's (1995) article ,"The Saturation Hypothesis and African's Development Problems: On The Nature of Development Theory and Its Implications for the Human Factor in African's Development." For example, professor Adjibolosoo (1993, 1995) has argued that in the course of social, economic, and political development in many developing countries, we have neglected to develop in people the desirable human qualities such as accountability, responsibility, commitment, and integrity that allow political, social, and economic institutions to function and to remain functional over time. According to Adjibolosoo, successful economic growth, social development, gender balance, sustainable environment, and effective leadership, do not depend only on the availability of economic resources, but also on a well-prepared people who have acquired the human factor (such as accountability, responsibility, commitment, and integrity), which is capable of organizing and managing resources and relevant institutions effectively and efficiently.

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